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On corporate sustainability integration and the support of tools

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Abstract: Various tools have been developed to support companies integrating corporate sustainability (CS) into their organisational system. Research on the use of these tools does not clearly show how these tools support the integration process of CS. This paper focuses on the CS integration support of three tools most often mentioned in the literature. We will question the contribution each tool can make in supporting CS integration, based on six integration process elements. The analysis shows a potential complementarity between the tools. Moreover, companies should be critical on where within the organisation the interventions for CS integration are needed and what improvement should be generated before choosing tools.

Keywords: corporate sustainability integration; sustainability reporting; life cycle assessment; LCA; environmental management systems; EMSs.

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1 Introduction

Companies have increasingly become a key focus of attention in the sustainability debate (Cannon, 1994; Elkington, 2002; Hart, 1997), since they are perceived to be responsible for many negative impacts on the environment and on societies (Dunphy et al., 2006). Elkington (1997) proposed that the impact of the social and environmental outcomes for people, planet, and profit (i.e., triple P) should be placed on the same level of importance as the economic outcomes (Wells, 2013). Companies should proactively search for this balance as well as for the inter-relations between the impacts on triple P issues due to business processes within the life cycle of products or services, or in society, taking into account the past, current and future situation (Vermeulen and Witjes, 2016). In this context, Dyllick and Hockerts (2002) proposed the concept of corporate sustainability (CS) as: "...meeting the needs of a firm's direct and indirect stakeholders, such as shareholders, employees, clients, pressure groups, communities without compromising its ability to meet the needs of future stakeholders as well". Companies trying to meet stakeholder requirements on triple P issues now and in the future find their conventional organisational system fundamentally challenged. Their current organisational system, existing of management processes, organisational structure and control systems was created to steer the organisation toward a common goal (Hill and Jones, 2011; Ravichandran and Rai, 2000). However, companies willing to address sustainability should make interventions into their organisational system leading to adjustments to processes and products, revisions of communication strategies and, adaptation of value and knowledge systems (Azapagic and Perdan, 2005; Epstein and Buhovac, 2010; Siebenhüner and Arnold, 2007).

The integration of CS into the organisational system entails a continuous adjustment of the internal organisation to the ever-changing stakeholder requirements on triple P issues and, therefore, constitutes the interventions made to internal processes, structure, and management control of the organisational system in order to comply with an established corporate vision on CS. The understanding of the success of past and present interventions into the organisational system is a prerequisite for the contribution of CS to business goals (Vermeulen and Witjes, 2016). Continuous learning cycles on the success

of CS integration interventions will, therefore, improve operations (Epstein and Roy, 2001), improve the overall performance of the company (Eccles et al., 2014; Zangwill and Kantor, 1998) which can lead to companies outperforming equivalent companies over the long term (Eccles et al., 2011; Kurapatskie and Darnall, 2013).

Companies willing to address CS use a wide range of CS integration mechanisms, referred to as ‘tools’, initiatives and instruments (see Lozano, 2012; Baumgartner, 2014; Hahn et al., 2015; Johnson and Schaltegger, 2015) to support the CS integration process (Epstein and Buhovac, 2014; Kuhndt, 2004; Robèrt et al., 2002). In this paper we will call all these mechanisms ‘tools’; where a tool is anything used as a means of accomplishing a task or purpose¹, and we define a CS integration tool as a means to accomplish continuous learning cycles on the success of interventions into the organisational system contributing to the integration of CS.

With research on CS integration tools (see e.g., Hahn et al., 2015; Lozano, 2012; Robèrt et al., 2002; Johnson and Schaltegger, 2015) having been focussed on where within the organisational system [e.g., organisational levels (Robèrt et al., 2002; Baumgartner, 2014) and organisational departments (Lozano, 2012)] tools are applied, there is a need to understand how these tools support CS integration. Subsequently, an overall analysis of CS integration tools should take a more holistic perspective on how the process of CS integration is incorporated (Hahn et al., 2015; Lozano, 2012).

This paper explores the contribution of tools in supporting companies with the process of CS integration into its organisational system. To understand these tools Section 2 contains an analysis of tools developed to support companies with the integration of CS, and discusses recent studies that aim to analyse the use of these tools in a corporate context. In analysing these CS integration tools we rely theoretically upon the integration-process perspective, as explained in Section 3. The resulting framework, as presented in Section 4, enables data gathering and analysis based on the integration process elements. The same section explains the operationalisation of this framework and, finally, introduces the three most prominent CS integration tools in professional and scientific publications. These three tools are analysed in Section 5 according to their integration support by the application of the framework. Section 6 discusses the findings in light of the literature of Sections 2, 3 and 4. The paper finishes with conclusions and proposals for future research.

2 Tools to integrate CS

Over the last decades, a large number of CS tools (for an overview of these tools see e.g., Baumgartner, 2014; Johnson and Schaltegger, 2015; Lozano, 2012; Robèrt et al., 2002) have been developed to support companies with integrating CS into their organisational system. CS integration tools provide necessary data for management decisions and inform companies’ internal and external stakeholders about the impact of corporate processes on the triple P issues, the development of a corporate culture towards CS integration, and opportunities and risks (Baumgartner, 2014). Despite that most tools are identified using overarching terms (e.g., ‘management system’) differences in set-up (e.g., web-based or printed versions) and in application and scope (e.g., stand-alone tools or

integrated tools), they have led to an evolution of a more integrative focus covering all triple P issues (i.e., environmental, social and economic; Johnson and Schaltegger, 2015). According to Kuhndt (2004) CS integration tools can be grouped into three categories:

1 Tools for action

Tools supporting companies to take action tend to make the link between corporate strategy and the core business activities on an operational level by integrating CS into the management control system (Engert et al., 2015): the physical and social dynamics (Vermeulen and Witjes, 2016) aimed at reducing the impact caused by a company's business operations. Creating action plans from CS strategy for each sustainability goal will demand employee engagement (Pojasek, 2012) to use these tools successfully. Since action tools lack an obligation for companies to set absolute targets for sustainability measures (Cramer, 1998), and managers at tactical levels lack strategic vision (Hahn et al., 2015), tools for CS action are not expected to fully support the integration of CS.

2 Tools for analysis and evaluation

Tools supporting companies to analyse and evaluate the company's CS performance are oriented towards the assessment of the supply and/or value chain of the product and/or services produced by the company (Searcy, 2016), or the level of CS integration into the organisational system (Vermeulen and Witjes, 2016).

