

# MASTER THESIS

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M.Sc. Business Administration  
M.Sc. Innovation Management & Entrepreneurship

UNIVERSITY OF TWENTE  
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## **Utilizing the Business Model Canvas to Enable Sustainability Measurement on the Business Model Level**

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*An Indicator Framework Supplementing the Business Model Canvas*

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## Executive Summary

**Context:** All-encompassing system-level changes such as climate change, resource use and inequality lead to an increasing pressure on businesses to operate in a sustainable manner. However, the Brundtlandreport's appeal for more *Sustainability* in businesses does not seem to be enough to foster an economic shift towards a global sustainable development. Instead, the classic organizational focus on financial success, rather than on the integration of economic, social and environmental performance, has caused well known financial, social and environmental adversities.

**Challenge:** We believe that there is an imbalance between sustainability issues and business, evident from an absence of social and environmental dimensions in the recent, most popular tool for developing and testing *Business Models (BMs)*, namely the *Business Model Canvas (BMC)*. This tool focuses on profit first, but neglects value added to society and environment. Hence a systematic approach for the creation of *Sustainability Business Models (SBMs)*, integrating the three dimensions of sustainability, is missing. Therefore, a practical tool that integrates the knowledge of SBMs into the general management of companies such as a standardized *Key Performance Indicator (KPI)* framework is absent as well. Consequently, the lacking theoretical basis inhibits in practice the measurement of sustainability performance on the level of BMs, including all nine elements of the BMC. This lack limits the management process of identifying, evaluating and acting in a more sustainable way.

**Solution:** Applying a theory-based exploration, this thesis first reveals the desired organizational performance towards "strong" sustainability. Therefore, it investigates the emerging, trans-disciplinary research field around SBMs. It was found that the BM represents the core logic of a company, but currently lacks in its conceptual model, the BMC, sustainability issues. "Strong" sustainability is thereby defined as a balanced triangle of non-substitutable economic, social and environmental values. Thus, the proposition of a balanced set of *Sustainability Performance Indicators (SPIs)*, measuring all three sustainability dimensions, is developed. Secondly, in an empiric exploration, these SPIs, used by different *Sustainability Reporting (SR)* guidelines, are further investigated and altered together with 20 experts in three Delphi panel rounds. As a result, a *SPI Framework*, supplementing the BMC, is built. The framework depicts and visualizes the current (with lagging indicators) as well as potential (with leading indicators) sustainability performance of companies. Hence it enables the measurement of sustainability performance on the BM level and not only on the product or service level, as conventional *Corporate Sustainability (CS)* tools do.

**Contribution:** The developed framework enables practitioners - such as *small and medium sized enterprises (SMEs)* and start-ups - to identify and measure their sustainability performance in the early stages. In addition, it enables them to seamlessly report their sustainability performance in later stages, as the SPI framework is based on the *Global Reporting Initiative (GRI)* SR standard and the *Impact Reporting and*

*Investment Standard* (IRIS) metric set. Stakeholders, as the local community, the government or investors, can use the framework to understand and compare the sustainability impact of organizations. Moreover, as the framework supplements the BMC and is compatible with the *Balanced Scorecard* (BSC), it facilitates a fluent transfer between strategy and BM. Hence it supports the easy integration of sustainability strategies into the core logic of companies and thus into the general management objectives.

“Be the change that you wish to see in the world!”

(Mahatma Gandhi)

But how could one, if:

“You can't manage what you can't measure”?

(W. Edwards Deming)



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## INDEX OF ABBREVIATIONS

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%	Percent
BM	Business Model
BMC	Business Model Canvas
BSC	Balanced Scorecard
CS	Corporate Sustainability
CSR	Corporate Social Responsibility
Ed.	Editor
Etc.	Et cetera; and so forth
E.g.	Exempli gratia; for example
Et al.	Et aliae / alii; and others
FBMC	Flourishing Business Model Canvas
F	Following
FF	And the following
GRI	Global Reporting Initiative
Ibid.	Ibidem; in the same place
IRIS	Impact Reporting and Investment Standard
KPI	Key Performance Indicator
LCA	Life Cycle Assessment
P.	Page
PI	Performance Indicator
RQ	Research Question
SRQ	Sub Research Question

SA	Sustainability Accounting
SBSC	Sustainability Balanced Scorecard
SBM	Sustainable / Sustainability Business Model
SBMC	Sustainable / Sustainability Business Model Canvas
SME	Small and Medium sized Enterprise
SPI	Sustainability Performance Indicator
SR	Sustainability Reporting
TLBMC	Triple Layered Business Model Canvas

## INTRODUCTION

### RESEARCH PROBLEM: SUSTAINABILITY AND BUSINESS MODELS

All-encompassing system-level changes such as climate change, resource use and inequality increasingly pressure businesses to operate sustainably, using “sustainable business thinking” (Bocken et al., 2013, p. 78). However, companies classically focused on financial success, rather than on the integration of economic, social and environmental performance (Schaltegger & Burritt, 2005). Hence this emerging pressure leads to the challenge of how to restructure businesses to avoid financial, social and environmental adversities (IPCC, 2014; Upward & Jones, 2015).

The current imbalance between the three dimensions of sustainability - society, economy and environment (Elkington, 1999) - is in a way depicted by the absence of social and environmental dimensions in the recently most popular tool for developing and testing BMs (Upward, 2015), namely the BMC (Osterwalder et al., 2010). This tool focuses on profit first, but neglects value added to society and environment (Upward & Jones, 2015). Hence a systematic approach for the creation of SBMs, which fully integrates the three dimensions of sustainability (Boons & Lüdeke-Freund, 2013), is so far missing (Bocken et al., 2014). Moreover, a standardized KPI framework (Kaplan & Norton, 1996), measuring the sustainability performance on the level of BMs is absent as well (OECD, 2004; Schaltegger & Wagner, 2006; Accenture & UN Global Compact, 2010). Consequently, the lack of a theoretical basis inhibits in practice the comprehensive measurement of an organization’s sustainability performance. Meaning, on a company embracing, BM level along the nine BM elements and not only on the product and service level or along a company’s business units, in contrast to conventional CS tools (Bonini & Görner, 2011; Figge & Hahn, 2004; Hall et al., 2010; Lüdeke-Freund, 2013; Upward & Jones, 2015). Thus, there is no tool for businesses that strive to change the way they do business and aim to embed sustainability not only into their key value creation levers, but into their DNA, hence their BMs (Lüdeke-Freund, 2013; Accenture & UN Global Compact, 2010; IFAC, 2011). So how should practitioners do so without a tool to consequently measure sustainability performance while applying a SBM?

Regarding this question, Lüdeke-Freund (2013) advises investigating how the use of BMs as a management tool can be guided, including the “development of performance measurement systems and instruments that help in qualifying and quantifying companies’ sustainability performance on the business model level” (p. 36). Building on this request, this master thesis does not aim to build a more *Sustainable BMC* (SBMC), but to use the existing knowledge from theory and practice to make sustainability performance measurable on the level of BMs. Consequently, the following research question (RQ) and two sub research questions (SRQ) are developed.

Number	Question	Method	Chapter
RQ	What are the relevant indicators essential to measure sustainability performance on the business model level?	Framework Development / Evaluation	2.3 / 3
SRQ1	Which indicators are discussed as most relevant in the sustainability-oriented research field connected to sustainability business models?	Literature Review	1
SRQ2	Which sustainability indicators do experts from practice use to assess the sustainability performance of businesses?	Database, Expert Interviews	2

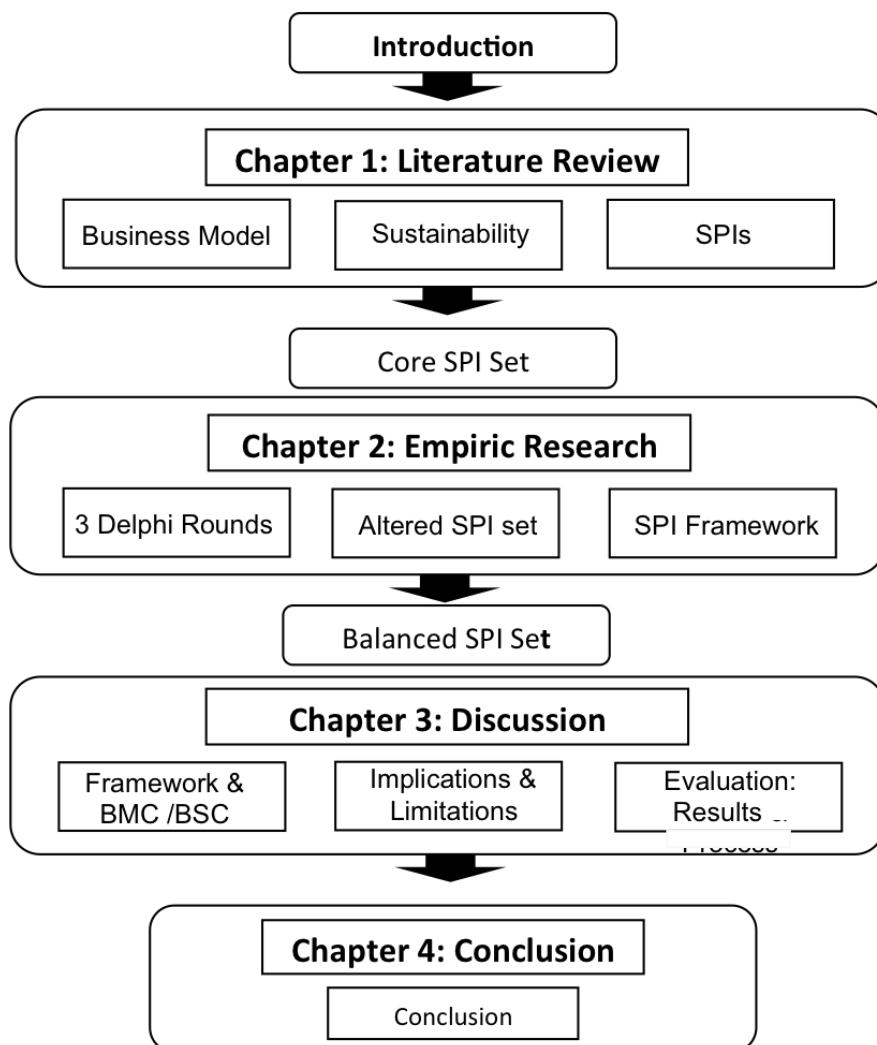
**Table 1: Research question and two sub research questions.**

In order to investigate the RQ and the SRQs, various methods are used: literature review, data collection in a database, expert interviews and the final framework development. The questions are thus answered in different chapters and lead from theory (SRQ1 in chapter 1: concept of “BM” and “Sustainability”) to practice (SRQ 2 in chapter 2: framework with indicators from practice) and finally to the framework development (2.3) and evaluation (RQ in chapter 3: results of theory and practice).

## STRUCTURE: RESEARCH DESIGN AND METHODS

This thesis takes an integrated view on theory and practice, enabling a multi-perspective angle on the research problem. As illustrated in Figure 1, this thesis is therefore structured in three main parts, conducting different methodical steps.

First, a comprehensive literature review (Tranfield et al., 2003) is done. Second, a SPI database is built and interviews with experts are conducted. These findings are intertwined into the SPI framework. In the third part, the framework is evaluated, utilizing a complex reasoning approach (Al-Debei & Avison, 2010). Chapter four summarizes the research results.



**Figure 1: Research design and process.**

After a short introduction into the research topic and the specific research conditions, chapter one contains a comprehensive literature review. Findings about the “BM” and “Sustainability” concept as well as “SPIs” are analyzed. As a result, the theory of the trans-disciplinary field of SBMs (Lüdeke-Freund, 2013) and SRQ1 are examined.



This “theory-based exploration” (Bortz & Döring, 2009, p. 358) shows that the fields of SBMs and sustainability performance measurement are merging together, referring to both, theories from the general business management and the sustainability management field (Schaltegger & Burritt, 2010). This way, the new challenge evolves: measuring sustainability performance on the BM level through the use of SPIs (Dunphy et al., 2014; Figge et al., 2002; Gauthier, 2005; Lüdeke-Freund, 2013; Searcy, 2012).

The second chapter includes the empirical part of this thesis. Here, the knowledge about SBMs and SPIs is enriched by a SPI database and the experience of experts, gathered through a Delphi panel discussion (Dalkey et al., 1969; Linstone et al., 1975). This “empiric exploration” (Bortz & Döring, 2009, p. 358) helps to investigate the research problem from a multi-perspective point of view (Flick, 2000). The Delphi method is appropriate as it allows insights into the research field to be gained (Bortz & Döring, 2009), whereas the available literature on SBMs is limited (Bocken et al., 2014) and the research field of sustainability performance measurements is still in its development (Schaltegger & Burritt, 2010). Hence it allows researching SPIs with a group of experts, as “two heads are better than one” (Dalkey et al., 1969, p. 5).

In the empirical part, the data from the SPI database as well as the insights from the Delphi interviews are used as “Data Triangulation” (as the data are collected from different sources) as well as “Methodological Triangulation” (as the data is collected through different methods) (Bortz & Döring, 2009; Flick, 2011).

The third chapter evaluates the SPI framework by comparing the inductive collected data with the deductive knowledge from literature in a qualitative analysis (Maxwell, 2005). Implications and limitations of the developed framework as well as of the research are discussed, reflecting on the thesis’ contribution to theory and practice.

The forth chapter, provides a detailed conclusion and summarizes the results.

**RELEVANCE OF TOPIC: CONTRIBUTION TO THEORY AND PRACTICE**

This thesis uniquely contributes to the theory development and practical implications of the research field around SBMs and their performance measurement. It transfers the theoretical knowledge about “Sustainability” and “BMs” into the world of practice by building an easy-to-use SPI framework. This framework uncovers how sustainability performance of companies can be measured on the BM level, with the help of indicators that supplement the BMC. In doing so, the thesis contributes to the research field in two significant ways.

First, the literature review reveals the current state of the research field. It uncovers critique and new approaches of SBMs and analyses existing guidelines and methods to identify, measure and report sustainability performance of businesses. It is shown that scholars do not agree whether or not the BMC is sufficient to facilitate the creation of SBMs (Yunus et al., 2010; Osterwalder et al., 2010; Upward, 2015). Moreover, it is emphasized that not one definition of sustainability, suitable for BM innovation for sustainability (Girotra & Netessine, 2013) exists, nor one binding SBMC (Boons & Lüdeke-Freund, 2013; Upward & Jones, 2015).

Hence this thesis does not aim to redesign the BMC, but follows the request to build a practical application, enabling sustainability to be measured on the BM level (Lüdeke-Freund, 2013). Therefore, this thesis strives to enable sustainability to be built into the core logic of a company and consequently measured along all processes and lifecycle stages of an organization. This is done by the development of a multi-dimensional SPI framework, which measures with a balanced set of non-substitutable economic, social and environmental indicators the sustainability impact of an organization along all nine BM elements. Hence it focuses on “strong” sustainability (Ayres et al., 1998; Daly et al., 1995), assuming that strong SBMs are more adoptive to recent challenges (Bonini & Görner, 2011).

In conclusion, this thesis is relevant for theory development as the literature review provides a foundation for prospective research in the field of SBMs, the definition of relevant criteria respectively SPIs for them and the proposition for a SPI framework that supplements the BMC.

To transfer the knowledge from theory to practice and vice versa, the results from literature are reviewed and altered together with 20 experts from practice in three

iterative Delphi panel rounds (Dalkey et al., 1969). Thus, this thesis secondly contributes to the world of practitioners by developing the proposed SPI framework. This easy-to-use management tool enables increased control of the degree of sustainability performance of a company.

The SPI framework enables practitioners to gain applicable knowledge on how to identify, measure and justify (Lebas, 1995) sustainability performance on the level of BMs. Using the framework, SMEs and start-ups can strategically build sustainability issues into the core logic of their BMs, measure their performance in social, environmental and economic aspects in the early stages and report seamlessly their sustainable performance in later ones. Other stakeholders can use the SPI framework to assess the sustainability performance of companies. For example, investors can easily understand recent and potential sustainability performance of a business by looking at its BM and even compare its metrics with other organizations. This way, stakeholders of all kinds, willing to support or invest in “sustainable businesses”, can justify their decisions with an academically developed SPI framework.

However, as the framework is developed with the help of Germany-based experts, it is limited in its applicability to SMEs and start-ups in Germany. Moreover, future research has to critically review and test the framework and the developed SPIs, before allowing any generalization.

## 1. THEORY: SUSTAINABILITY MEASUREMENT ON THE LEVEL OF BUSINESS MODELS

### 1.1 METHOD: LITERATURE REVIEW AS THEORY-BASED EXPLORATION

The literature review investigates, as a “theory-based exploration” (Bortz & Döring, 2009), SRQ1.

*SRQ1: “Which indicators are discussed as most relevant in the sustainability-oriented research field connected to sustainability business models?”*

This way, the literature review provides a “deductive overview” of the research field of SBMs and SPIs and thus as “conceptual framework” the fundament of this thesis (Maxwell, 2005, p. 223). In the following paragraphs, the specific methodology and process is explained.

Literature reviews are necessary as they allow researchers to fully understand, plan and design research (Webster & Watson, 2002). By getting an overview of what literature already exists, the researcher can explore in which saturation stage a certain research field is and which kind of research can still add value to it (Tranfield et al., 2003). Boote and Beile (2005) even argue that a researcher cannot perform significant research without first understanding the literature in the field. For the literature review of this thesis, mainly academic journal articles were reviewed, but also books, internet- and other written materials such as institutional reports or online presentations.

To find out which “indicators are discussed as most relevant in the sustainability-oriented research field connected to sustainability business models” (SRQ1), the two concepts “Sustainability” and “BM” are first investigated. Furthermore, as the research field concerning SBMs has not yet created consensus about a central key term (Boons & Lüdeke-Freund, 2013), the literature review starts with the search for the key words “Sustainability Business Model” and “Business Model Innovation for Sustainability”, in addition to “Sustainability” and “Business Model”. To increase the outreach, literature is searched

in English as well as in German in the “TU Berlin Primo”- (TU Berlin Primo, 2015) “EBSCO”- (EBSCO, 2015), “Sage”- (Sage Journal, 2015) and “Google Scholar” (Google Scholar, 2015) online database.

The literature is firstly divided into three main topics: BMs, Sustainability and SBM, to get an overview of the broad and yet poorly defined research field. This way, in a first review round the key literature is found (Appendix A). Analyzing this first literature selection, it becomes clear that the “sustainable innovation literature” lacks attention towards “business modeling literature” (Boons & Lüdeke-Freund, 2013, p. 10). The emerging research field combines however sustainable innovation with BM literature and thus analyses “BMs for sustainable innovation” (ibid.). Elsewhere, these are named “BMs for sustainability” (Schaltegger et al., 2011), but most often described as “Sustainable Business Models” (Bocken et al., 2014; Upward, 2015). Boons and Lüdeke-Freund (2013) argue that the literature contains various descriptions of SBM examples (Girotra & Netessine, 2013), including attempts to classify typical SBM types (Bocken et al., 2014) as well as critique on the existing BMC (Stubbs & Cocklin, 2008). Nonetheless, no consensus is formed about the definition of “Sustainable Business Models” (Bocken et al., 2013) or “Sustainability Business Models” (Stubbs & Cocklin, 2008) respectively. Moreover, a lack between the theoretical implications of sustainability and its implementations for its management in companies is identified (Lüdeke-Freund, 2013). Building on these findings, the literature review comes to the conclusion that a hands-on management tool to measure sustainability performance of companies is missing (Schaltegger & Lüdeke-Freund, 2011), translating the knowledge about SBMs into a language understandable for practitioners (Boons & Lüdeke-Freund, 2013).

Having identified this need for an easy-to-use sustainability management tool, in a second literature review step, “indicators discussed in the sustainability-oriented research field” (SRQ1) are investigated by reviewing the *Sustainability Accounting* (SA) literature as well as institutional reports and online databases. This second review round uncovers the fact that sustainability meas-

urements are hardly connected to the BM level. Thus, this thesis' aim is to contribute to their integration into the general management and especially, the core logic of a company.

The detailed literature results are presented in the next chapters. Chapter 1.2 contains the review of the BM concept and its visualization in the BMC. Chapter 1.3 investigates the sustainability concept and its missing representation in the BMC. Chapter 1.4 uncovers which sustainability measurements are recently used to assess sustainability performance of companies and argues that the integration of SPIs into the BMC helps to measure sustainability performance on the BM level.

## 1.2 BUSINESS MODELS: THE CORE LOGIC OF COMPANIES

### 1.2.1 WHAT IS A BUSINESS MODEL?

To understand what it means to measure sustainability performance on the BM level, the following sub chapter first of all investigates the “BM” concept.

The term “Business Model” gained by the end of the 1990s with the raise of the e-commerce businesses increased attention (Al-Debei & Avison, 2010). Since then, the term has been widely used, but seldom explicitly defined (see Appendix B for chronological BM definitions) (Chesbrough & Rosenbloom, 2002). Among the first scholars, Amit and Zott (2001) proposed to define the BM as a unique unit of analysis that captures value creation from multiple sources. The authors stated that a BM depicts the structure, transaction content and governance, which are creating value through the exploitation of business opportunities (ibid.). Meanwhile, Weill and Vitale (2001) interpreted the BM as a description of the roles and relationships among a firm’s stakeholders. In their point of view, the BM identifies the major benefits for stakeholders such as customers, allies and suppliers as well as the main product, information and money flows. In addition, Stähler (2002) noted that a BM could always be only a model, aiming to simplify the complexity of reality. Nevertheless, Stähler acknowledged that a BM can help to understand the fundamental basis of a business and enables the planning of how a business should look in future (ibid.).

Since these first definitions, much research has been conducted, but no consensus was reached (Al-Debei & Avison, 2010). However, Osterwalder’s (2004) groundbreaking PhD thesis provided a shared language and overarching definition of BMs (Upward, 2014). Building on previous management literature, especially the *Balanced Scorecard* (BSC), Osterwalder (2004) introduced the *BM Ontology*. Whereas the BSC is a strategic management tool, developed by Kaplan and Norton (1992), that enables managers to measure and monitor performance indicators (Martinsons et al., 1999), the BM ontology defines the BM as an abstract representation of the business logic of a company, describing the way a company makes money (Osterwalder, 2004).

As this thesis aims to build an indicator framework supplementing Osterwalder's BMC, his definition is adopted, defining a BM as:

*"[C]onceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams."* (Osterwalder, 2004, p. 16)

To fully understand the structure of the resulting BMC, its ontology basing on the BSC is explained in the following.

### 1.2.2 THE BUSINESS MODEL CANVAS: AN ONTOLOGY

Osterwalder's BM ontology (2004) found groundbreaking resonance and was cited by 1428 academic publications (Google Scholar, 2015b). Moreover, the handbook *Business model generation*, in which Osterwalder et al. (2010) develop the BMC, was sold over one million times and the BMC template downloaded over five million times (Upward & Jones, 2015). Hence Osterwalder's BMC has attained considerable social proof and the derived BM ontology has become "a de facto reference standard" in management education worldwide (ibid., p. 4).

Nevertheless, confusion exists concerning the terms "BM", "BM concept" and "BM ontology", based on the three different BM hierarchies. The first hierarchy level contains a meta-model (theoretical overarching BM concept); the second the taxonomy of various abstract BMs types (each describe a set of common patterns) and the third includes instances of specific real world BMs. All three hierarchies are described in the BM ontology, which is defined as "explicit specification of a conceptualization" and provides a shared language to describe, understand, adapt and develop BMs (Osterwalder, 2004, p. 11). The holistic BM concept, on the first hierarchy level, embraces all elements of the second and third hierarchy level and is visualized by the BMC (Osterwalder et al., 2010).



To conclude, a BM describes how an organization creates, delivers and captures value (Teece, 2010), whereas the BM concept explains with help of its ontology how single components of a BM relate to each other (Osterwalder, 2004). Thus, the BMC enables management of the business logic of a firm by helping to design, change and implement a firm's specific BM (Osterwalder et al., 2010). Hence the BMC provides three main applications.

- I. Single-page visual tool: intuitively understandable, while not “oversimplifying” the complexity of how an enterprise functions (Osterwalder et al., 2010, p. 15). It can be used for any individual and collaborative research or practical work on BMs (Osterwalder et al., 2005).
- II. Multifunctional, strategic management and entrepreneurial tool: allows in five phases (Osterwalder et al., 2010) to describe, understand, design, implement and manage BMs (Strategyzer AG, 2015).
- III. BM Innovation tool: testing rounds allow to change key BM elements or turn them around (Blank & Dorf, 2012; Osterwalder et al., 2014).

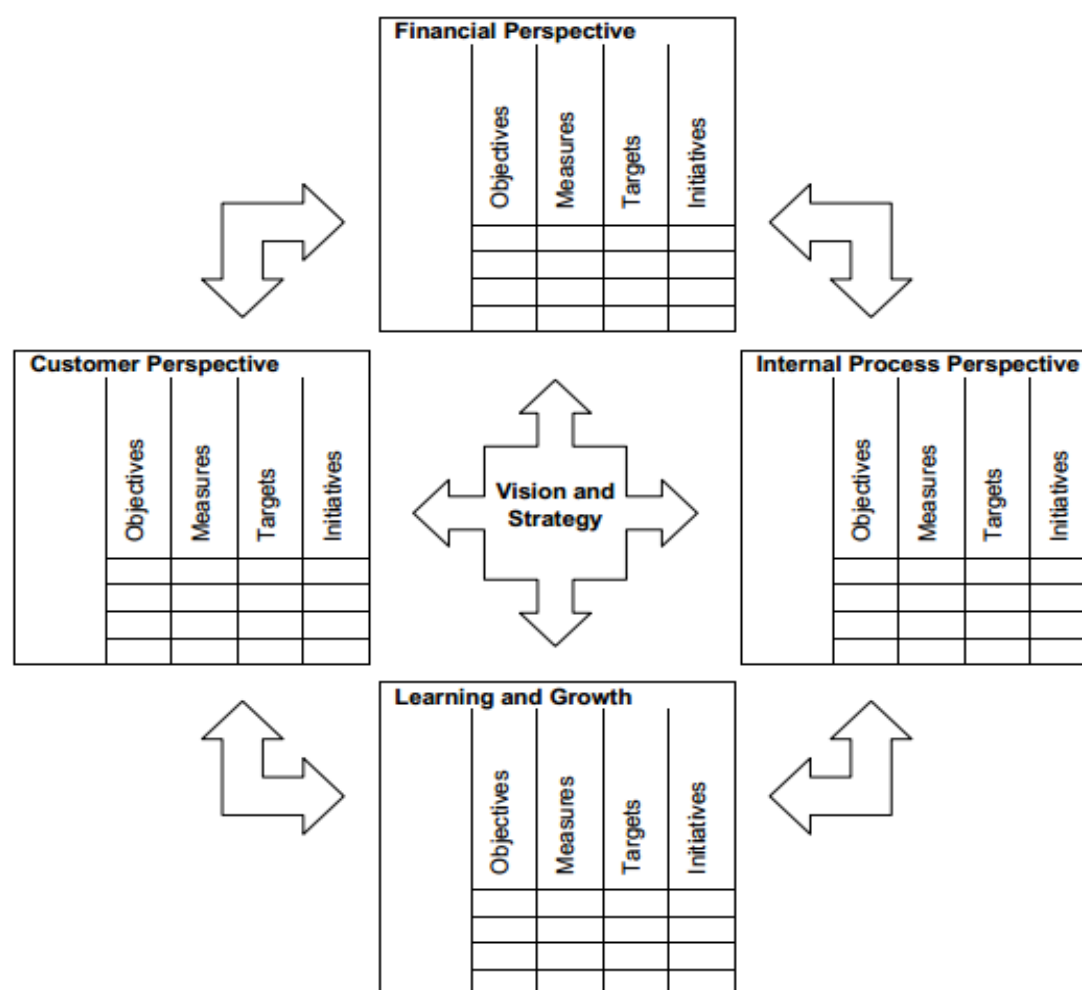
Concluding, the BMC is used as practical business tool to visualize and manage the core logic of a company, as it allows to create, implement and change BMs over the entire lifecycle of a company. For this reason, the BMC is beside BM creation also increasingly used as a strategic thinking instrument to execute or innovate BMs (Strategyzer AG, 2015).

#### 1.2.2.1 BALANCED SCORECARD: THE STRATEGIC PERSPECTIVE

Osterwalder's BM ontology (2004) and later developed BMC (2010) is embedded in previous BM and management research, including the research of fourteen authors as well as the BSC approach of Kaplan and Norton (1992).

The BSC is a strategic management tool that allows executives to transfer a company's strategy, defined as “a pattern in a stream of decisions” (Mintzberg, 1978, p. 934), into measurable objectives, using a set of indicators (Kaplan & Norton, 1992; Martinsons et al., 1999). These indicators are not defined as pure financial ones, but also as operational indicators, measuring customer satisfaction, internal processes and the organization's innovation and improvement activities (Kaplan & Norton, 2005). This is because Kaplan and Norton claim that a successfully managed business needs complex per-

formance measures, which cannot be solely based on a “Financial Perspective”. Thus, they additionally identified the “Customer”-, “Internal Process”- and “Learning and Growth Perspective” (Figure 2) (ibid.).



**Figure 2: Basic BSC perspectives, by Kaplan and Norton (1996, p. 9).**

The four perspectives are hierarchical interlinked to each other, leading management executives in a set process from the “financial”, through the “customer” to the “internal” and finally to the “learning” perspective. Along these perspectives a company can ask itself the following questions that help to identify measures to better execute business (Kaplan & Norton, 1992; 1996).

- I. Financial: How do we look to shareholders? Financial measures help to define the long-term goals of a business unit.
- II. Customer Interface: How do customers see us? Customer measures help to identify the market segments a business unit competes in.

