

 Open access • Journal Article • DOI:10.2139/SSRN.2062320

Sustainability Balanced Scorecard: Concept and the Case of Hamburg Airport

— [Source link](#) 

Stefan Schaltegger, Florian Lüdeke-Freund

Published on: 16 Dec 2011 - Social Science Research Network

Topics: Balanced scorecard, Strategy map, Strategy implementation, Corporate sustainability and Sustainability organizations

Related papers:

- إطار نظريّ لإضافة منظور الاستدامة لبطاقة الأداء المتوازن وانعكاسه في استراتيجية الوحدة الاقتصادية: Theoretical Framework for Adding The Sustainability Perspective to The Balanced Scorecard and its Reflection in the Economic Unit Strategy
- Corporate Sustainability: Strategic Alternatives and Methodology; Implementation
- Sustainability balanced scorecard architecture and environmental performance outcomes: a systematic review
- The Sustainability Balanced Scorecard: A Systematic Review of Architectures
- The Sustainability Balanced Scorecard – linking sustainability management to business strategy

Share this paper:    

View more about this paper here: <https://typeset.io/papers/sustainability-balanced-scorecard-concept-and-the-case-of-z20ixc450n>



Sustainability Balanced Scorecard

Schaltegger, Stefan; Lüdeke-Freund, Florian

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Schaltegger, S., & Lüdeke-Freund, F. (2011). *Sustainability Balanced Scorecard: Concept and the Case of Hamburg Airport*. Centre for Sustainability Management.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

The Sustainability Balanced Scorecard

Concept and the Case of Hamburg Airport



Stefan Schaltegger & Florian Lüdeke-Freund

Centre for Sustainability Management (CSM)
Leuphana Universität Lüneburg
Scharnhorststr. 1
D-21335 Lüneburg

Fax: +49-4131-677-2186
csm@uni.leuphana.de
www.leuphana.de/csm/

2011

© Stefan Schaltegger and Florian Lüdeke-Freund, 2011. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic magnetic tapes, photocopying, recording or otherwise, without the permission in writing from the copyright holders.

Centre for Sustainability Management (CSM)
Leuphana University of Lueneburg
Scharnhorststr. 1
D-21335 Lueneburg

Centrum für Nachhaltigkeitsmanagement (CNM)
Leuphana Universität Lüneburg
Scharnhorststr. 1
D-21335 Lüneburg

Tel. +49-4131-677-2181
Fax. +49-4131-677-2186
E-mail: csm@uni.leuphana.de
www.leuphana.de/csm

ISBN 978-3-942638-07-4

OVERVIEW

This working paper provides an overview of the Sustainability Balanced Scorecard (SBSC) approach. Its basis, the Balanced Scorecard (BSC) as developed by Kaplan and Norton, is introduced with an emphasis on conceptual elements such as the four basic perspectives, the role of leading and lagging indicators as well as the development of strategy maps based on cause-and-effect-chains in and across the BSC perspectives. Due to its openness to modifications of perspectives and indicators and the different kinds of information that can be handled, the BSC was further developed to support an integrated corporate sustainability management. The SBSC helps to address different environmental and social aspects with regard to their relevance for strategy implementation and execution at the business unit or company level. Moreover, it can be used as a tool of sustainability accounting and reporting. For illustration purposes the case of Hamburg Airport Corporation (Germany) is introduced and discussed from different angles throughout this paper.

CONTENT

Overview	III
Content	IV
Figures and Tables.....	V
1. The SBSC – A Tool for Integrated Sustainability Management.....	6
1.1 The BSC concept	6
1.1.1 The basic BSC perspectives.....	7
1.1.2 BSC indicators and causal chains	8
1.2 From BSC to SBSC.....	10
1.2.1 Integrating sustainability aspects.....	11
1.2.2 Formulating the SBSC.....	14
2. Case: SBSC Development at Hamburg Airport Corporation	19
2.1 Profile of Hamburg Airport Corporation.....	19
2.2 The non-market perspective: location-related aspects.....	20
2.3 Hamburg Airport’s strategy map	22
3. Sustainability Performance Measurement and Reporting with the SBSC.....	24
3.1 Connecting the SBSC to sustainability accounting	25
3.2 The SBSC and sustainability reporting	26
4. Outlook: Using SBSC Information to Manage Business Model Innovation.....	28
5. Summary and Conclusion.....	29
References.....	31

FIGURES AND TABLES

Figure 1: Basic perspectives of the Balanced Scorecard concept 8

Figure 2: Example of a cause-and-effect chain in a simple strategy map 10

Figure 3: Basic layout of an SBSC with fifth, non-market perspective 14

Figure 4: Process and steps of formulating a SBSC 15

Figure 5: Strategy map of Hamburg Airport’s SBSC 23

Figure 6: Integrated framework for sustainability performance measurement, management and reporting..... 25

Table 1: Examples of generic categories of lagging and leading indicators 9

Table 2: Methods of developing an SBSC 12

Table 3: Template for the identification of the environmental exposure 16

Table 4: Template for the identification of the social exposure 16

Table 5: Template for the determination of environmental and social aspects’ strategic relevance..... 17

Table 6: Strategic core aspects and performance drivers of Hamburg Airport 21

1. THE SBSC – A TOOL FOR INTEGRATED SUSTAINABILITY MANAGEMENT

The Balanced Scorecard (BSC) was developed in the early 1990s as a reaction to one-sided, short term and past-oriented management practices that were mainly relying on quantitative performance measurement and tending to overemphasize purely financial indicators (Johnson & Kaplan 1987; Kaplan & Norton 1992). Measurement systems influence managers' and employees' behaviour and can even give misleading signals. Thus, management has to rely not only on information like return-on-investment or earnings per share but also on more operational measures (e.g. cycle times, defect rates) (Kaplan & Norton 1992). Consequently, the BSC was introduced as an alternative concept of performance measurement and management that balances financial measures (results from past activities) and operational measures (drivers of future performance) and helps controlling for corporate performance in several areas simultaneously. The crucial point is that these operational measures can have different characters, quantitative and qualitative, financial and non-financial.

For this reason, scholars from the field of sustainability management identified the BSC as a promising starting point for the development of integrated sustainability performance measurement and management approaches. Concepts of so called Sustainability Balanced Scorecards (SBSC) were developed, aiming at the integration of non-monetary, qualitative and sometimes "soft" factors related to environmental and social issues (e.g. Bieker & Waxenberger 2002; Epstein & Wisner 2001; Figge et al. 2001, 2002a, 2002b; Schaltegger 2004, 2010; Schaltegger & Wagner 2006a, 2006b). The most challenging task of corporate sustainability management is to contribute to sustainable development by addressing the environmental, social and economic dimensions of sustainability simultaneously (Schaltegger & Burritt 2005). The scorecard's ability to integrate different perspectives on business and different kinds of information is seen as a possibility to enable mainstream businesses to tackle the challenge of corporate sustainability (cf. Figge et al. 2002b).

1.1 The BSC concept

The BSC concept is based on the assumption that competitive advantages are not only derived from quantifiable "hard facts" referring primarily to the efficient use of fixed capital, but that also rather "soft" and intangible assets like intellectual property, employees' knowledge and abilities or customer relationships have to be measured and managed. These factors are becoming increasingly important sources of competitive advantages and long-term economic success in the post-industrial information age (Kaplan & Norton 1992, 1996a, 2000). When developing the BSC and related concepts like the "strategy map" Kaplan and Norton were obviously influenced by different then current topics like the increasing relevance of digital data, information technologies, new challenges for organizational learning, and the re-organization of the industrial business model. Thus, to better cope with soft factors and intangible assets the BSC performance measurement concept was developed to integrate financial as well as non-financial and quantitative as well as qualitative information – a feature that is crucial for developing Sustainability Balanced Scorecards.

1.1.1 The basic BSC perspectives

In its default layout the BSC is based on four perspectives which are derived from the explicitly formulated strategy of a business unit (if a firm is rather small and no unit-level strategies exist, the BSC can also be derived from a firm-level strategy; cf. Figge et al. 2002b). The four basic perspectives are the financial, customer, internal business process, and learning and growth perspectives – with regard to individual companies' situations more or less than four perspectives may be reasonable; i.e. the BSC concept is explicitly open to modifications (Kaplan & Norton 1992, 1996a). Reflecting on these perspectives broadens managers' views beyond financial key performance indicators (KPIs). However, the financial perspective with its objectives and measures is "at the top" of the BSC and serves as starting point for the BSC process. The guiding question for the financial perspective is: "To succeed financially, how should we appear to our shareholders?" (Kaplan & Norton 1996a, 9)

- *Financial perspective:* In the hierarchical BSC concept all perspectives are directed towards the financial perspective of which measures control for bottom-line improvements through strategy implementation and execution. Objectives and measures refer to profitability (e.g. operating income, return-on-capital-employed, economic value-added), sales growth, shareholder value or cash flow generation. Economic performance and viability as main objectives are directly linked to market success and customers.
- *Customer perspective:* This perspective helps to identify current and future market segments and customers. Customers are mainly concerned about time, quality, service, and cost of offerings; thus, it is important to understand how a supplier is performing against these criteria from their customers' point of view. The task is to evaluate what they really value, today and in the future, and translate this into value propositions that lead to customer satisfaction and retention. This perspective asks (Kaplan & Norton 1996a, 9): "To achieve our vision, how should we appear to our customers?"
- *Internal business process perspective:* Here, the focus is on the internal value-chain. It defines what the company must do to provide attractive customer value propositions and realize an adequate financial performance for shareholders. Critical innovation and operations processes are identified, referring to product design and development, manufacturing, marketing and postsale service. Executives need to identify core competencies and technologies which are needed to succeed in both short and long-term value creation. The question is (Kaplan & Norton 1996a, 9): "To satisfy our shareholders and customers, what business processes must we excel at?"
- *Innovation and learning perspective:* Global competition and changing business environments require companies to innovate, improve and learn continuously to offer compelling value propositions and better processes. The ability of organizational learning is based on employees, IT systems and organizational quality. The innovation and learning perspective identifies the infrastructure underlying the other three perspectives. This infrastructure is crucial to make a company become a learning organization. It asks (Kaplan & Norton 1996a, 9): "To achieve our vision, how will we sustain our ability to change and improve?"