3 Tools for communication

Tools supporting companies with the communication of their CS performance also support the strategy development process of the companies (Robèrt et al., 2002). This category of tool is mostly based on the back-casting process: by defining the desired future and looking at the current situation a possible path forward can be determined (Dreborg, 1996). Understanding the company's future vision in relation to CS and its current CS status is an essential focus of these tools (Baumgartner, 2014).

CS integration tools have been developed by a number of organisations and programs (Robèrt et al., 2002). The resultant variation of set-ups and the foci of tools make them applicable to specific contexts, or specific sectors, or particular types of companies (Lozano, 2012). This variety of specialised CS integration tools do not enable one tool to cover the broad range of triple P issues within a company's organisational system (Azapagic, 2003; Jamali, 2006), and has led to some confusion regarding the qualities and differences between various tools, and raised questions on how best to apply them (Robèrt et al., 2002). Consequently, the application of these tools may not necessarily lead to the CS integration support companies need (Doppelt, 2003; Lozano, 2012; Siebenhüner and Arnold, 2007). With the non-existence of a one-size-fits-all tool (Baumgartner, 2014; Jamali, 2006), research on CS integration tools is necessary to understand what support tools can offer companies willing to address the integration of CS into their organisational system (Hahn et al., 2015). Over the last 15 years, Robèrt et al. (2002), Lozano (2012), Baumgartner (2014) and Johnson and Schaltegger (2015) have been the main researchers trying to cover this gap by offering various insights into integrated analyses of CS tools. A summary of their research can be found in Table 1.

Table 1 The main researches over the last 15 years contributing to the understanding of the support tools can offer companies with the integration of CS into the organisational system

<i>Authors</i>	<i>Summary</i>	<i>Analytical focus</i>
Robèrt et al. (2002)	This research maps essential elements for CS and documents how these elements related to the application of respective tools. The aim is to show how these tools relate to each other and build on each other when supporting CS integration.	<p>This research divides the field of CS integration tools into five principle-levels:</p> <ol style="list-style-type: none"> 1 principles for the constitution of the system 2 principles for a favourable outcome of planning within the system 3 principles for the process to reach this outcome 4 concrete measures that comply with the principles for the process to reach a favourable outcome in the system, 5 tools to monitor and audit. <p>Tools should support companies with a clear understanding and synergistic application of these levels for the process of CS integration to become more successful.</p>
Lozano (2012)	This research provides an analysis of 16 of the most widely used CS integration tools on how they contribute or address CS and the organisational system.	The research compares the tools according to the organisational departments, triple P issues and the time dimension. For a successful integration, the tools should be applied resulting in an alignment of all these departments.
Baumgartner (2014)	This research provides more insight into how a company can become more sustainable by the development of a management framework to concretise CS integration on different, but interrelated management levels. The research uses concepts applied in business practice to understand the practical perspective together with theoretical business instruments.	<p>The research proposes a classification of CS integration tools according to the three levels of the organisational structure:</p> <ol style="list-style-type: none"> 1 strategic (top management) 2 tactical (middle management) 3 operational (shop-floor) level. <p>By adding the external and internal dimension, the framework complements the framework used by Robèrt et al. (2002). For a successful integration, the tools should be applied resulting in an alignment of the levels of the organisational structure adding the external and internal dimension.</p>
Johnson and Schaltegger (2015)	This research discusses reasons why small and medium sized enterprises (SME) should use CS integration tools and reveals that most tools are perceived to have little to no use in SMEs. The research discusses the main barriers. Besides, facilitating criteria are discussed. Additionally, implications for future research, SME management, and public policy are drawn.	Based on a list of key criteria for acceptance and application the internal and external barriers for using tools are identified.

Notes: The researches use different names for what, in this article, is referred to as tools (see also note 3).

Although all the researchers mentioned in Table 1 take a different analytical perspective [i.e., Robèrt et al. (2002) – CS principal levels; Lozano (2012) – the corporate system with its departments; Baumgartner (2014) – organisational levels; Johnson and Schaltegger (2015) – internal and external barriers] they generally conclude that since CS integration is specific for each organisation (Baumgartner, 2014; Lozano, 2012), each tool has advantages and disadvantages when it comes to the integration of the CS into any particular organisational system (Lozano, 2012).

Robèrt et al. (2002) conclude that, when planning the use of tools as a support for the integration of CS, an integrated and comprehensive strategic plan, and a systems perspective is often lacking. Besides, the activities in the organisation related to the corporate vision on CS are often selected and designed in an unclear way due to an equally unclear vision on CS. Although there is a growing awareness that proactivity is likely to improve CS integration (Baumgartner, 2014; Hahn et al., 2015), activities arising from the use of, mostly voluntary, CS integration tools rarely influence corporate decisions (Lozano, 2012). Lozano (2012) specifies procurement and marketing (P&M) as the least addressed corporate departments when using tools for CS integration. With CS always being specific for each department within the organisational system (Baumgartner, 2014), companies are challenged to choose and implement a set of tools that is relevant to their particular situation to support CS integration (Johnson and Schaltegger, 2015).

To analyse whether the application and use of the tools leads to the integration support that companies need (Lozano, 2012), the researchers (Hahn et al., 2015; Lozano, 2012; Robèrt et al., 2002) emphasised the need to improve the understanding of how tools support the CS integration process by taking a more holistic perspective in which the process of CS integration is incorporated into an overall analysis of the tools. This corresponds with the need expressed by other CS integration researchers (e.g., Azapagic, 2003; Salzmann et al., 2005; Siebenhüner and Arnold, 2007; Weber, 2008) when demanding a more longitudinal research approach to highlight CS integration into the organisational system.

For example: Lozano (2012) analysed how CS tools address sustainability within the different elements of the organisational system (see Table 2): operations and production (O&P), management and strategy (M&S), organisational system, P&M and assessment and communication (A&C).