III. Internal Process: What must we excel at? Internal process measures help identify the greatest impact on customer- and financial objectives.

IV. Learning and Growth: Can we continue to improve and create value? Learning and growth measures help identify the most critical factors for current and future success.

In each perspective a clear goal is set and appropriate measures identified, linking to concrete targets and initiatives (Figure 2). The set of indicators should be limited to three to five KPIs in each perspective, minimizing information overload (Kaplan & Norton, 1996). These measures are crucial as they are operationalized as *lagging* (outcome measures) and *leading* indicators (performance drivers) (ibid.). A generic set of these indicators, developed by Kaplan and Norton, is carried together by Figge et al. (2001) (Table 2).

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

**Table 2: Lagging and leading indicators, by Figge et al. (2001), In: Schaltegger et al. (2011, p. 9).**

Lagging indicators highlight long-term strategic objectives and must be formulated for every strategic core issue (Schaltegger & Lüdeke-Freund, 2011). Hence lagging indicators are used to control to which degree an objective has been achievement in the past.

Contrastingly, leading indicators describe how the strategic objectives, should be realized in future. They often base on specific firm competencies. Thus, leading indicators are difficult or not at all generalizable (ibid.). Nevertheless, Kaplan and Norton (1996) proposed a set of generic lagging and leading indicators, which are supposed to be suitable for any strategic unit.

The indicators are held together by “cause-and-effect” chains, leading in a reverse order from the learning, through the internal and customer, to the fi-

nancial perspective (Kaplan & Norton 1996, p. 30). Schaltegger and Lüdeke-Freund (2011) noted that because cause-and-effect chains are not directly visible in a company, they are also not manageable. However, Kaplan and Norton (2000) state that the cause-and-effect chains make nonvisible relationships and intangible assets such as employee satisfaction or customer relation, visible and thus support effective management.

Overall, the BSc is used by managers to identify and control the planned actions to reach a company's goals, following the described process from one BSC perspective to the other. In fact, Norton and Kaplan (2000) propose the BSC for mapping strategy, which makes it “even more important” as a starting point for the BM ontology (Osterwalder, 2004, p. 42).

#### 1.2.2.2 FROM BALANCED SCORECARD TO BUSINESS MODEL CANVAS

Basing on the BSC perspectives, Osterwalder identified four major areas that constitute a BM (Osterwalder, 2004).

BM Ontology	BSC Perspectives	Markides (1999)
<b>Product</b>	Innovation and Learning	What?
<b>Customer Interface</b>	Customer	Who?
<b>Infrastructure Management</b>	Internal Business	How?
<b>Financial Aspects</b>	Financial	

**Table 3: The four business model pillars, after Osterwalder (2004, p. 43).**

Thereby, Osterwalder referred to the four pillars of the BSC (Kaplan & Norton, 1992) and the management research of Markides (1999). Merging these inputs together, he built a framework out of “Product”, “Customer Interface”, “Infrastructure Management” and “Financial Aspect” (Table 3).

These ontology pillars describe “what business a company is in”, its products and value propositions offered (Product); who the “company's target customers” are, how products and services are delivered to them and strong relationships are built up (Customer Interface); how the company “perform infrastructural or logistical issues”, with whom and in what kind of network (Infrastructure Management); and which “revenue model and cost structure”, is in place

(Financial Aspect) (Osterwalder, 2004, p. 42). Thus, the four-pillar-structure of the BMC resembles the four BSC perspectives.

### 1.2.2.3 BUSINESS MODEL CANVAS: THE BUSINESS MODEL PERSPECTIVE

Having analyzed the BSC perspectives as basis for the four BM pillars, Osterwalder (2004) broke them down into nine building blocks (Table 4).

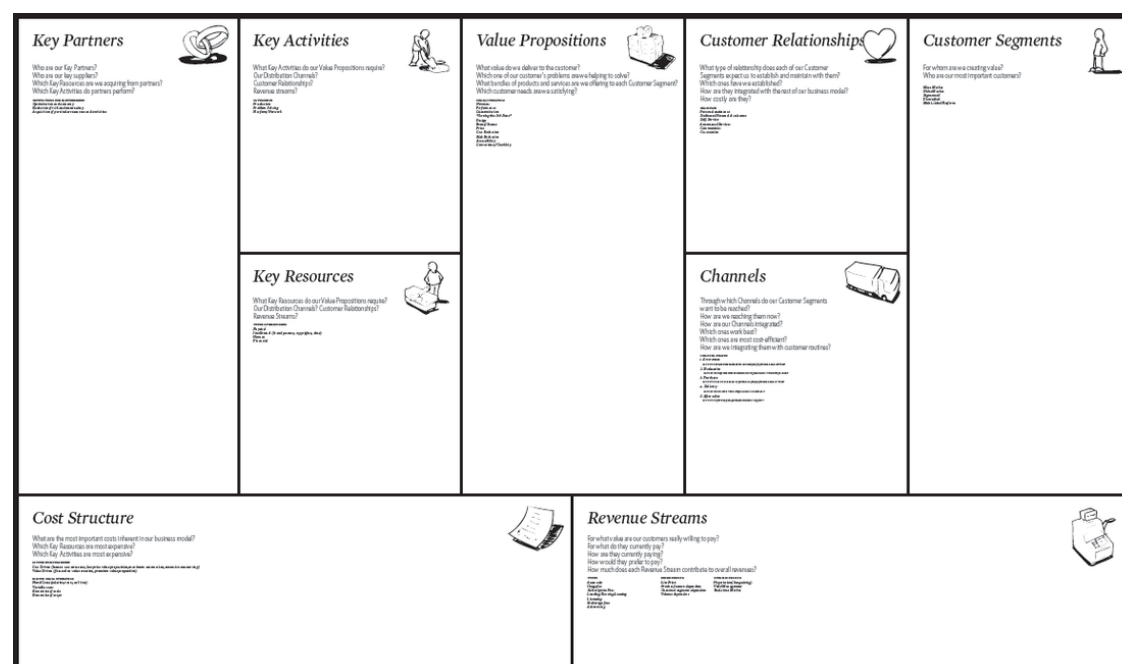
BM Pillars	Building Blocks
<b>Product</b>	Value Proposition
<b>Customer Interface</b>	Target Customer
	Distribution Channel
	Relationship
<b>Infrastructure</b>	Value Configuration
<b>Management</b>	Capability
	Partnership
<b>Financial Aspect</b>	Cost Structure
	Revenue Model

**Table 4: BM pillars and building blocks, after Osterwalder (2004, p. 43).**

These generic BM elements are: “Target Customer” (Customer Segments), “Value Proposition”, “Distribution Channel” (Channels), “Relationship” (Customer Relationships), “Value Configuration” (Key Activities), “Capability” (Key Resources), “Partnership” (Key Partners), “Cost Structure” and “Revenue Model” (Revenue Stream). In the BMC, these elements are named differently, indicated in brackets, as research further developed (Osterwalder et al., 2010).

Each of the nine elements was named by at least two other authors in the previous existing literature and was thus not radically new to the research field (Osterwalder, 2004) (see Appendix C for a detailed description of all elements). Though, Osterwalder newly defined the relations between the elements with help of linkages, which describe “to which other elements of the ontology an element is related to” (ibid., p. 47). Thus, the elements should be

prepared and reviewed in the order presented above (Table 4). This way, all nine elements must always be seen interrelated as a holistic model, aiming to capture all relevant components of a BM and their conjunctions.



**Figure 3: Business Model Canvas, by Osterwalder et al. (2010).**

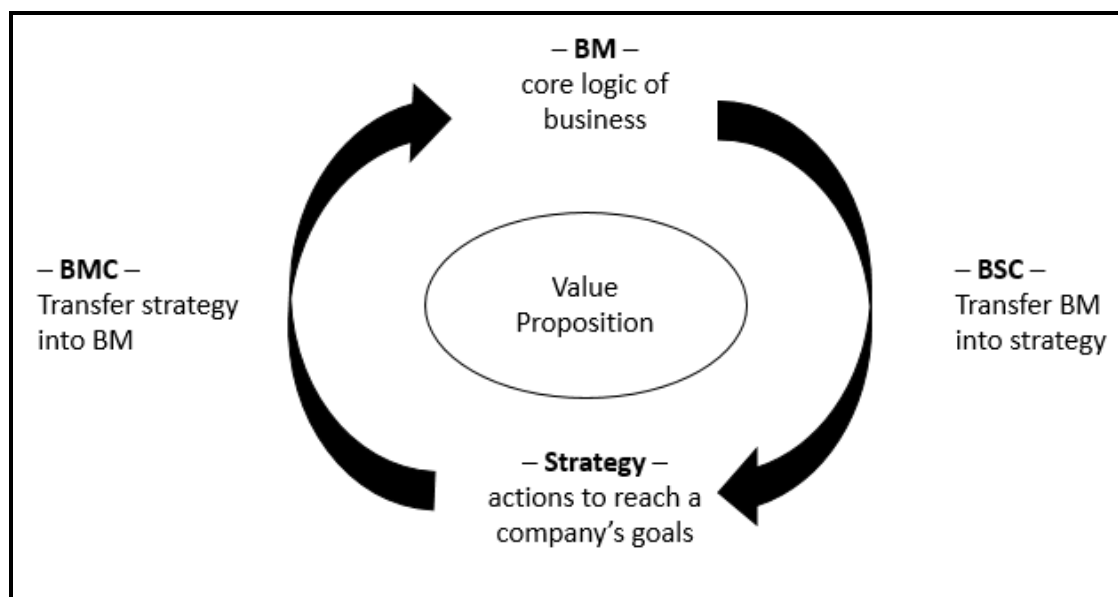
Figure 3 illustrates how the nine building blocks, each symbolized with an item, frame the BMC. It also shows that differently than other authors, Osterwalder (2004) leaves out elements related to competition (strategy) or BM implementation, as he does not understand them as parts of the BM concept.

In sum, the BM building blocks lend the canvas its flexible, but precise structure. All elements can be independently thought of, created and adapted, while they are always part of a complex as well as parsimonious model.

### 1.2.3 CHALLENGE: LACK OF SUSTAINABILITY

This sub chapter reveals the connections and differences as well as advantages and disadvantages of the BMC and BSC, regarding their ability to measure sustainability performance.

The first connection between the BMC and the BSC is that Osterwalder et al. (2005) propose to use the BM concept to "improve balanced scorecard design by defining more adequate indicators" (p. 21).



**Figure 4: Connection between BSC and BMC.**

Figure 4 illustrates the argumentation of Osterwalder et al. (2005) that when the BM is captured, understood and clearly described, it is easier to identify the indicators for monitoring a company's strategy, based on the BSC approach. They state that the BMC can be used in a first step as BM design tool, before applying in a second step the BSC to transfer the conceptual design into concrete actions that implement a company's strategy. Hence due to them the BSC can help to implement and execute a sound and coherent BM or better said: the form it takes in reality (ibid.). Moreover, Osterwalder's et al. (2005) suggest that the other way round the BMC allows transferring strategy into a BM design.

Both, BMC and BSC, are necessary, because a "strong" BM can be managed badly and fail such as a "weak" BM can succeed just because of good management and implementation skills. Despite, research on what can actually be called a strong or weak BM is still in its infancy (ibid., p. 9). Thus, the BMC and the BSC are strongly connected. Not only their four-pillar-structures base on similar conceptual foundations, also their function as management tool accompanies the same goal. Both tools aim to bring a company's core logic into existence, however they take other approaches and are part of different steps in the management process. Hence one could say that both tools follow the same value proposition and help to enable its creation, capture and delivery to the customer (Ndaa, 2015; Osterwalder et al., 2005). Nevertheless, the

BMC does this on a more conceptual BM level, allowing to explain the concrete BM to all stakeholders and making its element easy to understand. The BSC on the other hand, adapts respectively takes the existing BM concept and enables its implementation in practice through precise measurements. This way, the benefit of a combined tool usage could be that not only indicators for each business unit are identified, but also for the whole BM in all nine building blocks. Having uncovered this existing and potential interrelation between the BMC and the BSC, it is interesting to think about their stronger connection and combined usage in practice (see chapter 1.4).

As until now, the BMC as well as the BSC are not directly linked to “Sustainability” (defined in chapter 1.3), but to the bottom line of financial sustainable existence (Figge et al., 2002; Upward & Jones, 2015). Nonetheless, Osterwalder et al. (2010) ask “how the Canvas can drive business model innovation in the public and non-profit sectors” (p. 263). As a response, the authors propose to add two elements: “social and environmental costs” as well as “social and environmental benefits” (see Appendix D). The authors leave it at this raw BMC adaptation and its single application for the “Grameen phone” BM (ibid., p. 265). Though, they also emphasize that the issue of beyond-profit BMs is highly relevant and could be topic of a new book. Still, elsewhere Osterwalder and Pigneur (2011) explain the very same example (Grameen phone), but use the genuine BMC again. This underlies the point of view, expressed by Mills-Scofield (2013), that there is no significant difference in the social and conventional BM itself and that the BMC is also appropriate for the design of social-oriented BMs. However, other authors (Bocken et al., 2014; Yunus et al., 2010) criticize the BMC for having a too narrowed view by focusing its value proposition only on the customer. As such, for Bocken et al. (2014) the BMC seems to be “poorly suited for assisting a firm in generating wider sustainability across the full stakeholder network, including suppliers, local communities, society (e.g. NGOs and government) and the environment” (p. 67).

The BSC faces similar critique. Although, it includes not only financial measures, its cause-and-effect chains lead all measures towards the financial perspective. Kaplan and Norton (1992) stress that many have criticized financial measures because of their “well-documented inadequacy, the backward-



looking focus, and their inability to reflect contemporary value creating actions” (p. 72). Despite, the authors argue that without financial measures, the success of operating improvements cannot be measured properly, as these do not necessarily lead to financial success (ibid.)

Thus, both BMC and BSC, miss to integrate the strategic goal of sustainability into the company’s core logic. Elaborated extra elements in the BMC, especially in its value proposition (Bocken et al., 2014), as well as metrics measuring sustainability in the BSC (Schaltegger & Lüdeke-Freund, 2011) are absent. Hence a focus on sustainability performance and its measurement is lacking in both tools.

Therefore, the following chapter (1.3) investigates the concept of “Sustainability” and sustainability models that can help to measure the degree of sustainability performance. Later (chapter 1.4), indicators within these models are reviewed, measuring sustainability performance of companies.

### 1.3 SUSTAINABILITY: ENHANCING THE BUSINESS MODEL CANVAS

#### 1.3.1 WHAT IS SUSTAINABILITY?

The following sub chapter investigates how the “sustainability-oriented research filed” (SRQ1) defines sustainability.

The basic principle of sustainability was declared by the *World Commission on Environment and Development* (WCED) in the co-called Brundtland report (Drexhage & Murph, 2010), which states that:

*“Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs”.*

However, many attempts exist to define sustainability and most of these are used simultaneously without a clear differentiation (Stubbs & Cocklin, 2008). Hence there is yet no consensus on one definition and still a huge variety of sustainability-worldviews are presented in literature (ibid.). Nevertheless, this master thesis will follow the WCED definition (1987), which defines “sustainable development” as a long-term development-strategy, whereas the simple term “Sustainability” means basically the ability to endure (Grober, 1999).

This sustainable development definition touches the three dimensions of environment, society and economy (Harris, 2003), defined in the “Three Pillar Model” of sustainability (Deutscher Bundestag, 1998, p. 18). Between these dimensions, a basic conflict occurs due to their different perspectives (Harris, 2003). The economic perspective, claims that natural and human-made capital can be substituted to follow the overall goal of human welfare, respectively profit maximization (Ayres et al., 1998; Solow, 1986). Contrastingly, the ecological perspective assumes that almost no substitution between natural and human capital can be made (Common & Perrings, 1992; Daly et al., 1995; Holling, 1973). Finally, the social perspective defends basic human needs and equality (United Nations, 2015).

The three-dimensional model aims to equally integrate the social, environmental and economic dimension (Grunwald & Kopfmüller, 2006) by using the

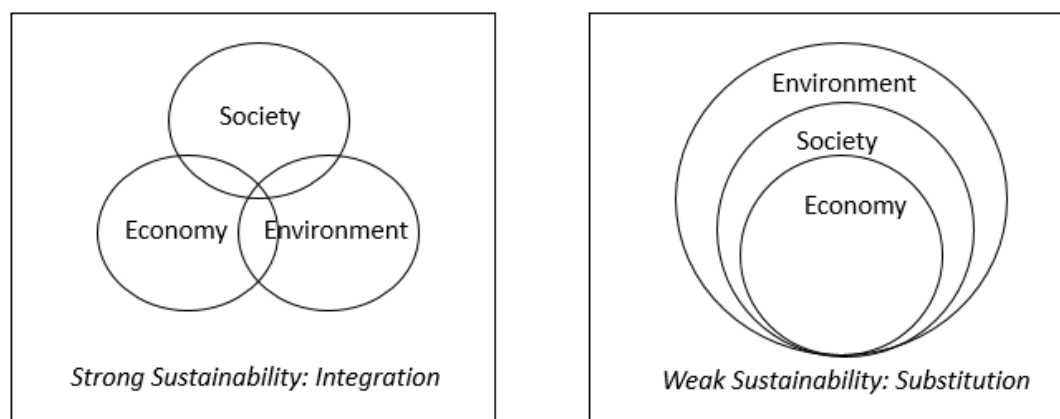
biosphere while maintaining its potential benefit for future generations as well as economic growth and development (United Nations, 1997).

In doing so, the three-pillar model corresponds to the more practical oriented *Triple Bottom Line* (TBL). An approach developed by John Elkington (1999; 1999b), who states that sustainability has to be understood as an attempt to harmonize the traditional financial bottom line with an emerging environmental and long overlooked social bottom line.

The TBL concept strives to balance traditional economic goals with social and environmental concerns, in such a flexible way that it is a useful tool for integrating sustainability into businesses (McDonough & Braungart, 2002). Therefore, the TBL focuses businesses not only on their economic value added, but also on the environmental and social value that they may add or destroy (Elkington, 2004). Hence Elkington claims that the TBL concept is needed to guide businesses through the upcoming “sustainable capitalism transition” and would be necessary to measure, judge and manage the performance of companies (ibid., p. 3).

In spite of that, the TBL has been criticized for becoming only a measure of the degree to which a company has minimized negative values (McDonough & Braungart, 2002). The flexible TBL concept may allow to substitute different capital types and thus raises again the question if natural, social or economic capitals should be substitutable or not.

Consequently, the multi-dimensional goals of the TBL approach, implied by the highly normative WCED definition, raised the issue of how to balance objectives and how to judge success or failure of sustainable development (Harris, 2003), respectively of “sustainable” businesses (Wicks, 1996; Stubbs & Cocklin, 2008). As it is difficult to find a balance between the three sustainability dimensions and thus the substitution-degree of social, economic and natural capital, Daly et al. (1995) defined a spectrum of sustainable solutions, going from “weak” to “strong” sustainability. Figure 5 illustrates below the differences between both concepts.



**Figure 5: Strong versus weak sustainability, after Daly et al. (1995).**

Daly et al. (1995) define strong sustainability as insuring the wellbeing of future generations, opposed to weak sustainability, which reduces but does not eliminate negative impacts completely. Hence weak sustainability allows the substitution of one of the three dimensions against another (Ayres et al., 1998). This way, natural capital, described as the range of ecosystem goods and services provided by nature, can be substituted with human, social or manufactured capital (Pelletier et al., 2012). Strong sustainability instead asks for the integration of all three dimensions, without substituting one capital type against another (Neumayer, 2013).

In the view of this thesis, “real” sustainability is understood as “strong” sustainability, because it uniquely demands to fully propitiate the three conflicting sustainability dimensions. Therefore, this thesis will follow the WCDE definition, as the basic of the three-pillar model as well as of the TBL approach, and will argue for strong sustainability. Hence to provide a sustainability definition that focuses on strong sustainability and is applicable in practice, this thesis merges the WCED definition with Ayres et al.’s (1998) strong sustainability approach and defines sustainability as:

*“An overarching long-term goal that can only be reached through the equal integration of all three sustainable development dimensions: economy, environment and society; while substituting no or as little capital as possible”*

### 1.3.2 SUSTAINABILITY BUSINESS MODEL CANVAS: TOWARDS AN ONTOLOGY

The previous discussion showed that sustainability is only loosely connected to businesses and their BMs. The following investigates the emerging “SBM” field as “sustainability-oriented research field connected to sustainable business models” (SRQ1), merging “BM” and “Sustainability” concept together.

The definition of so-called “Sustainable”- or “Sustainability Business Models” is up until today widespread and inconsistent, however the need for a more comprehensive investigation of the concept is arising (Joyce, 2013). Joyce (2013), Boons and Lüdeke-Freund (2013) as well as Bocken et al. (2014) name Stubbs and Cocklin (2008) as a first starting point of the SBM concept genesis.

Stubbs and Cocklin (2008) initiated a first description of the characteristics that make a BM sustainable. Thereby, the authors denote the effect of sustainability on a firm’s BM as shaping the mission or driving force of a firm and its decision-making. Thereby, Stubbs and Cocklin (2008) derive their SBM construct, containing preconditions, drivers and measures of SBMs, from two business cases (Boons & Lüdeke-Freund, 2013). Joyce (2013) therefore remarks that Stubbs and Cocklin (2008) remain on a very broad level concerning a potential application in practice, as their research is limited to the two cases. Nevertheless, one can assume that the following six principles for SBMs, stated by Stubbs and Cocklin (2008, p. 121ff), lay the basic foundation of a first SBM definition.

- I. A SBM defines its purpose with economic, environmental and social aspects of sustainability.
- II. A SBM uses a TBL approach in measuring performance.
- III. A SBM considers the needs of multiple stakeholders rather than prioritizing shareholders.
- IV. A SBM treats nature as a stakeholder and promotes environmental stewardship.
- V. Sustainability leaders, drive necessary structural changes to implement sustainability.
- VI. A SBM encompasses the system- and firm level perspective.

In this definition, the degree of sustainability within SBMs is unclear. However, it can be stated that the “strong sustainability” paradigm is assumed to help create BMs that are more adaptive to recent challenges such as climate change and better use of resources (IFC, 2012). Weak sustainability is instead supposed to shift problems of sustainability to the future and make them to burdens of new generations (Neumayer, 2013). Moreover, it is suggested to define sustainability KPIs that aim to measure strong sustainability (Pelletier et al., 2012). This thesis will thus follow Stubbs and Cocklin’s (2008) SBM principles and acknowledges these as basic SBM definition.

Building on Stubbs and Cocklin’s SBM definition, many scholars have investigated the SBM concept (see Appendix E for a chronological SBM review), but have not yet created consensus about a central key term or a structured concept (Bocken et al., 2013; Boons & Lüdeke-Freund, 2013; Joyce, 2013; Lüdeke-Freund, 2009; Upward & Jones, 2015). Certainly, a generic template for SBMs, applicable independently from specific cases, is missing (Lüdeke-Freund, 2009). The question is raised if a *Sustainability Business Model Canvas* (SBMC) is needed, similar to the first BM hierarchy of Osterwalder (2004), or if the existing BMC is sufficient in fostering the creation of SBMs (Lüdeke-Freund, 2013).

Concerning this question, Lüdeke-Freund (2009) claims that a generic template of a SBM, resembling the BM ontology, could be achieved by changing in the BMC the following five parts (ibid., p. 56).

- I. Extend value proposition: integrate public and private benefits
- II. Customers and responsible partners involvement: joint value creation
- III. Partnerships: increase joint resource usage and cooperative activities
- IV. Combined measures: shareholder, environmental and social value
- V. Resources and activities: explore neglected opportunities in non-market spheres, including resources and activities that are not directly subjected to the financial market

These incremental BMC changes, in all four BM pillars, enlarge the BMC adaptations towards sustainability, as Osterwalder et al. (2010) proposed. Nevertheless, other authors claim that a SBMC would need more fundamental changes and the integration of all three sustainability-dimensions into its nine

elements (Joyce, 2013; Upward, 2014). In any case, Schaltegger et al. (2011) emphasize that the BM supports the business case for sustainability through the continuous alignment of the BM elements on the company level to the competitive environment.

The following shortly explains two emerging SBMC approaches, with different sustainability degrees, as attempts to fully integrate sustainability into BMs.

### 1.3.2.1 FLOURISHING BUSINESS MODEL CANVAS

Upward (2015) claims to have created with his *Flourishing Business Model Canvas* (FBMC), the first SBMC, which incorporates the concept of strong sustainability. Thereby, Upward (2015) follows Ehrenfeld's argumentation that the combination of the term "sustainable" and "development" in the Brundtland report would be oxymoronic. Instead, he uses the term "Flourishing", meaning the possibility that humans and other life will flourish on earth forever (Ehrenfeld & Hoffman, 2013).



**Figure 6: Flourishing Business Model Canvas, by Upward (2014b).**

The FBMC aims to integrate all three sustainability-dimensions into the BMC by redesigning its four basic pillars (Figure 6).

In the customer interface pillar, “Stakeholders” are targeted instead of “Customer Segments” and reached through “Relationships” and “Channels”.

In the product pillar, value is co-created with stakeholders as well as co-destructed through negative externalities to environment and society.

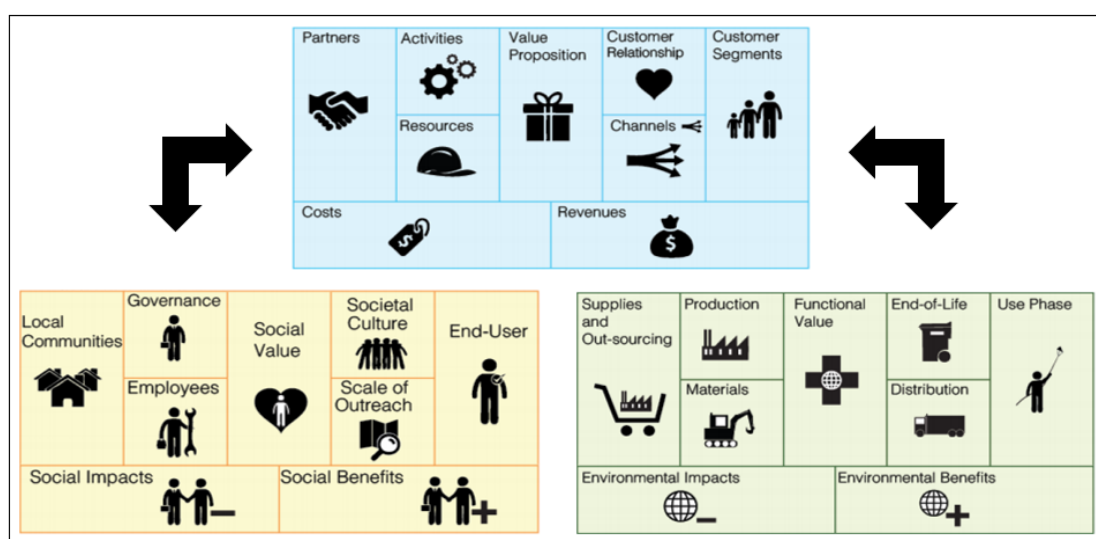
The internal process perspective contains in its “Activities” the “Governance” of the organization and in “Resources” the organization’s “Partnerships”. Moreover, the financial pillar is enriched by social and environmental “Costs”, “Benefits” and “Goals”.

In addition, non-market elements are added. These include “Biophysical Stocks” and “Ecosystem Services” as well as “Ecosystem Actors” and their “Needs”, who enhance the stakeholder element, which is allocated only in the economic stakeholder sphere.

In total sixteen building blocks frame this strong sustainable BMC version. For more details to the FBMC see Upward & Jones (2015).

### 1.3.2.2 TRIPLE LAYERED BUSINESS MODEL CANVAS

The *Triple Layered Business Model Canvas* (TLBMC) by Joyce et al. (2015) applies a creative approach to sustainability upon an organization’s BM (Figure 7).



**Figure 7: Triple Layered Business Model Canvas, after Joyce et al. (2015).**



The authors assume that BM innovation that takes a TBL approach will be more sustainable over time. Therefore, they aim to support, with a structured canvas, organizations that innovate their current BM and create concepts of more SBMs, referring to Stubbs and Cocklin's (2008) SBM-definition. Thereby, Joyce et al. (2015) state to follow Bocken et al. (2013), who stress that current tools and methods lack a systematic approach to consider value for multiple stakeholders and for innovating the BM for sustainability.

As a result, Joyce et al. (2015) design the TLBMC as tool to create BMs, which deliver and capture multiple forms of value. This was done by adding a second layer with nine environmental elements that follow a lifecycle approach as well as a third layer with nine social elements that follow a stakeholder approach (Figure 7). All three layers are interrelated. For more details and a bigger version of the TLBMC, see Joyce et al. (2015).

### *1.3.3 CHALLENGE: SUSTAINABILITY MEASUREMENT ON THE BUSINESS MODEL LEVEL*

The SBMC approaches presented above uncover that none of the existing conceptual SBMC tools help to define and control sustainability in concrete actions, while implementing a strategy and its related BM in practice. Therefore, practitioners, who try already today to design and implement SBMs have to use "self-identified" (Grunwald & Kopfmüller; 2006, p. 64) indicators that are not directly related to the BMC (Lüdeke-Freund, 2013).

