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Utilizing the Business Model Canvas to Enable Sustainability Measurement on the Business Model Level

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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%	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 BMCs 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 BMCs. 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.

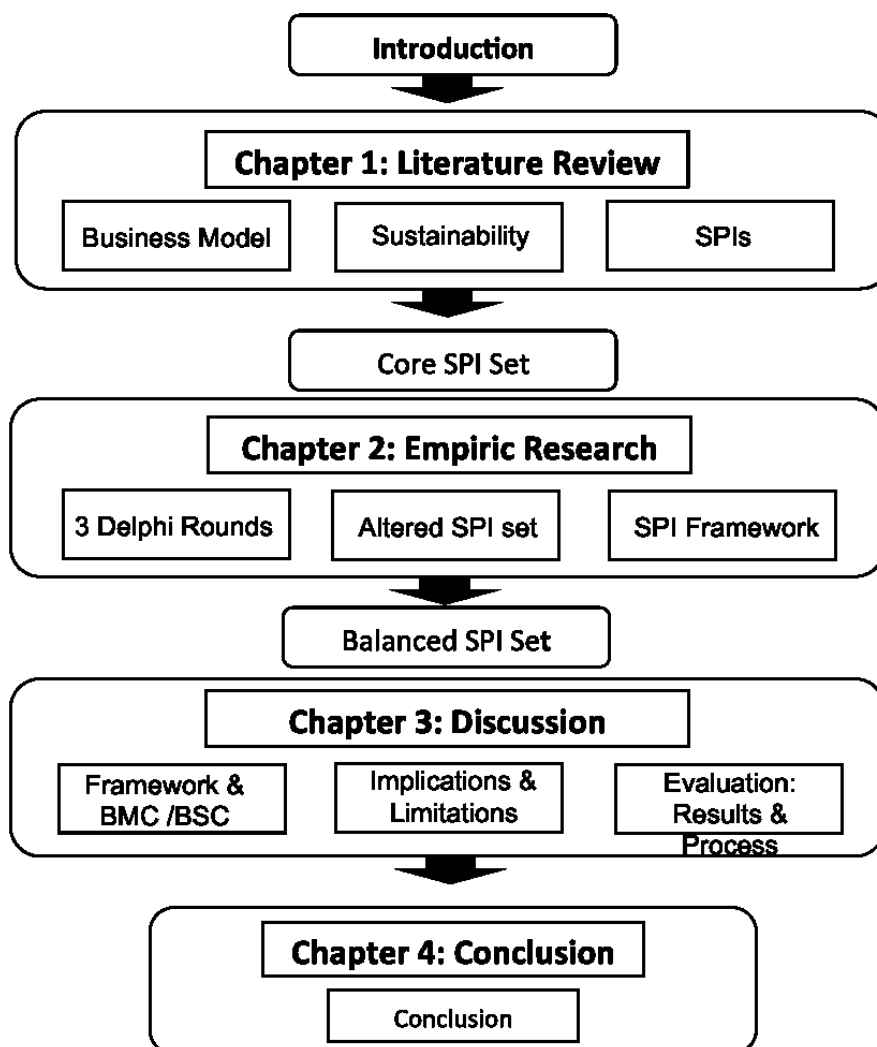


Figure 1: Research design and process.

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 a 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.).