Table 2 The analysis by Lozano (2012) on how CS tools address the different elements of the organisational system and corporate sustainability

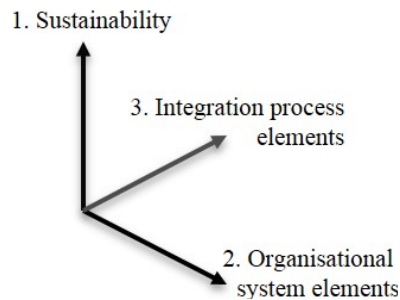
CS integration tools	Sustainability				Elements of the organisational system				
	People	Planet	Prosperity	Time	O&P	M&S	OS	P&M	A&C
Tool 1	■	■	■	■	■	■	■	■	■
Tool 2	■	■	■	■	■	■	■	■	■
Tool 3	■	■	■	■	■	■	■	■	■

Notes: Coding: ■ – full contribution; ■ – limited contribution; ■ – variable contribution. The tools were scored full, limited and variable on addressing sustainability in the different organisational system elements.

The required more longitudinal research approach, highlighting CS integration into the organisational system, could be seen as an additional third perspective to Lozano's

analysis (see Figure 1): how do CS integration tools address sustainability (i.e., sustainability as the *first* perspective), within the organisational system (i.e., organisational system elements as the *second* perspective), by supporting the different elements of the integration process (i.e., integration process elements as the *third* perspective).

Figure 1 The three perspectives of the analysis of the support of tools for CS integration into the organisational system



3 CS integration

The integration of CS into the company's organisational system demands learning from a continuous adjustment of the organisational processes in response to the ever-changing stakeholder demands on triple P issues (Hahn et al., 2015; Jamali, 2006; Maon et al., 2009). The interventions made to internal processes of the organisational system are aimed at complying with the established corporate vision on CS (Vermeulen and Witjes, 2016).

Based on organisation theory and strategic management theory, an organisational system exists of rules, hierarchies and procedures that permit the organisation to engage in activities that are directly related to a set of goals as specified in the company's vision statement (Hill and Jones, 2011; Ravichandran and Rai, 2000). As a result of this vision, the company is linked to the demands of internal and external stakeholders resulting in a dependency relationship (Witjes and Lozano, 2016). With organisational activities having outcomes for stakeholders of the organisation, for the organisation itself, and for society (Tolbert and Hall, 2015), stakeholders have a considerable effect on the company's organisational system (Hienerth et al., 2011). To ensure compliance of organisational outcomes with ever-changing demands of internal and external stakeholders the organisational system must be adjusted accordingly. Continuous changes must be made to formalised and informal processes as part of the social dynamics (e.g., members and their relationships; Linnenluecke et al., 2009) and the physical dynamics (e.g., chemical and mechanical transformations; Scott, 2012), and their relationships within the organisational system (Epstein and Buhovac, 2010). Coordinated interventions by means of objects, activities or verbal expressions (Hatch and Cunliffe, 2013) aim for improving organisational processes by increasing the density of the relationships between the processes of the social and physical dynamics of the organisational system (Vermeulen and Witjes, 2016) in order to ensure compliance with stakeholder demands and the company's vision. Therefore, CS integration can be defined as the creation and sustaining

of interventions leading to increased cohesion of the relationships between the social and physical dynamics of the organisational system and their impact on compliance with an established corporate vision on CS. As with the general corporate vision, the translation of the CS vision into interventions occurs through a learning process (Schein, 2010) achieved from gauging the success of the different interventions over time (Epstein and Buhovac, 2010), and is key to a successful integration of CS (Siebenhüner and Arnold, 2007). The continuous learning cycle of CS integration interventions entails the permanent improvement of the identification and control of the integration of CS into both the social and physical dynamics of the organisational system (Epstein and Buhovac, 2010; Vermeulen and Witjes, 2016).

4 Proposing a framework for understanding the support of tools for CS integration

As corporate learning approaches differ widely, the following questions arise: when and why do companies pursue processes of learning and change to integrate CS; what effects does this integration have, and to what extent; and, what factors promote or inhibit learning of CS integration (Siebenhüner and Arnold, 2007). Consequently, an understanding of the outcomes of the process of CS integration (what are the outcomes of the intervention activities?), the overall goal of the company with the integration of CS (what does the company want to achieve with the integration of the vision?), and the triggers motivating the company to integrate CS (why does the company wish to integrate the vision; Rauter et al., 2015) is needed to understand the overall CS integration process (Baumgartner and Korhonen, 2010). Moreover, a selection of integration objects, activities or verbal expressions (Hatch and Cunliffe, 2013) will show how the company's vision on CS is integrated. The following must be taken into consideration:

- 1 Distribution of the impact (how does the intervention change the organisation and its impact on triple P issues?)
- 2 Outcomes of the interventions throughout the organisation, supply chain, or in society (where does the integration take place and have its impact (Searcy, 2016)?)
- 3 The time dimension (when does the intervention take place and have its impact?).

These considerations complete the integration process perspective (Zott and Amit, 2010). The resulting six integration process elements (what; vision; why; how; where; and when) represent questions that, therefore, have to be asked to understand the potential contribution of a tool to the integration of a corporate vision into the organisational system (see Table 3).

To contribute to the understanding of how the support tools deliver for companies when integrating CS into the organisational system, this paper proposes a framework using the integration process elements as a basis for the analysis of tools (see Table 4), instead of taking an analytical focus on organisational system elements, or the development of new management concepts [as in the case of e.g., Robèrt (2000), Baumgartner (2014), and Lozano (2012)].

Table 3 The integration process elements to understand the integration process of a company’s vision into its organisational system

<i>Integration process element</i>	<i>Supporting questions</i>
What?	What are the intended outcomes of the integration into the organisational system?
Vision	What does the company want to achieve with the integration? What is the company’s end goal with the integration?
Why?	Why does the company want to integrate the vision? What are their motives?
How?	What intervention activities are needed for the integration?
Where?	Where does the intervention activity take place or how is the impact of the intervention and its outcomes distributed throughout the organisation, the supply chain, or in society?
When?	When do the intervention take place and its impact occur?

Table 4 The integration process elements to analyse the support tools deliver to companies when integrating CS into their organisational system

<i>CS integration tools</i>	<i>Integration process elements</i>					
	<i>What</i>	<i>Vision</i>	<i>Why</i>	<i>How</i>	<i>Where</i>	<i>When</i>
EMS						
LCA						
SR						
etc.						