Figure 1 shows the four basic perspectives. Their hierarchical relationships become obvious when the role of indicators and causal chains is described.

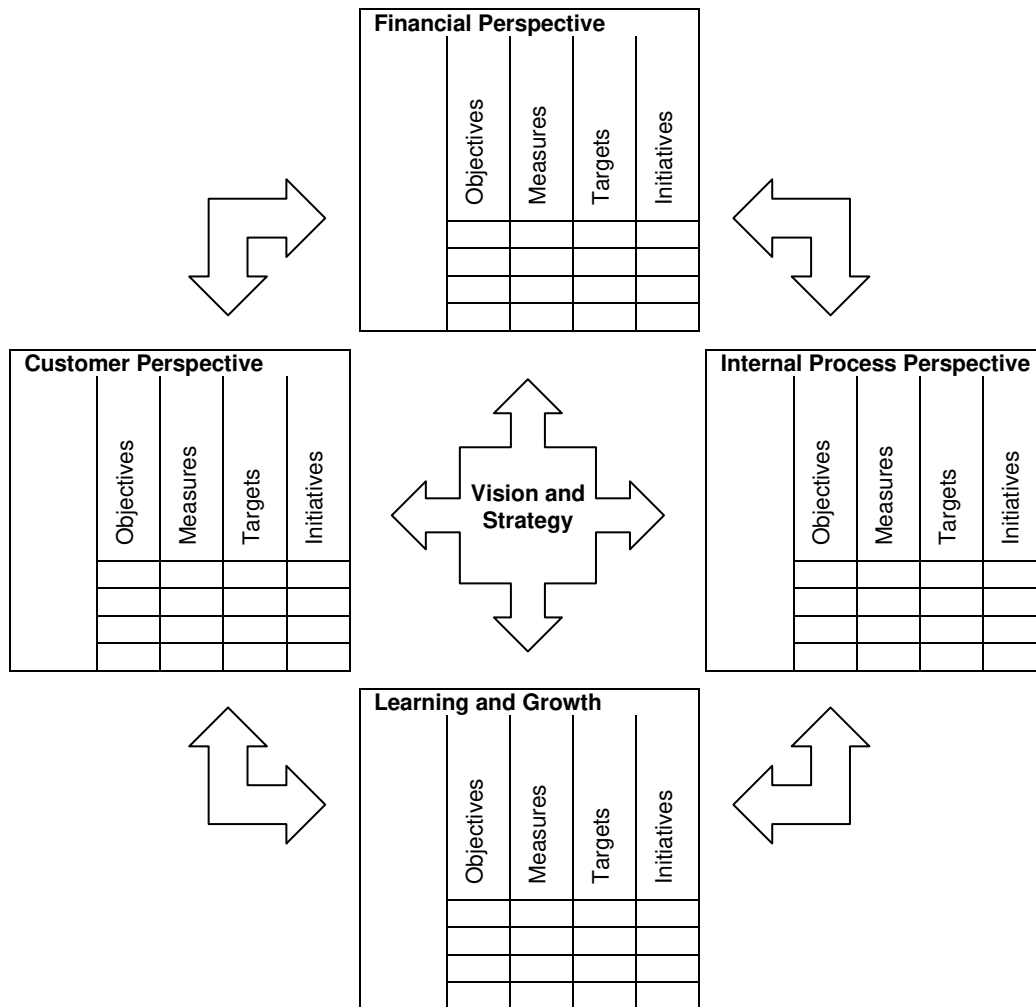


Figure 1: Basic perspectives of the Balanced Scorecard concept (Kaplan & Norton 1996a, 9)

1.1.2 BSC indicators and causal chains

The BSC process starts from a company's vision and strategy which are translated into objectives, measures, targets, and initiatives for every perspective. Here, objectives and measures are crucial as these are operationalised as lagging indicators (outcome measures) and leading indicators (performance drivers) (Kaplan & Norton 1996a). *Lagging indicators* stand for the long-term strategic objectives in every perspective and are formulated for every strategic core issue in the respective area. These indicators are used to define and control for the degree of objective achievement. Table 1 shows generic categories of lagging indicators which are suitable for any strategic unit as proposed by Kaplan and Norton. *Leading indicators* define how the strategic objectives – as expressed by the lagging indicators – should be realized. In relation to the strategic objectives that were broken down to lagging indicators, the main performance drivers have to be identified and managed as leading indicators. These are usually based on very firm specific competencies and

competitive advantages and can thus not be generalised. Nevertheless, Kaplan and Norton also propose some categories (Table 1). At least, based on the identification of strategic objectives and measures, concrete operative *targets* and *initiatives* are defined to guarantee for the operational realization of the broken down strategy.

Table 1: Examples of generic categories of lagging and leading indicators (Figge et al. 2001; see also Kaplan & Norton 1996a)

Lagging indicators			
Financial perspective	Customer perspective	Process perspective	Learning and growth perspective
Revenue growth Productivity growth Asset utilization	Market share Customer acquisition Customer retention Customer satisfaction Customer profitability	Innovation process Operations process Postsale service process	Employee retention Employee productivity Employee satisfaction
Leading indicators			
-	Product attributes Customer relationship Image and reputation	Cost indicators Quality indicators Time indicators	Employee potentials Technical infrastructure Climate for action

Besides the four perspectives and their indicators *cause-and-effect relationships* between perspectives, objectives and measures are another conceptual element of the BSC (Kaplan & Norton 1996a, 2000, 2004). They make the BSC more than a loose collection of indicators. Figure 2 shows the four perspectives in their hierarchical order and some basic causal relationships. These relationships are hypotheses about cause and effect in accordance with the strategy. In turn, any strategy itself is a set of hypotheses (Kaplan & Norton 1996a). Often these cause-and-effect chains are not directly “visible” – and thus not manageable. Therefore, thinking in terms of cause and effect among the objectives and measures in one perspective and across perspectives supports effective management even of formerly non-visible relationships and intangible assets such as employee knowledge and corporate culture (Kaplan & Norton 2000).

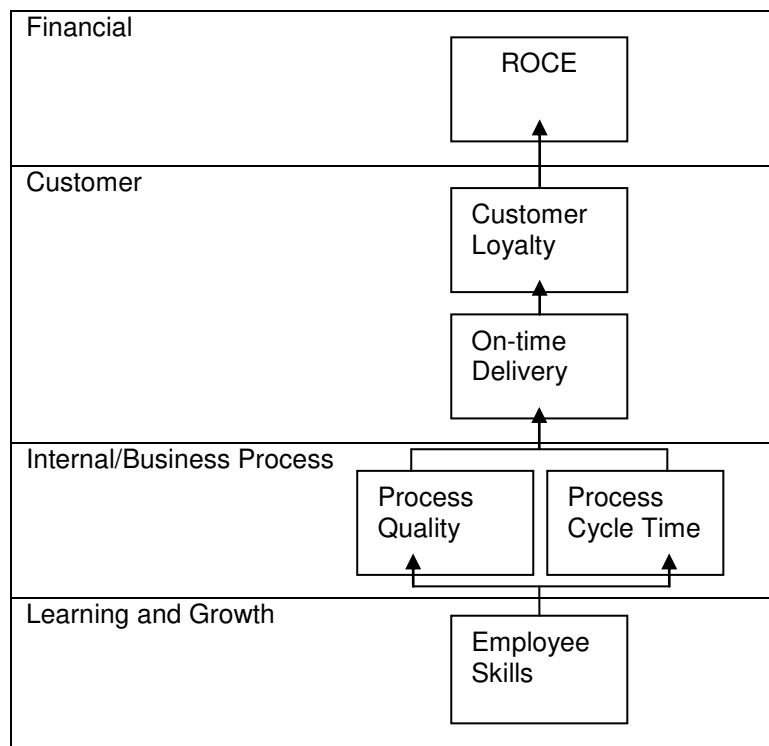


Figure 2: Example of a cause-and-effect chain in a simple strategy map (Kaplan & Norton 1996a, 31)

Given that return-on-capital-employed (ROCE) is a scorecard measure (lagging indicator) to be optimized in the financial perspective (Figure 2), one has to identify causal relationships throughout the complete BSC that affect this measure. The standard example of Kaplan and Norton then identifies customer loyalty as a performance driver (leading indicator) for increased sales which in turn are a lever for ROCE (Kaplan & Norton 1996a). The question here is, what leads to increased customer loyalty? On-time delivery may be one reason, i.e. on-time delivery is identified as a leading indicator in the customer perspective that drives loyalty as lagging indicator in this relationship. When working with the concept of lagging and leading indicators this special feature has to be kept in mind: A lagging indicator of a lower perspective is at the same a leading indicator for a higher perspective. This is why the development of a BSC results in an interlinked, hierarchically structured system directed towards the financial perspective.

Figure 2 also refers to a complementary concept to the BSC: The strategy map (Kaplan & Norton 2000, 2004). A strategy map is a framework with a common language that visualizes and communicates a strategy and the according processes and systems necessary to its realisation. It is a direct extension of the BSC as it depicts critical objectives and relationships identified in the BSC process. The above introduced cause-and-effect relationships – which include soft and intangible assets – are central to strategy maps. Below, in the case of Hamburg Airport Corporation, a more thorough strategy map is presented and discussed.