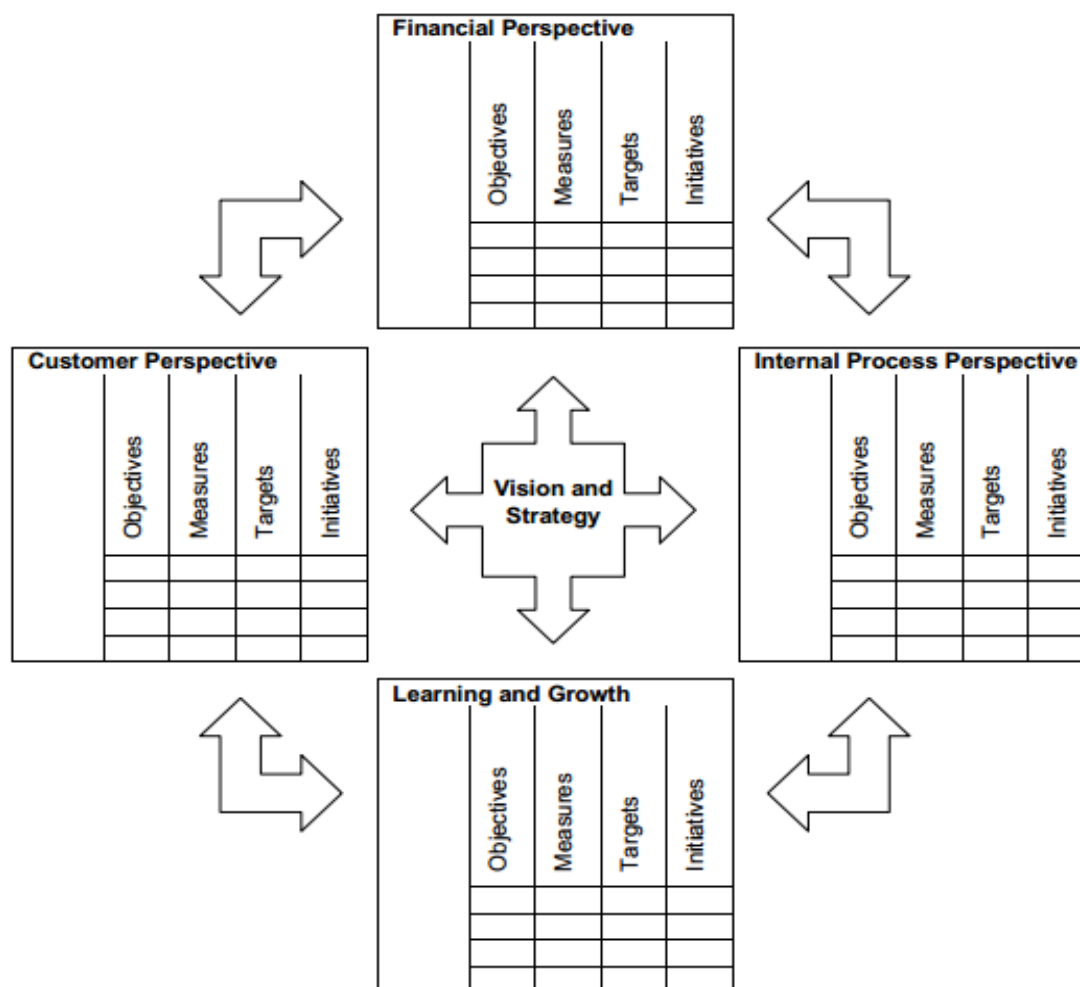


Figure 2: Basic BSC perspectives, by Kaplan and Norton (1996, p. 9).

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)
Product	Innovation and Learning	What?
Customer Interface	Customer	Who?
Infrastructure Management	Internal Business	How?
Financial Aspects	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
Product	Value Proposition
Customer Interface	Target Customer
	Distribution Channel
	Relationship
Infrastructure	Value Configuration
Management	Capability
	Partnership
Financial Aspect	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.