4.1 Application of the framework

To provide insights into the support of CS integration offered by the different tools, the framework was constructed based on the integration process elements (see Table 3), with their specific guiding questions. The CS integration tools are analysed in a comparative way: scientific and professional literature on a specific tool was collected, analysed and interpreted in order to describe each integration process element. As Smith and Osborn (2008) suggest, the comparison of literature leads to the understanding by interpretative analysis of the role of the tool in the CS integration process. We illustrate this with three selected tools (see Section 4.2). In most cases clear answers and descriptions were given. However, in some cases the authors of literature on the selected tools did not elaborate on specific integration process elements and thus the description was based on interpretations of the underlying philosophy supporting each tool, and the mind-set of the originator(s).

4.2 Selection of CS integration tools

The most prominent CS tools mentioned in selected professional and scientific publications are summarised in Table 3 in the Appendix. This overview is based on an

analysis of the appearance of CS integration tools from the results of our search with four internet search engines: Web of Science; Scopus; Google Scholar; and Google web search. The tools were taken from four prominent papers (i.e., Baumgartner, 2014; Johnson and Schaltegger, 2015; Lozano, 2012; Robèrt et al., 2002)² covering 15 years of CS integration tool analysis. By providing analyses of the qualities, differences and linkages (Robèrt et al., 2002) of widely used CS integration tools (Lozano, 2012), these researches contribute to the understanding of the support of these tools for management decisions related to the integration of CS into the organisational system (Baumgartner, 2014). The appearance of a tool in the search engines shows the attention and importance for specific tools as a support for the integration of CS within the organisational system. This selection is not claimed to be complete but rather symbolises the range and importance of existing CS integration tools. The analysis shows that the most prominent CS integration tools are (see Table 3 in the Appendix): environmental management system (EMS); life cycle assessment (LCA); and, sustainability reporting (SR), and they are analysed according to their integration support by the application of the framework.

4.2.1 Environmental management systems (EMS)

EMS is administrative tools aimed at assessing the environmental impact of organisations in order to improve their environmental performance (Robèrt, 2000). With an evolution into a more integrative management perspective, EMS has opened new possibilities to explore integrative management systems (IMS) (Asif et al., 2011; Panagiotakopoulos et al., 2016), covering triple P issues simultaneously (Azapagic, 2003).

When the broader CS principles and activities of EMS are put into a relevant administrative context, this allows for a guide to the planned EMS activities to integrate CS. These activities, in turn, are monitored, audited, and evaluated in order to direct and manage the continuous improvement cycle of activities captured by EMS (Pojasek, 2012; Robèrt et al., 2002). This means that for EMS to be useful as a tool for CS integration, the objectives coming from the CS vision need be incorporated into the structure of the EMS (Curkovic and Sroufe, 2011).

4.2.2 Life cycle assessment (LCA)

A LCA refers to the impact evaluation of processes in the life cycle of a product or service, ranging from downstream to upstream, including the use phase (DeSimone and Popoff, 2000). With the definition of the goal and scope as an ongoing activity during a LCA, the impact evaluation is primarily focused on quantifiable information that can help in the decision making process (Hale, 1996). LCA is often used to compare products with equivalent functions, or to determine opportunities for improvement of the overall environmental impact of a specific product or service (Robèrt, 2000). Besides, the application of lifecycle techniques generally refers to physical products, and adopts the single company perspective (Peruzzini et al., 2013). With the development of social LCA permitting the inclusion of the social issues (Weidema, 2006), and the addition of Life Cycle Costing, LCAs can be used for CS decision making by quantifying impacts of the life cycle of a product and/or service on more than just one of the triple P issues simultaneously (Azapagic, 2015; Kloepffer, 2008).

4.2.3 Sustainability reports (SR)

The production of a SR is a voluntary activity to assess and report on the efforts and progress of addressing the organisation's economic, environmental and social issues, and to communicate the outcomes to their stakeholders (Dalal-Clayton and Bass, 2002). With the assessment including ethics, environmental and/or social issues, a SR does not just focus on the corporate governance sections of reports. A SR evaluates whether companies address the supervision of strategic management in relation to sustainability, codes of ethics and complaints procedures. With the possibility for companies to choose for an external audit of their SR, the reliability of the CS assessment can be confirmed (Kolk, 2008).

5 Illustration of the framework with three CS integration tools

The CS integration tools EMS, LCA and SR are analysed using each integration process element of the framework. This section ends with a synthesis of the findings.

5.1 What?

The scope of support SR offers companies, ranges from assessing triple P issue performance to guiding the development of the CS strategy. By forcing companies to assess their triple P issue performance (GRI, 2011) and comply with stakeholder requirements over time, SR also supports companies to continuously improve their CS performance (GRI, 2011; IIRC, 2014). Consequently, SR could contribute to the incremental redesign of the organisation and its activities towards all triple P issues. SR is a tool to assess the state of the organisation's triple P issues and to communicate these efforts and progress (Lozano and Huisinsh, 2011) and, consequently, has the potential of becoming a tool that supports the company on strategic matters as well.

EMS supports organisational activity improvement through awareness creation aimed at reducing environmental impact. EMS is based on the continuous improvement of business activities constituted by interlinking the plan, do, check and act stages (ISO, 2009; Pojasek, 2012). The reduction of environmental impacts of these activities requires high employee participation and training resulting in increased environmental awareness. Despite a correct application of EMS, it is difficult to attribute environmental improvements directly to the certification of an EMS (Morrow and Rondinelli, 2002).

LCA is applied to define impact improvement actions at product or process level, whether short term or long term depending on the scope chosen by the company itself (Goedkoop et al., 1998). Consequently, LCA contains a technological orientation through the assessment of the processes constituting the life cycle stages. The initial product data scope can be increased with full life cycles of other materials that are used for making the product or service (UNEP/SETAC LCI, 2009). The identification of the most significant impacts on triple P issues is used for decisions on system improvements or redesign (Azapagic, 2010), and is characterised by its complexity due to wide and far-reaching impacts and the close links between the triple P issues throughout the product's life cycle or in society (Azapagic, 2010; Vermeulen and Witjes, 2016). Moreover, it contributes to the transparency and accountability necessary to define the company's efforts to contribute to the sustainable development of society.

In summary for the ‘what’ element: with SR covering all three triple P issues, LCA and EMS principally focus on environmental issues, with the potential to focus on all three triple P issue. The three tools relate in their CS integration support to different business activity improvements: where SR supports at the strategic level, and EMS demands participation, training and awareness, LCA is used to support the decision making processes. Therefore, it is up to the company to choose the scope of the support.