1.2 From BSC to SBSC

Twenty years after Kaplan and Norton saw reasons for the development of their concept a different type of significant changes and challenges lies in front of entrepreneurs and

managers: However normative, one can say the greatest challenge of coming decades is to realise corporate sustainability as unavoidable contribution to sustainable development of the economy and society (cf. Burritt & Schaltegger 2010; Schaltegger & Burritt 2005; Schaltegger 2010). Companies are moving from challenges of disrupting information technologies to challenges of corporate sustainability. Accordingly, management research tries to support and guide entrepreneurs and managers through the development of more appropriate management instruments, concepts and systems (e.g. BMU et al. 2002; Schaltegger & Burritt 2005). As discussed above, the BSC is able to integrate soft, intangible and qualitative aspects, but nevertheless it has to be developed further to become an integrated system of corporate sustainability management. In this context research brought forth different approaches to developing SBSCs to integrate sustainability aspects into corporate performance measurement and management systems (e.g. Bieker & Waxenberger 2002; Epstein & Wisner 2001; Figge et al. 2001, 2002a, 2002b, 2003; Schaltegger & Wagner 2006a).

From a methodical point of view, the main question is, where and how to integrate environmental and social aspects of sustainability? Hansen identifies four basic approaches in the literature (Hansen 2010, 89f.):

- integrating environmental and social aspects into the four standard perspectives (e.g. Epstein & Wisner 2001; Figge et al. 2001, 2002b);
- adding further perspectives to the standard BSC layout to take up sustainability issues (e.g. Bieker & Waxenberger 2002; Figge et al. 2001, 2002b);
- changing the original hierarchy and replacing the financial perspective with a sustainability perspective (SIGMA 2003);
- adding further perspectives to guide the financial perspective at the top (e.g. van der Woerd & van den Brink 2004).

Figge et al. (2001, 2002a, 2002b, 2003) and Schaltegger and Dyllick (2002) worked out a comprehensive SBSC concept comprising different *methods of integrating sustainability aspects* and a complete *process of formulating a SBSC* according to the first two approaches mentioned above.

1.2.1 Integrating sustainability aspects

SBSCs can be developed by either subsumption of environmental and social aspects to the basic BSC perspectives and/or the introduction of an additional non-market perspective (Schaltegger & Dyllick 2002; Figge et al. 2002). Moreover, these two variants can be complemented by the deduction of an extra environmental and social scorecard from an existing BSC. This method is an optional step which can only complement subsumption or addition. Table 2 summarizes these methods.

Table 2: Methods of developing an SBSC (see Figge et al. 2002a, 2002b; Schaltegger & Dyllick 2002)

Method	Approach
Subsumption – integration into four basic perspectives (optional first step)	<ul style="list-style-type: none"> - environmental and social aspects are subsumed under the existing four perspectives, lagging and leading indicators, targets and measures - captures strategically relevant environmental and social aspects that are already integrated in the market system
Addition – formulation of a fifth, non-market perspective (optional first step)	<ul style="list-style-type: none"> - strategically relevant but not market integrated environmental and social aspects are included in an additional non-market perspective - this refers to aspects which are of strategic relevance and influence a firm's success but are not reflected in the basic four perspectives - therefore, lagging and leading indicators, targets and initiatives have to be formulated and linked towards the financial perspective
Deduction – development of an extra sustainability scorecard (optional second step)	<ul style="list-style-type: none"> - deduction of a derived environmental and social scorecard - optional second step that is only possible as an extension of subsumption or addition - used to coordinate, organize and further differentiate environmental and social aspects due to their strategic relevance and position in the cause-and-effect chains

Subsumption requires the identification of environmental and social aspects' relevance for the business unit's strategy and the definition of according strategic objectives and performance drivers. The resulting lagging and leading indicators as well as targets and initiatives then have to be integrated into the existing four perspectives. An advantage is the direct integration into cause-and-effect chains and orientation towards superior financial objectives. This method requires environmental and social aspects to be already incorporated in the market system – the basic four perspectives do not go beyond the market mechanism, i.e. market prices and transactions (Figge et al. 2001, 2002b). But actually, most sustainability aspects are treated as externalities, i.e. they are not reflected in market prices and transactions. Strategically relevant issues are often neglected as they appear in the socio-cultural or legal sphere and are thus not realised as strategic objectives or performance drivers (cf. Schaltegger & Burritt 2005). Therefore, Figge et al. propose the introduction of a fifth non-market perspective (*addition*). Non-financial, environmental and/or social aspects with strategic influence on the business unit's performance, either directly via the financial perspective or indirectly through the other perspectives, are included in the non-market perspective (Figure 3). The addition of an explicit non-market perspective must be justified through environmental and social aspects from outside the market system that influence the implementation and execution of the respective business unit's strategy. The task for sustainability management thus is to identify formerly not recognized influences from outside the market.

The first two methods are not mutually exclusive; they can be combined. If subsumption or addition is the appropriate approach depends on the character of the identified aspects. Some environmental and social issues might be directly or indirectly included in the market (e.g. environmental costs), while others are not (e.g. neighbourhood complaints, child work at

an indirect supplier). Figge et al. define some kind of rule of thumb that can help to decide on one of the two methods, or both: “In order to justify the addition of a non-market perspective (i) environmental and social aspects have to be strategically relevant, i.e. they are either strategic core aspects or performance drivers *and* (ii) it is not possible to include these aspects appropriately, i.e. according to their strategic relevance, into the four conventional perspectives of the BSC.” (Figge et al. 2002b, 276) The third method, *deduction* of an environmental and/or social scorecard, is only possible as an extension to the first two methods. Subsumption and addition are the basic methods to identify and formulate sustainability aspects and to enable their integration and management in the core BSC’s cause-and-effect-chains. A deduced sustainability scorecard then can be used for more explicit and deepened management of the identified environmental and social issues with regard to the objectives of economic performance as defined in the financial perspective.

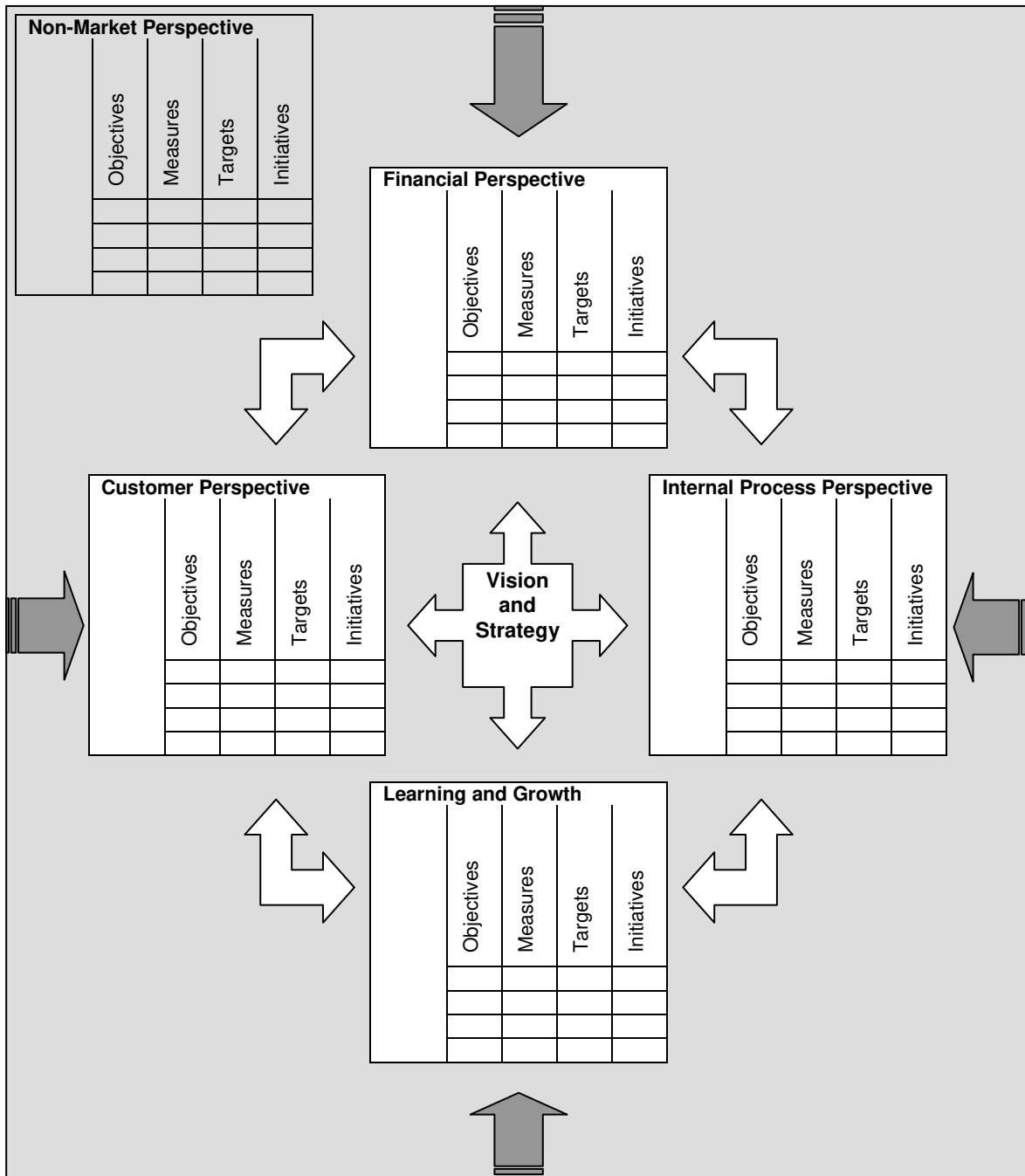


Figure 3: Basic layout of an SBSC with fifth, non-market perspective

1.2.2 Formulating the SBSC

The process of formulating a SBSC takes three steps: (1) choosing the strategic business unit for which the scorecard shall be developed; (2) identification of environmental and social aspects relevant to this unit; (3) determination of these aspects' relevance for the unit's strategy (Schaltegger & Dyllick 2002).