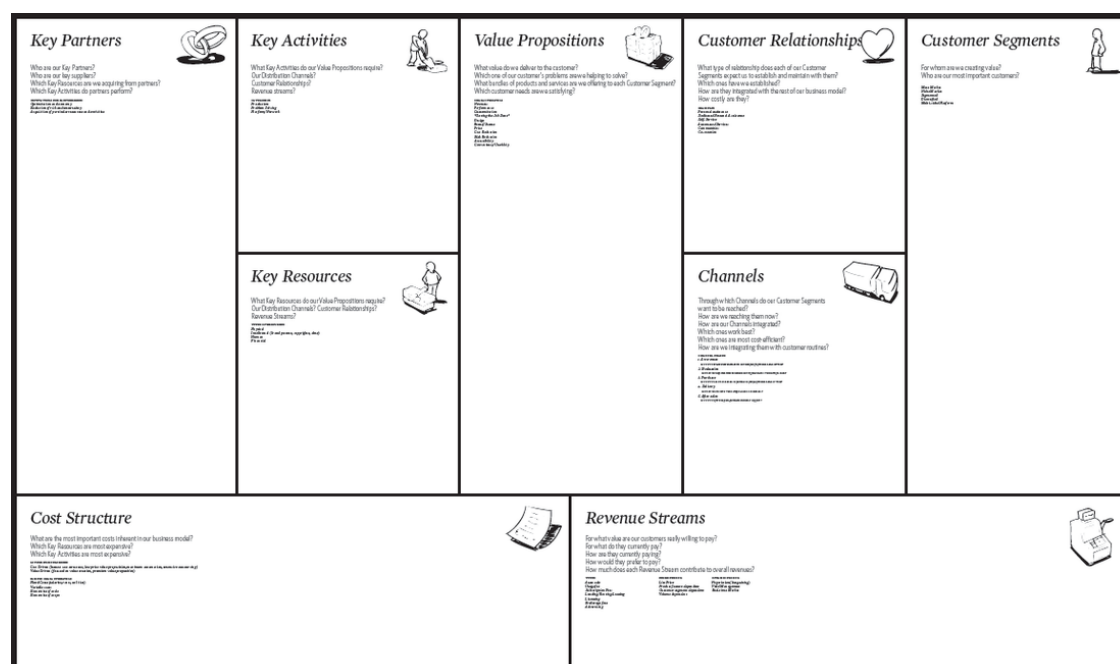


Figure 3: Business Model Canvas, by Osterwalder et al. (2010).

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).

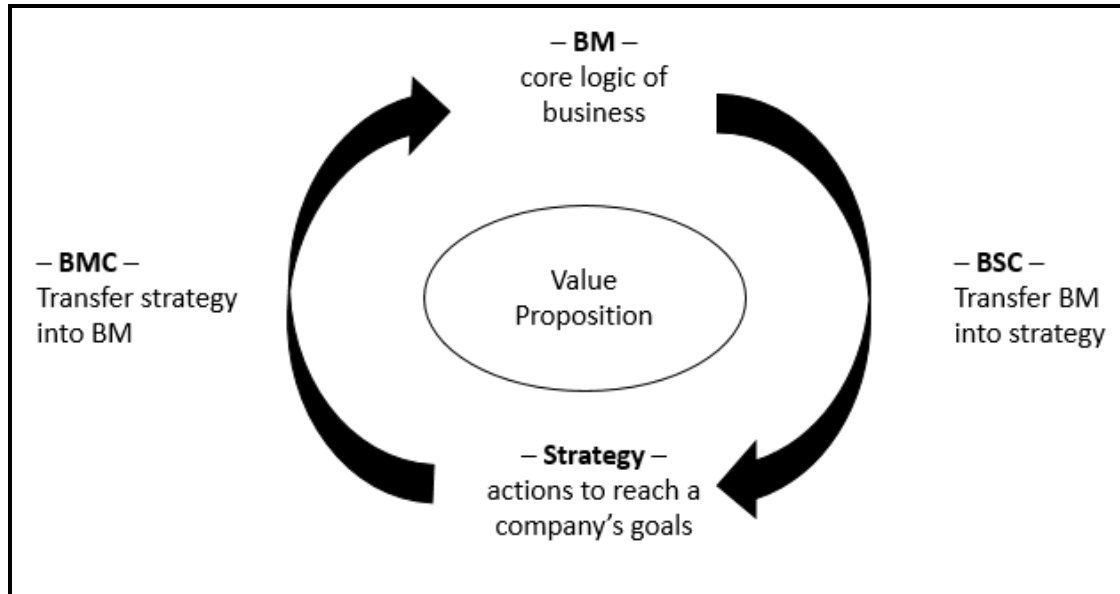


Figure 4: Connection between BSC and BMC.

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.