5.2 *Vision*

The company’s CS vision can be improved by applying SR with an integrated focus on all triple P issues. SR is a voluntary tool used to assess and to communicate the company’s efforts and progress on the current state of a company’s triple P issues (Lozano and Huisingh, 2011). With the scope of the report being limited to the organisation, the coverage of the triple P issues mentioned in the report has been developing from an original single issue focus (i.e., environment), towards a broader and more integrated issue focus to include ethical/social and financial issues (Kolk, 2008). This is confirmed by the current discussions on integrated reporting (IR) (IIRC, 2014). Companies confirm that significant changes were made to their CS vision after the analysis of measurements from past CS performance, thanks to the use of IR (IIRC, 2014).

EMS gives the company freedom in defining the scope of their single issue (i.e., environment) CS vision. As with SR, EMS is also a voluntary tool although supply chain actors tend to require certified EMS for doing business. It focuses on the structure, implementation and maintenance of a formal single issue management system: the environmental impact of the company’s activities (Curkovic and Sroufe, 2011). The definition of these activities depends on the scope set by the company and, when certified, included in the EMS certificate (ISO, 2004). This scope can range from a single process, or business unit, to the entire organisation, even extending towards multi-site certification covering more than one company.

LCA has the potential to support the complete triple P issues within the corporate CS vision for its products and processes, although LCA originally was a single-issue (i.e., environment) tool for the optimisation of products and processes. With recent developments showing that the scope has been broadened to include social and economic issues, allocation problems are still to be resolved before getting to a full sustainability LCA tool (Azapagic, 2015; Croes and Vermeulen, 2015). Moreover, LCA has been primarily applied to define impact improvement actions at product or process level on the short, or long, term depending on the scope chosen by the company itself (Goedkoop et al., 1998).

The ‘vision’ element in summary: all three tools support the company’s CS vision, but differ in covering the triple P issues in this support. The company has to take an active role by determining the scope of these triple P issues of its CS vision.

5.3 *Why?*

SR supports the company with the motives for CS integration from a stakeholder perspective. Because SR is a tool backed up by accounting principles (Adams and Frost, 2008; Kolk, 2008), companies tend to apply it to communicate the efforts and progress on quantitative indicators to their stakeholders. The development of guidelines for IR

includes shared value principles; i.e., “new approaches to value creation and decision making require organisations to assess their performance in new ways” [IIRC, (2014), p.5]. Due to this market oriented view, companies applying SR strive to increase transparency and accountability (Ioannou and Serafeim, 2011; Kolk, 2008). Therefore, stakeholder inclusiveness, as one of the SR guiding principles, motivates the reporting company to identify stakeholders and communicate compliance with stakeholder requirements (GRI, 2012).

Many companies use EMS to satisfy stakeholder needs, although EMS could support a company developing an intrinsic motivation for integrating CS. EMS supports companies to improve the environmental impact of their activities and to demonstrate sound environmental management (ISO, 2009). The use of EMS can lead to improved organisation and documentation of the activities that generate an environmental impact, increased certainty of legal compliance, a better company image, and increased employee motivation (Morrow and Rondinelli, 2002). Although the number of EMS certificates could indicate successful CS integration, Witjes et al. (2016) concluded that the management system itself is not always used as a support for CS integration. In the latter, the adoption of EMS is a paper-driven process of limited value (Curkovic and Sroufe, 2011) and is used to comply with external stakeholders’ requirements or to get access to environmentally advanced processes (Granly and Welo, 2014), instead of coming from an intrinsic motivation to contribute to the sustainable development of society.

LCA supports the company with the motive to integrate CS from a product life cycle process perspective. While using an integrative impact assessment, LCA is aimed at understanding the impacts of human interactions with the environment through the identification and quantification of environmental impacts of processes constituting the life cycle (i.e., cradle to grave) of a product or service (Azapagic, 2010; UNEP/SETAC LCI, 2009). Consequently, the motives for executing a LCA can differ from assessing the impact on triple P issues through the interpretation of improvement options for product design or process optimisation, to product labelling (Azapagic, 2010).

The ‘why’ element in summary: the three tools differ on supporting a company with their motives on CS integration. With motives varying from an external towards internal stakeholders, the tools permit intrinsic CS integration motivation as well as the motivation of others.

5.4 How?

The success of SR lies in the hands of a single person or limited group of persons, mostly positioned at the top of the organisation or serving a staff function with a direct link to the board of the company (Cooper and Owen, 2007; Kolk, 2008). Initially it can be the case that top positions drive the reporting process (i.e., top-down), but by using the input of employees formerly related to SR, SR can initiate sustainability improvement processes throughout the company (IIRC, 2014). The application of SR is a gradual improvement process coordinated from the top down, and often linked to the publication frequency of the general annual report of the company (Adams and Frost, 2008). Although the goal of an SR is to strive for continuous improvement (GRI, 2011), this publication frequency results in a gradual improvement of the integration of CS.

The use of EMS is a systematic, formal and top down process for identifying and managing environmental impact improvements throughout the organisation (ISO, 2004). To apply an EMS, the company should assign the responsibility for reaching set

objectives and targets for all relevant functions, and at each level of the organisation, provide the means for fulfilling these objectives and targets, and designate a specific time frame for achieving these objectives (Curkovic and Sroufe, 2011). Consequently, an EMS requires high employee participation and training (Azapagic, 2003) guided by a top management's commitment (Granly and Welo, 2014).

A LCA needs bottom up data to support top down strategic decisions to improve the impact of specific processes. The application of LCA is possible when people at the shop-floor and middle-management levels gather and analyse the large amounts of data (Azapagic, 2010) necessary to create the basis for interpreting and taking decisions at strategic level (Buxel et al., 2014). To enable the interpretation of life cycle data and assessment outcomes, an understanding of triple P issues and life cycle stages (i.e., life cycle thinking) at all participating levels of the organisation is a prerequisite.

The 'how' element in summary: the three CS tools are complementary on the integration direction, where SR is a tool merely for top management; while EMS needs a top-down approach to manage improvements in the whole organisation. On the other hand, LCA can be executed from the bottom up and affects only limited parts of the company. Besides, the three tools differ in their improvement support of the three bottom-line issues, where the application of a LCA enables a one-time improvement, and SR, based on the yearly reporting scheme, supports gradual improvement, while EMS can support continuous improvement of the triple P issues, but could already be satisfied with yearly minimal steps forward.