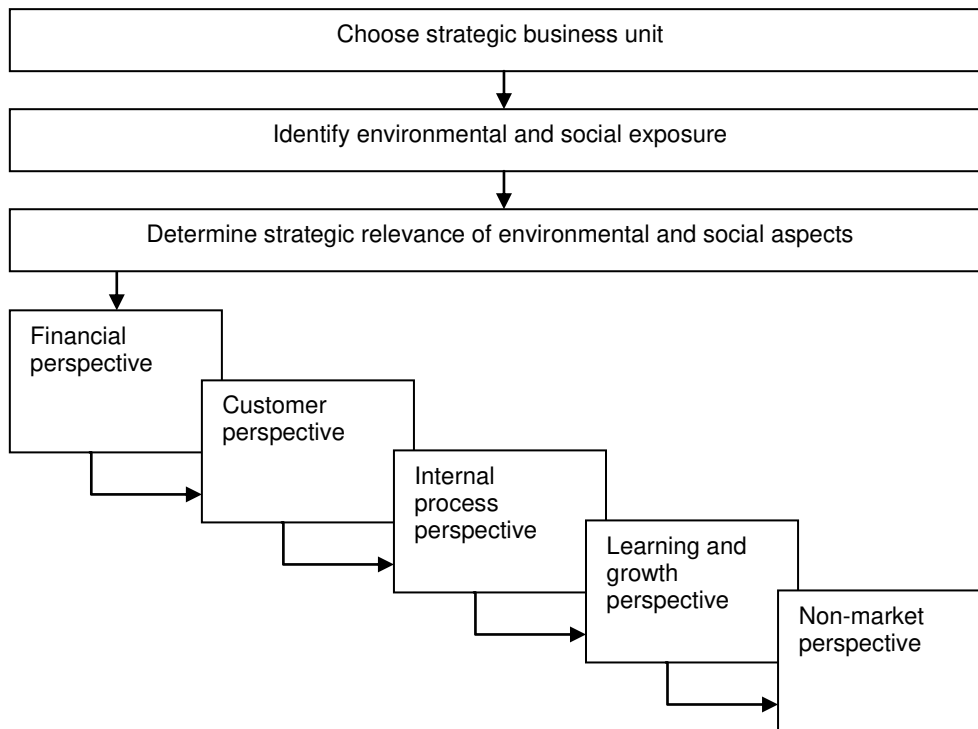


Figure 4: Process and steps of formulating a SBSC (Figge et al. 2001; Schaltegger 2004)

For choosing the strategic business unit it is important that on this level a strategy exists. The BSC, according to the basic idea of Kaplan and Norton, is thought to be an instrument for strategy implementation and execution, but not for strategy formulation (Kaplan & Norton 1996a). However, the BSC can also be used as a management tool that includes organisational learning and thus modifying strategies (Kaplan & Norton 2001); but nevertheless an explicitly formulated strategy is necessary in any case.

In the second step two frameworks can be applied to make the business unit's profile of environmental and social exposure transparent (Table 3; Table 4). Thus, all pertinent environmental and social interventions of the business unit have to be identified in order to come up with those of strategic relevance (Figge et al. 2001, 2002a). All processes and products of the business unit have to be checked against these and maybe further environmental aspects to develop the profile of environmental exposure, which is a prerequisite for assessing its strategic relevance in step three. The template for the identification of the social exposure proposes to differentiate between direct and indirect stakeholders (Figge et al. 2001). The template in Table 4 follows a different approach than the one used for environmental interventions. The latter can be categorized according to objective scientific classifications, whereas social interventions are judged subjectively from the involved actors' points of view. Thus, it seems appropriate not to pre-classify interventions and their effects, but to start from stakeholders' perspectives (cf. Freeman 1984; Rowley 1997), where direct and indirect stakeholders can be distinguished from the company internal to the societal level, and then to define their individual claims and issues (Table 4). Direct stakeholders are connected to the business unit through direct material resource exchange flows; indirect stakeholders are not linked in this way, but have different

interests that are communicated through different kinds of mechanisms by NGOs, the media or neighbours, for example (cf. Spitzbeck & Hansen 2010).

Table 3: Template for the identification of the environmental exposure (Hahn et al. 2002)

Environmental exposure of a business unit	
Type of environmental intervention	Business unit specific occurrence
Emissions (to air, water, and soil)	...
Waste	...
Materials input/materials intensity	...
Energy intensity	...
Noise and vibrations	...
Waste heat	...
Radiation	...
Direct interventions on nature and landscape	...

Table 4: Template for the identification of the social exposure (Hahn et al. 2002)

Social exposure of a business unit							
Direct stakeholders				Indirect stakeholders			
Internal	Along the value chain	In the local community	Societal	Internal	Along the value chain	In the local community	Societal
<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>	<i>particular stakeholder group</i>
...
<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>	<i>claim/issue</i>
...

The third step is the determination of the environmental and social aspects' relevance for strategy implementation and execution. As described above, the BSC process aims at identifying and causally linking strategic objectives and indicators. According to Figure 4 this is done in a cascade-like process from the financial perspective down to the non-market perspective. This process guarantees for aligning sustainability aspects, both from market and non-market spheres, towards long-term economic success. The strategic relevance of sustainability objectives and indicators can be differentiated into three qualities (Figge et al. 2002b, 280; Schaltegger 2004):

- Environmental and social aspects are *strategic core issues* for which *lagging indicators* can be defined; the question to be answered is: "Does the environmental or social aspect represent a strategic core issue for the business strategy of our business unit?"
- Sustainability aspects might also have the quality of *performance drivers*; thus *leading indicators* have to be developed: "Does the environmental or social aspect contribute significantly to a strategic core issue and therefore represent a performance driver for the business unit?"
- If sustainability aspects cannot be identified as strategic core issues or performance drivers, they might be *hygienic factors*. That is, factors that have to be managed in order to successfully execute a business strategy, but that do not bring about any competitive advantage. Thus, hygienic factors and their *diagnostic indicators* are not included in the scorecard: "Is the environmental or social aspect simply a hygienic

factor, which necessarily has to be well managed but leads to no particular strategic or competitive advantage?”

The guiding questions from the above list can be used to determine the strategic relevance of sustainability issues. To bring order to the task of developing lagging and leading indicators for environmental and social issues and to align this task with the BSC process (Figure 4), Figge et al. propose another template that builds on the ones presented before. Table 5 suggests a concept of how to identify the environmental and social exposure (main columns), define classes of environmental interventions and stakeholders' issues and claims (sub-columns), and then to determine according lagging and leading indicators (rows of strategic core issues and performance drivers).

Table 5: Template for the determination of environmental and social aspects' strategic relevance (Hahn et al. 2002; Figge et al. 2002a)

		Environmental exposure								Social exposure							
										Direct stakeholders				Indirect stakeholders			
										Internal	Along the value chain	In the local community	Societal	Internal	Along the value chain	In the local community	Societal
		Emissions	Waste	Material input / intensity	Energy intensity	Noise and vibrations	Waste heat	Radiation	Land use	Internal	Along the value chain	In the local community	Societal	Internal	Along the value chain	In the local community	Societal
Strategic core issues	#1																
	#2																
	#n																
Performance drivers	#1																
	#2																
	#n																

Based on the above described SBSC process, after having gone through the four perspectives and identified environmental and social strategic core issues and performance drivers related to the four conventional perspectives, it has to be checked for aspects which are not subject to the market mechanism but at the same significantly influence the business unit's strategy implementation and execution. Therefore, non-market mechanisms have to be identified and connected to the unit's strategic economic objectives. Finally, based on the template in Table 5 environmental and social strategic core issues and performance drivers can thus be integrated into the conventional or the additional non-market perspective. As can be seen from Figure 3, Figge et al. (2001, 2002b) and Schaltegger and Dyllick (2002) consider the non-market perspective as a frame that embeds the other scorecard perspectives. Schaltegger and Hansen (2011) discuss different interpretations of sustainability-related perspectives and techniques of integrating these with the basic BSC concept which can be identified in the current literature.

Having described possible methods of integrating environmental and social aspects into the basic BSC layout (Table 2) and the complete SBSC process (Figure 4), the next section introduces the case of Hamburg Airport Corporation to illustrate how the strategic relevance

of specific environmental and social aspects can be evaluated in practice and how a non-market perspective can be derived from these insights. Therefore, section 2 presents the results of a practical SBSC at Hamburg Airport Corporation. Additionally, another instrument developed by Kaplan and Norton will be applied in the following section: the strategy map (Kaplan & Norton 2000, 2004).

2. CASE: SBSC DEVELOPMENT AT HAMBURG AIRPORT CORPORATION

As part of a larger research project funded by the German government the Centre for Sustainability Management carried out different SBSC development and implementation projects in co-operation with German companies (see Schaltegger & Dyllick 2002 and Diaz Guerrero 2002 for details). This section gives an overview of the results achieved during the SBSC project with Hamburg Airport Corporation (Diaz Guerrero 2002; Diaz Guerrero et al. 2002; Schaltegger & Wagner 2006a).