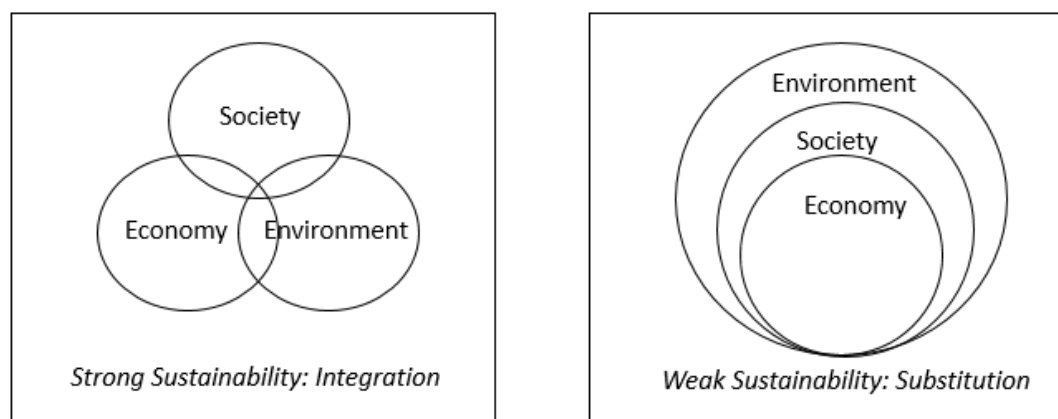


Figure 5: Strong versus weak sustainability, after Daly et al. (1995).

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 BMCs.

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-destroyed 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).

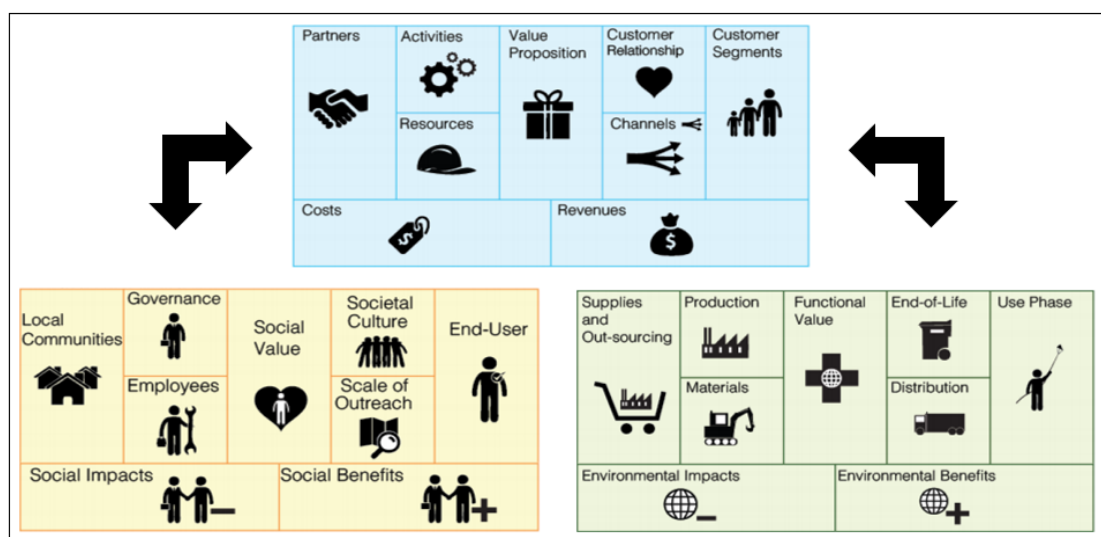


Figure 7: Triple Layered Business Model Canvas, after Joyce et al. (2015).

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).