5.5 *Where?*

The development of a SR needs people selected from within the organisation leading to outcomes applicable for a broad group of people. SR outcomes can be used for the internal improvement programs, or disclosed information can help related stakeholders to focus their decisions, without adversely affecting the company's shareholders (Ioannou and Serafeim, 2011). Although a select group of people will take responsibility for developing and publishing a SR, the impact of the outcomes can be used by a broad range of internal and external stakeholders (Kolk, 2008).

By defining the EMS scope, the company determines the impacts of its development and outcomes. The dedication of a selected group of people is necessary when the company aims for an EMS certificate. Only when the organisation wants to get maximum results out of the application of an EMS, then all levels of the company should support its development and maintenance (Curkovic and Sroufe, 2011). The crucial elements for the continuous improvement of the environmental impact of business processes will be defined (Pojasek, 2012) by setting the scope of the EMS which can vary according to the sector and the geographical context of the company (Curkovic and Sroufe, 2011).

As with EMS, the definition of the impacts of the development and the outcomes of an LCA depends on the definition of its goal and scope. Although setting the goal and scope for a LCA is open to the company, it depends on the company's needs what part of the life cycle will be assessed (UNEP/SETAC LCI, 2009). The scope of the tool itself has been increasing from the assessment of environmental and economic issues towards including social issues. By doing so, LCA enables a contribution to the full assessment of products and services within the scope of CS. Consequently, this increase in the number of issues also results in a larger group of stakeholders to engage with (Benoît et al., 2010), both internal and external to the company. For the internal organisation, this

broader scope of issues needs fundamental internal changes in culture and structure (Azapagic, 2010).

The 'where' element in summary: the distributed impacts of integration for the organisation, value chain, or society of the three tools depends, in all three cases, on the goal and scope definitions set by the company. Where SR mainly focuses on external stakeholder demands, the focus of an EMS can be on both internal and external stakeholders, as is the case with LCA. SR and LCA need the backing of a selected group of people within the company. This selection is related to the goals and scope definitions set by the company. With EMS ideally needs support from everyone within the organisation, the company's goal and scope definitions could result in only a select number of people being needed to support EMS.

5.6 *When?*

SR has a double time-focus by looking retrospectively at the triple P issue performance in support of decisions for a CS vision, and actions for the future. With SR entailing the measurement and disclosure of business activity performance on the triple P issues, the application of SR enables a company to be accountable towards stakeholders and improve their contribution to the sustainable development of society (GRI, 2011). Past performances of processes on the triple P issues are measured over the period of the report, usually one year. By analysing and comparing more than one report, a continuous performance assessment can be achieved. SR is, therefore, becoming a tool for companies for long-term CS planning and development (Lozano and Huisingsh, 2011).

As with SR, EMS also has a double time-focus; the continuous improvement cycle of an EMS ensures that companies are aware of the past when establishing strategies and policies for future improvements of the company's environmental impact (Pojasek, 2012). Although EMS enables a company to take advantage of long-term benefits, daily challenges can impede this (Curkovic and Sroufe, 2011). Therefore, knowledge of the organisation's historical development and current situation and its processes is required to develop and apply an EMS.

With LCA assessing the present environmental performance with a view to performance improvements in the future, LCA also supports a backcasting process aimed at reaching a total reduction of material flow (Robèrt et al., 2002), when the quantitative assessment of the environmental impacts of business activities is complemented by the qualitative perspective of life cycle thinking. When combined with an EMS, LCA can lead to continuous improvement of the processes and the organisation (ISO, 2009).

The 'when' element in summary: SR and EMS need a retrospective analysis (i.e., looking backwards) of the triple P issue impacts as a basis for CS vision and future actions. With LCA being a backcasting (i.e., looking forwards) tool for assessing the present impact of specific processes, the combination with life cycle thinking awareness-creation at all levels of the organisation can create a basis for SR or EMS resulting in a CS integration process in which the company defines its future strategy on CS integration, based on learning from past successes of CS integration.

5.7 *Synthesis*

The three tools support companies with the integration of CS in different and, for some activity elements, complementary ways. With all three tools encouraging companies to

have a clear vision of what they want to achieve with the application of the tool on the strategic level of the organisational system, the scope of support (i.e., ‘what’ element) of each tool on achieving outcomes on triple P issues is different; for example, where LCA and EMS support a company in adopting a vision on primarily environmental issues, SR gives a company the choice for indicators of all three triple P issues. Recent developments of LCA (i.e., towards sustainability LCA) and EMS (i.e., towards CS or integrated management systems) enable companies to cover the triple P issues as well. Therefore, it is up to the company to decide the scope of the outcomes of the integration of CS.

All three tools are complementary when it comes to their support of the company’s purpose for the integration and the integration approach (i.e., ‘why’ element). With motives varying from external to internal stakeholders, the three tools permit intrinsic CS integration motivation as well as the motivation of others to effect the integration of CS. For example, in the goal and scope phase LCA demands the company to define whether CS integration is for internal or external purposes. With SR and EMS demanding a top down approach of integration (i.e., ‘how’ element), LCA can also be executed from bottom up. In the latter case, LCA and SR only need specific departments or people, mostly managing the needed data, of the company to participate, while EMS ideally needs the participation, training and awareness of all people in the organisation for the integration of CS. Therefore, the effect of CS integration in the organisational system (i.e., ‘where’ element) depends in all three cases on the definition of the goal and scope of the integration as defined by the company.

As with the integration purposes, the three tools are also complementary from an integration time perspective: with LCA being a tool for assessing the present quantitative impact of specific processes leading to a one-time improvement, SR and EMS need an analysis of the past impacts on triple P issues, leading, respectively, to a gradual and continuous improvement as the basis for CS vision and future actions. With EMS and SR supported by a retrospective analysis of the CS performance for the company, LCA as a backcasting tool when extended with life cycle thinking awareness creation at all levels of the organisation can complement SR or EMS. Therefore, the combined use of the three tools while integrating CS is to be recommended over the use of just one of the tools.