2.1 Profile of Hamburg Airport Corporation

Hamburg Airport is the operator of Germany's fourth biggest airport, responsible for both aviation and non-aviation businesses, from providing apron and runway services to managing shopping malls (Germany's biggest airport is Frankfurt (463,000 aircraft movements, 50.9 million passengers), followed by Munich (397,000, 32.7 m) and Duesseldorf (214,000, 17.8 m) (figures as of 2009; skyscanner.de). The company's core business comprises four main divisions: Aviation, Ground Handling, Center Management, and Real Estate Management; moreover, it owns or has stakes in ten subsidiaries which offer different aviation and non-aviation services in Hamburg and abroad. With its nearly 1,600 employees Hamburg Airport managed 157,000 aircraft movements, i.e. starts and landings, carrying 12.2 million passengers in 2009. Revenues were 224 million Euros resulting in earnings of 35 million (Hamburg Airport Corporation 2010). One of the airport's special characteristics is its location. With only nine kilometres distance to Hamburg's city centre it is located amidst the town's north-western residential areas, surrounded by various districts. Only the end of the north-western runway points to the open fields of Schleswig-Holstein, the neighbouring federal state, while the south-western runway is completely surrounded by housing areas. Not only its proximity to the city is special, but also its location in Northern Germany. Hamburg Airport strategically positions itself as Germany's "northern gate to the world" as it is close to the Elbe River, and thus the port of Hamburg, as well as the Northern and the Baltic Sea (Hamburg Airport Corporation 2010).

Hamburg Airport formulated a detailed vision and strategy for its future development (cf. Diaz Guerrero et al. 2002): It strives for outstanding aviation and non-aviation businesses and superior customer-oriented air travel services. Their aspiration is to connect Northern Germany with the world. Regarding their employees the vision promotes motivation, team spirit, and co-operation, while being a fair and responsible partner in business and for the broader Hamburg region. Economic success and environmental protection must not exclude each other. Thus, Hamburg Airport has an environmental management system (EMS). In 1989 this was a coordinating staff position; meanwhile it is institutionalized in the Environmental Protection Centre with 14 employees. Since 1998 the company has an environmental policy based on guiding principles going beyond mere legal compliance and the EMS is certified according to ISO 14000 and validated according to EMAS (Hamburg Airport Corporation 1999).

With its explicitly formulated vision and strategy and its environmental awareness Hamburg Airport and the project team were able to derive a SBSC. Table 6 shows the strategic core issues and performance drivers that were identified during this process. Therefore, the steps

according to Figure 4 were taken; the strategic business unit was the corporate level of Hamburg Airport Corporation from where the business is managed top-down to the divisions and subsidiaries. Its environmental and social exposure was mainly identified before in the existing EMS. The primary task of the SBSC project thus was to determine and communicate specific strategic aspects of this exposure.

2.2 The non-market perspective: location-related aspects

In 2000 Hamburg Airport started its “HAM 21” development programme. More than 350 million Euros were invested until 2008 in order to modernise and extend the existing infrastructure and offerings. Increased competitiveness as an international airport was the main objective – but also environmental and social challenges related to local interventions at the airport site and its neighbourhood such as noise pollution, increased local traffic, waste water treatment and emissions to the air had to be managed. These and further aspects needed special attention from a strategic point of view and thus gave reason for adding a non-market perspective to integrate these and further location-related aspects into the scorecard (Table 6). Hence, the SBSC of Hamburg Airport was built according to the addition method and an additional “location perspective” was added to the basic perspectives due to the fact that many strategically relevant location aspects could not be taken into the conventional BSC layout (Table 2 above). This resulted from the practical application of the SBSC process which aimed at understanding the strategic dimension of Hamburg Airport’s environmental and social exposure, especially with regard to the implementation and execution of the “HAM 21” programme.

Table 6: Strategic core aspects and performance drivers of Hamburg Airport (based on Diaz Guerrero et al. 2002; Schaltegger & Wagner 2006)

	Financial	Customer	Internal process	Learning and growth	Location	
Strategic core aspects (lagging indicators)	High and long-term stable returns and profitability	Expansion of market share in German air travel	Development of new products and services	Entrepreneurial employees	Strengthened role as regional growth driver	
			Commercialising of know-how and services			
			High service quality and safety standards	Strengthening the role as reliable and attractive employer		Good relationships with neighbours
			Noise and environmental protection			
Performance drivers (leading indicators)	Development of non-aviation business fields (offerings of the airport that are not directly related to air travel)	Increase in customer satisfaction	Development of hub function	Support of employees' engagement and performance through trustful teamwork	Proactive compliance with legal environmental demands	
			Competitive price/performance ration		Development of direct connections	Voluntary definition of proactive standards
		Needs based airport expansion	Settlement of further regional companies			
	Development of air travel offerings	Expansion of customer-specific service concept "One stop shop services"	Excellent environmental management	Active participation of employees in corporate success	Cooperation with other airports and the port of Hamburg	
			Passenger-friendly facilities		Optimal air travel offerings for Northern Germany and Hamburg	
		Support of image and acceptance, establishing the brand "Hamburg Airport"	Frictionless travel management	Securing and developing attractive jobs	Support of the regional infrastructure	
			Competitive ground services			
			Lean and fast processes			

Hamburg Airport acts in an area of tension between competitiveness and economic success on the one hand and the resulting environmental and social interventions in the airport's direct neighbourhood on the other. Of highest strategic relevance are the non-market objectives of legitimacy and autonomy of action (Diaz Guerrero et al. 2002). The former is based on good relationships with neighbours through proactive compliance with legal demands and voluntary proactive standards (e.g. through suspended aircraft movements at night), while the latter is based on the airport's role as regional growth driver (which might partly contradict neighbours' needs). Managing these location-related lagging indicators and the according leading indicators with regard to the company's main strategic objectives is the key to maintaining legitimacy and autonomy of action while achieving the main objectives as formulated in the financial perspective: Long-term stable economic success through comprehensive aviation and non-aviation offerings.

2.3 Hamburg Airport's strategy map

By going through the steps of the SBSC process (Figure 4) lagging and leading indicators as shown in Table 6 and their causal relations can be identified. Figure 5 shows the resulting strategy map of Hamburg Airport. The strategy map concept serves the purpose of connecting the indicators in and across the scorecard's perspectives in order to make strategically relevant cause-and-effect chains visible and manageable. In this figure the location perspective is included as grey background which embeds the four conventional perspectives (see also Figure 3). According to the above introduced SBSC concept this fifth perspective includes non-market aspects which influence the other perspectives and thus the objectives of strategy implementation and execution directly and indirectly (here, in the context of the "HAM 21" programme).

Hamburg Airport's strategy map contains several causal chains related to local environmental and social aspects. One refers to the strategic meaning of excellent environmental management (see also Schaltegger & Wagner 2006a). This cause-and-effect chain starts from excellent environmental management as performance driver in the internal business process perspective. As a leading indicator of operation processes at Hamburg Airport, excellent environmental management is needed to cope with noise pollution. Noise from starting and landing airplanes, from the airplane shipyard where engines are handled and tested as well as from the induced traffic around the site is the most important issue of environmental protection which also has a social dimension (cf. Diaz Guerrero et al. 2002; Hamburg Airport Corporation 1999, 2008). Further issues are related to air pollution, waste water management, energy production and consumption, landscape protection and bird strike. Noise management represents the quality of Hamburg Airport's environmental management and is crucial to preserve and improve the airport's legitimacy, based on good relationships with neighbours (lagging indicator in the location perspective). Legitimacy is a leading indicator for improvements in image and reputation in the customer perspective aiming at expanded market shares for air travel services. According to Hamburg Airport's business report, service is the key issue for future success since international airports need differentiated and high-quality services to attract airlines and passengers (Hamburg Airport Corporation 2010). Market share, to be managed mainly in the customer perspective, is a prerequisite, read: a leading indicator, for the further development of aviation and non-aviation offerings which are finally needed to secure high and long-term stable revenues and profitability as main objectives in the financial perspective (cf. Diaz Guerrero 2002; Schaltegger & Wagner 2006a).

Going beyond strategy implementation and execution as described for the example of Hamburg Airport, the SBSC can also be used for further tasks of performance measurement, management and reporting. The following section introduces an according framework based on combining the SBSC with sustainability accounting and reporting.