As a result, it can be concluded that there is no management tool existing that comprehensively measures the all-embracing sustainability performance of an organization on the "BM level" (Bonini & Görner, 2011; Lüdeke-Freund, 2013; Schaltegger et al., 2012). Taking the previous literature review into account, there is yet no coherent definition of the term "BM level". However, based on Lüdeke-Freund (2013) and Schaltegger et al. (2012), who described "the 'architectural' business model level of a firm" (p. 102) as a conceptual level that links business strategy and business architecture, the author of this thesis defines the BM level as:

*“The level on which all elements of an organization, along the nine building blocks of the BMC, are considered; including the product and service level, but especially the core logic of a company. Hence the BM level displays the way an organization creates or destroys value for society and environment.”*

Building on this definition and following the request of Upward and Jones (2015) for sustainability measurements that disclose sustainability performance of the whole organization, this thesis proposes to transfer the abstract sustainability model into a practical management tool that allows to measure sustainability performance of companies on the BM level.

Hence it needs to be critically investigated which existing methods and indicators are used to measure sustainability performance of companies, which will be done in the following chapter.

## 1.4 TOWARDS SUSTAINABILITY MEASUREMENT ON THE BUSINESS MODEL LEVEL

### 1.4.1 SUSTAINABILITY MEASUREMENT

This chapter explores the most relevant tools and indicators for sustainability measurement of companies on the BM level, based on a literature review of the field “Corporate Sustainability”, dealing with conventional sustainability performance measurement (Bos-Brouwers; 2009; Delmas & Blass; 2010; Dunphy et al., 2014; Dyllick & Hockerts, 2002; Figge & Hahn, 2004; Schaltegger & Burrit, 2005; Weber; 2008).

*Corporate Sustainability* (CS) is a heuristic “multi-criteria approach”, which strives to integrate environmental and social management in the traditional economically oriented business management (ibid., p. 192). It is defined as:

*“[M]eeting the needs of the firm’s direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities, etc.), without compromising its ability to meet future stakeholder needs as well.”* (Dyllick & Hockerts, 2002, p. 131)

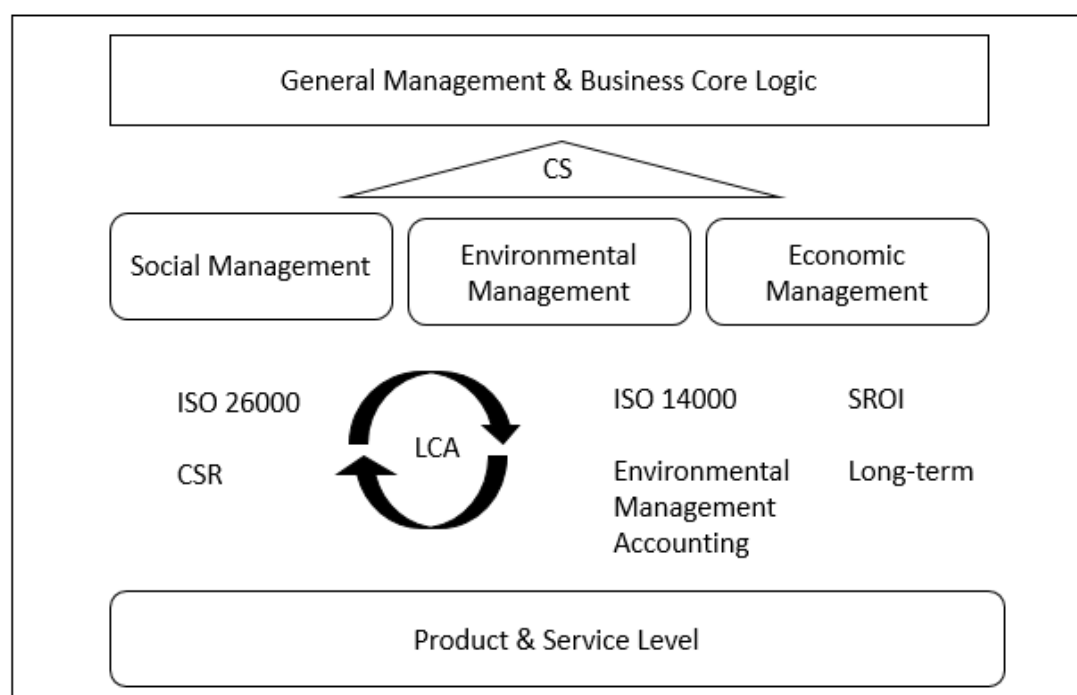
CS must not be confused with *Corporate Social Responsibility* (CSR), a concept whereby companies voluntarily contribute to a better society and a cleaner environment (ibid.). CSR is often criticized for addressing mainly short-term activities with isolated focus on environmental or social aspects and is therefore interpreted as only a sub area of CS (Weber, 2008).

CS instead aims to simultaneously satisfy the needs of all three dimensions of sustainability (Schaltegger & Burrit, 2005), involving the four challenges of “ecological-” and “social effectiveness” as well as “eco”- and “socio-efficiency” (Dunphy et al., 2014; Dyllick & Hockerts, 2002; Schaltegger & Burritt, 2005). Measuring how well these challenges have been met is a complex task, which is so far not carried out by one measurement tool, but by different methods helping businesses to indicate their sustainability performance (Figge & Hahn, 2004).

Based on reviewing the literature regarding CS measurement, a list of common tools was identified. This list has no claim to be complete, but includes the most referred-to tools in literature (Bocken et al., 2013; Gauthier, 2005; Hall et al., 2010; Hoffman et al., 2014; Rebitzer et al., 2004; Roder, 2011; Schaltegger & Lüdeke-Freund, 2011). The identified CS measurement tools are *Life Cycle Assessment* (LCA), CSR, Environmental Management Accounting, *Social Return on Investment* (SROI) and the *Sustainability Balanced Scorecard* (SBSC). All of them will be discussed hereafter.

#### 1.4.1.1 SINGLE-DIMENSIONAL MEASUREMENT TOOLS: LIFECYCLE ASSESSMENT AND OTHERS

Up until now, tools to measure environmental and social impact (Goodland, 1995; Varian, 2010) of companies on an all-embracing organizational or even BM level are missing (Lüdeke-Freund, 2013; Schaltegger et al., 2012).



**Figure 8: Single-dimensional measurement tools.**

Instead, as figure 8 illustrates, ecological and social performance of companies is mostly measured on the product and service level (Figge & Hahn, 2004; Hall et al., 2010), using LCAs, CSR, Environmental Accounting tools or SROI calculations (Bocken et al., 2013; Gauthier, 2005; Roder, 2011). There-

fore, firms strive to create low-impact products and/or aim to deliver value as a flow of services to reduce their negative ecological or social impact, but do not adapt their whole BMs to sustainability (Stubbs & Cocklin, 2008).

However, the performance measurement of these commodities on the larger environment and society are often vague and realized by various international or national certificates (Crals & Vereeck, 2005). To gain such certificates, organizations or third parties apply *Life Cycle Assessments* (LCAs) (Rebitzer et al., 2004), which are standardized by the ISO norm 14044:2006 (ISO, 2015) and track indicators that are supposed to measure sustainability (Hoffman et al., 2014). Despite, this most commonly used corporate environmental management tool (defined around the ISO 14000 family of standards for environmental management accounting), the LCA, was first introduced to measure mainly environmental indicators (Gauthier, 2005) such as “greenhouse gases”, “waste”, “de-forestation” or “water usage” (Schneider, 2008, p. 40).

The standardized social measures for the “extended”, social LCA (Gauthier, 2005) include among other indicators “poverty”, “gender equality”, “health”, “education” and “employment” (Schneider, 2008, p. 40). However, social value is much harder to measure (Dees, 1998; OECD, 2015), as it is often intangible (Auerswald, 2009; Hubbard, 2009). As such, social LCAs include a multitude of impacts, ranging from direct impacts on workers to broader social consequences (Jørgensen et al., 2008). Therefore, the scope, boundaries and level of LCAs are highly subjective and mostly limited to the product and service level (ISO, 1997, p. iv).

In addition, the ISO norm 26000:2010 provides guidance on CSR and aims to clarify how organizations can translate social principles into effective actions (ISO, 2015b). Nonetheless, businesses often cannot capture the social value they have created in the short-term and look instead for a long-term *Social Return on Investment* (SROI), which aims to express in quantitative numbers the sustaining impact created (Dees, 1998; Roder, 2011).

Thus, as shown in figure 8, LCAs and the other mentioned single-dimensional CS tools are inefficient to assess the whole sustainability performance of a company, but measure instead social or ecological impact on the product and service level (Figge & Hahn, 2004). These measures stand-alone and are

rarely connected to general management systems (Schaltegger & Lüdeke-Freund, 2011).

#### 1.4.1.2 MULTI-DIMENSIONAL MEASUREMENT TOOL: SUSTAINABILITY BALANCED SCORECARD

The *Sustainability Balanced Scorecard* (SBSC) is presented here as a unique sustainability measurement tool that goes beyond the single-dimensional measurement of CS on the product or service level. The SBSC was introduced by Figge et al. (2002) and further developed by Schaltegger and Lüdeke-Freund (2011) as strategic tool to create, measure and manage sustainability performance in business units along the four BSC perspectives. In doing so, a generic template for the determination of environmental and social aspects' strategic relevance was defined (Figure 9) and a potential non-market perspective added to the initial BSC perspectives (Figge et al., 2002).

		Environmental exposure								Social exposure							
										Direct stakeholders				Indirect stakeholders			
		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																

**Figure 9: Relevance matrix, by Schaltegger and Lüdeke-Freund (2011, p. 17), after Figge et al. (2002, p. 280).**

A SBSC is formulated by first identifying specific social and environmental aspects, related to the business unit and determining their relevance as lagging or leading indicators (Figure 9). These are proposed but not limited to the aspects of the generic template. Secondly, the aspects are integrated in the genuine BSC. Lastly, it is checked whether a non-market perspective needs to be added, in order to depict leftover strategic core aspects such as child la-

bour (Figge et al., 2002). This way, the SBSC transfers the vision of sustainability into operational objectives, goals and especially concrete measures. The SBSC hence allows to assess and integrate all sustainability dimensions in form of social, environmental and economic indicators into general business management (Schaltegger & Lüdeke-Freund, 2011).

In sum, against the described drawback of the deficits of most CS tools, the ability of the SBSC to fully merge the three dimensions of sustainability, offers the possibility to integrate the management of environmental and social aspects into “mainstream business activities” (Figge et al., 2002, p. 272).

#### 1.4.1.3 PROPOSING A BALANCED SET OF MULTI-DIMENSIONAL SUSTAINABILITY MEASUREMENTS

The SBSC introduces the approach to measure sustainability performance by a balanced set of firm specific economic, social and environmental indicators. These balanced indicators are named in this master thesis *Sustainability Performance Indicators* (SPIs), defined as:

*“[I]ndicators that provide a corporation with information needed to help in the short and long-term management, controlling, planning, an performance of the economic, environmental, and social activities undertaken by the corporation.”* (Searcy, 2012, p. 240)

Integrating SPIs into general management tools, as proposed by Schaltegger and Wagner (2006), could overcome the drawbacks of single-dimensional sustainability management tools in CS.

However, as long as no generally accepted sustainability measurements (Upward & Jones, 2015, p. 2) are incorporated into accounting practices, decision-making and especially the BM, organisations cannot represent themselves as successful sustainable businesses (Schaltegger & Burritt, 2005). Hence sustainability measurements that assess the whole organization on the BM level, are needed (Upward & Jones, 2015).

Addressing this need, this thesis assumes that the integration of SPIs in the most common business creation and management tool, the BMC, would allow a similar enriched management decision foundation for creating and as-

sessing BMs, as the SBSC provides on a strategic level for business units. Whereas, the original BMC leaves out the strategic long-term goal of sustainability, supplementing SPIs could allow during all five use phases of the BMC to identify, measure and evaluate sustainability performance of the whole business and not just of single business units. A set of balanced SPIs could be integrated, as a BMC add-on, into the existing BM elements. This way, as long as no consensus about the degree of sustainability in BMs as well as no common accepted SBMC exists, practitioners could identify, control and improve the sustainability performance of their business by using this SPI framework, supplementing the BMC.

Moreover, such as Osterwalder (2004) proposes, after having found a sound BM, businesses need to define indicators to measure their performance. Applying the SPI framework while creating and evolving a BM could help to focus in the early stages on the long-term goal of sustainability.

Finally, the balanced SPI set of non-substitutable economic, environmental and social measures would ensure moderate up to strong sustainability performance and would justify to stakeholders, during all lifecycle stages of an organization, the sustainability degree that is aimed at.

The following hence investigates, where these SPIs can be taken from.

#### 1.4.2 TOWARDS MULTI-DIMENSIONAL SUSTAINABILITY MEASUREMENTS

Schaltegger and Wagner (2006) propose to deduct required information for sustainability measurement from the SBSC, collect and analyze them with *Sustainability Accounting* (SA) and communicate them externally with *Sustainability Reporting* (SR). Thus, Schaltegger and Lüdeke-Freund (2011) collect SPIs for the SBSC from SA, the subset of accounting that deals with activities, methods and systems to record, analyze and report the sustainable development of organizations (Schaltegger & Burritt, 2010).

The term “SA” is often used equivalent to the terms “environmental accounting” or “environmental reporting” (Lamberton, 2005, p. 8), however SA is defined as an approach to help general management improve CS, as specified



above (Schaltegger & Burritt, 2010). Thus, SA faces five key issues (Lamberton, 2005, p. 13-14):

- I. Definition of sustainability: TBL as contemporary definitions of sustainable development.
- II. Use of indicators: Sustainability as multi-dimensional concept is not directly measurable and requires indicators, enabling performance toward its objectives on an organizational level.
- III. Multiple units of measurement: Use of multiple units of measurement to assess performance toward the three dimensions of sustainability.
- IV. Interdisciplinary: SA needs to become a concept reaching across accounting, social and ecological disciplines.
- V. Traditional accounting: Most sustainability accounting approaches draw on traditional accounting practices.

According to Lamberton (2005), these emerging five core issues of SA lead to a radical change of its conventional system. Whereas traditional financial accounting is often criticized for not fostering an understanding of corporate environmental and social impacts (*ibid.*), SA discloses environmental and social performance and balances these with economic performance (Figge et al., 2002). Thus, understanding and presenting CS impacts is a core component of SA and SR (Schaltegger & Wagner, 2006), in order to facilitate awareness of their relevance to “commercial life” (McKernan, 2007, p. 172). Hence SA takes a TBL approach and strives to measure social, environmental and economic performance (Schaltegger & Burritt, 2010). These tripled-performance-accounts are often enriched with disclosures about corporate governance (IFAC, 2011).

The combined SA data, is reported in a corporate SR. Due to Schaltegger and Burritt (2010), these SRs encourage companies to design an integrated communication strategy, portray bad and good performance by reporting social- and environmental- as well as financial information and improve confidence of boards and executives in SA and SR models.

Nonetheless, measuring issues such as “child labour”, “land use” and “environmental impacts” are difficult to assess, which makes it hard to define standards and “universal measurements” (Grunewald & Kopfmüller, 2006, p. 65). Therefore, one of the key challenges in accounting deals with the objecti-

fication of performance and its measurement, as sustained through mechanisms such as KPIs (Humphrey & Gendron, 2015). Hence the integration of sustainability measures with mainstream financial reporting indicators is increasingly relevant to gain the trust of customers and investors (IFAC, 2011).

Manifold reporting standards and guidelines to do so exist. All of them provide different metrics and indicators, as they all take a different point of view (Delmas & Blass, 2010; Dumaya et al., 2010). For example, the *Global Reporting Initiative* (GRI) encourages companies to report their inside-out perspective, whereas the *Impact Reporting and Investment Standard* (IRIS) is a guideline for investors to justify their outside-in perspective (GRI, 2014b; IRIS, 2015). The following chapter introduces these two standards.

#### 1.4.2.1 THE GLOBAL REPORTING INITIATIVE'S SUSTAINABILITY MEASUREMENTS

The *Global Reporting Initiative* (GRI) is an independent, international acting organization, which promotes the mandatory use of SR, in order to facilitate that organizations become more sustainable and contribute to sustainable development (GRI, 2015). 69% of the largest companies in the world (by revenue) follow the GRI Guidelines (KPMG, 2008).

Since the GRI SR framework was introduced in June 2000 (Moneva et al., 2006), it was periodically reviewed to ensure the most up-to-date guidance (GRI, 2014b). Thus, "Version 4.0" (G4) helps businesses, governments and other organizations to understand and communicate their impact on critical sustainability issues such as climate change, human rights and corruption (GRI, 2015). Therefore, the G4 is structured into four key areas of performance: Economic, environmental, social and governance (ibid.).

Along these four areas, the G4 provides reporting principles and standardized disclosures, including 9 economic, 34 environmental and 48 social specific disclosure indicators as well as 58 general standard disclosure metrics (GRI, 2014b). These specific metrics are additionally structured along 4 economic, 12 environmental and 30 social material aspects (ibid.). The GRI's reporting principles provide criteria that should be used to guide the organization's indicator choices, in order to achieve effective GRI reporting (GRI & IRIS, 2014).

The specific and general standard disclosures are the “questions”, which the organization has to answer in its report. This way, The GRI *G4 Sustainability Reporting Guidelines* enables companies to report on their economic, environmental and social performance as well as their governance approach (ibid.). Doing so, the GRI metrics set is the de facto standard for SPIs (GRI & IRIS, 2014; KPMG, 2008), reflected by its use that increased from 2008 to 2012 by 73% (IFC, 2012).

Nevertheless, the GRI is criticized for focusing with its TBL approach on traditional accounting schemes and for being unbalanced (Moneva et al., 2006), taking a too “managerialistic” approach to sustainability (Dumaya et al., 2010, p. 531) and being not transparent enough for stakeholders, as it would define no clear boundaries (O'Dwyer & Owen, 2005). Moreover, KPIs often measure primarily past performance with lagging indicators (Kendall & Willard, 2014) and thus do not help to capture the significant value sustainability offers (Bonini & Görner, 2011).

In fact, the G4 aims to capture sustainability value by defining boundaries and materiality of its proposed measures. “Materiality” refers directly to the SR (GRI, 2014, p. 3). This means that reported information should cover topics and indicators that reflect the organization’s significant economic, environmental and social impacts or that would substantively influence the assessments and decisions of stakeholders (ibid.). Thus, materiality is explicitly not limited to topics, which have a significant financial impact on the organization (IFAC, 2011). This materiality aspect allows companies that report in accordance to the G4, to choose the indicators they prefer as long as they explain why they pick them and take at least one indicator related to each “identified material aspect” (GRI, 2014, p. 12).

“Boundaries” refer to each chosen materiality aspect (ibid., p. 92). In setting the boundaries, an organization has to consider impacts occurring within and outside of the organization. Consequently, boundaries vary based on the materiality aspects.

#### 1.4.2.2 THE IMPACT REPORTING AND INVESTMENT STANDARD FOR SUSTAINABILITY MEASUREMENTS

The *Impact Reporting and Investment Standard* (IRIS) is managed by the non-profit *Global Impact Investing Network* (GIIN), dedicated to scale the effectiveness of “impact investing”, investments made into organizations that have the intention to generate social and environmental impact as well as a financial return (GIIN, 2014; IRIS, 2014b). Since 2009, the GIIN offers its metrics as a free public good to ensure the accountability in measurement practices across the impact investing industry and was used in 2014 by more than 5.000 organizations (IRIS, 2014b).

The IRIS provides value in the following ways. First of all, the IRIS “3.0” set of 488 standardized metrics (IRIS, 2015) can be used to measure and describe the social, environmental and financial performance of any kind of organization (Gelfand, 2012). Outstandingly, these metrics can be integrated into most SR approaches and other data management platforms (ibid.). IRIS metrics underpin for example the *Global Impact Investing Rating System* (GIIRS) (IRIS, 2014b, GIIRS, 2011), which is used to certify *Bcorps*, businesses that meet rigorous standards of social and environmental performance and accountability (Bcorporation, 2015). Moreover, the IRIS 3.0 metrics can also easily be integrated into impact measurement systems, used by investors across the fields (Gelfand, 2012). Therefore, IRIS provides metrics that are divided into twelve sectors for a widespread market use (IRIS, 2015). Hence IRIS (2014b) aims to provide with its metric catalogue a “one-shop” solution, where companies and investors find standardized indicators, universal applicable and reviewed every two years by experts.

IRIS offers no methodology to measure sustainability performance, but builds up a shared language to compare impact results, investments and aggregated information about these across different industries (MaRS, 2015). In doing so, it strives to work together with other institutions and uses for example indicators from the GRI framework, resulting in many overlapping metrics in both indicator sets (ibid.).

### 1.4.3 CHALLENGE: MISSING LINK BETWEEN SUSTAINABILITY MEASUREMENTS AND BUSINESS MODELS

The following conveys the most important literature review result: there is yet no clear “most relevant” (SRQ1) indicator set defined that would allow the measurement of sustainability performance on the BM level (Delmas & Blass, 2010; Keeble et al., 2003; Lüdeke-Freund, 2013; Searcy, 2012; Upward & Jones, 2015).

The presented GRI and IRIS metric set illustrate the problem in SA and SR of a manifold number of diverse measurements and reporting guidelines existing (IFAC, 2011; White, 2006). These need to be distinguished into “Normative Frameworks”, “Management Systems” and “Process Guidelines” (Ligteringen & Zadek, 2005, p. 3), as they take different perspectives and follow diverse goals. As such, the GRI reporting standard aims to set a normative framework for SR methodologies, whereas the IRIS metric set aims to be easy to integrate in various management systems. Besides these differences, three major pitfalls of the existing SPIs can be outlined.

First of all, no consensus exists yet about which indicators can be seen as standard to measure sustainability performance on a holistic BM level (Grunwald & Kopfmüller, 2006; IISD, 2015; Keeble et al., 2003; White, 2006), even if the institutes work towards this goal (IRIS, 2014b). The GRI SR guidelines and disclosure metrics have been widely accepted as standards (ibid.), however they are very complex and especially for *small and medium sized enterprises* (SME) not suitable (Bos-Brouwers, 2009). SMEs mostly lack the resources, capabilities and priority for SRs. Hence the standardized metrics are in practice often not applicable for smaller companies, leading to a low number of SRs done by SMEs (ibid.).

Secondly, in terms of strong sustainability, the GRI and IRIS are not explicit enough (Moneva et al., 2006; Searcy, 2012). Both, GRI and IRIS instructions, allow the choice of best fitting indicators to enable context-based measurements. However, a balanced set of social, environmental and economic indicators is not required. As a drawback of this, criticized as “Greenwashing”, companies can choose metrics that stress their sustainability performance and neglect other more critical ones (Schaltegger & Burritt, 2010). Thus, the met-

rics indicate and foster at best weak sustainability performance (Moneva et al., 2006).

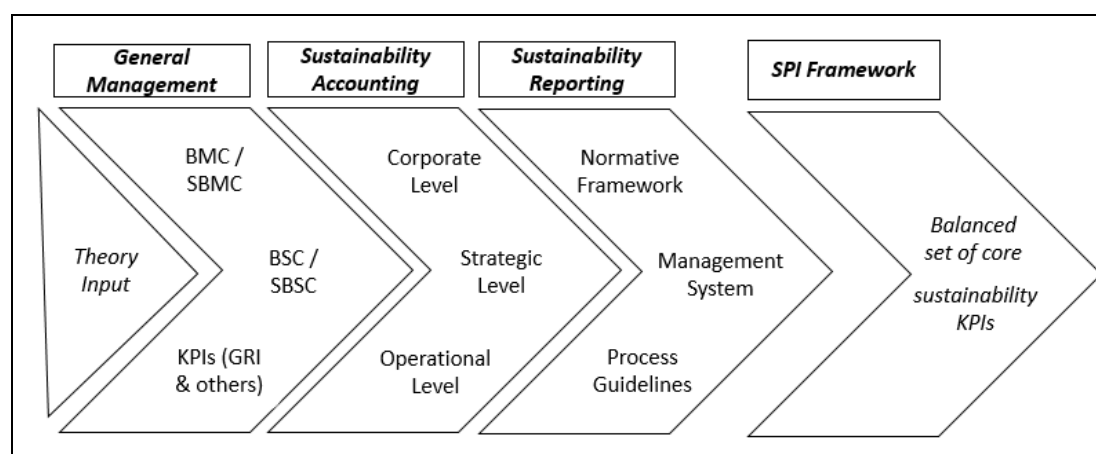
Thirdly, as a general problem in accounting, also the indicators to measure sustainability performance are often chosen in the very end of a production cycle (Parmenter, 2007), when it comes to reporting (Delmas & Blass, 2010). Hence the indicators are not integrated in the core logic of a business, respectively linked to its BM (Moneva et al., 2006) and can again be misused as posthumous green washing.

Summarizing the results from the whole literature review, it can be stated that “the indicators discussed in the sustainability-oriented research field” (SRQ1) are yet neither strongly connected to BMs, nor measuring the sustainability performance of a business on the holistic BM level. Thus, SRQ1 cannot be answered clearly. However, the GRI and IRIS metrics were identified as the so far most promising indicator sets, which nevertheless need to be integrated into an easy management tool that allows to measure sustainability on the BM level.

Therefore, the master thesis proposes the transfer of a balanced set of core SPIs into the BMC, to foster the integration of sustainability performance measures into the general management processes. This way, sustainability theories and normative SR guidelines could be thought of during the whole lifecycle of an organization. Especially, from the beginning, if for example a start-up has not yet created any SRs and thus needs to identify fitting SPIs. A balanced set of core SPIs in the BMC would enable start-ups and SMEs to choose from this set. Also, they would have the possibility to change SPIs, if needed, in the near-term.

Providing a balanced set of core SPIs supplementing the BMC and pre-determine a balanced choice, would moreover foster that strong sustainability performance could be measured on the BM level. Having these measurements in place, the SPI set would raise awareness for which actions have to be taken to manage a sustainable business logic. Hence instead of using the SBSC to identify SPIs, collecting data with SA and presenting them with SR, a SPI framework would combine these different CS steps and integrate them into the general management practice.

This master thesis therefore combines, as illustrated in figure 10, BM theory with SA knowledge to replace vague SR guidelines with a clear SPI framework. This way, the gap between the strategic vision of SBMs, the operational use of SPIs and the need for SR is bridged with a SPI framework, supplementing the BMC.



**Figure 10: Theory input for SPI framework development.**

The SPI framework, which will be developed in the following empirical part, is thus created as a practical management tool that combines knowledge from theory with experiences from practice. Therefore, a core SPI set will be extracted first from the practical field of SA and SR guidelines (using GRI 4.0 and IRIS 3.0 metrics).

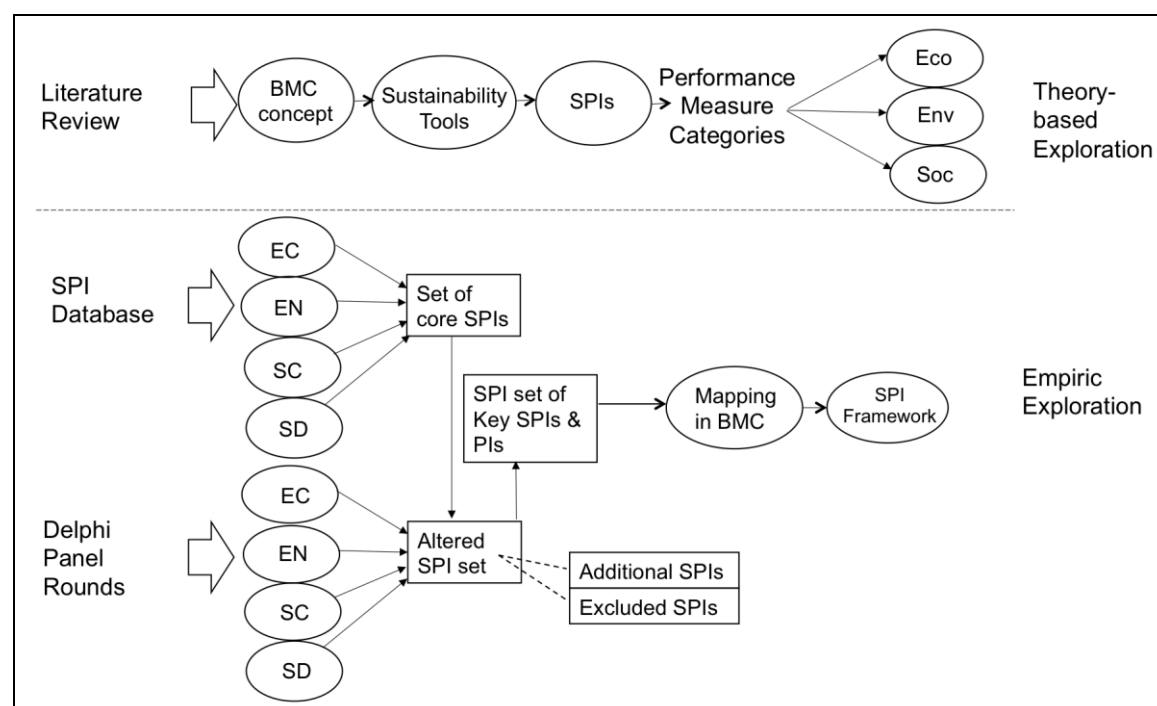
Secondly, this core set will be introduced to practitioners, as organizations and entrepreneurs increasingly employ sustainability practices that improve environmental and social impacts while maintaining profit (Shepherd & Patzelt, 2011; Upward & Jones, 2015). Thus, entrepreneurs, who create “sustainable” businesses as well as investors and consultants, who aim to measure sustainability performance of companies, are asked as experts, to identify the most relevant SPIs from the core SPI set.

The expert’s knowledge will help bridge the gap between theory and practice, symbolized in figure 10 with a gap between the “Theory input” and the “SPI framework”.

## 2. EMPIRIC: DEVELOPING A SUSTAINABILITY INDICATOR FRAMEWORK SUPPLEMENTING THE BUSINESS MODEL CANVAS

### 2.1 METHODOLOGY: EMPIRIC EXPLORATION WITH A MIXED-METHOD APPROACH

The first part of the thesis examined the literature about sustainability measurements on the BM level with a “theory-based exploration” approach (Bortz & Döring, 2009, p. 358).