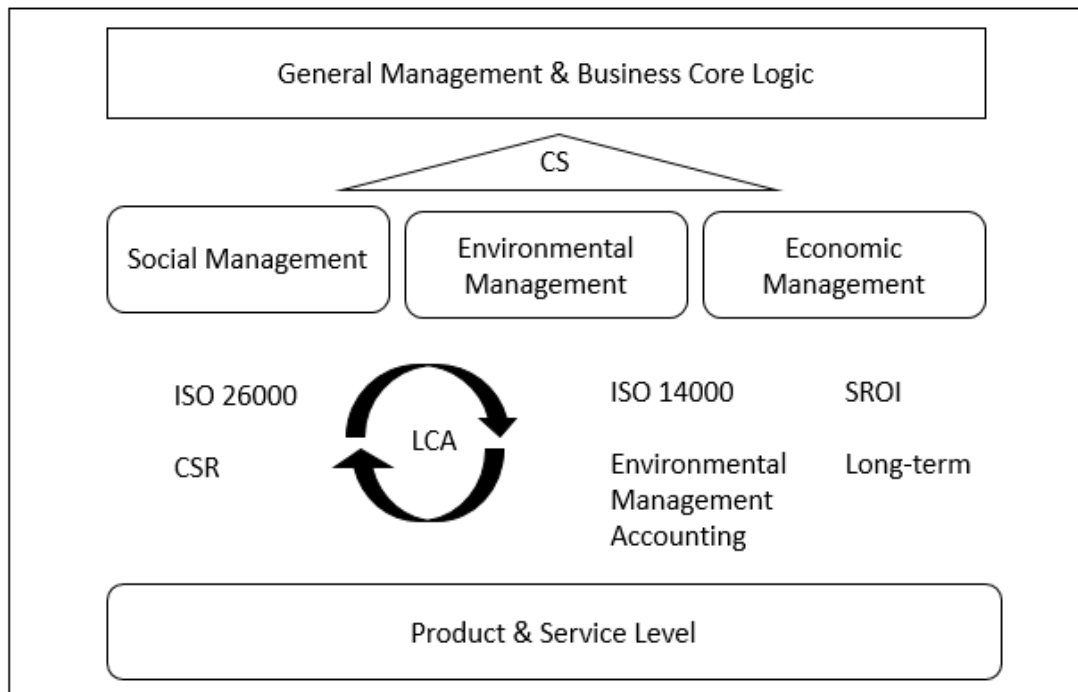


Figure 8: Single-dimensional measurement tools.

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 BMCs 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.

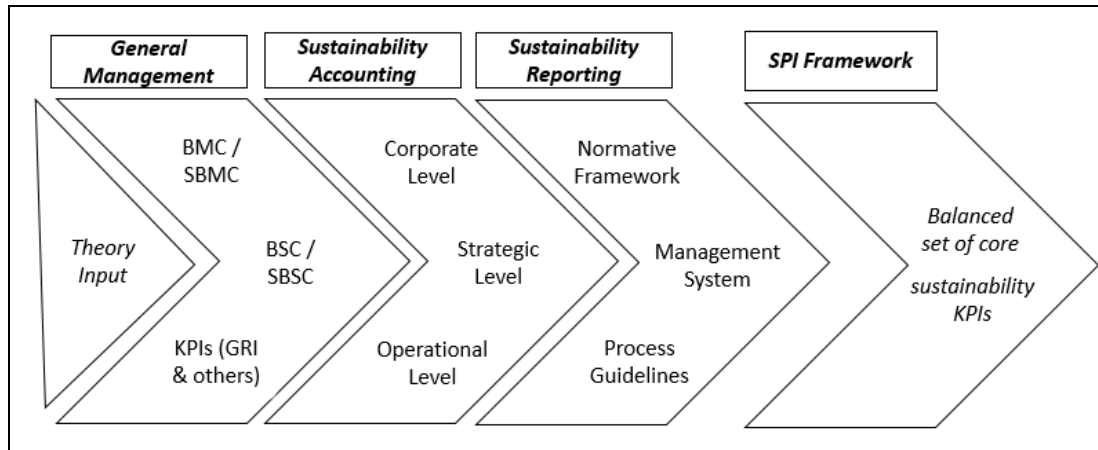


Figure 10: Theory input for SPI framework development.

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).