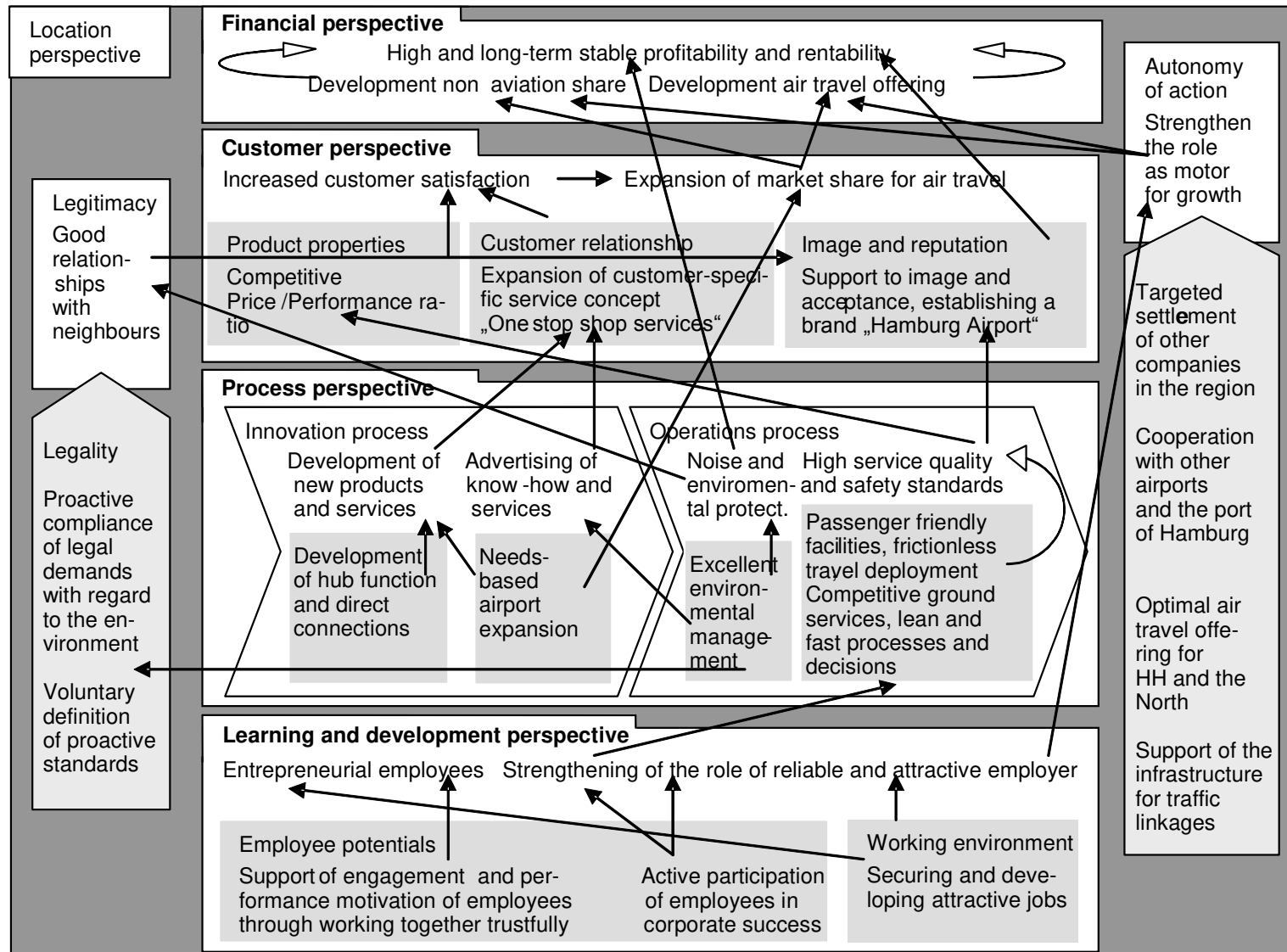


Figure 5: Strategy map of Hamburg Airport's SBSC (Diaz Guerrero et al. 2002; Schaltegger & Wagner 2006)

3. SUSTAINABILITY PERFORMANCE MEASUREMENT AND REPORTING WITH THE SBSC

The case of Hamburg Airport includes many different interactions between business, the natural environment and society. Dealing with these interactions is the purpose of sustainability performance measurement and management (Bennett & James 1997). Here, Schaltegger and Wagner (2006a) differentiate three levels: individual sustainability performance indicators; the overall performance measurement system; and the relationships of this system with the external environment. They propose a framework for the measurement system level based on the SBSC, sustainability accounting and reporting. The idea behind this integrative framework can be described as follows: "By providing information for strategic management and for reporting purposes, sustainability accounting serves as an important link between the SBSC and reporting. The information requirements are deducted from the Sustainability Balanced Scorecard, collected and analysed with sustainability accounting and communicated externally with sustainability reporting." (Schaltegger & Wagner 2006a, 10) The SBSC for identifying strategically relevant information needs, accounting for data generation and processing, and reporting for internal and external communication are combined. These three approaches share common tasks and questions. For example, the SBSC and accounting share the question: "What KPIs reflect our performance in managing the relevant causal chains?" Accounting and reporting need to find answers to another common question: "How can we get valuable data and information?" (Schaltegger & Wagner 2006a, 4) The framework proposed in Figure 6 identifies those overlaps and further questions and tasks that have to be addressed by an integrative information management.

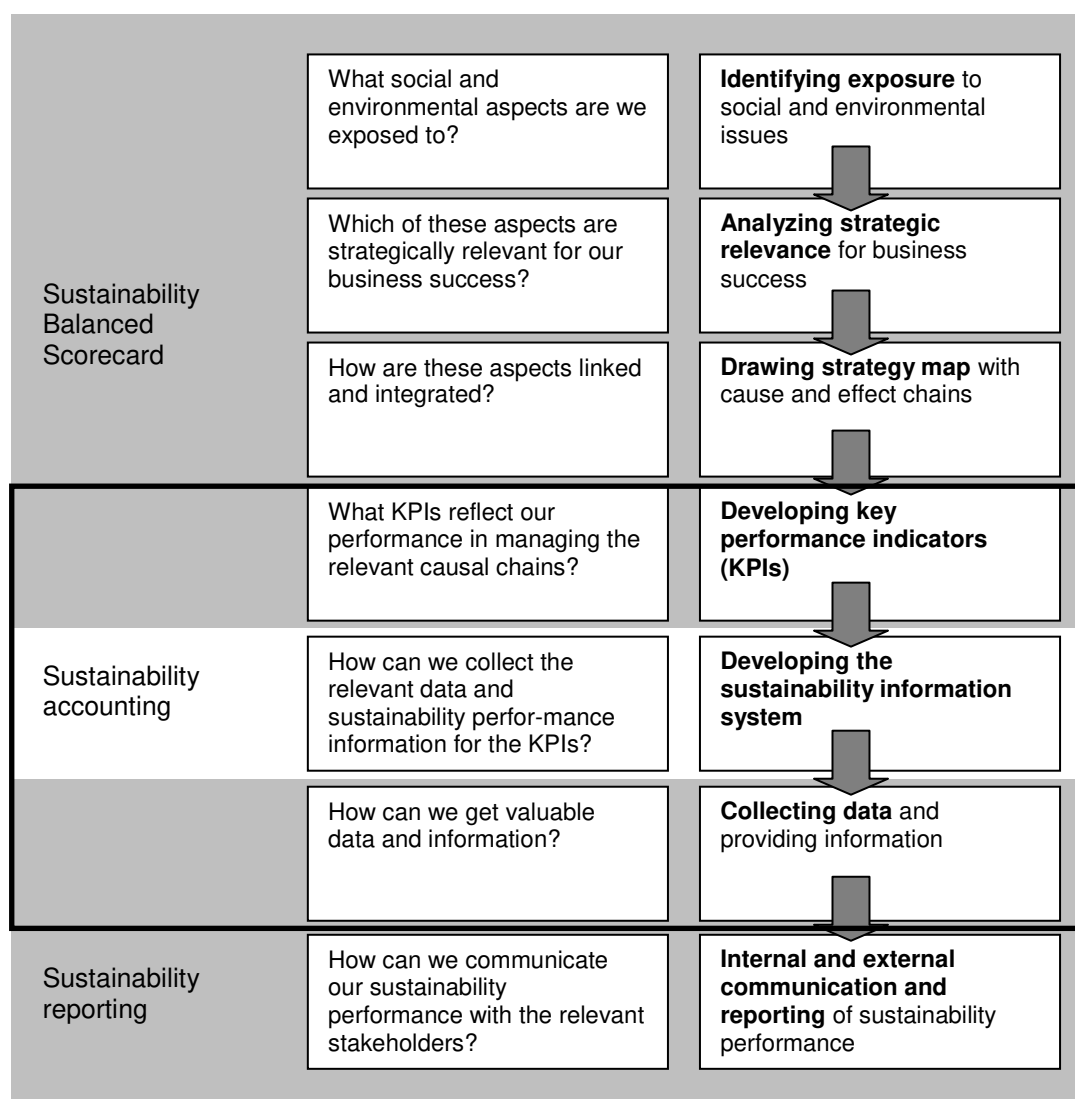


Figure 6: Integrated framework for sustainability performance measurement, management and reporting (Schaltegger & Wagner 2006a) (top down oriented arrows indicate the inside-out-perspective of this framework)

According to the SBSC concept the framework starts from a company's strategy and the factors affecting its successful implementation and execution. The relevant steps of developing a SBSC were described above. Thus, the remainder of this section focuses on how to connect the SBSC with sustainability accounting and reporting.

3.1 Connecting the SBSC to sustainability accounting

Sustainability accounting deals with three types of relationships between business and sustainability aspects: economic impacts that are environmentally or socially induced, ecological and social impacts from business activities, and simultaneous links between social, environmental and economic issues that constitute the three dimensions of sustainability (e.g. Bennett & James 1997; Schaltegger & Burritt 2000; Burritt & Schaltegger 2010). While in the SBSC process lagging and leading indicators are developed, the function of accounting is to gather and provide the necessary information to properly calculate according KPIs. Here, the SBSC process serves not only to determine strategically relevant

impacts of environmental and social aspects, but also to support the accounting function of developing and calculating KPIs that reflect the SBSCs causal chains. As a consequence, strategic issues and the design of the accounting system interfere (Figure 6). The greatest challenge at this intersection of the SBSC and accounting is to develop existing accounting approaches further to record, analyse and report environmental and social information.

Hamburg Airport's EMS, for example, includes an indicator based system for environmental reporting purposes, including figures of noise levels, energy consumption, air pollution emissions and the like (Hamburg Airport Corporation 1999, 2008). Nevertheless, these figures are reported separately from financial information in the annual business report and as absolute figures only. That is, even simple measures of eco-efficiency (cf. Schaltegger & Burritt 2005), such as energy consumption per passenger (e.g. kWh/person) or waste volume in relation to revenue (e.g. kg/€), are not reported. Regardless whether this is a problem of accounting or reporting in the case of Hamburg Airport, the internal information system needs to be adapted to such information requirements to avoid informational satellite systems that are merely linked to the company's core business and strategies. Using the SBSC and sustainability accounting in an integrative information management system helps strengthening those links. But Schaltegger and Wagner also point to conceptual limitations of this approach: "Sustainability accounting based on the SBSC is focused on the provision of those strategic and operational indicators which have been identified as key to business success and the creation of shareholder value." (cf. Schaltegger & Wagner 2006a, 9f.) That is, this approach differs from measuring and reporting the overall sustainability performance of a company.