**Figure 11: SPI database and Delphi rounds as part of empiric exploration.**

As visualized in figure 11, the literature review, leading from the BM concept to sustainability measurement tools and indicators, showed that neither one standardized SPI set exists, nor consensus about the degree of sustainability performance that “sustainable businesses” should reach. Hence it was proposed to investigate which balanced set of economic (EC), environmental (EN), social (SC) and standard disclosure (SD) SPIs can be used to measure sustainability performance on the BM level. Thus, this part of the thesis empirically explores the “multi-perspective” investigation (Flick, 2000, p. 318) of the proposed SPI set and SPI framework development by investigating SRQ2.

*SRQ2: “Which sustainability indicators do experts from practice use to assess the sustainability performance of their businesses?”*



Starting from the results of the literature review, a SPI database is developed, creating a balanced, core SPI set (2.2.2). Secondly, the extracted core SPI set is altered and redeveloped with experts from the practice-field of sustainability (2.2.4) as well as a SPI framework built (2.3). Later, these findings are compared to the literature results and critically reviewed (chapter 3). Therefore, a complex reasoning approach, through deductive literature review and inductive framework development is applied (Maxwell, 2005). This way, the knowledge transition between the theoretical and empirical part of this thesis is iterative and forms complementary parts.

In order to comprehensively examine the research object and the potential application of the previous knowledge gained, an “empiric triangulation” will be used (Flick, 2011, p. 9). This method was originally introduced by the sociologist Denzin and became originally known as “Mixed-Method” approach (Reichert, 2007, p. 197). It reflects the current differentiation of empirical research methods and approaches (Reichert, 2007). This way, qualitative and quantitative methods, including data collection and analysis, are combined with each other, based on a meaningful structure (Soeffner, 2000). This means, it always underlies the quality criteria of empirical research, so that the precision of the terminology, the credibility of the research, the applied research ethics and the scientific scope within the respective investigation must be respected (Bortz & Döring, 2009). To achieve this, the research design of a study has to be comprehensively planned and needs to be built “consistent in itself” along the triangulation approach (Flick, 2011, p. 26). Overall, triangulation aims for a “better outside-understanding” of the object of investigation, enabled by departing from both, the qualitative research standpoint of pure process-examining as well as the quantitative hypothesis-checking by means of a qualified researcher authority (Flick, 2000b).

Hence by using a mixed-method approach, this thesis contributes to theory and practice with the development of a SPI set and its empiric exploration (Bortz & Döring, 2009) as a BMC add-on.

## 2.2 SPI DATABASE AND DELPHI-PANEL-DISCUSSION

### 2.2.1 *METHOD: DATABASE DEVELOPMENT*

The data for the SPI database got collected in two steps: a selection of potential SA institutes providing SPIs and a selected core SPI set. Both steps were conducted in order to gain metrics that got defined by global expert groups (SPI database) and could be understood as “de facto standard”. These global indicators were later reviewed by local experts (Delphi-panel-discussion). Thus, a “data triangulation: the use of a variety of data sources in a study” (Janesick, 1994, p. 214) was applied.

#### 2.2.1.1 DATA COLLECTION

Investigating 23 SA Institutes, a SPI database was build up, which provides an initial overview of SPIs that are applied globally. So far, various global SPI sets exist, but a combined database of a standardized core SPI set is absent (IISD, 2015). To identify the most important metric sets, cross-links between the SR guidelines and recommendations of the SA institutes were used. This way, the GRI and IRIS metric sets were identified as de facto standards and as basis for further analysis.

The SPI database presents a rather qualitative selected core SPI set, extracted from the GRI and IRIS guidelines (see Appendix G). Nonetheless, the large number of totally 90 selected SPIs, can be considered a reasonable quantitative database (Bortz & Döring, 2009). The detailed data analysis step is explained in the following.

#### 2.2.1.2 DATA ANALYSIS

The collection of 23 global SA institutes was analyzed by type of institution and type of data provided. Following Maxwell (2005), “substantive” categories that derived from this data were created, dividing the institutes into 9 different types, depending on their aim to establish sustainability “rating”, “-reporting” or

“-accounting” standards as well as the elaboration of them, in the form of “standard development”, “tools” or only “institutional aims” (Appendix F).

Out of these categories, the “Sustainability Accounting & Standard Development Institute” category was chosen as basis for the next analysis step, as the institutes in this category provide SPI metrics to account sustainability performance and aim to establish them as global standards. In this category, the GRI and IRIS metrics were identified as the most referred-to and thus de facto SR standards.

Next, the GRI and IRIS metrics as well as the guidelines of 10 other institutes from the previous analysis step were reviewed in more detail, in order to identify specific characteristics, similarities and differences. This analysis supported the finding that only the GRI and IRIS guidelines are further developed, as they are divided into standardized “economic”(EC), “environmental” (EN) and “social” (SO) indicators. In addition, they provide general “standard disclosure” (SD) metrics and global reporting guidelines. The other institutes rather provide SR principles and serve for companies as a basis to develop their individual SPIs.

The deeper analysis of the GRI and IRIS metrics brought up a recently published “white paper” (GRI & IRIS, 2015) that aligns both metric sets. This paper was used as a basis to develop a core SPI set. Aggregating the 248 metrics from the white paper, a balanced set of 25 economic, 25 social, 25 environmental and 15 general standard disclosure metrics were selected. The detailed development of this core SPI set is described in the next sub chapter.

### *2.2.2 DATABASE AND CORE SPI SET ANALYSIS*

The collected 23 SA accounting were ordered in a first analysis step into the following 9 categories (Appendix F): “Sustainability Accounting” (1), “Sustainability Accounting Institute” (2), “Sustainability Accounting & Policy Development Institute” (3), “Sustainability Accounting & Rating Institute” (4), “Sustainability Accounting & Reporting Database” (5), “Sustainability Accounting & Standard Development Institute” (6), “Sustainability Accounting Tool” (7), “Sustainability Rating & Standard Development Institute” (8), “Sustainability Reporting Institute & Standard Development Institute” (9).

This categorizing strategy allowed uncovering the different goals and objectives of these institutes. Some are purely SA-oriented (1, 2), others aim to develop additional SR (5, 6) or policy (3) guidelines and the remaining focus on sustainability rating principles (4, 9) or provide databases (5). Besides these multiple orientations, also the goals of the SA institutes vary. Some develop tools for SA (7), other identify indicators to measure sustainability performance (6, 8, 9) and the rest provides abstract principles and frameworks instead of clear indicators. Therefore, it was decided, to focus on the “Sustainability Accounting & Standard Development Institute” category (6), as the institutes in this category provide metrics to account sustainability performance and aim to establish these as global standards.

This category includes besides the GRI and the IRIS, the *Social Reporting Standard* (SRS, 2014) and *Sustainable Accounting Standards Board* (SASB, 2015). However, out of 23 institutes from all categories, 8 mention the GRI metrics as core SPI set and 4 name (additionally) the IRIS metrics as source for their sustainability performance calculations. These recommendations for the GRI and/or IRIS metric sets were either stated on the homepage of the institutes (e.g. the *Global Impact Investing Rating System* refers to the IRIS metrics for the judgment of Bcorps) (BAanalytics, 2015) or were mentioned as cross-links in their own guidelines, frameworks or tools (e.g. the *Social Reporting Standard* recommends GRI metrics in its reporting framework) (SRS, 2014). This way, the GRI and IRIS metric sets were identified as de facto standard for CS performance measurement.

Next, the GRI and IRIS metric sets were investigated in more detail and compared to 10 other SA institutes of the former SA institute collection as well as their approach towards SPIs (Appendix F). The ten institutes' approaches were namely: the *ARISTA 3.0* framework (ARISTA, 2015), the *GIIRS* metrics (BAanalytics, 2015), the *Global Initiative for Sustainable Ratings* principles (GISR, 2014), the *International Integrated Reporting* framework (IRRC, 2014), the *MultiCapital Scorecard™* (MCS, 2014), the *Natural Step* framework (Natural Step, 2015), the *Sustainable Accounting Standard Board* standard (SASB, 2015), the *Social Reporting* standard (SRS, 2014), the *UN Global Compact* principles (UN Global Compact, 2015) and the *World Business Council for*

*Sustainable Development* framework (WBCSD, 2015). The analysis showed that all of these institutes provide rather vague principles, guidelines or frameworks to measure sustainability performance of companies. Despite, they do not provide own metrics and thus often refer to the GRI or IRIS metrics as core indicators. Hence this analysis step supported the finding that the GRI and IRIS metrics establish the de facto standard for sustainability performance measurement of businesses. Consequently, the question arose how a core set of SPIs can be extracted out of the 149 GRI indicators and 488 IRIS metrics.

Addressing this exact question, the GRI and IRIS published in February 2015 a “white paper” that aligns their two metric sets, improving the consistency and comparability of sustainability performance measurement and making corporate reporting more efficient and effective (GRI & IRIS, 2015). In this paper, the unbalanced GRI G4 indicator set, is compared to the IRIS metrics. Overlapping metrics are ordered along the GRI indicators, providing all IRIS metrics that are similar to one GRI indicator. This way, the white paper provides 70 (5 economic, 20 environmental, 25 social, 20 general standard disclosure) GRI indicators aligned to 178 IRIS metrics. As these 70 GRI indicators are ordered along the G4 structure, the IRIS metrics can also be separated into 35 economic, 41 environmental, 42 social and 60 general standard disclosure metrics.

Taking this white paper as basis, the scholar of this thesis balanced the provided GRI indicators by comparing them to the IRIS metric set. Thereby, it was aimed to build up a SPI set that contains an equal number of social, environmental and economic indicators and includes as well a certain set of standard disclosure metrics, as the GRI G4 advises. Therefore, the aligned IRIS metrics were ordered along their “Relevance”. This is possible by using the order function on the IRIS homepage (IRIS, 2015). Doing so, the most relevant IRIS indicators aligned to the GRI metrics of the white paper have been identified. At least one of the most relevant IRIS indicators for each GRI materiality aspect was chosen, as the GRI G4 guideline advises to take out of its indicator set at least one indicator for each aspect. However, the white paper provides for 12 social GRI aspects no fitting IRIS metric. Thus, to have a core SPI set established in accordance to the GRI G4 standard, 12 social GRI indi-

cators were added to the metrics. This way, a core SPI set of 25 social, 25 environmental, 25 economic and 15 general standard disclosure metrics were identified. The core SPIs can be found in Appendix G.

### 2.2.3 METHOD: DELPHI-PANEL-DISCUSSION

In a second step, the selected core SPI set was introduced to 20 practitioners, who have working expertise in one or more fields related to the three sustainability dimensions. Using the Delphi method (Dalkey et al., 1969), their feedback was used to discover new SPIs and to alter the core SPI set, in three survey rounds.

The Rand Corporation developed the Delphi method in the 1950s originally as technology forecast tool for warfare (Rand Corporation, 2015). The method entails an expert panel that anonymously replies to surveys and subsequently receives feedback in the form of “group responses”. Afterwards this process repeats itself, until the response-range is reduced and something closer to expert consensus is achieved (ibid). This way, the method gained importance as a widely accepted tool for gathering data, achieve opinion-convergence about uncertain real world issues, evaluating future decisions or putting together the structure of a model (Brosi et al., 2003; Hsu & Standford, 2007). Hence the Delphi approach allows designing and evaluating group communication systems for large groups, dealing with complex problems and helps to gather structured information for decision processes (Helmer, 1975).

In this thesis, the Delphi expert-panel-discussion is chosen as appropriate method, since it allows obtaining an agreed-on opinion (Linstone & Turoff, 1975), regarding which SPIs will be relevant in the future to assess sustainability performance on the BM level. Moreover, as the panel discussion took place in form of online surveys, the experts could be interviewed even if a simultaneous discussion were not be possible due to time and place constraints. Hence the Delphi method was used to gather opinions of geographically dispersed experts, to compare individual and group responses, to avoid negative effects of group dynamics and to approach a consensus, in a case where the information is insufficient and not well structured (Ziglio, 1996).

### 2.2.3.1 PANEL SELECTION

The most important aspects of a Delphi survey are the chosen interviewees, who have the greatest impact on the quality of this method (Häder & Häder, 2000). The interviewees should be a multi-disciplinary group of persons, who are seen as experts in their working field (Paetz et al., 2011). Hence for this thesis, a heterogenic group of 20 experts was recruited, via emails that explained the research and its participation requirements (Appendix H).

The experts were mainly chosen from the Berlin start-up community, as it is a vibrant field for social (ASHOKA, 2015; Social Impact Lab, 2015), environmental (Climate KIC, 2015; Green Alley, 2015) and economic (Centre for Entrepreneurship, 2015) start-ups. Out of the potential expert pool, the expert “panel” was identified according to the “purposeful sampling” and “criterion-based selection” strategy (Maxwell, 2005, p. 88), choosing members of a group, which conform to predetermined criteria. This way, the expert group is not seen as a sample that represents a specific population, but as a panel that provides unique information, which cannot be gained elsewhere (ibid.). The selection criteria of the experts taking part in the panel were the following.

- I. Professional background: Either founder of a for-profit or a non-profit start-up or work experience as consultant, as public or private investor or in a public or private incubator.
- II. Usage of KPIs: Using KPIs or other qualitative and quantitative indicators to measure performance of their own or consulted businesses.
- III. BMC experience: Having high professional experience in using the BMC.
- IV. Sustainability context: Working consciously in a practice-field related to sustainability, with a social, environmental or economical focus.

The degree of the panel’s expertise was judged by the scholar, who was in personal contact, via phone calls or face-to-face meetings, with all experts (Appendix I). Nonetheless, this subjective judgment was balanced, as suggested by Dalkey et al. (1969). Therefore, in the first two survey rounds self-assessment questions were included, asking the experts to disclose their pro-

professional background and their specific knowledge degree in the different practice-fields related to sustainability (Appendix K).

The panel size followed the advice to survey in a Delphi-discussion 10 to 15 experts, when they come from a homogenous background (Dalkey et al., 1969), and at least 5 to 10 if the experts have a heterogeneous background (Linstone et al., 1975). The group size of initially 20 experts is reasonable, as a bigger sample size reduces the risk of group mistakes as well as the risk of experts dropping out of the survey rounds (Häder & Häder, 2000). Moreover, as within the panel three subgroups were defined, including each 5 experts with different professional backgrounds, the panel size of at least 15 experts was necessary. The three subgroups had a “social”, “environmental” or “economic” focus. The 5 professional backgrounds were: “for-profit start-up” and “non-profit start-up/ NGO”, “consultant”, “private investors/ incubator” and “public investors/ incubator”. Planning for the case of experts dropping out of the study, 5 experts were added for each of the professional backgrounds. Therefore, the experts’ focus was not fully balanced with regard to the three dimensions of sustainability. However, the aim of the expert separation, into the three subgroups with multiple professional backgrounds, was to enable an unbiased discussion on SPIs to the greatest possible extend.

#### 2.2.3.2 DATA COLLECTION

Due to the manifold application areas of the Delphi method, no standardized procedure exists (Häder & Häder, 2000). However, almost all Delphi approaches include two basic phases: “exploration” and “evaluation” (Ziglio, 1996, p. 9). The exploration phase ensures that the discussed subject is fully explored, whereas the evaluation phase reflects on the experts’ opinions and allows redefining one’s view as response to the group discussion (ibid.)

For this thesis, experts were invited to participate in three online survey rounds and one feedback round, conducted from March to August 2015. For each survey round, pre-structured, standardized surveys (Fontana & Frey, 1994) were designed with the online survey tool *Google Forms* (Google, 2015). The surveys were sent via email to all experts. Each survey contained rating or ranking tasks, which asked for quantitative answers on a 6-point Lik-



ert scale (Norman, 2010) as well as to answer “open questions”, asking for qualitative feedback that left room for unexpected side-effects and the possibility to bring up new items (Bortz & Döring, 2009, p. 213). This way, the online panel discussion was used to gain “rich data” about the use of SPIs in practice (Fontana & Frey, 1994). The four conducted rounds resemble the Delphi structure proposed by Linstone and Turoff (1975, p. 5f).

*I. Factor finding round (March): Exploration and rating.*

The experts were asked to rate the 90 core metrics by relevance, to provide feedback regarding the presented SPIs and to name additional SPIs, which they use in practice. The aim of the first round was to explore SPIs, the subject under discussion (Appendix L: 1. Survey). The core SPI set served only as a starting point for further SPI exploration.

Scale Description	Corresponding Rating Points
“Highly relevant”	6
“Relevant”	5
“Kind of relevant”	4
“Kind of irrelevant”	3
“Irrelevant”	2
“Highly irrelevant”	1
“Do not know”	0

**Table 5: Rating scale.**

The 6-point Likert scale (Table 5) was structured from “Highly relevant” to “Highly irrelevant” and included an additional “Do not know” option. This way, a middle value was avoided, forcing experts to clearly indicate their choice for “Relevance” or “Irrelevance” (Chang, 1994; Matell & Jacoby, 1971).

*II. Factor rating round (April): Evaluation through review of SPIs.*

Due to the ratings of survey one, SPIs that are not relevant got excluded. For this purpose, the median was used as statistical measurement to find the most agreed-on SPIs (Judd, 1972). All SPIs with a median of  $\geq 5$  (“Relevant”) were taken into account for the second survey round.

Moreover, due to the expert's feedback, selected SPIs were altered or new ones introduced. The results were written down and presented via email as introduction for the second survey to all experts (Appendix L: 2. Survey). The aim of the second round was to understand how the expert group views SPIs. In the second survey, the experts were asked to re-rate, on the same scale, the selected, altered and new metrics as well as to state whether the data presented their previous feedback.

### III. *Factor relation round (May): SPI ranking and mapping to BMC.*

Due to the second feedback, the indicators were again altered and selected by the median of  $\geq 5$ , indicating the experts' agreed-on opinion. The results were presented via email as introduction of the third online form (Appendix L). As some significant response-ranges between the different expert groups stayed consistent, the third round did not try to force (a deeper) consensus by a third rating round (Häder & Häder, 2000). Instead, experts were asked to rank the indicators by importance. Therefore, the experts had to rank the indicators in each of the four categories: environmental, social, economic and general standard disclosure. Moreover, the experts were asked to indicate whether they see a single indicator as *Key SPIs* (resembling generic KPIs of sustainability performance measurement) or other relevant *Performance Indicators* (PIs). Afterwards, they were asked to name all indicators, relevant for each BM component.

To facilitate this complex ranking and ordering task, a table explaining the SPI set and the BMC components got attached to the survey (Appendix L: 3. Survey). The aim of this round was to evaluate the relations among the discussed SPIs and the reason for potential agreement or disagreement of the experts.

### IV. *Last feedback round (August): SPI framework review.*

The experts were invited to provide feedback to the SPI framework. Therefore, a draft was sent to the experts via email, asking for comments or suggestions. The aim of this round was a last evaluation.

### 2.2.3.3 DATA ANALYSIS

The benefits and challenges of a “triangulation” research design are to balance between the significant amount of rich data and its analysis, presentation and final communication (Bortz & Döring, 2009). Especially, when applying a Delphi method, the insights can be extensive and full of details (Dalkey et al., 1969). To efficiently manage the data collected and its subsequent analysis, all data was stored during the research process in *Excel* (Microsoft, 2015) sheets. This way, the data could easily be structured into “in-vivo codes” during the research process as well as into categories in later steps of the analysis (Strauss, 1987, p. 30). In addition to these qualitative analyses steps, quantitative analysis methods in the form of statistical accounting, namely the calculation of the median, the mode and the variance of the answers, were used to analyze the Delphi surveys (Jubb, 1972).

Nonetheless, most of the qualitative data analysis highly depends on the scholar’s interpretation. To uncover and potentially overcome this bias, the aggregated data and its analysis was documented and transparently published in the appendix (F-M) (Fontana & Frey, 1994).

The analysis of the Delphi surveys was done with the help of the online Google Forms tools as well as with Excel. First, the online collected data was exported from Google Forms as Excel Tables. Secondly, the rating answers were transformed into numbers with help of Excel. This way, the answers from round one and two could be analyzed with statistical methods.

Delay (1969) advises to calculate the “statistical group response” in each survey round to explore the groups’ opinion, defined as appropriate aggregate of the individual members’ opinions in the final group response (p. V). Thus, to uncover the group response, statistical quantities were used to identify in the first two survey rounds the indicators that achieve consensus. However, as the kind of criteria used to define consensus in a Delphi study is subject to interpretation, decision rules need to be established (Hsu & Sandford, 2007). For this thesis, consensus was defined as a group response of at least 50% of the experts rating a SPI with “Relevant” or “Highly relevant”. This is equal to

the median of  $\geq 5$ . In the first two survey rounds, this analysis method allowed to select indicators that the experts judge as relevant.

In addition, between the different survey rounds the mode, variance and percentage of experts rating a SPI with “Relevant” or “Highly relevant” was used to analyze the range of the experts’ opinion and to investigate the consensus building (ibid.). This deeper analysis step, allowed to calculate an internal ranking of the SPIs for the first two rounds, showing on the top the indicators that are rate by up to 80% of the experts as “Relevant” or “Highly relevant” (media  $\geq 5$ ). In the second round, these calculations were used to define for each SPI category (economic, environmental, social, standard disclosure) a new consensus rate, in order to separate “Key SPIs” from other relevant “PIs”. All indicators that were rated by more than 60% of all experts as “Relevant” or “Highly relevant” and were agreed on with a median of  $\geq 5$  by all expert sub groups were seen as Key SPIs.

The qualitative feedback that was given as answers to the open questions was analyzed using the categorization strategy of substantive codes. These were used to frame the experts’ feedback into broader categories, which allowed clustering the different statements (Maxwell, 2005). Whenever possible, in vivo codes, including the words of the experts, were used to openly code the feedback (Strauss, 1987). From this feedback, new indicators arose, others were criticized and additional ideas for the further research were provided.

The data collected in the third survey round, differed from the data sets of the first two rounds. Here, the experts ranked the remaining SPI set of 38 indicators by importance. This way, it was aimed to analyze differences between the three sustainability perspectives of the experts as well as to finally identify the most agreed on indicators. In addition to this ranking, the indicators were named by the experts as “Key SPIs” or “PIs” and finally mapped to the BMC. Due to this ranking, 3 to 5 Key SPIs in each SPI category were selected and mapped to the BMC. The residual indicators, chosen by at least 50% of the experts as relevant SPIs, were defined as additional PIs.

The cross-analysis of the Delphi rounds is provided in 2.2.4. Moreover, an aggregated overview of the survey answers and of the various coding steps is published in Appendix M.

#### 2.2.3.4 QUALITY INSURANCE

The scholar is aware to be value-bound and strives to control subjective interpretations (Saunders et al., 2009) with a mixed-method research design (Denzin & Lincoln, 1994), in which literature results were evaluated together with experts (Maxwell, 2005).

This research attitude is best described by the “realism” research paradigm (Hine & Carson, 2006), which is perceived as neither value free nor value landed. Instead, the researcher is aware of value and hence investigates multiple perceptions of reality. This was done by the expert interviews as well as by comprehensive interpretations through qualitative and quantitative methods (ibid.). To secure research quality, the research design was therefore aligned to the triangulation strategy, bringing together complementary perspectives of different experts as well as data collected from different sources. This way, the scholar aimed to minimize the high uncertainty of this research with the triangulation of data and methods (Flick, 2000).

Furthermore, to ensure the information quality of the study, experts were chosen due to the mentioned selection criteria. Also, as all experts were contacted personally and confirmed their expertise as well as their will to participate in the various survey rounds, the experts were strongly concerned with the research topic and its goal. Hence the chosen experts were the best available source of information, although their personal commitment could have caused bias in the form of “socially desired answers” (Creswell, 2013). However, the anonymous Delphi surveys rounds were designed to reduce the social pressure towards these kinds of answers (Dalkey et al., 1969).

In addition, all surveys were pre-tested with two external test persons, who previewed the logical order of the questionnaires, the understanding of the single questions and the time needed to comply the surveys. This way, the survey quality was improved (Bortz & Döring, 2009).

Further actions of quality insurance have been conducted in terms of resilience, trustworthiness and reliability (Riege, 2009), thus, towards the “credibility” of the research (Corbin & Strauss, 2008). Credibility can be achieved if the “findings are trustworthy and believable in that they reflect participants’, researchers’, and readers’ experiences with a phenomenon” (ibid., p. 302). Hence the scholar aimed to not influence the results, during the survey rounds, in order to ensure resilience. As mentioned, complete objectivity cannot be achieved but a neutral data analysis was provided by an unbiased interpretation of data. Moreover, the documentation of the survey rounds and their availability for future reference provides additional data quality assurance (Dalkey et al., 1969). To further enhance trustworthiness of the results, the data was investigated critically, which is insured by a differentiated analysis of the results (Strauss, 1987). Therefore, the Delphi-round-results were cross-analysed and compared to literature with a clear process for data analysis, which has been presented previously.

Finally, continuous reflection and critical questioning of the conclusion is of high importance to ensure the quality of the results (Creswell, 2013).

## 2.2.4 CROSS-ANALYSIS OF DELPHI SURVEY ROUNDS

### 2.2.4.1 1. ROUND: CHOSEN SPIs

The first online survey was sent to the experts on 3<sup>rd</sup> of March 2015 and got closed on 24<sup>th</sup> March 2015, when the last expert answered. In between, “reminder emails” were sent to the experts, which kindly asked to fill out the survey. The first Delphi survey round demonstrates, with an answering rate of 100% (Appendix J), the high interest and motivation of the experts.

<b>SPI</b>	<b>Soc SG</b>	<b>Env SG</b>	<b>Eco SG</b>	<b>Panel</b>	<b>New SPIs</b>
So	21	15	10	<b>14</b>	<b>0</b>
Ev	17	18	2	<b>12</b>	<b>3</b>
Ec	19	6	6	<b>9</b>	<b>6</b>
SD	11	4	5	<b>8</b>	<b>3</b>
<b>Total</b>	<b>68</b>	<b>43</b>	<b>23</b>	<b>43</b>	<b>12</b>

**Table 6: First survey round results: selected SPIs.**

The analysis of the answers (Table 6) shows that the panel judged, out of the 90 introduced metrics, 14 social, 12 environmental, 9 economic and 8 standard disclosure indicators as “Relevant” or even “Highly relevant” (indicated by an median of  $\geq 5$ ). In addition, the experts named 12 new indicators: 3 environmental, 6 economic and 3 standard disclosure metrics. Noticeable, the answers differ significantly between the expert sub groups (Table 6: SG). The experts with a social background rated most indicators as relevant, in total 68. The economic sub group rated the least indicators as relevant, in total 23, and the environmental sub group lies in the middle with 43 indicators.

The selected indicators were analysed in depth, comparing median, mode, variance and percentage of the experts rating an indicator as “Relevant” or “Highly relevant” (Appendix M: Survey Round1a). This way, an “Internal ranking” of the SPIs was done for each of the four categories. This was conducted to compare the rating of the first round with the following rounds.

The qualitative feedback of the experts (Appendix M: Survey Round1b) was analysed using codes, including the expert’s words and arguments. The overall feedback was that the indicators should be more specific in terms of boundary and scope of a company, respectively of the applied measurement. Especially, customer-, region- and branch-dependency was claimed to be an important issue. For example, Jahnke (social consultant) stated:

*“A KPI is not a standalone issue but depends on the stakeholder and regions. For example water savings is a small KPI in the federal state of Brandenburg or maybe Canada, because there is enough in a good quality. But it’s a big KPI in Spain because they don’t have enough.”*

Süß (Social NGO) added: “in general, the selection of KPIs would depend on the supply chain (structure, relevance, countries etc.) of the enterprise.”

Moreover, the wording of the different indicators was criticized for being not flexible enough, in order to fit different company types and sizes (Appendix M: Survey Round 1b and 1c). Therefore, the selected indicators were altered and the newly added indicators formulated by taking this feedback into account. The changes were conducted as follow.

Indicators, including rather vague, qualitative measurements or disclosures, were complemented with the phrase “Organizations should footnote the type(s) and context (e.g. country, lifetime stage of product/service) of [...] as well as assumptions used when reporting against this metric”.

Furthermore, the terms “clients” and “customers” were changed into “clients (resp. customers, users), potential clients or other relevant stakeholders”. Also, feedback that referred to specific indicators, was integrated by changing phrases and adding terms that were proposed by the experts such as “Due Diligence” and “Child labour” by Süß or “Anti-Discrimination” by Saraogi (social start-up). This way, it was aimed to formulate the indicators more rigorous, in accordance with various stakeholder needs and reflecting the dependency on contextual circumstances.

In addition, in order to reduce doubling of indicators, the economic indicators EC5 “Net Income” and EC8 “Net Income Before Donations” were merged together in the new indicator EC1 “Net Income (Before Donations)”, indicating the organization's net profit and net profit before donation.

This was also done with the indicators EN10: “Indicate whether the organization has been found to be out of compliance with any local environmental regulations during the reporting period” and SO11: “Indicate whether the organization has been found to be out of compliance with any local labour or tax regulations during the reporting period”, both named “Local Compliance”. Here, the analysis showed that 73,33% of the experts rated SO11 with “Relevant” or “Highly relevant”, whereas 66,66% rated the indicator EN10 as “Relevant” or “Highly relevant” (Appendix M: Survey Round 1a). Hence SO11 and EN10 became the new social indicator SO3 “Local Compliance”, revealing whether the organization has been found to be out of compliance with any local regulations (e.g. labour, tax, environmental standards) during the reporting period.

Having analysed the first survey round, 9 indicators stood the same and were not altered, 32 were changed and 12 were added as new indicators (Table 7 below).