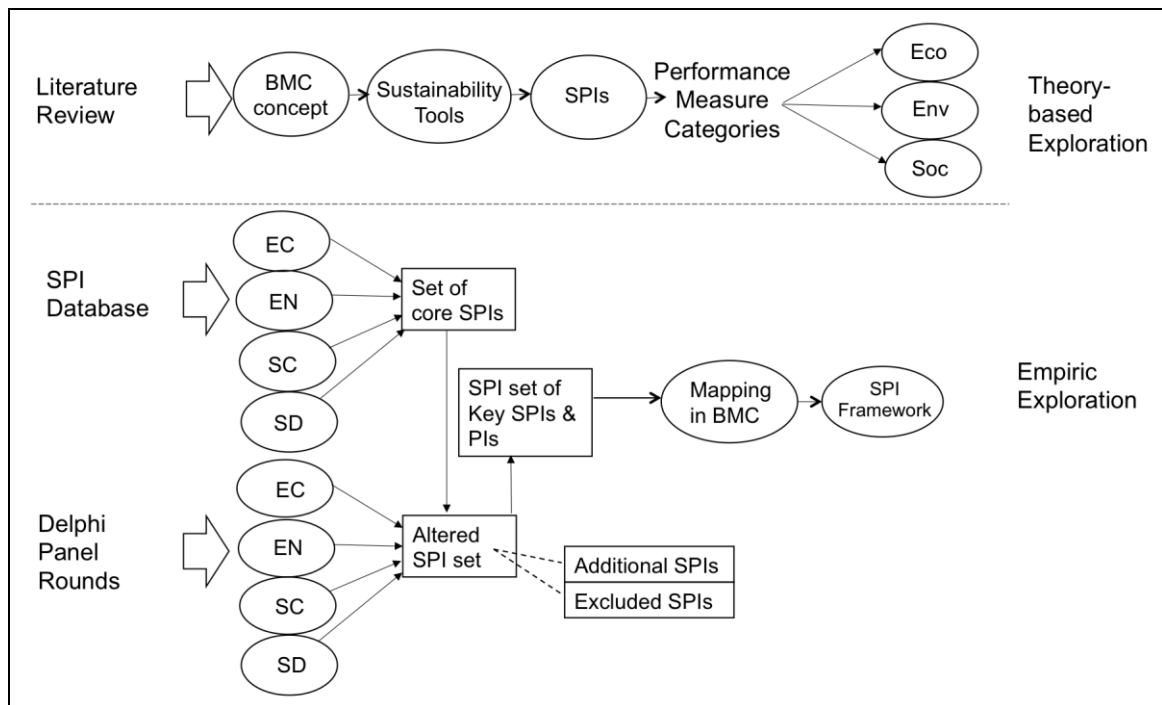


Figure 11: SPI database and Delphi rounds as part of empiric exploration.

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 ≥ 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 ≥ 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 ≥ 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 ≥ 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 ≥ 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 3rd of March 2015 and got closed on 24th 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.

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

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 ≥ 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).

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

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 7th April and got closed on the 29th 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%.

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

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 ≥ 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 and 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 ≥ 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 11th May and got closed on 10th 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.

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

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).

Rank	Soc SG	Env SG	Eco SG	Overall Rank: Code and Short Name
1	SO4	SO5	SO5	SO5: Safety and Social Security
2	SO5	SO4	SO1	SO4: Labour Evaluation
3	SO1	SO1	SO4	SO1: Employee Happiness
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	EN7: Reputation and Transparency
2	EN7	EN7	EN9	EN9: Sourcing Evaluation
3	EN1	EN3	EN1	EN3: Greenhouse Gas Reductions
4	EN9	EN1	EN3	EN1: Waste Generated
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	EC3: SROI
2	EC3	EC7	EC7	EC7: Growth Rate
3	EC7	EC1	EC1	EC1: Target Beneficiary Socioeconomics
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	SD5: Value Creation Statement
2	SD3	SD1	SD1	SD1: Social Impact Objectives
3	SD8	SD8	SD3	SD8: Environmental Impact
4	SD1	SD2	SD8	SD3: Operational Model
5	SD2	SD3	SD2	SD2: KPI Weighting
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).