3.2 The SBSC and sustainability reporting

Sustainability reporting refers to internal and external communication on corporate sustainability issues. An increasing number of companies use different formats and channels going beyond printed reports to communicate on environmental, social and sometimes financial issues which are commonly not included in conventional performance reports (e.g. Kolk 2003; Owen 2006; KPMG 2008; Futerra et al. 2010). This kind of communication evolved from environmental reporting practices and is now increasingly used to signal transparency and accountability to the public (e.g. Kolk 2004; Aras & Crowther 2009). According to the latest KPMG survey of corporate responsibility reporting, climate change, corporate governance and responsibility in the supply chain are among the top issues (KPMG 2008). Sustainability reporting aims to satisfy the information needs of diverse stakeholders such as NGOs, the media, legislative bodies, shareholders, and employees: "Among the main reasons for companies to publish a sustainability report are to communicate with stakeholders about non-market issues, to secure or increase legitimacy, credibility and corporate reputation and to motivate employees to deal with sustainability issues and benchmarking." (Schaltegger & Wagner 2006a) The major challenge lies in the multitude of addressees, information needs and potential topics to report on. Sustainability reporting has become a delicate strategic issue since research shows that readers use this information to support risk evaluations and investment decisions, for example (Aras & Crowther 2009; Futerra et al. 2010). To cope with this challenge performance measurement

and reporting can be built on widely accepted reporting standards as proposed by the Global Reporting Initiative (GRI 2011), for example. However, even if comprehensive standards are available, sustainability reporting challenges accounting to gather and deliver adequate information.

Here, the SBSC can be used to structure the indicators to be measured and reported. The inside-out-perspective of the integrated framework in Figure 6 suggests focusing on strategically relevant information corresponding to the findings from the SBSC process. The KPIs and accounting information can be structured by standards such as the GRI guidelines, followed by individual “customizing” through the SBSC. Consequently, the scorecard helps to systematically choose sustainability indicators from external guidelines and to structure the information need for sustainability accounting which then provides the main content for sustainability reporting (cf. Schaltegger & Wagner 2006a).

The case of Hamburg Airport is prototypical with regard to the practical implementation of an integrated measurement and reporting system. As described above, the company administered environmental issues since 1989 and introduced an EMS around 1998. The SBSC project thus was faced with existing structures and routines on all levels from measurement to reporting which required the SBSC team to deal with these structures and routines and their effect on daily business (cf. Diaz Guerrero et al. 2002; Schaltegger & Wagner 2006a). It can be assumed that most companies which try to implement either a SBSC or a comprehensive framework of sustainability performance measurement and reporting are confronted with similar situations as this is merely a blueprint process. Hamburg Airport was motivated to develop its SBSC in order to better understand potential links between its vision, strategy and environmental management. Such links were identified and made transparent in the SBSC process – consequences and approaches to further develop corporate accounting and reporting were also formulated (see Diaz Guerrero 2002; Diaz Guerrero et al. 2002; Schaltegger & Wagner 2006a). However, today Hamburg Airport reports on environmental issues in a separate statement according to the EMAS requirements (Hamburg Airport Corporation 2008).

4. OUTLOOK: USING SBSC INFORMATION TO MANAGE BUSINESS MODEL INNOVATION

Information deriving from measuring and managing business performance with a scorecard may turn out to be a valuable strategic asset. Leading and lagging indicators and their specific, often indirect, causal chains can not only be used to support accounting and reporting but also to manage a company's business model in the sense of (incremental) modification or (radical) innovation. Sometimes, even completely new business ideas may emerge on base of scorecard information that stimulates the creation of completely new business models. Already in 1997 Hamburg Airport founded the German Airport Consulting Corporation (GAC), a 100% subsidiary specialized in consulting on a broad range of commercial, technical, operative and administrative issues related to operating large airports. In fact, GAC was not founded based on insights from the company's scorecard, but the business logic of airport consulting services, which do originally not belong to the core competencies and core business of an airport operator, are documented in Hamburg Airport's SBSC (Schaltegger & Dyllick 2002; Schaltegger & Wagner 2006a).

The idea of the approach proposed here is to use scorecard insights to identify direct and indirect causal chains which contribute to the quality of an industry's *generic value proposition* (here: airport operators and their aviation as well as non-aviation offerings). This requires a shift in perspective: Not the financial objectives and their indicators, but the value propositions offered to customers are focused as the value proposition is at the heart of any business model. The general condition for realizing a competitive advantage with this information is that leading indicators, respectively performance drivers, and the causal chains linking them to the value proposition are hard to identify and imitate. On the one hand, this knowledge supports the strategic positioning of the company itself, but on the other hand it can also be translated into new offerings such as commercialized advice on flight noise management and business areas such as airport industry consulting. This approach could lead to a diversified and extended business portfolio without leaving the core business of a company.

5. SUMMARY AND CONCLUSION

This chapter provided a theoretical and conceptual overview of the Sustainability Balanced Scorecard (SBSC) approach according to Figge et al. (2002b) and Schaltegger and Dyllick (2002; see also Schaltegger 2004, 2010). The Balanced Scorecard (BSC), as developed in the 1990s by Kaplan and Norton (1992, 1996a), was introduced with an emphasis on conceptual elements such as the four basic perspectives, the role of indicators as well as strategy maps based on cause-and-effect-chains in and across the BSC perspectives. Due to its openness, first, to modifications in terms of perspectives and indicators and, second, in terms of the type of information that can be handled with this concept, the BSC was further developed as a tool for integrated corporate sustainability management. The SBSC addresses environmental and social aspects with regard to their relevance for a business unit's (or company's) strategy. Therefore, different methods of integrating sustainability aspects into the conventional BSC were introduced and a process of formulating a SBSC was described.

The SBSC is part of the wider field of strategic management. It is not used to develop strategies but to identify sustainability-related aspects that may be crucial when it comes to strategy implementation and execution. For this reason, the SBSC is also well-suited for mainstream companies that wish to integrate environmental and social aspects into their performance measurement and management. Here, it proves to be a valuable concept for the development of comprehensive approaches to sustainability performance measurement, management and reporting. Some authors propose a framework that consists of the SBSC, sustainability accounting and reporting (Figge et al. 2003; Schaltegger & Wagner 2006a, 2006b). The idea is to start from the strategic issues of the SBSC, take into account external standards such as the GRI guidelines, and then to develop corporate accounting and reporting according to the information need for calculating the identified key performance indicators from the SBSC process. Besides the discussed integrated measurement and reporting framework the SBSC is also proposed as a tool for other purposes such as eco-efficiency analyses or environmental and social management control (Figge et al. 2002b, Möller & Schaltegger 2005; Schaltegger 2004, 2010).

With regard to possible conceptual shortcomings the explicit focus on financial objectives might be critical. The SBSC is formulated top down, beginning with the financial perspective. This method might in some cases tend to ignore relevant sustainability aspects which cannot (obviously) be related to financial objectives because of too complex cause-and-effect chains. Here, the problem might not be strategic insignificance, but barriers to communicating such relationships. Moreover, when cause-and-effect chains are identified situations can be imagined where plausible causal chains are formulated with broad consensus among managers. But are plausible, convincing and easy to communicate cause-and-effect relationships always the most important ones? Therefore, approaches to formulating and validating causal chains by means of quantitative measures might be discussed to identify not only the strategic relevance of environmental and social aspects per se, but also to assess the effectiveness of cause-and-effect chains. The Analytic Network Process (ANP) could serve as reference method for such approaches as it measures the strength of relationships between variables in decision-making contexts (e.g. Aragonés-Beltrán et al. 2010; Ravi et al. 2005; Saaty 2001).

Throughout this chapter the case of Hamburg Airport Corporation was used to illustrate theoretical and practical features of the SBSC concept. Diaz Guerrero et al. (2002), who were directly involved in the SBSC process at Hamburg Airport, drew the following conclusions: In the case of Hamburg Airport the focus was primarily laid on environmental aspects and problems of noise pollution. These environmental aspects were centrally managed by an executive department while social aspects were spread across different departments. In part, practitioners perceived the BSC as a management trend and were sceptical of its value. Benefits were seen as the SBSC process helped to identify already existing environmental and social activities which were merely recognized before. The result was increased transparency and the identification of valuable causal chains between non-market aspects and economic targets. The causal hypotheses also helped to define value-oriented environmental and social measures, support communication and a better integration with general management and strategic objectives. The location perspective addresses crucial non-market issues which are of significant importance for the legitimacy and autonomy of action of Hamburg's airport and thus support value-oriented stakeholder management.

The case of Hamburg Airport shows that the SBSC process described in the theory section works in practice and helps with the formulation of strategic core issues and performance drivers in the context of concrete practical strategy programmes. Taking the three steps of the SBSC process and going through the perspectives helps to identify company and situation-specific environmental and social aspects and contributes to clarify if these aspects are already integrated and managed in existing management systems. Not least, the SBSC offers different approaches to integrating these aspects into existing performance measurement, management and reporting systems.