<b>SPI</b>	<b>Same</b>	<b>Changed</b>	<b>New</b>	<b>Total</b>
SO	4	10	0	<b>14</b>
EV	0	11	3	<b>14</b>
EC	5	3	6	<b>14</b>
SD	0	8	3	<b>11</b>
<b>Total</b>	<b>9</b>	<b>32</b>	<b>12</b>	<b>53</b>

**Table 7: Finalized metrics of first survey.**

Hence the second Delphi survey round contained 53 metrics, including 14 environmental, 14 social, 14 economic and 11 standard disclosure ones. Hence the initial indicator set was reduced by 41%. All indicator alterations are illustrated in Appendix M (Survey Round 1d).

#### 2.2.4.2 2. ROUND: REVIEW AND KEY SPIs

The second online survey was send to the experts on 7<sup>th</sup> April and got closed on the 29<sup>th</sup> April, as no more expert answered, even though three reminder-emails were send. Nevertheless, 17 experts answered in total (Appendix J), which equals an answering rate of 85%.

<b>SPI set</b>	<b>Soc SG</b>	<b>Env SG</b>	<b>Eco SG</b>	<b>Panel</b>	<b>New SPIs</b>
SO	13	10	4	<b>12</b>	<b>0</b>
EV	12	10	4	<b>10</b>	<b>-1</b>
EC	13	5	11	<b>12</b>	<b>-4</b>
SD	10	5	6	<b>9</b>	<b>0</b>
<b>Total</b>	<b>48</b>	<b>30</b>	<b>25</b>	<b>43</b>	<b>-5</b>

**Table 8: Second survey results: selected SPIs.**

The analysis of the second survey round shows that no more new indicators were named by the experts (Table 8). However, 43 SPIs were selected through a median  $\geq 5$  by the panel. Thus, the introduced SPI set of 53 indicators was only reduced by 19%. This gave the impression that the SPI saturation, in terms of new indicators, has reached a high degree of aggregation. Moreover, five indicators were merged into another indicator.

A deeper analysis (Appendix M: Survey Round 2a), comparing the variance and the internal rank of the single indicators in round one and two, shows that

for most of the 43 selected indicators, the variances decreased. This means, that the ratings of the different indicators did not differ as much as in round one. Especially, the newly added indicators showed, in comparison to the others, low variances (Variance:  $\leq 1,0$ ). This is true for example, for EC4 (Survey 1: New EC11): “Churn Rate” (Variance: 0,4) and EC10 (Survey 2: New EC15): “Growth Rate” (Variance: 0,5).

Nonetheless, the variance of 10 indicators increased and thus also the difference in the expert’s rating for these indicators. Looking at the specific data set, it becomes clear that many of these variance-increases can be explained by experts giving an extreme positive or negative rating, whereas they rated the same indicator in the round before with “Do not know” (Appendix M: Survey Round 2c). In addition, the dropout of three experts in the second round changed the overall ratings. This is the case, for example, for the indicator SD4: “Social Impact Objectives” (Variance 1: 0,2; Variance 2: 1,2). One expert chose “Do not know” in the first round and “Irrelevant” in the second. Moreover, all of the three dropping out experts rated this indicator with “Kind of relevant” or higher in the first round. Thus, the second rating of this indicator differed a lot from the first und hence the variance increased.

The rating tendencies of the three expert-sub-groups remained the same (Table 8). The social experts tended to rate the most indicators as “Relevant” or “Highly relevant”, the environmental sub group’s rating stayed in the middle and the economic sub group had the tendency to rate the least indicators as “Relevant” or “Highly relevant”. The differences between the ratings of the sub groups led to variance-increases (e.g. SD5) or prevented a clear consensus.

The differences between the sub groups were analyzed in detail in Appendix M (Survey Round 2c). Here, it was investigated which indicators could be identified as Key SPIs (in survey named KPIs) or as context-based additional PIs. This decision, was based on the agreement across all sub groups and the percentage of experts rating an indicator as “Relevant” or “Highly relevant”. This way, indicators that have been rated by all three sub groups with a median  $\geq 5$  and as “Relevant” or “Highly relevant” by more than 60% of the experts, were defined as Key SPIs.

Key SPI	Total	Code	Short Name	Changed	Expert
SO	4	SO1	Employee Happiness		x
		SO4	Labour Evaluation	x	x
		SO9	Human Right & Impact	x	
		SO10	Local Compliance	x	
EV	3	EN3	Green House Gas	/	/
		EN7	Reputation & Transparency	x	
		EN9	Sourcing Evaluation	x	x
EC	3	EC5	Customer Happiness		x
		EC7	Growth Rate		x
		EC8	Customer Lifetime Value		x
SD	3	SD2	KPI Weighting		x
		SD5	Value Creation		x
		SD6	Legal Structure	/	/

**Table 9: Survey round 2: aggregated Key SPIs.**

Hence, as table 9 illustrates, 4 social and each 3 environmental, economic and standard disclosure metrics were identified as Key SPIs. In addition it showed which of these Key SPIs have been changed due to feedback of the experts or have even been introduced by them. Only 2 identified Key SPIs (EN3, SD6) were similar to the wording of the core SPI set, extracted from the GRI and IRIS guideline. These internal analysis results were done as quality control and were compared with the answers of the next survey round, in which the experts were asked to identify the Key SPIs themselves.

The amount of the qualitative feedback of the experts decreased in the second round. However, to define “generic” SPIs was criticized by panel expert Linz (environmental private incubator) as well as Süß. Additionally, a context-based assessment of sustainability performance was proposed by panel experts Kroll (environmental non-profit start-up) and Rudolph (environmental consultant). This context-based assessment should fit individual BMs (Linz), reflect different effects on stakeholders and indicate the company’s dependency on “ecosystem services” (Rudolph) (Appendix M: Survey Round 2b).

Moreover, the economic indicators EC1: “Net Income (Before Donations)”, EC2: “Customer Acquisition Cost”, EC3: “Gross Profit”, EC5: “Total Revenue”, EC9: “Cash Flow: Net Total” and EC14: “EBITDA” were criticized for being “relevant for evaluation of the overall financial performance but not relevant for sustainability” (Linz). The same expert has rated these indicators in the

first round with "Highly relevant" and in the second round with "Kind of relevant". It seems as if the expert had reconsidered the relevance of the economic indicators in the context of sustainability. Instead, the in the first round newly added economic indicators EC4: "Churn Rate", EC6: "Customer Happiness", EC10: "Growth Rate", EC12: "SROI" and EC13: "Customer Lifetime Value" were considered as more sustainable in comparison to the above mentioned, old ones. Therefore, the in round two selected indicators EC1, EC3, EC5 and EC9 were merged into indicator EC10 "Growth Rate". This was done, since 73,3% of all experts rated EC10 as "Relevant" or "Highly relevant" and strongly agreed on its relevance (Variance: 0,52, very low). In addition, the indicator EN1: "Recycled Materials" was merged into the existing indicator EN9: "Recycled Materials Ratio", which was rated by 60% of the experts as "Relevant" or "Highly relevant" and EN1 only by 53%.

Taking the qualitative feedback into account and acknowledging the remaining differences between the sub groups, it was decided to not force consensus on the SPI set. Hence due to the feedback of a context-based relevance of SPIs in different sectors, branches, regions and business types, the next survey did not contain another re-rating. Instead, the last survey conducted a ranking.

#### 2.2.4.3 3. ROUND: RANKING AND SPIs MAPPED TO BMC

The third survey round was send to the experts on 11<sup>th</sup> May and got closed on 10<sup>th</sup> June, as no more experts answered after the third reminder-email. A list of all indicators as well as an explanation of the BMC elements was attached to the survey in order to ease the complex task of ranking and mapping the indicators to the BMC (Appendix L: 3. Survey). 13 experts answered in total (Appendix J), which is an answering rate of 65%.

The analysis of this final survey round showed that the experts agreed (with more than 50%) on which indicators can be acknowledged as Key SPIs and their specific rank of importance. Nevertheless, the importance-ranks for the PIs differ significantly between the sub groups (Appendix M: Survey Round 3a). Thus, for the PIs, the experts did not agree on one rank that is overall binding for all sub groups. Such an overall order was however calculated by taking the average value of all sub group rankings into account. This way, a

selection of finalized Key SPIs and additional PIs based on importance was conducted (Table 11 to 14). However, to acknowledge the different point of views of the sub groups, the rank numbers for each sub group was calculated as well (Appendix M: Survey Round 3a).

The selected Key SPIs differed to some extent to the selection that was internally calculated in round two (Table 9). Nonetheless, more than half of the Key SPIs, named by the experts in round three, were also identified as Key SPIs in round two. Hence the results are rather consonant.

<b>SPI Set</b>	<b>Key SPIs</b>	<b>PIs</b>	<b>Total</b>
SC	3	9	<b>12</b>
EV	4	5	<b>9</b>
EC	3	5	<b>8</b>
SD	5	4	<b>9</b>
<i>Total</i>	<i>15</i>	<i>23</i>	<b>38</b>

**Table 10: Third survey results.**

Table 10 illustrates the results of survey round three. 3 social, 4 environmental, 3 economic and 5 standard disclosure metrics were identified as Key SPIs, as more than 50% of the experts judged these indicators as “KPIs” (Appendix M: Survey Round 3a). The residual 23 metrics were identified as additional, context-based PIs and were ranked due to their overall importance-rank. The indicators sets were finalized as following (Key SPIs in bold letters).

<b>Rank</b>	<b>Soc SG</b>	<b>Env SG</b>	<b>Eco SG</b>	<b>Overall Rank: Code and Short Name</b>
1	SO4	SO5	SO5	<b>SO5: Safety and Social Security</b>
2	SO5	SO4	SO1	<b>SO4: Labour Evaluation</b>
3	SO1	SO1	SO4	<b>SO1: Employee Happiness</b>
4	SO11	SO9	SO9	SO9: Assessment: Human Rights and Impact
5	SO6	SO11	SO11	SO11: Child Labour Policy
6	SO8	SO6	SO12	SO6: Anti-Discrimination Policy
7	SO7	SO12	SO6	SO12: Fair Compensation Practices
8	SO12	SO10	SO8	SO10: Local Compliance
9	SO9	SO7	SO10	SO7: Women and Men Ratio
10	SO10	SO3	SO2	SO3: Grievance Mechanisms
11	SO3	SO2	SO7	SO8: Employee Turnover Rate
12	SO2	SO8	SO3	SO2: Market Research on Stakeholders

**Table 11: Social indicator set: 3 Key SPIs and 9 additional PIs.**

Rank	Soc SG	Env SG	Eco SG	Overall Rank: Code and Short Name
1	EN3	EN9	EN7	<b>EN7: Reputation and Transparency</b>
2	EN7	EN7	EN9	<b>EN9: Sourcing Evaluation</b>
3	EN1	EN3	EN1	<b>EN3: Greenhouse Gas Reductions</b>
4	EN9	EN1	EN3	<b>EN1: Waste Generated</b>
5	EN5	EN2	EN5	EN5: Environmental Management System
6	EN4	EN4	EN6	EN2: Recycled Materials
7	EN8	EN5	EN2	EN4: Non-hazardous Waste Avoided
8	EN2	EN6	EN8	EN6: Hazardous Waste Produced
9	EN6	EN8	EN4	EN8: Hazardous Waste Avoided

**Table 12: Environmental indicator set: 4 Key SPIs and 5 additional PIs.**

Rank	Soc SG	Env SG	Eco SG	Overall Rank: Code and Short Name
1	EC1	EC3	EC3	<b>EC3: SROI</b>
2	EC3	EC7	EC7	<b>EC7: Growth Rate</b>
3	EC7	EC1	EC1	<b>EC1: Target Beneficiary Socioeconomics</b>
4	EC8	EC5	EC2	EC5: Customer Happiness
5	EC4	EC6	EC5	EC8: Customer Lifetime Value
6	EC2	EC4	EC8	EC6: Churn Rate
7	EC6	EC8	EC6	EC2: Customer Acquisition Cost
8	EC5	EC2	EC4	EC4: Jobs Maintained: Low Income Areas

**Table 13: Economic indicator set: 3 Key SPIs and 5 additional PIs.**

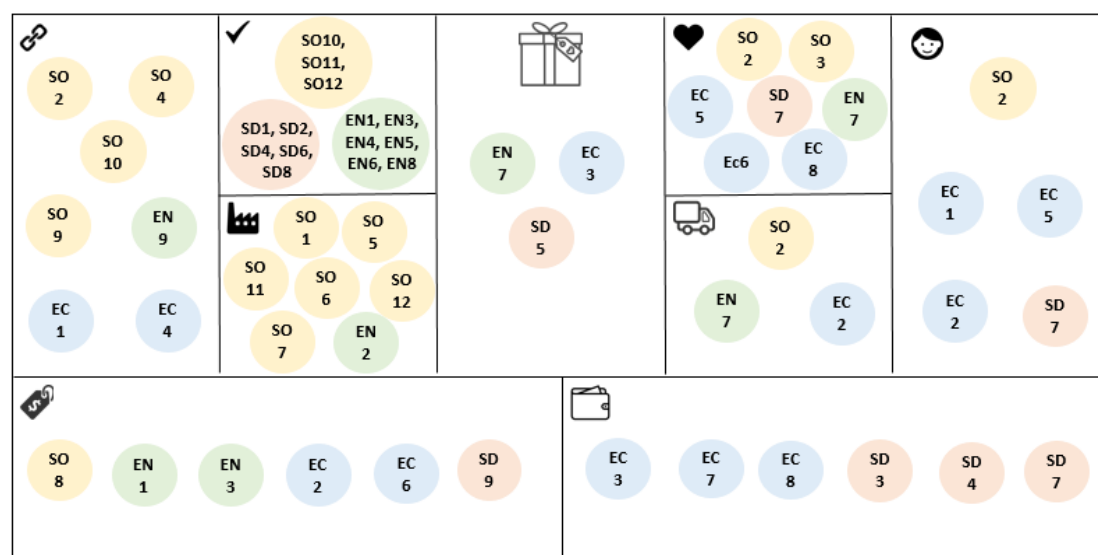
Rank	Soc SG	Env SG	Eco SG	Overall Rank: Code and Short Name
1	SD5	SD5	SD5	<b>SD5: Value Creation Statement</b>
2	SD3	SD1	SD1	<b>SD1: Social Impact Objectives</b>
3	SD8	SD8	SD3	<b>SD8: Environmental Impact</b>
4	SD1	SD2	SD8	<b>SD3: Operational Model</b>
5	SD2	SD3	SD2	<b>SD2: KPI Weighting</b>
6	SD7	SD4	SD7	SD7: Customer Model
7	SD4	SD9	SD6	SD4: Product /Service Output
8	SD9	SD6	SD4	SD9: New Investment Capital
9	SD6	SD7	SD9	SD6: Legal Structure

**Table 14: Standard disclosure metric set: 5 Key SPIs and 4 additional PIs.**

It was decided to define all indicators as Key SPIs that were identified as such by more than 50% of the experts. This was done because some indicators (SO4, EN3, EN9, EC7, SD8) were rated with only 50% - 60% as Key SPI but had a higher importance-rank than other indicators with more than 60% agreement. To acknowledge the importance of these indicators, they were included in the Key SPI set.

In the second part of the survey, the experts were asked to map all indicators to the BMC elements. Three experts did not fill out this part, either due to in-

convenience, a knowledge lack or time effort. However, the answers of the other ten experts was analyzed (Appendix M: Survey Round 3b). Each indicator that was mapped by at least three experts to one BMC element was identified as referring to this BMC element. This way, all indicators were mapped to the BMC (Figure 12).



**Figure 12: All Key SPIs and additional PIs mapped to the BMC.**

Mapping the indicators to the BMC, it became clear that by far the most social, environmental and standard disclosure metrics have been mapped by the experts to the BMC element “Key Activities”, followed by “Key Resources”.

The economic indicators were mapped mostly to the BMC elements “Customer Segments”, “Customer Relationships” and “Revenue”.

The BMC elements “Value Proposition” and “Channels” contain each only three indicators, thus a much aggregated range of indicators.

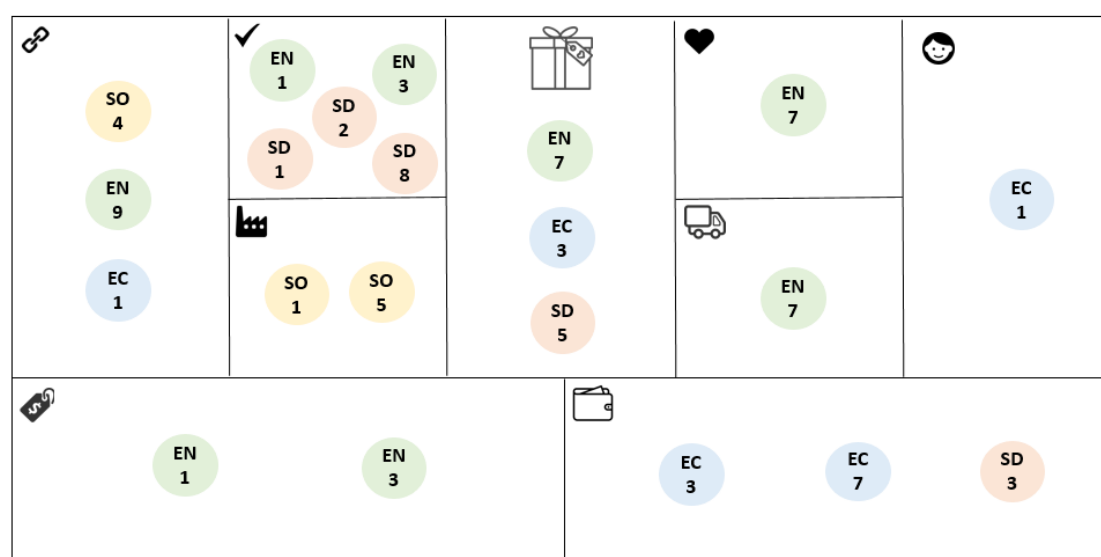
The “Cost” and “Customer Relationships” sections were the only BMC elements to which metrics from each indicator set were mapped. However, the “Channels” and “Key Partners” section contain indicators from the social, environmental and economic field.

## 2.3 RESULT: SPI FRAMEWORK

In the third, 15 Key SPIs were identified, answering the RQ.

*RQ: “What are the relevant indicators essential to measure sustainability performance on the business model level?”*

These Key SPIs were mapped to the BMC by the experts. In order to build the final SPI framework, they were visualized in the BMC (Figure 13).



**Figure 13: SPI framework with 15 Key SPIs.**

Customer Segments	Value Proposition	Channels	Customer Relationships	Key Resources	Key Activities	Cost Structure	Revenue Stream	Key Partners
EC1: Target Socio-economics	EN7: Reputation and Transparency EC3: SROI  SD5: Value Statement	EN7: Reputation and Transparency	EN7: Reputation and Transparency	SO1: Employee Happiness SO5: Safety and Security	EN1: Waste Generated EN3: Greenhouse Gas SD1: Social Impact SD2: KPI Weighting SD8: Environmental Impact	EN1: Waste Generated EN3: Greenhouse Gas	EC3: SROI EC7: Growth Rate SD3: Operational Model	SO4: Labor Evaluation EN9: Sourcing Evaluation EC1: Target Socio-economics

**Table 15: Key SPIs (code and short name) mapped to the BMC elements.**

This way, a SPI framework was created that contains the following indicators in each BMC element (Table 15). Each Key SPI indicates specific impacts, actions or efforts of an organization that allow measuring its sustainability per-



formance on the BM level. In the following, each Key SPI role in the framework as well as its measurement is explained.

SO1: “Employee Happiness” indicates in the BMC element “Key Resources”, whether the organization has a system in place to solicit feedback from employees and an established procedure to measure their happiness. Using this indicator, organizations should footnote the process and frequency by which they obtain feedback to measure employee happiness.

SO4: “Labour Evaluation” indicates in the BMC element “Key Partners”, whether an elaborated process is in place to evaluate along the whole supply chain the number of operations and suppliers identified as having significant risk for incidents of forced, compulsory or child labour. Using this indicator, organizations should footnote the measures taken to contribute to the elimination of all forms of forced or compulsory labour.

SO5: “Safety and Security” measures in the BMC element “Key Resources”, whether an organization has systems and policies in place to monitor, evaluate and ensure worker safety, including the guarantee for social security protection. Organizations should footnote the type and context of these systems and policies.

EN1: “Waste Generated” depicts in the “Key Activities” and “Cost” BMC element, the total amount of waste disposed by the organization during the reporting period. Organizations should footnote the type of waste, the context (e.g. country, lifetime stage of product or service) and assumptions used when reporting against this indicator.

In addition, EN3: “Greenhouse Gas Reductions” reveals as well in the “Key Activities” and “Cost” BMC element, the amount of reductions in greenhouse gas (GHG) emissions over the lifetime of products sold, during the reporting period. Organizations should footnote the energy type, the context of the reduced GHG (e.g. country, lifetime stage of product or service) and assumptions used when reporting against this metric.

EN7: “Reputation and Transparency” uncovers in the three BMC elements “Value Proposition”, “Customer Relationships” and “Channels”, the activities taken to transparently disclose the company's environmental impact. Including certificates the organization received, memberships or other honours by recognized third parties, taking a stand for sustainable impact.

EC1: “Target Beneficiary Socioeconomics” specifies in the “Key Partners” BMC element, the socioeconomic stakeholder groups of beneficiaries targeted (e.g. very poor, poor, low income) by the organization along the whole supply chain. Organizations should footnote the type and context (e.g. country, lifetime stage of product/service) of the socioeconomic stakeholder groups as well as assumptions used when reporting against this indicator.

EC3: “SROI” calculates for the “Value Proposition” and the “Revenue” BMC element the SROI ratio.

EC7: “Growth Rate” asks to calculate the amount of increase that a specific variable has gained within a specific period and context for the “Revenue” BMC element. Organizations should footnote which variable is chosen (e.g. revenue, income, profit, cash flow, social or environmental outcome) to calculate the organization's growth. All organizations are advised to choose at least one economic, one social and one environmental metric.

SD1: “Social Impact Objectives” requires disclosing the overall social impact objectives pursued by the organization in the “Key Activities” BMC element (e.g. access to: clean water, education, energy, financial services and information. Aiming for: Affordable housing, agricultural productivity, capacity-building, community development, conflict resolution, disease-specific prevention and mitigation, employment generation, equality and empowerment, food security, generate funds for charitable giving, health improvement, human rights protection or expansion, income/productivity growth, etc.).

In the same BMC element, “Key Activities”, SD2: “SPI Weighting: Scope and Relevance”, requires to disclose the scope and boundaries (e.g. region, nation, international affairs, in and external stakeholders) as well as the relevance of the used SPIs. Organizations need to indicate whether a weighting for certain SPIs is necessary, due to e.g. sector-, industry-, branch- or stakeholder-dependency as well as due to the organizational lifecycle stages. Organizations should footnote the type, context and assumptions of their proposed weightings.

SD3: “Operational Model”, asks to disclose the operational model of an organization (e.g. production or manufacturing, processing or packaging, distribution, wholesale or retail, service, financial services) in the BMC element “Revenue”.

SD5: “Value Creation Statement” is essential, in order to disclose in the “Value Proposition” BMC element, the overall value creation process of the company, with regard to where the organization creates, retains or destroys value in economic, social and environmental terms.

Finally, SD8: “Environmental Impact Objectives” aims to disclose the overall environmental impact objectives pursued by an organization in the “Key Activities” BMC element (e.g. biodiversity conservation, energy and fuel efficiency, natural resources conservation, pollution prevention and waste management, sustainable energy, sustainable land use, water resources management, etc.).

In addition to these Key SPIs, the final PI set (Figure 12) can be used ancillary, in order to comprehensively measure an organization’s individual sustainability performance, fitting to its specific BM.

## 2.4 FEEDBACK OF EXPERTS

The final framework, with its SPI and PI selection (see sub chapter 2.2.4.3 and 2.3), was send to the experts on 3<sup>th</sup> August 2015. They were asked to provide feedback to the developed framework as well as suggestions for its potential application. As many experts were in vacations during August, only one expert answered via email (Bartel) and two others gave a short oral feedback (anonymously). This equals an answering rate of 15%.

Bartel (for-profit, economic start-up) described the development of the framework as “excellent”, as its single parts would be consistent and its development coherent. He stressed four potential use cases of the framework.

- I. Companies that aim to transform into a more sustainable business, beyond CSR or simple product diversification.
- II. Start-ups that want to build a new business order.
- III. Corporative businesses and other new economy approaches.
- IV. Governments, to assess, benchmark and standardize the sustainability performance of companies.

The other two experts supported Bartel’s statement and judged the findings as promising for in early stage start-ups. Another stated that he might use the framework to assess potential impact investments.

As only three experts provided feedback in the given timeframe of one month (until 31<sup>th</sup> August), the final framework needs to be critically reviewed and tested by researchers and practitioners, in the future.

### 3. DISCUSSION

#### 3.1 COMPARISON OF RESULTS WITH THEORY

Having analyzed the three Delphi panel rounds in chapter two, a first SPI framework was built. In this chapter, the resulting framework will be compared with the initial findings from literature (sub chapter 1.2). Thereby, the comparability with the theory of the BMC and the BSC will be investigated, in order to foster the knowledge transfer between the theory-based and empiric exploration of this thesis.

##### 3.1.1 *NINE BUSINESS MODEL CANVAS BUILDING BLOCKS*

Osterwalder et al. (2010) proposed to extend the BMC with “social and environmental costs” as well as “social and environmental benefits” in order to make it fit “more” sustainable BMs. In contrast, the SPI framework that was built in this thesis does not require any changes of the initial BMC building blocks, but rather enhances the existing model with sustainable measurements. The SPI framework can be applied to identify and track adequate indicators, supplementing the BMC, which measure the sustainability performance of a company on the BM level. Hence the framework enriches the BMC with a set of Key SPIs, which can be seen as relevant for any kind of organization, but especially for SMEs and start-ups in Germany.

The 15 finalized Key SPIs as well as the additional 23 PIs were successfully mapped into the BMC elements. This enabled a rather balanced set of “economic”, “social”, “environmental” and also “standard disclosure” metrics to be assigned to the nine building blocks. These metrics help to measure the sustainability performance for each of the BMC elements. Therefore, the SPI framework supports the BM-effect of aligning the BM elements with its competitive environment as well as environmental and social success (Schaltegger & Wagner, 2006), independently from an organization’s specific sustainability strategy (Schaltegger et al., 2011).

Consequently, the SPI framework can be understood as a BMC add-on that allows organizations to measure their sustainability performance on the BM level. Nevertheless, as Lüdeke-Freund (2009) demands, the SPI framework in a way enhances the following BMC elements: “Value Proposition” (indicating private and public benefits); “Customer Segments” and “Key Partnerships” (focusing on stakeholders); “Key Activities” and “Key Resources” (dedicated to indicators from the market and non-market sphere). Hence in the future, the SPI framework could also enable to transform the BMC’s building blocks into more comprehensive elements that incorporate the core logic of sustainability.

### 3.1.2 FOUR BALANCED SCORECARD PERSPECTIVES

As discussed in sub chapter 1.2, the BSC allows measuring the impact that is most important to a company in four different perspectives (Kaplan & Norton, 1992). In terms of sustainability, Schaltegger and Lüdeke-Freund (2011) demand that companies investigate which environmental and social indicators measure strategic core issues and can thus be defined as lagging indicators. Sustainability aspects that contribute as performance drivers significantly to a strategic core issue need to be depicted by leading indicators (ibid.).

Lagging Indicators				Leading Indicators			
Financial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective	Financial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective
Revenue growth: <b>EC7 Growth Rate</b>	Market share	Innovation process: <b>SD3 Operational Model</b>	Employee retention	<b>SD5 Value Statement</b>	Product attributes: <b>SD1 Social Impact, SD8 Environmental Impact</b>	Cost indicators: <b>EN1 Waste Generated, EN3 Greenhouse Gas Reductions</b>	Employee potentials
Productivity growth	Customer acquisition	Operations process: <b>SO5 Safety and Security</b>	Employee productivity	<b>EC3 SROI</b>	Customer relationships: <b>EC1 Target Socioeconomics</b>	Quality indicators: <b>SO4 Labour Evaluation, EN9 Sourcing Evaluation</b>	Technical infrastructure
Asset utilization	Customer retention  Customer satisfaction Customer profitability	Postsale service process	Employee satisfaction: <b>SO1 Employee Happiness</b>		Image and reputation: <b>EN7 Reputation and Transparency</b>	Time indicators	Climate for action: <b>SD2 KPI Weighting</b>

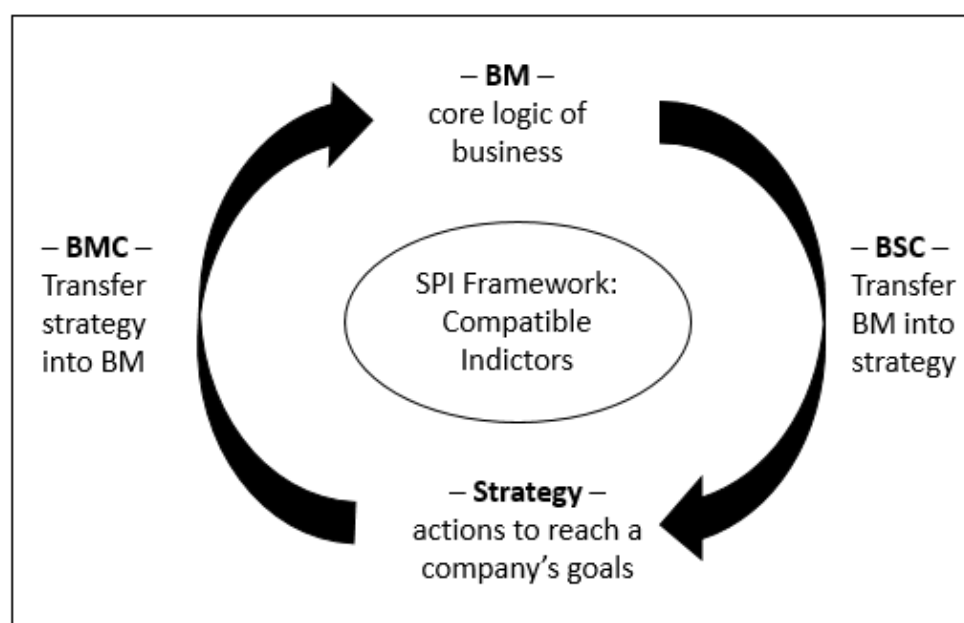
**Table 16: Leading and lagging indicators of the SPI framework.**

In order to identify the leading and lagging indicators of the SPI framework, the finalized 15 Key SPIs got compared to the generic indicator set (see Table 3) of Kaplan and Norton (1996). As a result, table 16 demonstrates that 4 Key SPIs are identified as lagging indicators and 11 Key SPIs as leading indicators (generic indicators in normal letters, the assigned Key SPIs in bold letters). To each BSC perspective, 2 to 6 indicators were ascribed.