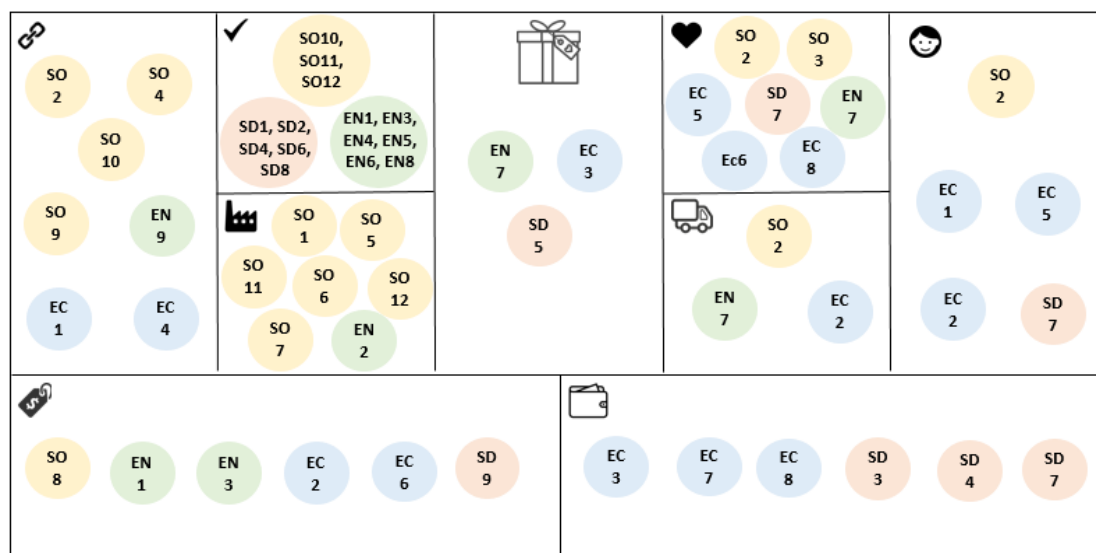


Figure 12: All Key SPIs and additional PIs mapped to the BMC.

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).

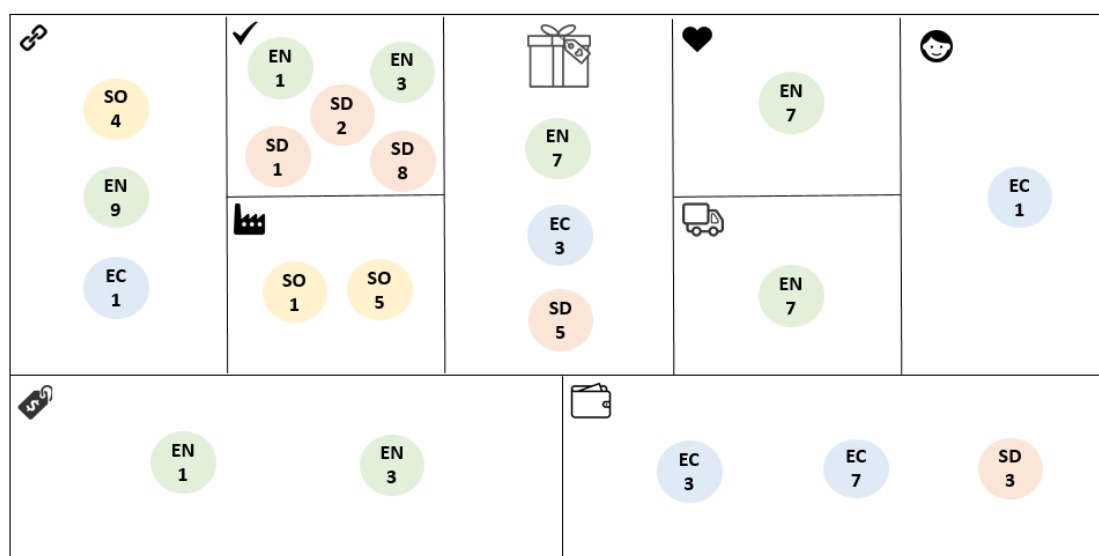


Figure 13: SPI framework with 15 Key SPIs.

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	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 sent to the experts on 3th 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 (Küper, Robinson). 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 future research and practice. Robinson (public, environmental incubator) suggested presenting the framework within the start-up unit of Climate KIC. Küper (private, economic investor) was looking forward to the final results and stated that he might use them to assess potential impact investments.