Table 5 The analysis of EMS, LCA and SR and their support of the integration process of CS into the organisational system according to the six integration process elements

<i>CS integration tools</i>	<i>Integration process elements</i>					
	<i>What</i>	<i>Vision</i>	<i>Why</i>	<i>How</i>	<i>Where</i>	<i>When</i>
EMS	■	■	■	■	■	■
LCA	■	■	■	■	■	■
SR	■	■	■	■	■	■

Notes: Coding: ■ – full contribution; ■ – limited contribution; ■ – variable contribution. Coding is done according to Lozano (2012) (i.e., full, limited and variable contribution) and is based on the findings described in this section.

As can be seen in Table 5, only EMS has the potential to contribute in variable or full modus to the integration of CS. LCA and SR have their limitations in supporting CS integration with the vision-element and why-element (both due to the environmental focus of LCA and the focus on quantitative data of both tools), and when-element (while both tools are not operational planning or management tools). Applied together, EMS,

LCA and SR have the potential to contribute fully to almost all integration process elements and therefore, cover almost the full integration process, emphasising the need for a combined use of the three tools. Before the application of the tools a proactive and critical input of the company itself is needed to decide what to focus on (i.e., the scope of the CS vision and the interventions into the organisational system).

6 Discussion

With the six integration process elements covering the factors proposed by several authors (e.g., Siebenhüner and Arnold, 2007; Zott and Amit, 2010) to promote learning about CS integration, the framework in this article contributes to the understanding of CS integration by taking a comparative approach emphasising how tools support the integration process (Hahn et al., 2015; Lozano, 2012; Robèrt et al., 2002).

The three tools analysed support motives for integrating CS coming from either internal or external stakeholders. With these motives being either internally or externally driven [as discussed by Rauter et al. (2015)], and differing in their outcomes for members of the organisation, the organisation itself and for society [as mentioned by Tolbert and Hall (2015)], the support for a suitable company response should come from a tool that fits the organisational system of the company [as emphasised by Epstein and Buhovac (2010)] and its CS integration motives. The three tools analysed show potential complementarity based on their differences in CS integration support, confirming the need to use several CS integration tools, as concluded by Jamali (2006) and Baumgartner (2014).

Firstly, EMS has the potential for supporting the continuous improvement of the density of the relationships between the organisational, social, and physical dynamics [as specified by Vermeulen and Witjes (2016)]. LCA and SR mostly support strategic levels of the organisational system with, respectively, one-time or gradual improvement approaches aiming for an enhancement of the outcomes of the integration process [as defined by Hatch and Cunliffe (2013)]. With LCA as the action tool on a tactical level potentially lacking an obligation to set absolute targets on the strategic levels for sustainability measures [as concluded by Cramer (1998)], and SR as the communication tool supporting policy development at strategic corporate level (according to Robèrt et al., 2002), the combined use of both tools could support sustainability impact improvements at both levels. Secondly, the retrospective basis of SR and EMS entails the joint learning process [as discussed by Schein (2010)] about the success of intervention activities [as concluded by Epstein and Buhovac (2010)] such as are necessary for the translation of the CS vision into actions. This critical analysis of past CS integration activities forms the basis for the selection of the tools for future CS integration activities. With LCA being based on a backcasting approach (i.e., measure current impact to set future improvement targets), the combined use of EMS, SR and LCA could support closing the gap between top management CS strategy development and determining related actions by middle managers at tactical level [as indicated by Hahn et al. (2015)]. Thirdly, the tools show a different integration direction, ranging from top-down (e.g., SR) towards bottom up (e.g., LCA), contributing to the cohesion of, especially, the social relationships within the organisation [as emphasised by Epstein and Buhovac (2010)]. Fourthly, the tools differ in their coverage of the triple P issues in both the vision and the outcomes, as well as where the intervention activity should take place [as was concluded

by Baumgartner (2014) and Lozano (2012)]. Consequently, the use of only one of these tools does not lead to the needed density of the relationships between the organisational, social, and physical dynamics as was emphasised by Hatch and Cunliffe (2013). Fifthly, with the inter-linkages between the triple P issues [as proposed by Lozano and Huisinigh (2011)] being necessary for the required cohesion of the relationships between the physical and social dynamics and their impact on the outcomes of the organisation [as proposed by Putnam (2001)], the support of more than just one of the illustrated tools is necessary. Finally, companies should proactively and critically define the scope of the processes to be analysed [as indicated by Robèrt et al. (2002)], and the distribution of the impacts of the execution and outcomes over the organisation, supply chain, and society [as discussed by Hahn et al. (2015)] as a necessary preparation for choosing suitable tools for supporting CS integration.

7 Conclusions

Integration of CS entails identification and coordination leading to increased cohesion of the relationships between the social and physical dynamics of the organisational system and their impact on compliance with an established corporate vision on CS. With the translation of this CS vision into future activities occurring through a joint learning process of past and present intervention activities, the continuous learning cycle of CS integration entails the permanent improvement of the identification and coordination of the intervention into the social and physical dynamics of the organisational system.

To contribute to the understanding of CS integration into the organisational system this paper explores the contribution of tools in supporting companies with the process of CS integration into their organisational systems, and proposes a framework based on six integration process elements (i.e., what, Vision, Why, How, Where, and When). When applying the integration process elements from an analysis of the most prominent CS tools mentioned in selected professional and scientific publications, a potential complementarity between the tools is indicated due to several differences in their CS integration support (i.e., different support of improvement approaches (i.e., one-time or gradual improvements)), use at different organisational levels (i.e., strategic versus tactical), developmental perspective (backcasting versus retrospective), integration direction (i.e., top-down versus bottom-up), and coverage of the triple P issues). With all three tools demanding a clear CS vision, the support of each tool for achieving the desired outcomes on triple P issues is different. Where the triple P scope of LCA and EMS is limited to environmental issues, SR covers all issues.

These differences and potential complementarity between the three tools emphasises the need for choosing both determining the goal and scope of their vision on the triple P issue outcomes of the integration of CS, and the intervention in the physical and social dynamics of the organisational system. Consequently, the company itself should still be proactive and critical in defining the scope of triple P issues, and about where in the organisation the interventions are needed.

7.1 *Suggestions for further research*

To further explore the process of CS integration by companies, the analysis on integration support should be extended to include more CS integration tools. Besides, the use of CS

integration tools in companies should be analysed in practice by using the six integration process elements. With a retrospective analysis of the use of tools for CS integration as a basis for determining strategies on the future support of tools (Baumgartner, 2009; Dunphy et al., 2006; Robèrt et al., 2002), it is suggested that the use of tools to support CS integration should also be explored retrospectively by means of longitudinal empirical research.