Some Key SPIs could easily be identified as equivalent to a generic indicator as they have similar descriptions such as “Revenue growth” and “EC7: Growth Rate”, “Employee satisfaction” and “SO1: Employee Happiness” or “Image and Reputation” and “EN7: Reputation and Transparency”.

The remaining Key SPIs were assigned to the generic indicators, whenever they quantify the indented goal of a specific BSC perspective as an output value (lagging indicator) or measure future success (leading indicators).

The comparison shows that the Key SPI set is largely compatible with the generic KPIs of Kaplan and Norton (1996). They could thus be easily integrated into the BSC or even SBSC.



**Figure 14: Result: SPI framework compatible with BMC and BSC.**

Therefore, the conclusion is drawn that the SPI framework fosters an easy transfer between a company's core logic and strategy by providing a balanced set of Key SPIs, applicable for BMC and BSC (Figure 14).

Taking the identified PIs into account, the SPI framework could be even more balanced by additional lagging (or leading) indicators. To provide an impression of which PIs could be leading or lagging indicators, these have also been aligned to the generic indicators (Table 17), as only one possible solution.

Lagging Indicators				Leading Indicators			
Financial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective	Financial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective
Revenue growth: <b>EC7 Growth Rate</b>	Market share	Innovation process: <b>SD3 Operational Model</b>	Employee retention: <b>SO8 Employee Turnover</b>	<b>SD5 Value Statement</b>	Product attributes: <b>SD1 Social Impact, SD8 Environmental Impact</b>	Cost indicators: <b>EN1 Waste Generated, EN3 Greenhouse Gas Reductions, EN8 Hazardous Waste Avoided, EN4 Non-hazardous Waste Avoided</b>	Employee potentials
Productivity growth: <b>SD4 Product/Service Output Produced</b>	Customer acquisition: <b>SO2 Market Research on Stakeholders, EC2 Customer Acquisition Cost</b>	Operations process: <b>EN6 Hazardous Waste Produced, EN6 Waste Produced, SO5 Safety and Security</b>	Employee productivity: <b>EC4 Jobs Maintained</b>	<b>EC3 SROI</b>	Customer relationships: <b>EC1 Target Socioeconomics</b>	Quality indicators: <b>SO4 Labour Evaluation, EN9 Sourcing Evaluation</b>	Technical infrastructure: <b>EN5 Environmental Management System</b>
Asset utilization: <b>EN2 Recycled Materials Ratio</b>	Customer retention: <b>EC6 Churn Rate</b>	Postsale service process	Employee satisfaction: <b>SO1 Employee Happiness, SO6 Anti-Discrimination Policy, SO11 Child Labour Policy, SO7 Women and Men Ratio, SO12 Fair Compensation</b>	<b>SD9 New Investment Capital</b>	Image and reputation: <b>EN7 Reputation and Transparency</b>	Time indicators	Climate for action: <b>SD2 KPI Weighting, SO9 Assessment: Human Rights and Impact</b>
	Customer satisfaction: <b>SO3 Grievance Mechanisms, SO10 Local Compliance, EC5 Customer Happiness</b>				<b>SD6 Legal Structure</b>		
	Customer profitability: <b>EC8 Customer Lifetime Value</b>						

**Table 17: All Key SPIs and PIs separated into leading and lagging indicators.**



## 3.2 SPI FRAMEWORK REVIEW

### 3.2.1 IMPLICATIONS AND LIMITATIONS FOR FUTURE RESEARCH

The implications of the findings for future research are shown in table 18.

Research findings	Future Research	Implication	Limitation
Literature Review	Starting point for “SBM” and “SPI” research	Basic literature	Further research needed
SPI set development	Using expertise from 20 experts to adapt SPIs to German context	Insights from practice	German SME & start-up market
Balanced SPI set	Focus on strong sustainability	Strong SBMs	Better fit of PIs
Leading and lagging SPIs	Transfer of sustainability strategies into a business’ core logic	Integration of CS into general management	Compatibility & integration

**Table 18: Implications for future research.**

First of all, the comprehensive literature review reveals the “Sustainability-oriented research field” (SRQ1) related to “SBMs” and “SPIs”, which can serve future research as a starting point.

Secondly, as a main result, this thesis contributes to research as it collected, reviewed and altered globally applied SPIs together with experts from practice, whose experience nearly overtook, in the last years, the related research field of SBMs and their performance measurement (Bcorporation, 2015; Upward & Jones, 2015). As a result, the “universal” SPIs, extracted from the GRI and IRIS metric sets, have been adapted to the current circumstances, depending on country, region, industry, branch and time boundaries in Germany. This way, the research field has been enriched by insights from practice, applicable to further explore SPIs.

Moreover, the altered and chosen SPIs have been combined to a balanced set that focuses on strong sustainability by providing a similar number of social, economic and environmental indicators. This focus on “strong sustainability” is missing in current research (Upward & Jones, 2015). Thus, this thesis fosters further investigations on strong SBMs.

Finally, the developed SPI framework consists of “leading and lagging indicators” (Kaplan & Norton, 1992). This separation within the SPI framework ena-

bles not only output-oriented lagging indicators to be measured, but also leading ones that aim to display metrics of future success. This way, the SPIs of the framework can also be integrated into the BSC or SBSC and hence allow a better transfer of strategy into a BM or vice versa. This alignment supports, in research and practice, the incorporation of CS into general management and the core logic of an organization, its BM.

Nevertheless, several limitations need to be outlined. Future research will have to investigate the developed Key SPIs, before allowing any generalization, but especially how the additional PI set can be “better” integrated into the developed SPI framework. Here, it will be necessary to find out which PIs could be related to specific countries, regions, industries or branches. So far, it is only advised to choose from the provided PI set any additional indicator that fits to the applied BM.

Furthermore, as only experts from Germany - mainly from the Berlin start-up field - have been interviewed, the indicators must be understood as focused on German start-ups and SMEs. Further research can explore other SPIs, fitting to different countries in contexts. In addition, the compatibility of the SPIs and their integration into other management- and CS tools can be investigated.

Finally, a complementary “benchmark index” can be created, which indicates and compares the sustainability performance degree of organizations, based on the values of the applied SPIs and PIs.

### 3.2.2 IMPLICATIONS AND LIMITATIONS FOR MANAGEMENT AND PRACTICE

The research's impacts on management and practice are shown in table 19.

Agent	Management & Practice	Implication	Limitation
Stakeholders: Customers, Communities, Governments	Use BMC and SPI framework to understand sustainability performance of companies, based on an organization's BM	Transparency & control; Understand & inform themselves; Justify grants	Developed with "only" 20 experts, further feedback needed; Test other SPIs
Start-ups & SMEs	Use Key SPIs to measure "standardized" impact and PIs to display individual impacts, visualized in BMC;  Report sustainability performance	Measurement & improve; Easy & seamless reporting  Reputation & legitimation	Developed with "only" 20 experts, further feedback needed; Test other SPIs
Investors	Compare companies based on sustainability performance; Justify investment decisions	Benchmarking of companies,  Justify investment	Developed with "only" 20 experts, further feedback needed; Test other SPIs

**Table 19: Implications for management and practice.**

Firstly, the SPI framework allows any kind of stakeholder to investigate the sustainability performance of Germany-based SMEs and start-ups. Easy to understand and simply visualized in the BMC (Osterwalder et al., 2010), the SPI framework indicates any existing and potential, organizational sustainability impacts. This way, for example governmental subsidy programs can use the framework to justify the allocation of grants. Hence a tool with a focus on hands-on measurements was created that transfers the knowledge from the SBM research field into practice (Lüdeke-Freund, 2009) and thus serves a wide range of stakeholders.

Secondly, start-ups and SEMs can demonstrate their current and future sustainability performance and can choose - in addition to the Key SPIs - individual PIs that emphasize their firms' specific impact. Therefore, in contrast to existing SR guidelines, the framework is easy to understand, visualized in the BMC and provides a manageable amount of SPIs, focused on strong sustainability. Thus, the framework is especially applicable for start-ups and SMEs, which can use it in the five iterative BM phases (Osterwalder et al., 2010) as well as in later stages for the seamless reporting of their sustainability perfor-

mance. This way, also in the early stages, they can transparently track and report their sustainability performance, allowing stakeholders such as the local community or customers to inform themselves about a company's sustainability performance. Therefore, start-ups and SMEs can potentially increase their reputation and legitimation by using the SPI framework and reporting against its metrics. Moreover, they can use the indicators to improve their current performance and identify needs for further actions and management decisions. Thirdly, investors can compare and benchmark with (standardized) Key SPIs the sustainability performance of companies. Thus, they can justify their investment decisions by the usage of academically developed indicators.

As a result, the SPI framework does not only facilitate the identification and measurement of sustainability performance of companies, but also the gap-less reporting and benchmarking of it.

Nonetheless, the SPI framework must be critically reviewed due to its limitations. These limitations derive mainly from its development, which is based on the experiences of 20 experts. Further feedback from practitioners should be used to evaluate, redesign or extend the SPI framework. Hence the framework could be tested in practice by start-ups, SMEs, consultants and investors in Germany, in order to investigate its usefulness and applicability.

Also, indicators from other reporting and rating guidelines could be included such as the in-development-metrics of the *Global Initiative for Sustainable Ratings* (GISR), the *International Integrated Reporting Council* (IIRC) or the *Sustainable Accounting Standard Board* (SASB) (Appendix F).

### 3.3 EVALUATION: RESULTS AND RESEARCH PROCESS

Evaluating the research of this thesis, one can state that the RQ and the two SRQs have been answered successfully (Table 20).

Question	Result
RQ: What are the relevant indicators essential to measure sustainability performance on the business model level?	15 Key SPIs and 23 PIs
SRQ1: Which indicators are discussed as most relevant in the sustainability-oriented research field connected to sustainability business models?	Not one set, but GRI and IRIS metrics
SRQ2: Which sustainability indicators do experts from practice use to assess the sustainability performance of businesses?	Experts' indicators

**Table 20: Review of research questions.**

For SRQ1, the GRI and IRIS guidelines and metric sets have been identified as the most relevant in the research field connected to SBMs, although not “the” one indicator set or framework has been found. As for SRQ2, individual metrics that the experts advised to use were identified additionally. Taking their feedback, rating and ranking into account, 38 indicators were created based on the GRI and IRIS metrics, including the experts’ input. Thereby answering the RQ, 15 Key SPIs and a set of 23 additional PIs have been identified and were mapped onto the BMC. As a result, the SPI framework was composed, which orders the 15 Key SPIs along the BMC elements. In addition to these results, the following challenges during the research process were identified.

The theory-based exploration is based on various theories and their normative foundations, models or standards. However, most of these theories are either still in their infancies or have not been agreed upon due to their complexity. Therefore, the thesis faced the challenge of providing simple results in its literature review that explain the complex research field.

The empiric exploration included the SPI database development, which contains so far only an aggregated number of metrics and could be extended by future research. The scholar identified a need for a comprehensive database of SPIs and related SA and SR guidelines.

In addition, the Delphi panel discussion turned out to be very time-consuming and challenging in terms of keeping the experts' motivation high as well as the survey tasks and time effort as low as possible. The experts' feedback indicated that in each round they needed between 40 minutes and more than one hour to fill out the survey, which was unintended and reported differently by the two test persons. Also, some experts found the questions and scale were not easy to understand. Due to this feedback, semi-structured interviews might have been more comfortable for the experts.

However, the biggest challenge was to design the different Delphi rounds, as it was initially planned to focus on the qualitative feedback of the experts and their rating of the indicators. But, after the first two rounds were completed, it turned out that the experts lost interest and did not have time to continue a rating process. Finally, the feedback of the high dependency of SPIs on the specific context as well as the very diverse rating attitude of the three sub groups, made the scholar decide to conduct a ranking instead of rating in the third survey round. Nonetheless, a third and maybe forth rating round would have delivered an even higher consensus on the individual indicators and could have made the SPI set even more precise in terms of relevance. Furthermore, the internal ranking and Key SPI separation during the analysis of round one and two became this way somewhat obsolete.

Nevertheless, the research found, due to the experts' feedback, reasonable results and a new approach to tackle the issue of lacking sustainability performance measurements on the BM level.

#### 4. CONCLUSION

This thesis investigated relevant indicators essential to measure sustainability performance on the BM level (RQ), resulting in the creation of an indicator framework that supplements the BMC. Doing so, a triangulated research design was applied and, with a mixed-method approach, a theory-based and empiric exploration conducted. This way, the thesis tied a connection between the theoretical foundations of the sustainability-oriented research field related to SBMs (SRQ1) and the further investigation of sustainability measurements in practice, with the help of 20 experts (SRQ2).

Building on the theory-based exploration (chapter 1), this thesis understands BMs as the core logic of companies and identified a lack of sustainability issues in the widely accepted model that conceptualizes BMs, namely the BMC. The BMC was recognised as the recently most popular management tool for creating, developing and testing BMs. As this tool does not include any sustainability indicators, it was shown that sustainability measurements are missing on the BM level. The BM level is thereby defined as the level on which all elements of an organization are considered, along the nine building blocks of the BMC - including the product and service level, but especially the core logic of a company. Moreover, “right” sustainability is defined as “strong” sustainability, being a balanced triangle of non-substitutable economic, social and environmental values. Thus, the proposition of a balanced set of SPIs, measuring all three sustainability dimensions of a companies’ performance on the BM level, was developed.

Investigating existing SR guidelines, the GRI and IRIS metrics were identified as the recent standards for SPIs. However, a practical tool, integrating the knowledge of SBMs and SPIs into the general management of companies, is still missing. Therefore, it was suggested that a balanced set of SPIs, supplementing the BMC, can help to easily depict and visualize the current (with lagging indicators) as well as potential (with leading indicators) sustainability performance of companies, especially of SMEs and start-ups.

The empiric exploration (chapter 2), further investigated these findings by refining a set of 90 identified core SPIs together with experts from the related practice-field.

In three Delphi panel rounds, these core SPIs were evaluated, altered and enriched by indicators that the experts had suggested. Analysing the expert's feedback, it became clear that the indicators needed to be context-based and fit the specific BM of a company. Hence in sub chapter 2.3, a SPI framework was created, which includes 15 Key SPIs and which can be individually complemented with 23 PIs (sub chapter 2.2.4.3), all supplementing the BMC.

The standardized Key SPIs (shown in table 11 - 14) measure in the social dimension of sustainability safety and security of workers and employees; in the environmental dimension an organizations' reputation and transparency regarding greenhouse gas and waste production; and in the economic dimension social, environmental and financial return on investment. Moreover, they disclose the value creation of an organization by revealing its social and environmental impact objectives.

Reflecting on the results from theory and practice (chapter 3), implications as well as limitations for further research and management practice were discussed.

In theory, the developed SPI framework enables the integration of "Sustainability" into the "BM" concept and thus into the core logic of a company. In addition, the developed SPI set focuses on "strong" sustainability and therefore fosters further research in this field. Furthermore, the framework facilitates the easy transfer of a company's BM into strategy and vice versa, being compatible with the BMC and the BSC.

In practice, the SPI framework enables the sustainability performance of organizations to be measured and controlled on the BM level - and not only on the product or service level, as conventional CS tools do. In contrast to existing SR guidelines, such as the GRI or IRIS, the developed indicator framework is easy to understand due to its simple visualization in the BMC and provides a manageable amount of balanced indicators. Thus, the framework is especially applicable for start-ups and SMEs. They can apply it in the early



stages during the five iterative BM phases (describing, understanding, designing, implementing and managing BMs) as well as in later stages for the transparent and seamless reporting of their sustainability performance. Moreover, the framework clearly requires companies to focus on their strong sustainability performance, by implementing a balanced set of SPIs.

In the future, having incorporated the framework into the everyday operations of a company, it could additionally monitor management tasks to improve an organizations' sustainability performance such as decision-making processes (e.g. choosing which degree of sustainability performance is aimed at and which additional PIs are used) and BM re-creations (e.g. TBL thinking: focus on stakeholders, environmental and social values).

Moreover, as the SPI framework is transparent to all stakeholders, it may allow the benchmarking of sustainability performance of organizations. Thus, the framework has the potential to help overcome the classic focus of firms on economic performance, rather than on the integration of economic, social and environmental performance, as demanded by research and practice.

Future research needs to further investigate and validate the developed SPI framework, as it is only a first attempt to identify indicators that measure sustainability performance of companies on the BM level, utilizing the BMC.

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## APPENDIX

### A. LITERATURE REVIEW: FIRST KEY LITERATURE

Search Word	Key	Title	Author, Year	Topic
BM Innovation		<i>Business Model Canvas</i>	Osterwalder et al., 2010	BM
BM		<i>The business model: an integrative framework for strategy execution.</i>	Richardson, 2008	BM
BM		<i>Geschäftsmodelle in der digitalen Ökonomie.</i>	Stähler, 2002	BM
BM, BM Innovation		<i>Business Models, Business Strategy and Innovation.</i>	Teece, 2010	BM
Sustainability, SBM		<i>Sustainability by design. A subversive strategy for transforming our consumer culture.</i>	Ehrenfeld, 2008	Sustainability
Sustainability, SBM		<i>A literature and practice review to develop sustainable business model archetypes.</i>	Bocken et al., 2014	SBM
BM Innovation for Sustainability, SBM		<i>Business models for sustainable innovation: State of the art and steps towards a research agenda.</i>	Boons and Lüdeke-Freund, 2013	SBM
Sustainability, BM		<i>The Sustainability Balanced Scorecard - linking sustainability management to business strategy</i>	Figge et al., 2002	SBM / SBSC
BM Innovation for Sustainability		<i>Business Model Innovation for Sustainability. Faculty &amp; Research Working Paper.</i>	Girotra and Netessine, 2013	SBM
Sustainability, SBM		<i>Conceptualizing a "Sustainability Business Model"</i>	Stubbs and Cocklin, 2008	SBM
SBM		<i>The Strongly Sustainable Business Model Ontology and Canvas - A Briefing v2.3.</i>	Upward, 2014	SBM

**Table 21: Basic literature list.**

## B. LITERATURE REVIEW: BUSINESS MODELS

Source	Business Model Definition	Key Statement
Timmers (1998)	BM = architecture for the product, service and information flows as well as a description of the different business actors, their roles and the potential benefits for them, also a revenue stream description.	Business architecture + Marketing model
Linder and Cantrell (2000)	BM = three different model types: the components of a business model, real operating business models and change models. A business model is defined as an organization's core logic for value creation.	Core logic for creating value
Amit and Zott (2001)	Architectural formation of the components of transactions designed to exploit business opportunities. The author's framework shows how the network of firm, e.g. suppliers and customers, enables transactions.	Network centered approach
Weill and Vitale (2001)	BM = characterization of all firm's roles and relations, e.g. among consumers, customers, allies and suppliers, and specification of the major product, information and money flows as well as the major benefits to participants.	Role/ Relations + Major flows + Benefits to actors
Chesbrough and Rosenbloom (2002)	BM = described as intermediary between technologies, strategy and economic value.	Mediator
Magretta (2002)	BM = used to tell a logical story about who are one's customers, what they value and how one will make money in providing them that value (p. 4).	Story telling of value proposition + Customer focus
Stähler (2002)	BM = unit of analysis. The author reminds that a model is always a simplification of the complex reality. But, it helps to understand the fundamentals of a business and to plan the design of a future business.	Theory building
Osterwalder (2004)	BM = is an abstract representation of the business logic of a company. <i>"And under business logic I understand an abstract comprehension of the way a company makes money, in other words, what it offers, to whom it offers this and how it can accomplish this."</i> (p. 14)	Logic of a company/ money
Osterwalder (2004)	<i>"The business model design translates a strategy into a business model blueprint. Then the business model has to be financed through internal or external funding (e.g. venture capital, cash flow, etc.). And finally it has to be implemented into an actual business enterprise."</i> (p. 15)	Strategy translator
Osterwalder (2004)	BM = <i>"an abstract conceptual model that represents the business and money earning logic of a company."</i> And <i>"a business layer (acting as a sort of glue) between business strategy and processes"</i> . (p. 15)	Abstract conceptual model
Osterwalder (2004)	Working definition of BM: <i>"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams."</i> (p. 16)	Company's logic of earning money: Description of value offered, delivered and captured
Osterwalder et al. (2005)	<i>"The Business model serves as a building plan that allows designing and realizing the business structure and systems"</i>	Building Plan: structure, organization,

	<i>that constitute the company's operational and physical form."</i> (p. 2)	system
Haaker et al.(2006)	A "blueprint of collaborative effort" of multiple companies who offer together a joint proposition to their consumers. (p. 646)	Network
Teece (2010)	<i>"The essential of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and covers those payments to profit. It thus reflects management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit."</i> (p. 172)	Customer focus
George and Bock (2011)	BM = no common definition, nor a well-defined theoretical construct.	Lack of theory

**Table 22: Chronological BM review.**

### C. OSTERWALDER'S NINE BUSINESS MODEL BUILDING BLOCKS

The nine building blocks can be shortly described as it follows (Osterwalder et al., 2010).

**Customer Segments:** The customer segments block defines the different groups of people or organizations which are reached and served by an enterprise. A company may group customers into single or multiple segments in order to decide which target customer segment to serve. These segment's needs are primarily satisfied. As customers are at the heart of any BM, a deep understanding and precise definition of the customer segments is necessary. Exemplary customer segments types can be: mass market (no distinguished segments), niche market (special segment), segmented (segments with slightly different needs and problems), diversified (two unrelated segments with different needs and problems) or multi-sided markets (two or more interdependent customer segments. (p. 20–21)

**Value Proposition:** The value proposition block defines the bundle of products and services that create value for and is offered to a specific customer segment. Hence the value proposition is designed to solve a specific customer problem or to satisfy a customer need and is the reason why a customer turns to one company over another. Value propositions can vary from innovative, representing new and disruptive offers, to ordinary, being similar to existing market solutions, but offering added features or characteristics. Values may be qualitative or quantitative as well. The following exemplary elements can contribute to value creation for customers: newness (satisfy entirely new needs), performance (improved product or service performance), customization (tailored products or services to specific needs), design (fashion element), status (usage and display of a specific brand), price (price-based value proposition), cost or risk reduction as well as accessibility (easy available product or service) and usability (convenient usage). (p. 22–25)

**Channels:** The channels block describes the single touch points the company has with its customer segments, how it communicates with and reaches them in order to deliver the value proposition. The channels comprising communication, distribution and sales and play an important role in the customer experience. They can cover one or all of the following five functions: raising customer's awareness, helping customers to evaluate a company's value proposition, allowing customers to purchase specific products or services, delivering a value proposition or providing post-purchase support. (p. 26–27)

**Customer Relationships:** The customer relationships block describes the type of relationships an enterprise establishes with each customer segment. Customer relationships may be driven by different motivations (e.g. customer acquisition and retention or upselling) and can range from personal to automated. Different customer relationship categories may co-exist in a company and can be, but are not limited to: personal assistance, self-service, automated service, communities and co-creation. (p. 28–29).

**Revenue Stream:** The revenue streams block represents the cash a company generates from each customer segment. However, to create earnings, costs must be subtracted from the revenues. The company has to find out for what value a customer segment is willing to pay, how much and in what manner. Having found a fitting answer allows a company to generate one or more revenue streams. For example from selling assets (ownership rights), usage of particular service or subscription (continuous access to service) as well as leasing products (temporary usage) or licensing of intellectual property. In each revenue stream, fixed (e.g. price list, volume, product or customer dependent) or dynamic (e.g. negotiation, yield management or auctions) pricing mechanisms can be applied. (p. 30-33)

**Key Resources:** The key resources element describes the essential assets that are required to realize and implement a BM. These resources provide the key foundation from which a business is able to create and offer its value propositions, by maintain its relationships to customer segments through various channels and finally generating revenue streams. Key resources can be physical, human, financial or intellectual as well as owned or leased by the company or acquired from key partners. (p. 34–35)

**Key Activities:** The key activities block describes necessary actions, an enterprise has to do to successfully execute its business model. Such as key resources, key activities are needed to design a value proposition, distribute it through channels, maintain customer relationships and earn revenues. Depending on the industry and BM type, activities can be categorized as production (activities related to creation of a product), problem solving (activities related to new solution creation) and platform (network related activities). (p. 36–37)

**Key Partnerships:** The key partnerships element presents the network of partners and suppliers that are needed to successfully make the BM work. The alliance with key partners can be driven by three exemplary motivations: to optimize and scale a company's BM, to reduce risks in a competitive environment or to acquire particular resources and activities. This way, also four different types of partnerships can be differentiated: strategic alliances between non-competitors, coopetition as strategic partnership between competitors, joint-ventures to develop new businesses and buyer-supplier relationships to assure reliable supply. (p. 38–39)

**Cost Structure:** The cost structure block outlines all of costs incurred while operating under a particular BM. The costs depend heavily on key activities, key resources and key partnerships that are used to create value, deliver it to the customer and to generate value. All of these elements incur costs. Often companies intuitively aim to reduce cost and are thus cost-driven, others focus on value creation and are more value-driven. For both approaches, the cost structure can be characterized as fixed, variable or dependent on economies of scale or scope. (p. 30–41)



#### D. BUSINESS MODEL CANVAS ADAPTATION BY OSTERWALDER ET AL. (2010)

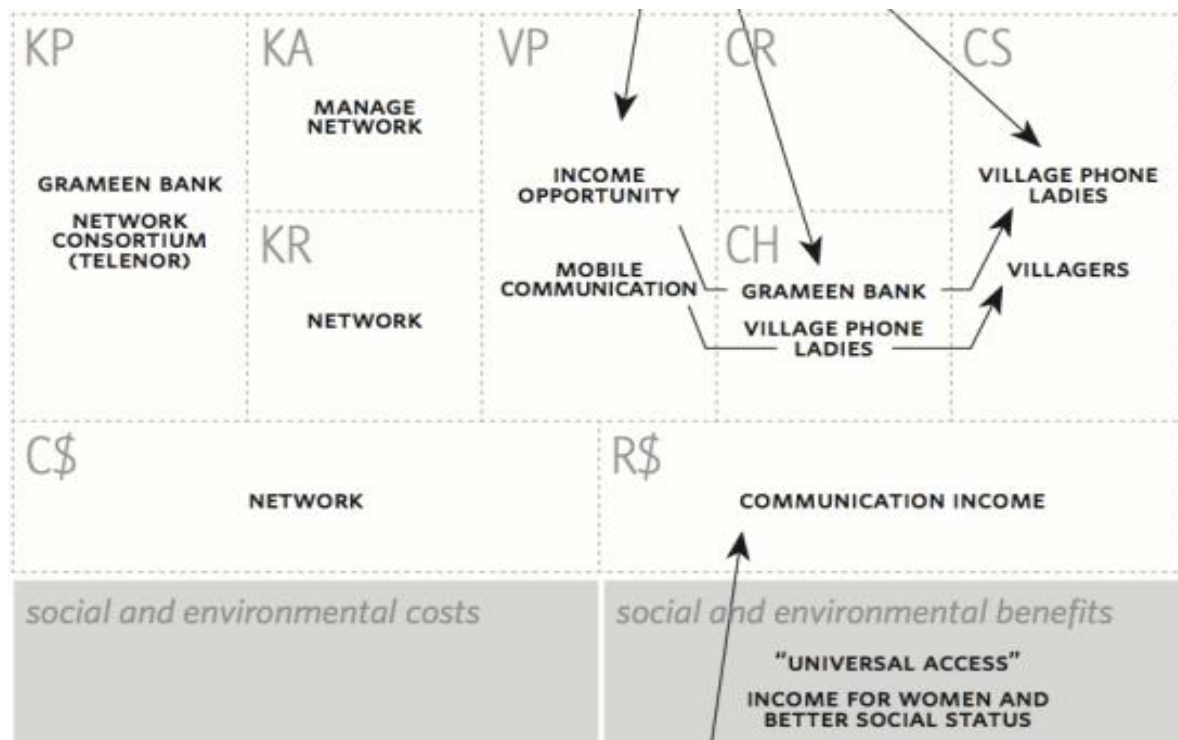


Figure 15: Triple bottom line BMC (Osterwalder et al., 2010, p. 265)

#### E. LITERATURE REVIEW: SUSTAINABILITY BUSINESS MODELS

Source	Sustainable Business Model Definition	Key Statement
Stubbs & Cocklin (2008)	Firm level and system perspective that integrates environmental, social and financial firm purpose in a triple bottom line approach by measuring performance along all stakeholder interests	Integrating TBL approach in SBM concept
Lüdeke-Freund (2009)	BM for sustainability is a blueprint of an organization's business logic, which internalizes the business case for sustainability.	SBM concept embraces the BM for sustainability concept based on the business case for sustainability
Yunus et al. (2010)	A social (and environmental) business models is a self-sustaining company that sells goods or services and repays its owners' investments, but whose primary purpose is to serve society and improve the lot of the poor. It is important to stress that the social business model can also be applied to environmental issues.	Social business models require new value propositions, value constellations and profit equations.
Bocken et al. (2013)	SBN could serve as a vehicle to coordinate technical and social innovation with system-level sustainability.	Need for SBM
Boons and Freund-Lüdeke (2013)	SBM is a BM that creates competitive advantage through superior customer value and contributes to a sustainable development of the company and society. However, no BM for sustainable innovation or concept of a SBM exist yet.	Customer value through sustainable development
Joyce (2013)	The SBM concept is still conceptual and removed from the field, requiring research to establish it into practice. A literature and practice gap exists. Design approach in the field of sustainable business model innovation needed.	New design approach needed to create SBMC

Upward et al. (2014)	Strong SBM describes the logic of an organizational existence, how it creates, delivers and captures value (for human and non-human actors), while all actors behavior enable the possibility of a flourish planet.	Stakeholder perspective and flourishing planet as focus
Upward and Jones (2015)	Strong SBM need to ensure the description of ethically and practically appropriate decisions (choosing the “right” things to do) and actions (doing things “right”). Thereby, a strong SBM has to respect its multiple boundaries, determined by the social and legal definition of strong SBM, the systems within a firm applying a strong SBM and the relations/objectives shared with stakeholders.	SBM need to consider strong sustainability as long-term goal

**Table 23: Chronological SBM review.**

## F. SUSTAINABILITY ACCOUNTING INSTITUTES

Here not available.