REFERENCES

- Aragonés-Beltrán, P.; Chaparro-González, F.; Pastor-Ferrando, J. & Rodríguez-Pozo, F. (2010): An ANP-based Approach for the Selection of Photovoltaic Solar Power Plant Investment Projects, *Renewable and Sustainable Energy Reviews*, Vol. 14, No. 1, 249-264.
- Aras, G. & Crowther, D. (2009): Corporate Sustainability Reporting: A Study in Disingenuity?, *Journal of Business Ethics*, Vol. 87, Suppl. 1, 279-288.
- Bennett, M. & James, P. (1997): *Environment-Related Performance Measurement: Current Practice and Trends*. Ashridge: Ashridge Management College.
- Bieker, T. & Waxenberger, B. (2002): Sustainability Balanced Scorecard and Business Ethics. Developing a Balanced Scorecard for Integrity Management, 10th Conference of the Greening of Industry Network, <http://www.alexandria.unisg.ch/export/DL/17767.pdf> (assessed 21 March 2011).
- Bundesumweltministerium (BMU); Bundesverband der Deutschen Industrie (BDI) & Centre for Sustainability Management (CSM) (Eds.) (2002): *Sustainability Management in Business Enterprises. Concepts and Instruments for Sustainable Organisation Development*. Berlin: BMU & BDI.
- Burritt, R. & Schaltegger, S. (2010): Sustainability Accounting and Reporting: Fad or Trend?, *Accounting, Auditing & Accountability Journal*, Vol. 23, No. 7, 829 - 846.
- Diaz Guerrero, A. (2002): *Analysis of the Implementation of a Sustainability Balanced Scorecard at Hamburg Airport: Application of Performance Indicators to Selected Causal Chains*. Hamburg: Northern Institute of Technology.
- Diaz Guerrero, A.; Möller, D. & Wagner, M. (2002): Sustainability Balanced Scorecard in der Flughafen Hamburg GmbH [Sustainability Balanced Scorecard at the Hamburg Airport GmbH], in: Schaltegger, S. & Dyllick, T. (Hrsg.): *Nachhaltig managen mit der Balanced Scorecard. Konzept und Fallstudien [Sustainability Management with the Balanced Scorecard – Concept and Cases; in German]*. Wiesbaden: Gabler, 229-257.
- Epstein, M. & Wisner, P. (2001): Using a Balanced Scorecard to Implement Sustainability, *Environmental Quality Management*, Vol. 11, No. 2, 1-10.
- Figge, F.; Hahn, T.; Schaltegger, S. & Wagner, M. (2001): Sustainability Balanced Scorecard. Wertorientiertes Nachhaltigkeitsmanagement mit der Balanced Scorecard [Sustainability Balanced Scorecard. Value-Based Sustainability Management with the Balanced Scorecard; in German] Lüneburg: Center for Sustainability Management (CSM).
- Figge, F.; Hahn, T.; Schaltegger, S. & Wagner, M. (2002a): Development of a Sustainability Balanced Scorecard: Translating Strategy into Value-Based Sustainability Management, *Journal of the Asia Pacific Centre for Environmental Accountability*, Vol. 8, No. 1, 3-16.
- Figge, F.; Hahn, T.; Schaltegger, S. & Wagner, M. (2002b): The Sustainability Balanced Scorecard - Linking Sustainability management to Business Strategy, *Business Strategy and the Environment*, Vol. 11, No. 5, 269–284.
- Figge, F.; Hahn, T.; Schaltegger, S. & Wagner, M. (2003): The Sustainability Balanced Scorecard as a Framework to Link Environmental Management Accounting with Strategic Management, in: Bennett, M.; Rikhardsson, P. & Schaltegger, S. (eds.): *Environmental Management Accounting – Purpose and Progresss*. Dordrecht: Kluwer Academic Publishers, 17-40.
- Freeman, R. (1984): *Strategic Management. A Stakeholder Approach*. Marshfield, Mass.: Pitman.

- Futerra; KPMG & SustainAbility (2010): Reporting Change: Readers & Reporters Survey 2010. London et al.: Futerra Sustainability Communications et al.
- Hahn, T. & Wagner, M. (2001): Sustainability Balanced Scorecard. Von der Theorie zur Umsetzung [Sustainability Balanced Scorecard. From Theory to Application; in German]. Lüneburg: Center for Sustainability Management (CSM)
- Hamburg Airport Corporation (1999): Horizonte – Umwelterklärung 1999. Hamburg: Hamburg Airport Corporation.
- Hamburg Airport Corporation (2008): Environmental Statement 2008. Hamburg: Hamburg Airport Corporation.
- Hamburg Airport Corporation (2010): Annual Report 2009. Hamburg: Hamburg Airport Corporation.
- Hansen, E. (2010): Responsible Leadership Systems. An Empirical Analysis of Integrating Corporate Responsibility into Leadership Systems. Wiesbaden: Gabler.
- Hansen, E.; Sextl, M. & Reichwald, R. (2010): Managing Stakeholder Collaboration Through a Community-Enabled Balanced Scorecard. The Case of Merck Ltd, Thailand. In: Business Strategy and the Environment, Vol. 19, No. 6, 387-399.
- Johnson, H. & Kaplan, R. (1987): Relevance Lost: the Rise and Fall of Management Accounting. Boston: Harvard Business School Publishing.
- Kaplan, R. & Norton, D. (1992): The Balanced Scorecard - Measures that Drive Performance, Harvard Business Review, Vol. 70, No. 1, 71–79.
- Kaplan, R. & Norton, D. (1993): Putting the Balanced Scorecard to Work, Harvard Business Review, Vol. 71, No. 5, 134–147.
- Kaplan, R. & Norton, D. (1996a): The balanced scorecard. Translating strategy into action. Boston, Mass.: Harvard Business School Press.
- Kaplan, R. & Norton, D. (1996b): Using the Balanced Scorecard as a Strategic Management System, Harvard Business Review, Vol. 74, No. 1, 75–85.
- Kaplan, R. & Norton, D. (2000): Having Trouble with Your Strategy? Then Map It, Harvard Business Review, Vol. 78, No. 5, 167–176.
- Kaplan, R. & Norton, D. (2001): Transforming the Balanced Scorecard from Performance Measurement to Strategic Management: Part I, Accounting Horizons, Vol. 15, No. 1, 87–104.
- Kaplan, R. & Norton, D. (2004): Strategy maps. Converting intangible assets into tangible outcomes. Boston, MA: Harvard Business School Press.
- Kolk, A. (2003): Trends in sustainability reporting by the fortune global 250, Business Strategy and the Environment, Vol. 12, No. 5, 279-291.
- Kolk, A. (2004): A decade of sustainability reporting: developments and significance, Int. J. Environment and Sustainable Development, Vol. 3, No. 1, 51-64.
- KPMG (2008): KPMG International Survey of Corporate Responsibility Reporting 2008. Amstelveen, The Netherlands: KPMG Sustainability Services.
- Möller, A. & Schaltegger, S. (2005): The Sustainability Balanced Scorecard as a Framework for Eco-Efficiency Analysis, Journal of Industrial Ecology, Vol. 9, No. 4, 73-83.
- Rowley, T. (1997): Moving beyond dyadic ties: a network theory of stakeholder influences, Academy of Management Review, Vol. 22, No. 4, 897-910.
- Ravi, V.; Shankar, R. & Tiwari, M. (2005): Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach, Computers & Industrial Engineering, Vol. 48, No. 2, 327-356.

- Saaty, T. (2001): Decision making with independence and feedback: The Analytic Network Process. Pittsburgh: RWS Publications.
- Schaltegger, S. (2004): Unternehmerische Steuerung von Nachhaltigkeitsaspekten mit der Sustainability Balanced Scorecard, Controlling, Sonderheft Strategische Steuerung, Heft 8/9, 511-516.
- Schaltegger, S. (2010): Nachhaltigkeit als Treiber des Unternehmenserfolgs. Folgerungen für die Entwicklung eines Nachhaltigkeitscontrollings, Controlling. Zeitschrift für erfolgsorientierte Unternehmenssteuerung, 22. Jg., Nr. 4/5, 238-243.
- Schaltegger, S. & Burritt, R. (2005): Corporate Sustainability, in: Folmer, H. & Tietenberg, T. (Eds.): The International Yearbook of Environmental and Resource Economics. Cheltenham: Edward Elgar, 185-232.
- Schaltegger, S. & Dyllick, T. (Eds.) (2002): Nachhaltig managen mit der Balanced Scorecard. Konzept und Fallstudien [Sustainability Management with the Balanced Scorecard – Concept and Cases; in German]. Wiesbaden: Gabler.
- Schaltegger, S. & Wagner, M. (2006a): Integrative management of sustainability performance, measurement and reporting, International Journal of Accounting, Auditing and Performance Evaluation, Vol. 3, No. 1, 1-19.
- Schaltegger, S. & Wagner, M. (2006b): Managing Sustainability Performance Measurement and Reporting in an Integrated Manner. Sustainability Accounting as the Link between the Sustainability Balanced Scorecard and Sustainability Reporting, in: Schaltegger, S.; Bennett, M. & Burritt, R. (Eds.) (2006): Sustainability Accounting and Reporting. Dordrecht: Springer, 681-697.
- Schaltegger, S. (2010): A Framework and Typology of Ecopreneurship. Leading Bioneers and Environmental Managers to Ecopreneurship, in Schaper, M (Ed.): Making Ecopreneurs, Burlington (USA): Gower, 75-94.
- SIGMA (2003): The SIGMA Guidelines Toolkit. Sustainability Scorecard. London: The SIGMA Project. (Available online: <http://www.projectsigma.co.uk/Toolkit/SIGMASustainabilityScorecard.pdf>; assessed 21 March 2011).
- Spitzeck, H. & Hansen, E. (2010): Stakeholder Governance - How do stakeholders influence corporate decision-making?, Corporate Governance: The International Journal of Business in Society, Vol. 10, Issue 4, 378-391.
- Wagner, M. & Schaltegger, S. (2006): Mapping the Links of Corporate Sustainability. Sustainability Balanced Scorecards as a Tool for Sustainability Performance Measurement and Management, in: Schaltegger, S. & Wagner, M. (eds.): Managing the business case for sustainability. The integration of social, environmental and economic performance. Sheffield: Greenleaf.
- Woerd, F. van der & Brink, T. van den (2004): Feasibility of a Responsive Business Scorecard – A Pilot Study, Journal of Business Ethics, Vol. 17, No. 2, 173-186.