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Notes

- 1 Tool (2011) Merriam-Webster.com [online] <http://www.merriam-webster.com/dictionary/tool> (accessed 15 April 2016).
- 2 Robèrt et al. (2002), Lozano (2012), Baumgartner (2014) and Johnson and Schaltegger (2015) use different names for what, in this article, is referred to as tools: Robèrt et al. (2002): tools; Lozano (2012): initiatives; Baumgartner (2014): instruments; Johnson and Schaltegger (2015): tools.

Appendix

Analysis of CS integration tools

Table 3 presents an overview of the most prominent CS tools, based on tools mentioned in literature on CS integration (i.e., Baumgartner, 2014; Johnson and Schaltegger, 2015; Lozano, 2012; Robèrt et al., 2002) with their appearances in four internet search engines: Web of Science, Scopus, Google Scholar and Google web search. The search was performed by using the term 'CS' and the tool name between quotation marks. For example, for the tool LCA the search was: 'CS' AND 'LCA'. Specific for each source:

- Web of Science (<http://apps.webofknowledge.com.proxy.library.uu.nl/>): the search was within 'topic'
- Scopus (<http://www-scopus-com.proxy.library.uu.nl/>): the search was within 'article title', 'abstract' and/or 'keywords'
- Google Scholar (<https://scholar.google.com/>): without specifications
- Google web search (<https://www.google.com/>): without specifications.

As can be seen in Table 4, the tools are grouped into three categories according to Kuhndt (i.e., 1. tools for action, 2. tools for analysis and evaluation, and tools for communication; 2004) and were ordered according their appearances in the four web searches. For the illustration of the framework in this paper we selected the three highest scoring tools (for each category one) that were mentioned in at least three of the four articles (see Table 4 column seven 'sum of articles' rbehwurhwbeuyrw rgwuqebt7). This resulted in a selection of EMS for the tools for action, LCA for the tools for analysis and evaluation, and SR for the tools for communication as the tools to be used for the illustration of the framework proposed in this paper.

Table 6 Appearance of CS integration tools in web searches (21 February 2016)

Kühndt (2004) categories	CS integration tool	Mentioned in article					Appearances of tools in web searches				
		Robert et al. (2002)	Lozano (2012)	Baumgartner (2014)	Johnson and Schaltegger (2015)	Sum of articles	Web of Science	Scopus	Google Scholar	Google Web Search	
	Policy				1	1	65	110	21,500	917,000	
	Environmental management system	1	1	1	1	4	17	49	5,900	101,000	
	Supply chain management				1	1	32	39	4,250	89,900	
	Corporate citizenship		1			1	4	8	6,880	59,000	
	Cleaner production	1	1	1		2	3	8	4,930	23,000	
	Eco efficiency		1		1	1	14	18	4,010	23,000	
	ISO 26000			1		1	6	4	1,920	30,100	
	Industrial ecology		1			1	4	6	2,120	12,800	
	Sponsoring			1		1	0	0	1,520	53,100	
	Ecodesign/design for the environment		1	1		2	2	1	854	38,500	
	Sustainable technology development	1				1	0	0	902	35,200	
	Better business plan				1	1	0	0	870	33,404	
	Green chemistry		1			1	1	8	344	23,500	
	European corporate sustainability framework		1			1	9	10	232	1,030	
	The natural step	1	1			2	0	2	657	14,900	
	CSR management				1	1	0	3	729	5,260	
	Natural capitalism	1				1	0	0	640	4,090	
	Sustainable livelihoods		1			1	0	0	349	9,440	
	Zero emission	1	1	1		3	0	0	279	11,800	
	Incentive systems			1		1	0	1	340	3,960	
	Employee volunteering			1		1	0	0	322	4,180	
	Factor X	1	1			2	0	0	265	2,350	
	Environmental shareholder value			1		1	0	1	193	1,310	
	Green engineering		1			1	0	0	173	3,470	
	Quality circle			1		1	0	1	53	953	
	Sustainability evaluation and reporting system (SERS)				1	1	0	1	54	364	
	Ecological rucksack	1	1			2	0	0	41	179	
	Employee suggestion system			1		1	0	0	9	154	
	Efficient entrepreneur calendar				1	1	0	0	5	45	

Action

Table 6 Appearance of CS integration tools in web searches (21 February 2016) (continued)

Kuhnle (2004) categories	CS integration tool	Mentioned in article					Appearances of tools in web searches				
		Robert et al. (2002)	Lozano (2012)	Baumgartner (2014)	Johnson and Schaltegger (2015)	Sum of articles	Web of Science	Scopus	Google Scholar	Google Web Search	
	Education				1	1	21	24	15,800	1,330,000	
	Corporate social responsibility		1			1	138	167	16,900	226,000	
	Balance				1	1	11	20	11,700	176,000	
	Triple bottom line		1			1	29	58	8,980	54,400	
	Benchmarking				1	1	13	25	4,500	64,500	
	Controlling			1		1	3	4	5,280	65,700	
	Audits			1	1	2	1	15	4,340	85,700	
	Life cycle assessment	1		1	1	4	12	14	2,540	26,100	
	(Sustainability) balanced scorecard		1	1	1	3	12	16	2,420	18,600	
	Key performance indicators			1	1	2	10	9	2,040	28,200	
	Budgeting			1		1	1	1	1,070	90,100	
	Ecological footprinting	1				1	7	8	1,640	13,800	
	Risk analysis					1	1	1	881	56,300	
	Environmental cost accounting		1	1	1	3	1	6	1,060	10,800	
	Checklists			1		1	0	1	553	21,000	
	Scenario analysis			1		1	0	0	330	8,150	
	Sustainability assessment for enterprises				1	1	0	0	45	322	
	Cross impact analysis			1		1	0	0	42	222	
	Eco mapping				1	1	0	0	33	185	
	EPM-KOMPAS				1	1	0	0	28	181	
	Corporate environmental information systems			1		1	0	0	10	6	
	VerdEE				1	1	0	0	6	23	
	Total material flow	1				1	0	0	5	6	
	Material inputs per unit of service		1			1	0	0	3	3	
	Environmental investment accounting			1		1	0	0	2	3	

Analysis and evaluation