## G. CORE SPI SET

### Economic Indicators

IRIS Rank	GRI Code	IRIS Code	Explanation	Survey 1 Code
5	G4-EC8	Target Beneficiary Demographic (PD5752)	Demographic groups of beneficiaries targeted by the organization. Select all that apply: - Children (younger than 10 years old), Adolescents (10 year of age or older but younger than 19), Adults, Elderly/older adults, Persons with disabilities, Minority/previously excluded populations, Women, Pregnant women, Other at risk populations, Other target populations.	Ec13
8	G4-EC1	Total Assets (FP5293)	Value, at the end of the reporting period, of all of the organization's assets.	Ec1
9	G4-EC1	Net Income Before Donations (FP3274)	Value of the organization's net profit before donations, calculated as total income, excluding donations, minus total expenses during the reporting period.	Ec8
10	G4-EC8	Target Beneficiary Setting (PD6384)	Setting of the groups of beneficiaries targeted by the organization. Select all that apply: - Rural, Urban, Peri-urban	EC18
11	G4-EC8	Target Beneficiary Socio-economics (PD2541)	Socioeconomic groups of beneficiaries targeted by the organization. Select all that apply: - Very poor, Poor, Low income, Other	Ec4
12	G4-EC1	Net Income (FP1301)	Value of the organization's net profit, calculated as total income minus total expenses, taxes, and cost of goods sold during the reporting period.	Ec5

13	G4-EC1	Permanent Employee Wages: Total (OI9677)	Value of wages (including bonuses, excluding benefits) paid to all full-time and part-time employees of the organization during the reporting period.	Ec3
26	G4-EC1	Impaired Assets (FP1717)	Value of assets classified as impaired under regulatory or accounting rules and recorded by the organization during the reporting period. Impaired asset is a condition in which an asset's market value falls below its carrying amount and is not expected to recover.	Ec6
30	G4-EC1	EBITDA (FP1657)	Value of the organization's net income before interest, taxes, depreciation and amortization during the reporting period. Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA).	Ec17
33	G4-EC1	Gross Profit (FP7629)	Value of the organization's residual profit after incurring the direct costs associated with production/delivery, for the reporting period. (Calculation: Total Revenue (FP6510) – Cost of Goods Sold (FP9049)).	Ec9
62	G4-EC1	Charitable Donations (FP3774)	Value of all financial contributions and in-kind donations of goods and services made by the organization to charities, private foundations, non-profits or non-governmental organizations, during the reporting period.	Ec11
97	G4-EC8	Jobs Created at Directly Supported/Financed Enterprises: Total (PI3687)	Net number of new full-time equivalent employees working for enterprises financed or supported by the organization at the end of the reporting period, and since the beginning of support/investment by the organization. Organizations should footnote the calculation assumptions, specifically the definition of full time work used when reporting against this metric.	Ec2
110	G4-EC1	Total Revenue (FP6510)	Value of all revenue received by the organization during the reporting period.	Ec14
151	G4-EC1	Full-time Wages: Total (OI5887)	Value of wages (including bonuses, excluding benefits) paid to all full-time employees of the organization during the reporting period.	EC15
163	G4-EC1	Part-time Wages: Total (OI9948)	Value of wages (including bonuses, excluding benefits) paid to all part-time employees of the organization during the reporting period.	Ec22
167	G4-EC9	Payments to Supplier Organizations: Total (PI5478)	Value of payments made to enterprises that sold goods or services to the organization during the reporting period.	Ec12
175	G4-EC9	Payments to Supplier Individuals: Total (PI1492)	Value of payments made by the organization to individuals who sold to the organization during the reporting period.	EC10
182	G4-EC1	Temporary Employee Wages (OI4202)	Value of wages (including bonuses, excluding benefits) paid to all temporary employees of the organization during the reporting period.	EC16
187	G4-EC1	Cash Flow: Net Total (FP3466)	Value of the organization's net cash flow at the end of the reporting period. Net cash flow equals inflows less outflows of cash and cash equivalents from operating, investing, financing, etc. activities.	Ec19
204	G4-EC9	Distributors Individual Earnings: Total (PI4881)	Earnings generated by individual distributors from selling the organization's products/services during the reporting period. Earnings generated by individual distributors from selling the organization's products/services during the reporting period. Organizations that rely on assumptions to report against this metric should footnote any	Ec20

			assumptions used in the calculation process.	
207	G4-EC8	Client Savings Premium (PI1748)	Price discount/savings obtained, by the consumer (client) when purchasing a product/service from the organization during the reporting period. This is a ratio of the average price paid by the consumer to the organization compared to the average price that would otherwise be paid for a similar good in the local market. Organizations should footnote assumptions used in calculating this metric. (Calculation: Cost of product or service sold by the organization–Cost of alternative similar product or service through the cost of alternative similar product or service).	Ec21
208	G4-EC1	Interest Expenses (FP1012)	Value of expenditures incurred by the organization, during the reporting period, due to interest incurred on all liabilities, including any client deposit accounts held by the organization, borrowings, subordinated debt, and other liabilities.	Ec23
210	G4-EC8	Organizations Receiving Training (PI6065)	Number of organizations that received training from the reporting organization during the reporting period. Organizations should footnote the type and extent of training provided.	Ec25
262	G4-EC5	Wage Premium (OI9767)	Wage premium obtained by the employee as a result of working for the organization during the reporting period. This is the additional average wage paid to an employee of the organization compared to the average wage paid for a similar job in a similar industry/sector in the local market during the reporting period. Organizations should footnote the assumptions used when reporting against this metric. (Calculation: Average wage paid to employees in a specified position–Average wage paid to employees in a similar position at a different organization through the average wage paid to employees in a similar position at a different organization).	Ec24
302	G4-EC8	Jobs Maintained at Directly Supported/Financed Enterprises: Low Income Areas (PI2688)	Number of full-time equivalent employees living in low-income areas, who work for enterprises financed or supported by the organization at the time when the organization began its support/investment. Organizations should footnote the calculation assumptions, specifically the definition of full time work used when reporting against this metric.	Ec7

**Table 24: Extracted economic indicators.**

## Environmental Indicators

IRIS Rank	GRI Code	IRIS Code	Explanation	Survey 1 Code
16	G4-EN15	Greenhouse Gas Emissions: Total (OI1479)	Amount of greenhouse gases (GHG) emitted through the organization's operations during the reporting period. This should include GHG emissions from direct and indirect sources. Organizations should footnote calculations and assumptions.	En1
68	G4-EN29	Local Compliance (OI9379)	Indicate whether the organization has been found to be out of compliance with any local labour, tax, or environmental regulations during the reporting period.	En10

91	G4-EN10	Water Conservation (OI4015)	Amount of reduced water usage achieved as a result of the organization's water conservation efforts during the reporting period. Organizations should footnote conservation strategies employed and calculation method.	En12
92	G4-EN6, G4-EN27	Hazardous Waste Avoided (PI2073)	Amount of hazardous waste avoided based on refurbishing/reusing/recycling as part of delivering or developing the organization's products/services during the reporting period. Organizations should footnote assumptions used when reporting against this metric.	En6
95	G4-EN27	Non-hazardous Waste Avoided (PI8177)	Amount of non-hazardous waste disposal avoided based on the organization's refurbishing/reusing/recycling as part of delivering or developing the organization's products/services during the reporting period. Organizations should footnote assumptions used when reporting against this metric.	En13
100	G4-EN1, G4-EN2, G4-EN27	Biodegradable Materials (OI5101)	Amount of biodegradable materials used in the organization's products (including packaging) during the reporting period.	En15
124	G4-EN13	Land Reforested (PI4907)	Hectares of land that have been reforested by the organization during the reporting period.	En14
150	G4-EN7, G4-EN27	Energy Savings from Products Sold (PI7623)	Amount of energy savings over the lifetime of the organization's products for those products that were sold during the reporting period. Organizations should footnote the energy type(s) and calculation assumptions used when reporting against this metric. (Calculation: Units/Volume Sold: Total (PI1263) × (Energy Consumption of Product Replaced (PD5578) – Energy Consumption of Product (PD6596))	En9
155	G4-EN8	Water Use: Total (OI1697)	Amount of water used for the organization's operations during the reporting period, including uses for productive processes such as packaging, manufacturing, and for human consumption.	En8
157	G4-EN3	Energy Purchased: Total (OI8825)	Amount of purchased energy consumed by the organization during the reporting period.	En11
164	G4-EN27	Energy Capacity of Product (PD2713)	Amount of potential energy generation over the lifetime of the product based on the planned operation of the product/system. Organizations should footnote the energy type(s) and other calculation assumptions when reporting against this metric.	En7
178	G4-EN12	Trees Planted (PI4127)	Hectares of trees planted by the organization during the reporting period.	En16
179	G4-EN32	Supplier Evaluation (OI4739)	Indicate whether the organization considers social and environmental performance when evaluating suppliers. Organizations should footnote the type of factors taken under consideration.	En19
183	G4-EN10	Waste-water Treatment Compliance (OI7860)	Indicate whether the organization's practices related to discharge of wastewater comply with local legal requirements	En2
186	G4-EN2	Recycled Materials (OI4328)	Amount of recycled materials used in the organization's products (including packaging) during the reporting period.	En18
196	G4-EN27	Greenhouse Gas Emissions of Product (PD9427)	Greenhouse gas (GHG) emissions of the product during the product lifetime. Organizations should footnote emissions calculation assumptions/tools used.	En22

234	G4-EN27	Greenhouse Gas Reductions due to Products Sold (PI5376)	Amount of reductions in greenhouse gas (GHG) emissions over the lifetime of products sold during the reporting period. Organizations should footnote the energy type(s) and calculation assumptions used when reporting against this metric. (Calculation: Units/Volume Sold: Total (PI1263)×(Greenhouse Gas Emissions of Product Replaced (PD2243)–Greenhouse Gas Emissions of Product (PD9427))	En17
250	G4-EN27	Greenhouse Gas Emissions of Product Replaced (PD2243)	Greenhouse gas (GHG) emissions that would have been produced by the replaced product during the lifetime of the organization's product. Organizations should footnote details on the product replaced and emissions calculation assumptions/tools used.	En4
256	G4-EN11, G4-EN14	Biodiversity Assessment (OI5929)	Indicate whether the organization has undertaken any biodiversity-related assessments to evaluate the biological diversity present on the land that is directly or indirectly controlled by the organization. Organizations should footnote specific assessments undertaken.	En5
269	G4-EN27	Energy Produced for Service Sale (PI8706)	Energy produced and delivered to off-taker(s) during the reporting period. Organizations should footnote the energy type(s) and calculation assumptions used when reporting against this metric.	En20
270	G4-EN23	Waste Produced: Hazardous Waste (OI1346)	Amount of hazardous waste created by the organization's operations during the reporting period.	En3
271	G4-EN2, G4-EN27	Recycled Materials Ratio (PD9364)	Percentage of recycled materials used to manufacture the organization's product (including packaging)/services, during the reporting period. (Calculation: Weight or volume of recycled materials used in products through the total weight. Or: Volume of materials used in products or Recycled Materials (OI4328) through the total weight or volume of materials used in products.)	En21

**Table 25: Extracted environmental indicators.**

## Social Indicators

IRIS Rank	GRI Code	IRIS Name	Explanation	Survey 1 Code
2	G4-LA1, G4-LA12	Permanent Employees: Total (OI8869)	Number of people employed by the organization as of the end of the reporting period. This is the sum of all paid full-time and part-time employees.	So13
27	G4-SO1	Community Service Hours Contributed (OI8429)	Number of hours volunteered by full-time and part-time employees of the organization during the reporting period.	So4
29	G4-LA1	Employee Turnover Rate (OI1638)	Ratio of the number of departing permanent (full-time and part-time) employees compared to the average number of permanent (full-time and part-time) employees at the organization during the reporting period.	So5
36	G4-LA2, G4-LA3	Healthcare Benefits Participants (OI4061)	Number of full-time employees who received healthcare benefits through the organization's programs during the reporting period. Organizations should footnote the types of benefits provided such as: - Health Insurance, Dental Insurance, Disability Coverage, Life Insurance, Maternity/Paternity Leave, Retirement Provisions, Stock Ownership - vision programs.	So6

41	G4-LA6	Worker Safety (OI8001)	Indicate whether the organization has systems and policies in place to monitor, evaluate and ensure worker safety. Organizations should footnote details around these systems and policies including information on safety training, protection gear required, testing of equipment, posting of signs, etc.	So7
54	G4-PR8	Client Protection Policy (OI4753)	Indicate whether the organization has a written policy for client protection with mechanisms to ensure compliance. Organizations should footnote the relevant details about their client protection policy.	So1
68	G4-SO8, G4-PR2, G4-PR4, G4-PR7, G4-PR9	Local Compliance (OI9379)	Indicate whether the organization has been found to be out of compliance with any local labor, tax, or environmental regulations during the reporting period.	So11
71	G4-PR5	Market Research on Clients (OI8113)	Indicate whether the organization uses market research to identify the needs of clients and potential clients. Organizations should footnote the process and frequency with which they conduct market research.	So3
73	G4-HR3	Fair Compensation Practices (OI3819)	Indicate whether the organization has a written policy to compensate employees fairly and equally. Organizations should footnote the personal characteristics explicitly referenced in the organization's fair compensation policies.	So17
147	G4-LA16, G4-HR3	Employee Feedback (OI3601)	Indicate whether the organization has a system in place to solicit feedback from employees. Organizations should footnote the relevant details about the employee feedback system.	So19
153	G4-LA9	Employee Training Costs: Total (OI7390)	Value of the costs incurred by the organization as a result of training provided to employees (full-time, part-time, or temporary) during the reporting period.	So23
172	G4-HR5	Child Labor Policy (OI4432)	Indicate whether the organization has a written child labor policy in line with International Labour Organization (ILO) standards.	So16
174	G4-HR3	Sexual Harassment Policy (OI9088)	Indicate whether the organization has a written policy and practice to combat sexual harassment of employees in line with internationally-recognized standards.	So9
179	G4-LA14, G4-HR10, G4-SO9	Supplier Evaluation (OI4739)	Indicate whether the organization considers social and environmental performance when evaluating suppliers. Organizations should footnote the type of factors taken under consideration.	So24

**Table 26: Extracted social indicators.**

### Additional Social Indicators

No IRIS metric	G4-LA13	<b>Aspect: Equal Remuneration for Women and Men</b>	Report the ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation. Report the definition used for 'significant locations of operation'.	So8
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No IRIS metric	G4-HR1	<b>Aspect: Investment</b>	Report the total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening. Report the definition of 'significant investment agreements' used by the organization.	So10
No IRIS metric	G4-HR4	<b>Aspect: Freedom of Association and Collective Bargaining</b>	Report operations and suppliers in which employee rights to exercise freedom of association or collective bargaining may be violated or at significant risk either in terms of: Type of operation (such as manufacturing plant) and supplier. Countries or geographical areas with operations and suppliers considered at risk. Report measures taken by the organization in the reporting period intended to support rights to exercise freedom of association and collective bargaining.	So12
No IRIS metric	G4-HR6	<b>Aspect: Forced or Compulsory Labor</b>	Report operations and suppliers considered to have significant risk for incidents of forced or compulsory labor either in terms of: Type of operation (such as manufacturing plant) and supplier. Countries or geographical areas with operations and suppliers considered at risk. Report measures taken by the organization in the reporting period intended to contribute to the elimination of all forms of forced or compulsory labor.	Together with So24
No IRIS metric	G4-HR7	<b>Aspect: Security Practices</b>	Report the percentage of security personnel who have received formal training in the organization's human rights policies or specific procedures and their application to security. Report whether training requirements also apply to third party organizations providing security personnel.	So21
No IRIS metric	G4-HR8	<b>Aspect: Indigenous Rights</b>	Report the total number of identified incidents of violations involving the rights of indigenous peoples during the reporting period. Report the status of the incidents and actions taken with reference to: Incident reviewed by the organization, Remediation plans being implemented, Remediation plans have been implemented and results reviewed through routine internal management review processes, Incident no longer subject to action.	So22
No IRIS metric	G4-HR9	<b>Aspect: Assessment</b>	Report the total number and percentage of operations that have been subject to human rights reviews or human rights impact assessments, by country.	So25
No IRIS metric	G4-HR12	<b>Aspect: Human Rights Grievance Mechanisms</b>	Report the total number of grievances about human rights impacts filed through formal grievance mechanisms during the reporting period. Of the identified grievances, report how many were: Addressed during the reporting period, Resolved during the reporting period, prior to the reporting period but resolved during the reporting period.	So20
No IRIS metric	G4-SO3	<b>Aspect: Anti-corruption</b>	Report the total number and percentage of operations assessed for risks related to corruption. Report the significant risks related to corruption identified through the risk assessment.	So15
No IRIS metric	G4-SO6	<b>Aspect: Public Policy</b>	Report the total monetary value of financial and in-kind political contributions made directly and indirectly by the organization by country and recipient/beneficiary. Report how the monetary value of in-kind contributions was estimated, if applicable.	So14
No IRIS metric	G4-SO7	<b>Aspect: Anti-competitive Behavior</b>	Report the total number of legal actions pending or completed during the reporting period regarding anti-competitive behavior and violations of anti-trust and monopoly legislation in which the organization has been identified as a participant. Report the main outcomes of completed legal actions, including any decisions or judgments.	So2



No IRIS metric	G4- SO11	<b>Aspect: Grievance Mechanisms for Impacts on Society</b>	Report the total number of grievances about impacts on society filed through formal grievance mechanisms during the reporting period. Of the identified grievances, report how many were: Addressed during the reporting period Resolved during the reporting period Report the total number of grievances about impacts on society filed prior to the reporting period that were resolved during the reporting period.	So18
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**Table 27: Additional social indicators according to G4 materiality aspects**

### General Standard Disclosure Metrics

IRIS Rank	GRI Code	IRIS Code	Explanation	Survey 1 Code
1	G4-1	Social Impact Objectives (OD6247)	Social impact objectives pursued by the organization. Select all that apply: - Access to: clean water, education, energy, financial services, information. Also: Affordable housing, Agricultural productivity, Capacity-building, Community development, Conflict resolution, Disease-specific prevention and mitigation, Employment generation, Equality and empowerment, Food security, Generate funds for charitable giving, Health improvement, Human rights protection or expansion, Income/productivity growth.	SD7
2	G4-1	Environmental Impact Objectives (OD 4108)	Environmental impact objectives pursued by the organization. Select all that apply: Biodiversity conservation, Energy and fuel efficiency, Natural resources conservation, Pollution prevention & waste management, Sustainable energy, Sustainable land use, Water resources management	SD1
4	G4-8	Client Individuals: Total (PI4060)	Number of unique individuals who were clients of the organization during the reporting period.	SD3
6	G4-12	Supplier Individuals: Total (PI5350)	Number of individuals who sold goods or services to the organization during the reporting period.	SD5
16	G4-8	Customer Model (OD8350)	Customer model. Select all that apply: - Business to Business (B2B); Business to Consumer (B2C); Business to Government (B2G)	SD6
20	G4-9	Temporary Employees (OI9028)	Number of temporary employees paid by the organization during the reporting period.	SD8
45	G4-8	Client Organizations: Total (PI9652)	Number of enterprises that were clients of the organization during the reporting period.	SD12
47	G4-56	Governance Policies (OI2330)	Indicate whether the organization has written corporate governance policies that have been communicated to stakeholders.	SD11

58	G4-9	New Investment Capital (FP8293)	Value of funds invested in the organization (both loans and investments) during the reporting period.	SD13
73	G4-9	Units/Volume Sold: Total (PI1263)	Amount of the product/service sold by the organization during the reporting period.	SD10
77	G4-36	Employees Dedicated to Social and Environmental Performance (OI6370)	Number of full-time equivalent employees dedicated to managing social and environmental performance during the reporting period.	SD 9
102	G4-43	Social and Environmental Performance Management Training (OI4136)	Indicate whether any member of the organization's board of directors participated in training sessions related to any aspect of environmental or social performance management during the reporting period. Organizations should footnote details on the type and duration of training.	SD15
140	G4-4	Operational Model (OD6306)	Operational model of the organization. Select all that apply: - Production/Manufacturing: Production and/or manufacturing of goods (e.g., farming, construction, manufacturing), Processing/Packaging: Processing and/or packaging of goods (can include both raw materials such as wheat, or secondary materials/goods), Distribution: Delivery of good or service to the target audience, whether through traditional transport (e.g., vehicle, rail, air) or infrastructure (electric grid operator), Wholesale/Retail: Intermediary organization that purchases goods and sells them to new target customers, Services: Services such as education, health, communication, transportation, social services, etc., Financial Services: Financial products and services	SD2
142	G4-7	Legal Structure (OD2999)	Legal structure of the organization. Select one: - Benefit Corporation, Co-op, Corporation, Limited Liability Company, Non-Profit/Non-Governmental Organization, Partnership, Sole-proprietorship, Other	SD4
173	G4-41	Conflict of Interest Policy (OI2596)	Indicate whether the organization has a written policy to monitor and disclose any potential conflicts of interest between the company, board members, owners, or material investors.	SD14

**Table 28: Extracted standard disclosure indicators.**

## H. DELPHI ROUND 0: FIRST EXPERT CONTACT EMAIL

Here not available.

## I. DELPHI EXPERTS: VITA AND EXPERTISE

To judge the expert's expertise, data about the personal vita and expertise of each panel participant is collected online (e.g. on linkedin.de) and in personal conversations with the expert. These data are structured along the four quality criteria: "Professional Background", "BMC Experience", "KPI Usage" and "Sustainability Context".

### 1-Expert: Amit Saraogi, *Oorja* (Social start-up)

**Professional Background:** Saraogi is a Berlin-based entrepreneur from India with 12 years of business experience. He previously worked as a CSR consultant as part of a fellowship in social entrepreneurship, co-founded a micro-franchise retail enterprise, conducted primary research for UNICEF in India and worked in financial services and economic analysis with multinational corporations across three continents. In 2014 he founded the start-up *Oorja*.

**BMC Experience:** In his manifold work with corporates, start-ups and as founder, Saraogi uses the BMC not only to evolve BMs. He also uses it to apply for funding such as the *Echoing Green Fellowship* he received in May 2015.

**KPI Usage:** KPIs became important during his work to measure social and ecological impact.

**Sustainability Context:** *Oorja* aims to empower rural communities in India, by helping to reduce social exclusion, combat energy poverty and improve food security for small-holding farmers.

### 2-Expert: Bernd Steinmeyer, *Social Impact Lab* (Public, social investor)

**Professional Background:** Steinmeyers worked in the last decades in manifold positions in the broad area of social entrepreneurship. He does coaching's and start-up consultancy in the iq-consultancy and invests privately and in his position at Social Impact Lab in social start-ups.

**BMC Experience:** The BMC is the key tool at his work in the Social Impact Lab.

**KPI Usage:** KPIs and indicators are the key area of research of the iq-consultancy. The team aim to develop a social indicator framework.

**Sustainability Context:** His expertise is not limited to, but most elaborated in the field of social sustainability. Steinmeyer also supports the waste free supermarket *Original Unverpackt* and holds 1% of its shares.

### 3-Expert: Caroline Rabe, *Jyoti – fairworks* (Non-profit, social start-up)

**Professional Background:** Caroline Rabe is the founder and managing director of *Jyoti – fairworks* (since 2013), a social, textile producing company that empowers women in India. She studied "Intercultural Management and Communication" at the Karlshochschule International University and the National Chengchi University in Taipei. Her additional studies at the *d.school* equipped her with skills in "Design Thinking", innovation and organizational development. Rabe also gained worthwhile professional experience in the fields of social entrepreneurship at the *Council of the European Union* as well as in international companies and NGOs.

**BMC Experience:** As *dschool* fellow, she extensively used the BMC in her studies as well as during her work at *Jyoti*.

**KPI Usage:** KPIs are in her everyday work at *Jyoti* important to research goals and to measure the company's social impact.

**Sustainability Context:** Rabe is specialized in the field of international, social equality, especially in women rights.

**4-Expert:** Carsten Wille, *Leuphana Incubator* (Public, economic incubator)

**Professional Background:** Wille is since 2010 the project manager of the “Business Creation & Accelerator” unit of the Leuphana Incubator. He coaches, consults and invests through the incubator in start-ups. In former times, Wille worked more than 15 years as CEO. First for the *Wille-Karosseriebau GmbH* and later for the *ceta e.V* (center of entrepreneurship in theory and application).

**BMC Experience:** Beside Business plans, the BMC is the most common tool in his everyday work in the Accelerator. The BMC is also part of University courses that he coordinates.

**KPI Usage:** KPIs are key to the success of the Incubator start-ups, thus he stresses their importance during the work with the entrepreneurs.

**Sustainability Context:** The Leuphana Incubator fosters projects in the three categories: digital media, health care and sustainability. The Accelerator program breaks these down into culture and education, ecological sustainability and economic businesses. Wille sees himself as expert in the economic area. However, he constantly works as well with start-ups from the other categories.

**5-Expert:** Christian Kroll, *Ecosia* (Non-profit, environmental start-up)

**Professional Background:** Kroll has founded in 2009 the environmental friendly start-up Ecosia that employs now eight people and has more than 2 million active users. Ecosia is a search engine that donates 80% of its income to tree planting programs in Brazil and Africa. The start-up was the first Bcorp in Germany.

**BMC Experience:** The BMC is important for the development of his start-up.

**KPI usage:** Kroll stresses that for Ecosia, the most important KPI is tree planting, other KPIs are however necessary to reach long-term financial success.

**Sustainability Context:** Kroll is an expert in combining ecological sustainability issues with economic sustainability.

**6-Expert:** Christian Rudolph, *nextcycle & Ernst&Young* (Environmental consultant)

**Professional Background:** Rudolph is an entrepreneur and consultant with interest in ecology, cradle-to-cradle and sustainability. He holds a master degree in “Corporate Management and Economics” from *Zeppelin University*. Despite his economics background, he is researching in the fields of complexity studies, ecology and organizational design.

Rudolph has gained experience as an independent consultant (2009-2011) for *Ernst&Young* Singapore, *BASF* Germany and *Philips Design* Eindhoven. In 2010, he co-founded the Berlin-based *Global Waste Ideas*, a platform for waste innovations and business models. Rudolph is since 2013 founder and CEO of *nextcycle*, a sustainability consultancy, writes for *fairplanet.net* and was since recently consultant at the sustainability consultancy *RE/CARBON GmbH*.

**BMC Experience:** During his work as sustainability consultant he studied the BMC of Osterwalder as well as more sustainable BM theories of Nancy Brocken, Antony Upward and Alexandre Joyce. He sees himself as BM expert.

**KPI Usage:** KPIs are key of his everyday work as consultant. He uses KPIs for value stream- and stakeholder mapping, benchmarking, circularity assessment as well as LCA and carbon footprint calculations.

**Sustainability Context:** Rudolph has a strong economic background as well as sound environmental sustainability experiences related to businesses.

**7-Expert:** Daniel Bartel, *klickreform* (For-profit, economic start-up)

**Professional Background:** Bartel is an independent facilitator of business modeling and design thinking processes. He is a co-worker of Osterwalder at *Strategyzer.com* (since

2013), alumnus of the design thinking school *d.school* and translator of Blank and Dorf's "The Startup Owner's Manual" (into German).

**BMC Experience:** He intensively uses the BMC in consulting innovation processes and as a facilitator in BM generation workshops, especially as partner of the *Institute for Business Innovation*, which helps companies to systematically create and evaluate BMs. Bartel is a BMC expert.

**KPI Usage:** KPIs are highly relevant for his work as founder of *klickreform* (2014), a digital innovation agency.

**Sustainability Context:** Bartel's expertise clearly lays in the field of economic start-ups. However, he is also an active "sharing economy" initiator, as speaker on conferences and author of the sustainable magazine *KoKosum*.

**8-Expert:** Daniel Hires, *MakeSense* (Social consultant)

**Professional Background:** Hires is a marketing and innovation expert working at the intersection of sustainability, start-ups and social (non-profit) entrepreneurship. He advises social enterprises and is currently co-founding the *SenseCube Berlin*, the acceleration program for social start-ups supported by the global *MakeSense* (2015) (social entrepreneurship) network.

Hires also established the *MakeSense* hotspots in Berlin and Busan (South Korea) (in 2011), co-creates the *SenseCamp* unconference (since 2012) and the *Silent Climate Parade Berlin* (since 2010), co-authored a book on kickstarting projects and in 2014, advised and fund-raised € 1.4 million for a green fintech start-up at the global, environmental *CDP*.

**BMC Experience:** The BMC is a common tool, he uses to advice start-ups.

**KPI Usage:** Hires sees a problem of purely quantitative measurements and prefers to apply a mixture of qualitative and quantitate KPIs for his projects.

**Sustainability Context:** Hires is an expert in social entrepreneurship and increased during his career his knowledge in the field of ecological sustainability issues, especially at his work for the *CDP*.

**9-Expert:** Heiko Franken, *Ilmenau Business Angel & BCG* (Private, economic investor)

**Professional Background:** Franken has been for more than 10 years (1998-2010) the managing director of the *Boston Consulting Group* in Germany. Today, he works as business angel and CEO of the *Ilmenau Business Angel GmbH*, as entrepreneur and start-up coach. From 2010-2013 he moreover managed the *Business School* of the *Leuphana University*.

**BMC Experience:** Franken acknowledges the BMC as helpful, addition tool to foster a sound start-up creation and development.

**KPI Usage:** Franken values the accuracy and usefulness of KPIs, fitting to the goals and needs of individual BMs.

**Sustainability Context:** In his manifold positions, especially during his work at the *Leuphana University*, Franken witnessed the need for sustainable business solutions. However, he sees himself as expert in the economic area.

**10-Expert:** Holger Heinze, *Mangoo* (Environmental start-up)

**Professional Background:** Heinze holds a degree in "Business data processing" and has established in 1999 with an online agency for intranet systems his first startup. After a career (2006-2010) in small and large consultancies (e.g. *IBM Deutschland*), and later as a freelance consultant and coach, he worked as an executive consultant for *Challenges Worldwide* (2011). In Belize, he designed sustainable micro BMs for an NGO and established a financially independent recycling network (2011). He also coordinated carbon footprint projects in Belize for *CARICOM* and the *World Bank*. In early 2014, Heinze founded *Monagoo*, an environmental friendly online store that brings consumers and providers together. He is a fellow of the *Chartered Management Institute*.

**BMC Experience:** During the work for the *Belize Tourism Industry Association*, Heinze developed “sustainable business model blueprints”, focusing on carbon neutrality. The BMC was and is a constant tool that he uses in his career.

**KPI Usage:** Heinze states that he focuses on sound strategies as well as on the lean, quick and economical execution of those strategies with sustainable results, therefore he regularly uses KPIs.

**Sustainability Context:** Heinze’s professional background lays in the economic field, especially in strategy development, change management, marketing, finance and controlling. However, he as well developed strong practical and theoretical knowledge in ecological fields such as carbon footprint calculation and environmental issues of businesses.

**11-Expert:** Jeremy Küpers, *BPO Capital* (Private, economic investor)

**Professional Background:** Küpers holds an MBA in “Business Administration” and worked since 2008 in different companies (ebay, mindwyse, dgroup) as consultant in the areas: eCommerce, business development, interim management and digital transformation. Since 2015, he works as Investment & Portfolio Manager for BPO Capital.

**BMC Experience/ KPI Usage:** Küpers sees the BMC and KPIs as common tool of his everyday work. The BMC was more important for consultancy of companies. KPIs gained increasing importance in his work as investor.

**Sustainability Context:** Küpers has a strong economic focus. He invests with BPO Capital in clean technology, consumer internet, enterprise software, mobile and health care all over Asia, in New York and the Silicon Valley.

**12-Expert:** Julia Linz, *Green Alley* (Private, environmental investor or incubator)

**Professional Background:** Linz works since 2014 as communication and marketing manager for the Green Alley Investment GmbH. Before, she worked as Accountant Manager for *TerraCycle GmbH* in Germany, Austria and Switzerland (2012-2014). Together with Carsten Meyer, the associate director of Green Alley, who has years of experience as a business analyst and IT leader in various industries, she answered the Delphi survey rounds.

Since 2014, Green Alley offers together with the crowdfunding platform *Seedmatch* the first founder competition “InnoWASTEon - wanted green startups” with a focus on recycling, resource conservation and sought new perspectives and innovative approaches in dealing with waste. Entrepreneurs gain financial aid and an in-house incubation program, supporting start-ups from the first business idea to the final execution.

**BMC Experience:** The BMC helps Linz and Meyer to bridge the gap between idea, vision, concept and realization of BMs.

**KPI Usage:** Green Alley aims to develop “sustainable indicators” to judge the sustainability impact of start-ups.

**Sustainability Context:** Green Alley focuses on the financial success of environmental friendly start-ups and innovation in the broad field of renewable energy and environment.

**13-Expert:** Kate Robinson, *Climate KIC* (Public, environmental incubator)

**Professional Background:** Robinson has a master degree in “Political Science” and worked for two years as parliamentary assistant for the *European Parliament*. Since 2014, she worked as education manager and recently as member of the German innovation team for Climate KIC (Climate Knowledge and Innovation Community). In her role as education manager, Robinson was responsible for the selection process of start-ups, applying for the *Green Garage* (Pre-incubator) and *Accelerator* program of Climate KIC Germany, as well as for the “Journey” summer school.

**BMC Experience:** Robinson constantly uses the BMC, which is during the Climate KIC summer school a key tool to make the students familiar with start-up development. It is also used in the application process for the Pre-incubator and Accelerator program.

**KPI Usage:** To select best fitting start-ups for the pre-incubator and accelerator, Robinson uses KPIs from the economic and environmental field.

**Sustainability Context:** Robinson has a background in the political approach of sustainable development issues. During her time at Climate KIC, she gained experiences in the economic-oriented sustainability field of “green start-ups”.

**14-Expert:** Lisa Süß, *Fair Wear Foundation* (Social NGO)

**Professional Background:** Süß holds a degree in “Economics” (2011). After her studies, she gained experiences in CSR and social standards in the textile and clothing sector, deep knowledge of the German development cooperation and experiences with political communication and public affairs during her work at the *Gesellschaft für Interantionale Zusammenarbeit* (2011-2015). Since 2015, she is working as verification coordinator for Fair Wear, an independent, non-profit organisation that works with companies and factories to improve labour conditions for garment workers in Asia, Africa and Europe. In 2014, she also started a master study program in “Sustainable development”.

**BMC Experience:** The BMC is familiar to her, but not a frequently used tool.

**KPI Usage:** KPIs are key for her work as verification coordinator. She likes to combine quantitative indicators and standards with qualitative adapted metrics.

**Sustainability Context:** Süß has advanced knowledge in the field of sustainability standards, especially in the measurement of social and environmental sustainability in the clothing sector.

**15-Expert:** Markus Dr. Freiburg, *Fa-Se & McKinsey* (Private, social investor)

**Professional Background:** Freiburg has studied “Economics” in Witten (Dipl.-Ök.) and Cambridge (M.Phil.) and did his doctorate at the WHU Koblenz on “Investment by institutional investors in private equity funds”. He also looks at more than 7 years of experience as a consultant at *McKinsey & Company*, of which he was more than four years active as a pro bono consultant for social entrepreneurs and the economic advisory Council of *Chancenwerk*. In 2013, he co-founder Fa-Se, a funding agency for social entrepreneurship.

**BMC Experience:** Freiburg is familiar with the BMC.

**KPI Usage:** KPIs are the key tool to measure the social impact of Fa-Se’s start-ups.

**Sustainability Context:** Freiburg strives to merge his strategic and financial expertise with his passion for social entrepreneurship.

**16-Expert:** Martin Jähnert, *Schülerparten* (Economic non-profit start-up/ NGO)

**Professional Background:** Jähnert holds a master degree in “Industrial Engineering” from the *HTWK Leipzig University of Applied Sciences*, has been employed as quality manager at *Airbus* (2012-2014) and worked for *BMW* (2011-2012). Besides, he co-founded (2009) the non-profit organization *Schülerparten e.V.*, which connects high school students with Arabic background with college students, in order to enhance the student’s motivation, vision and cultural exchange. For this NGO, he worked until 2013 as treasure and did the finance and controlling. In 2014, he co-founded the non-profit start-up *dreiklang*, bringing textile manufacturing back to Germany to ensure fair supply chain management. Moreover, he founded the consulting and coaching agency *consistent concepts* and works as managing director for *binee*, a start-up enabling recycling through waste-management-gamification and is currently in residence in the *SpeedUP!Europe* accelerator.

**BMC Experience:** As participant of the *Climate KIC* summer school, the *Social Impact Lab* scholarship program, the *Global Entrepreneurship Summer School* of the *TU Munich* and *d.school* design thinking course, Jähnert extensively used and uses the BMC to evolve and develop the BM ideas for his projects.

**KPI Usage:** In his “former life”, Jähnert learned to measure success through economic-oriented, quantitative numbers. However, today he also appreciates the measurement through qualitative indicators.

**Sustainability Context:** Jähnert’s expertise lays in the more economic-oriented field of lean management, production- and quality management system, strategy, start-ups and BM crea-

tion. Nevertheless, his heart beats for the social and environmental impact of disruptive ideas and projects.

**17-Expert:** Michael Schulte, *förderbar* (Economic consultant)

**Professional Background:** As senior consultant (since 2012) at *förderbar GmbH* – Fördermittelmanufaktur, Schulte supports clients by supplying for various subsidy programs. As a trained and studied translators (English, Russian, German), he has started in 2005 his worked as management consulting for *eventurecat Corporate Finance Advisors*. He also has many years of full-time and volunteer experience in project management and financing in the non-profit sector (e.g. *Opferperspective Brandenburg e.V.* and *Internationaler Arbeitskreis e.V.*). Privately, he opens for other people “less-known” parts of the world, his interest lays especially in the society and politics of the countries in Central Asia

**BMC Experience:** For Schulte, the BMC is a well-known tool.

**KPI Usage:** KPIs are the key to his work as finance advisor and to the success of subsidy applications that he does.

**Sustainability Context:** Schulte’s work experience focuses on the management consultant and financial issues. However, his private interest for NGOs, political education as well as social and environmental issues raises his awareness for sustainability topics, also in economic-oriented fields.

**18-Expert:** Norbert Hermann, *TU Gründer-Service* (Public, economic incubator)

**Professional Background:** Hermann is since 2012 the manager director of the *TU Berlin Centre for Entrepreneurship* project “EXIST GründerUNiversum Berlin”. Moreover, he is since 2006 self-employed as social media expert, worked in multiple organizations and start-ups as manager or advisor (e.g. google Education, loveLife and GIZ).

**BMC Experience:** The “Knowledge and technology transfer” as well as “Entrepreneurship in education” program of the GründerUNiversum project, strongly work with the BMC to educate students about entrepreneurship. It is thus a common tool for Hermann.

**KPI Usage:** During his work as advisor, Hermann focuses on KPIs to improve and implement strategies.

**Sustainability Context:** Hermann’s profession clearly lays in the economic field. He is an expert in business development, strategy analysis and communication tactics. As project manager, he also selects and invests through the GründerUNiversum in start-ups.

**19-Expert:** Sebastian Gluschak, *Kansha* (Social start-up)

**Professional Background:** 2013, Gluschak co-founded the start-up *Kansha*, which improves the earning opportunities of some Kyrgyz with cases for smartphones and laptops! Craftsmanship, based on sustainability and appreciation of real nomads, for urban nomads worldwide. Before, Gluschak studied “Philosophy” and “Supply Chain Management” (2008-2010) and worked several years as consultant for *iq-consult*, *A.T.Kearney* and *SynerTrade* (2008-2013).

**BMC Experience:** Gluschak knows and works with the BMC.

**KPI Usage:** KPIs have been constantly important in his work.

**Sustainability Context:** Gluschak is an expert for supply chain management, strategic procurement and organizational transformation. However, as founder of *Kansha* and during his work at *iq-consult*, he developed as well strong expertise in social entrepreneurship.

**20-Expert:** Thorsten Jahnke, *iq-consult* & *SROI* (Social consultant)

**Professional Background:** Jahnke is a partner and since 2005, the managing director of *iq-consult GmbH*. After his trainee program as industrial management assistant and subsequent studies in “Business education and policy”, he acquired entrepreneurial experience as the founder, CEO and/ or board advisor in various companies and organizations. He is for exam-



ple the a co-founder of the *Social Impact gGmbH* and founding member of the *Social Return on Investment Germany e.V. (SROI)*.

**BMC Experience:** Jahnke has strong knowledge about the BMC.

**KPI Usage:** As SROI member, Jahnke currently co-develops social and economic indicators to measure social impact of start-ups.

**Sustainability Context:** Jahnke is an expert of social entrepreneurship and social sustainability issues.

## J. DELPHI ROUND 1-4: PARTICIPATION OF EXPERT PANEL

Here not available.

## K. DELPHI ROUND 1-2: EXPERT SELF-ASSESSMENT

Here not available.

## L. DELHI SURVEY ROUNDS: INTRODUCTION OF SURVEYS

Mails here not available.

### Attached Table

<b>Instruction:</b> <b>Social Metrics Ranking</b>	All the 12 remaining social metrics are listed below. Please select for each of them only one number from 1 to 12, to indicate their importance. 1 = very important to measure and manage sustainability in businesses 12 = not so much important to measure and manage sustainability in businesses Indicate whether the metric is a generic KPI or a PI, by filling an "x" in the belonging column. Try to choose not more than 3 KPIs.				
<b>Metric Code</b>	<b>Metric Explanation</b>	<b>KPI</b>	<b>PI</b>	<b>Rank</b>	<b>BMC element</b>
So1: Employee Happiness	Indicate whether the organization has a system in place to solicit feedback from employees and an established procedure to measure their happiness. Organizations should footnote the process and frequency by which they obtain feedback to measure employee happiness. Calculation: Anonymous self-rating of employees, indicating on a (e.g. 10 point) scale the degree of task, team and working condition satisfaction.				
So2: Market Research on Stakeholders	Indicate whether the organization uses market research to identify the needs of clients (resp. customers, users), potential clients or other relevant stakeholders. Organizations should footnote the process and frequency with which they conduct market research.				
So3: Grievance Mechanisms: Impacts on Society	Total number of grievances about impacts on society filed through formal grievance mechanisms during the reporting period. Organizations should footnote how many of the identified grievances were addressed or resolved (also when they accord prior to the reporting period) during the reporting period.				

So4: Labour Evaluation: Supplier and Supply Chain	Indicate whether an elaborated process is in place to evaluate along the whole supply chain the number of operations and suppliers identified as having significant risk for incidents of forced, compulsory or child labour. Organizations should footnote the measures taken to contribute to the elimination of all forms of forced or compulsory labour.				
So5: Safety and Social Security	Indicate whether the organization has systems and policies in place to monitor, evaluate and ensure worker safety, including the guarantee for social security protection. Organizations should footnote the type(s) and context of these systems and policies.				
So6: Anti-Discrimination Policy	Indicate whether the organization has a written policy and practice to combat any discrimination (e.g. due to ethnicity, religion, sex) of employees in line with internationally-recognized standards.				
So7: Women and Men Ratio	Ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation. Organizations should footnote type(s) and context of actions taken to establish equality between women's and men's salary and remuneration.				
So8: Employee Turn-over Rate	Ratio of the number of departing permanent (full-time and part-time) employees compared to the average number of permanent (full-time and part-time) employees at the organization during the reporting period.				
So9: Assessment: Human Rights and Impact	Total number and percentage of operations that have been subject to human rights reviews or impact assessments. Organizations should footnote type(s), context and any underlying assumptions of the review or assessment process.				
So10: Local Compliance	Indicate whether the organization has been found to be out of compliance with any local regulations (e.g. labour, tax, environmental standards) during the reporting period. Organizations should footnote type(s) and context of actions taken to solve these issues.				
So11: Child Labour Policy	Indicate whether the organization has a written child labour policy in line with International Labour Organization (ILO) standards				
So12: Fair Compensation Practices	Indicate whether the organization has a written policy to compensate employees fairly and equally. Organizations should footnote the personal characteristics (e.g. type(s) and context of fair compensation) explicitly referenced in the fair compensation policy				
<b>Instruction: Environmental Metrics Ranking</b>	All the 9 remaining environmental metrics are listed below. Please select for each of them only one number from 1 to 9, to indicate their importance. 1 = very important to measure and manage sustainability in businesses 9 = not so much important to measure and manage sustainability in businesses Indicate whether the metric is a generic KPI or a PI, by filling an "x" in the belonging column. Try to choose not more than 3 KPIs.				
<b>Metric Code</b>	<b>Metric Explanation</b>	<b>KPI</b>	<b>PI</b>	<b>Rank</b>	<b>BMC element</b>
En1: Waste Generated	Total amount of waste disposed by the organization during the reporting period. Organizations should footnote the waste type(s), the context (e.g. country, lifetime stage of product/service) and assumptions used when reporting against this metric.				
En2: Recycled Materials Ratio and Amount	Percentage and amount of recycled materials used to manufacture the organization's product (including packaging) or services, during the reporting period. Organizations should footnote the type(s) of recycled material, the context (e.g. country, lifetime stage of product/service) and assumptions made when reporting against this metric. Calculation: Weight or volume of recycled materials used in products/ total weight.				

En3: Greenhouse Gas Reductions: Products Sold	Amount of reductions in greenhouse gas (GHG) emissions over the lifetime of products sold during the reporting period. Organizations should footnote the energy type(s), the context of the reduced GHG (e.g. country, lifetime stage of product/service) and assumptions used when reporting against this metric. Calculation: $\text{Units/Volume Sold: Total} \times (\text{Greenhouse Gas Emissions of Product Replaced} - \text{Greenhouse Gas Emissions of Product})$ .				
En4: Non-hazardous Waste Avoided	Amount of non-hazardous waste disposal avoided based on the organization's refurbishing/ reusing/ recycling as part of delivering or developing the organization's products/services during the reporting period. Organizations should footnote the type(s) of non-hazardous waste, the context (e.g. country, lifetime stage of product/service) as well as assumptions used when reporting against this metric.				
En5: Environmental Management System	Indicate whether the organization has an environmental management system in place. Organizations should footnote the relevant details (e.g. written policy documents, stated objectives and targets, relevant programming, periodic auditing and evaluation practices) about their environmental management system.				
En6: Hazardous Waste Produced	Amount of hazardous waste created by the organization's operations during the reporting period. The organization should footnote the type(s) and context (e.g. country, point in production process) of hazardous waste created.				
En7: Reputation and Transparency	Indicate activities to transparently disclose the company's environmental impact. Including certificates the organization received, memberships or other honours by recognized third parties, taking a stand for sustainable impact				
En8: Hazardous Waste Avoided	Amount of hazardous waste avoided based on refurbishing/reusing/recycling as part of delivering or developing the organization's products/services during the reporting period. Organizations should footnote the type(s) and context (e.g. country, lifetime stage of product/service) of the avoided waste as well as assumptions used when reporting against this metric.				
En9: Sourcing Evaluation: Supplier and Supply Chain	Indicate whether an elaborated Due Diligence process as well as frequent procedure is in place to evaluate supplier's environmental performance according to recognized standards along the whole supply chain. Organizations should footnote which checklists and measures are used during the Due Diligence process and the evaluation procedure to control the environmental impact.				
<b>Instruction: Economic Metrics Ranking</b>	All the 8 remaining economic metrics are listed below. Please select for each of them only one number from 1 to 8, to indicate their importance. 1 = very important to measure and manage sustainability in businesses 8 = not so much important to measure and manage sustainability in businesses Indicate whether the metric is a generic KPI or a PI, by filling an "x" in the belonging column. Try to choose not more than 3 KPIs.				
<b>Metric Code</b>	<b>Metric Explanation</b>	<b>KPI</b>	<b>PI</b>	<b>Rank</b>	<b>BMC element</b>
Ec1: Target Beneficiary Socioeconomics	Specify the socioeconomic stakeholder groups of beneficiaries targeted (e.g. very poor, poor, low income, others) by the organization along the whole supply chain. Organizations should footnote the type(s) and context (e.g. country, lifetime stage of product/service) of the socioeconomic stakeholder groups as well as assumptions used when reporting against this metric.				
Ec2: Customer Acquisition Cost	Customer acquisition costs, including all organizational costs (e.g. marketing and incentives), to introduce new customers to the company's products and services. Calculation: $\text{Total acquisition costs divided by total new customers over a set period of time}$ . Organizations should footnote the type(s) and context (e.g. country) of costs as well as assumptions used when reporting against this metric.				

Ec3: SROI	Calculate Social Return on Investment (SROI) ratio. Calculation: 1. Projecting future Benefits and Discounted Values 2. Calculating the Net Present Value = Present value of benefits - Investment Value 3. Calculating SROI ratio = Present Value/Value of inputs 4. Sensitivity analysis = Assess the extent to which results would change if the assumptions made in the previous stages are changed.				
Ec4: Jobs Maintained at Ancillary Businesses: Low Income Areas	Number of full-time equivalent employees living in low-income areas, who work for enterprises financed or supported by the organization at the time when the organization began its support/investment. Organizations should footnote the type(s) and context (e.g. country) of jobs maintained as well as assumptions used when reporting against this metric.				
Ec5: Customer Happiness	Indicate whether the organization has a feedback system to solicit customer (resp. client, user) feedback and an established procedure to measure customer happiness. Organizations should footnote the type of process and the frequency by which feedback is obtained to measure customer happiness.				
Ec6: Churn Rate	Amount of customers (resp. clients or users) who cut ties with a service, product or company during a given time period. Calculation: Customers lost in time period/ starting customers in time period. Organizations should footnote the type(s) (resp. stakeholder groups) and context (e.g. country) of customers as well as assumptions used when reporting against this metric.				
Ec7: Growth Rate	Amount of increase that a specific variable has gained within a specific period and context. Organization should footnote which variable was chosen (e.g. revenue, income, profit, cash flow, social or environmental outcome) to calculate the organization's growth. All organizations are advised to choose at least one economic, one social and one environmental metric.				
Ec8: Customer Life-time Value	Prediction of the net profit attributed to the entire future relationship with a customer (resp. clients or users). Calculation: (Avg. Monthly Revenue per Customer x Gross Margin per Customer) / Monthly Churn Rate. Organizations should footnote the type(s) (e.g. stakeholder) and context (e.g. country) of customers as well as assumptions used when reporting against this metric.				
<b>Instruction: Standard Disclosure Metrics Ranking</b>	All the 9 remaining standard disclosure metrics are listed below. Please select for each of them only one number from 1 to 9, to indicate their importance. 1 = very important to measure and manage sustainability in businesses 9 = not so much important to measure and manage sustainability in businesses Indicate whether the metric is a generic KPI or a PI, by filling an "x" in the belonging column. Try to choose not more than 3 KPIs.				
<b>Metric Code</b>	<b>Metric Explanation</b>	<b>KPI</b>	<b>PI</b>	<b>Rank</b>	<b>BMC element</b>
SD1: Social Impact Objectives	Disclosure of the overall social impact objectives pursued by the organization (e.g. Access to: clean water, education, energy, financial services, information. Aiming for: Affordable housing, agricultural productivity, capacity-building, community development, conflict resolution, disease-specific prevention and mitigation, employment generation, equality and empowerment, food security, generate funds for charitable giving, health improvement, human rights protection or expansion, income/productivity growth, etc.).				
SD2: KPI Weighting: Scope and Relevance	Disclosure of company's scope and boundaries (e.g. region, nation, international affairs, in and external stakeholders) and the relevance of the given KPIs. Indicate whether a weighting for certain KPIs is necessary, due to e.g. sector, industry, branch or stakeholder dependency as well as due to the organizational lifecycle stages. Organizations should footnote the type(s), context and assumptions of their proposed weightings.				

SD3: Operational model	Disclosure of the operational model of the organization (e.g. Production/Manufacturing - Processing/Packaging - Distribution - Wholesale/Retail - Services- Financial Services).				
SD4: Product/Service Output	Disclosure of amount of the product/service sold by the organization during the reporting period.				
SD5: Value Creation Statement	Disclosure of the overall value creation process of the company, with regard to where the organization creates, retains or destroys value in economic, social and environmental terms.				
SD6: Legal Structure	Disclosure of the legal structure of the organization (e.g. Benefit Corporation, Co-op - Corporation, Limited Liability Company, Non-Profit/Non-Governmental Organization, Partnership, Sole-proprietorship, Other).				
SD7: Customer Model	Disclosure of the customer model(s) (e.g. Business to Business (B2B), Business to Consumer (B2C), Business to Government (B2G)).				
SD8: Environmental Impact Objectives	Disclosure of the overall environmental impact objectives pursued by the organization (e.g. Biodiversity conservation, Energy and fuel efficiency, Natural resources conservation, Pollution prevention & waste management, Sustainable energy, Sustainable land use, Water resources management, etc.).				
SD9: New Investment Capital	Disclosure of value of funds invested in the organization (both loans and investments) during the reporting period.				
<b>Instruction: Metrics and Business Model Canvas Mapping</b>	Coming so far, you as an expert have been altering, rating and ranking the above given metrics three times! Many thanks for this effort and your time! Having done these iterative rounds, finally the mapping of the last round metrics can be done. Please follow in this section your experiences, knowledge and intuition. Please name for each business model part the metrics (short name) that you think are related to it. If you want to refresh your knowledge about the different business model parts, please watch the 140 seconds video (Link: <a href="https://www.youtube.com/watch?v=QoAOzMTLP5s">https://www.youtube.com/watch?v=QoAOzMTLP5s</a> ).				
<b>Nine elements of Business Model Canvas</b>	The following description, explains in detail the elements (so-called building blocks) of the Business Model Canvas, entirely cited from Osterwalder et al. (2010); the respective page numbers are displayed at the end of each paragraph.				
Customer Segments	The customer segments block defines the different groups which are served in a certain business model. A business model may define a single or multiple different customer segments in order to decide which groups to serve and which to disregard. As customers are at the core of any business model, a deep understanding and precise definition of the customer segment is necessary to best fulfil its specific needs. Customer segments can be, among others, mass market, niche market, segmented, diversified or multi-sided markets, the latter of which relates to a business model serving two or more distinct but interdependent customer segments. A credit card company, for example, depends on both credit card holders and merchants accepting these credit cards. (p. 20–21)				
Value Proposition	The value proposition defines the bundle of products and services offered to serve a specific customer segment. It is closely tailored to the demands of the customer segments in order to solve a specific customer challenge or satisfy a customer need. For each customer segment a specific value proposition has to be defined. The value proposition is what distinguishes one company from another. While they are innovative and disruptive in some cases, in many cases they are similar to existing market solutions with added features and characteristics. The following elements (to name only a few) can be part of value creation for customers: Newness, performance, price, design, brand/status, risk reduction, convenience/usability. (p. 22–25)				



Channels	The channel block describes the interactions that the company has with the market in order to deliver its value proposition. Channels define the customer touch-points, thus the when, where and how of communication and interaction such as distribution, sales channels, customer service, etc. The channels and their execution play an important role in the customer experience, hence it is crucial to establish the right mix of channels to reach the customer in a satisfying way in order to successfully bring the value proposition to market. (p. 26–27)				
Customer Relationships	The customer relationships block defines the type of relationships a business establishes with each customer segment. Customer relationships are driven by different intentions (e.g. acquisition, retention, upselling) and can be approached in various manners, ranging from personal to automated. Categories of customer relationships may be, but are not limited to, personal assistance, self-service, automated service, communities and co-creation. The performed customer relationships have a deep impact on the customer experience. (p. 28–29)				
Revenue Stream	The revenue streams block represents the cash a company generates from each customer segment. However, to create earnings, costs must be subtracted from the revenues. The company has to find out for what value a customer segment is willing to pay, how much and in what manner. Having found a fitting answer allows a company to generate one or more revenue streams. For example from selling assets (ownership rights), usage of particular service or subscription (continuous access to service) as well as leasing products (temporary usage) or licensing of intellectual property. In each revenue stream, fixed (e.g. price list, volume, product or customer dependent) or dynamic (e.g. negotiation, yield management or auctions) pricing mechanisms can be applied. (p. 30–33)				
Key Activities	The key activities element describes the most important actions necessary for an enterprise to execute its business model. These most important activities are like the key resources distributed over the building blocks value proposition, channels, customer relationships and revenue streams and are crucial to success. Key activities can be categorized as production, problem solving and platform/network, depending on the industry and business model type. (p. 36–37)				
Key Resources	The key resources element describes the essential assets that are required to realize and implement a BM. These resources provide the key foundation from which a business is able to create and offer its value propositions, by maintain its relationships to customer segments through various channels and finally generating revenue streams. Key resources can be physical, human, financial or intellectual as well as owned or leased by the company or acquired from key partners. (p. 34–35)				
Key Partnerships	The key partnerships element presents the network of partners and suppliers that are needed to successfully make the BM work. The alliance with key partners can be driven by three exemplary motivations: to optimize and scale a company's BM, to reduce risks in a competitive environment or to acquire particular resources and activities. This way, also four different types of partnerships can be differentiated: strategic alliances between non-competitors, coopetition as strategic partnership between competitors, joint-ventures to develop new businesses and buyer-supplier relationships to assure reliable supply. (p. 38–39)				
Cost Structure	The cost structure block outlines all of costs incurred while operating under a particular BM. The costs depend heavily on key activities, key resources and key partnerships that are used to create value, deliver it to the customer and to generate value. All of these elements incur costs. Of-ten companies intuitively aim to reduce cost and are thus cost-driven, others focus on value creation and are more value-driven. For both approaches, the cost structure can be characterized as fixed, variable or dependent on economies of scale or scope. (p. 30–41)				

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**Table 29: List of indicators and BMC elements.**


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## **M. SURVEY ROUND RESULTS**

Not available here.