As only three experts provided feedback in the given timeframe of one month (until 31th 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			
Finacial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective	Finacial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective
Revenue growth: EC7 Growth Rate	Market share	Innovation process: SD3 Operational Model	Employee retention	SD5 Value Statement	Product attributes: SD1 Social Impact, SD8 Environmental Impact	Cost indicators: EN1 Waste Generated, EN3 Greenhouse Gas Reductions	Employee potentials
Productivity growth	Customer acquisition	Operations process: SO5 Safety and Security	Employee productivity	EC3 SROI	Customer relationships: EC1 Target Socioeconomics	Quality indicators: SO4 Labour Evaluation, EN9 Sourcing Evaluation	Technical infrastructure
Asset utilization	Customer retention Customer satisfaction Customer profitability	Postsale service process	Employee satisfaction: SO1 Employee Happiness		Image and reputation: EN7 Reputation and Transparency	Time indicators	Climate for action: SD2 KPI Weighting

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.

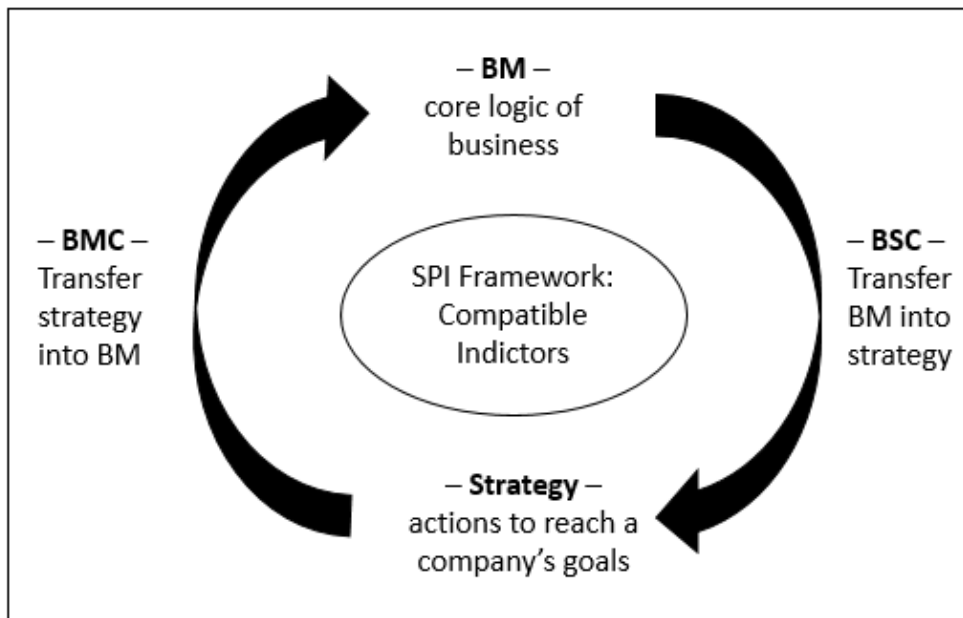


Figure 14: Result: SPI framework compatible with BMC and BSC.

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			
Finacial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective	Finacial Perspective	Customer Perspective	Process Perspective	Learning and growth perspective
Revenue growth: EC7 Growth Rate	Market share	Innovation process: SD3 Operational Model	Employee retention: SO8 Employee Turnover	SD5 Value Statement	Product attributes: SD1 Social Impact, SD8 Environmental Impact	Cost indicators: EN1 Waste Generated, EN3 Greenhouse Gas Reductions, EN8 Harzardous Waste Avoided, EN4 Non-harzardous Waste Avoided	Employee potentials
Productivity growth: SD4 Product/Service Output Produced	Customer acquisition: SO2 Market Research on Stakeholders, EC2 Customer Acquisition Cost	Operations process: EN6 Harzardous Waste Produced, EN6 Waste Produced, SO5 Safety and Security	Employee productivity: EC4 Jobs Maintained	EC3 SROI	Customer relationships: EC1 Target Socioeconomics	Quality indicators: SO4 Labour Evaluation, EN9 Sourcing Evaluation	Technical infrastructure: EN5 Environmental Management System
Asset utilization: EN2 Recycled Materials Ratio	Customer retention: EC6 Churn Rate	Postsale service process	Employee satisfaction: SO1 Employee Happiness, So6 Anti-Discrimination Policy, SO11 Child Labour Policy, SO7 Women and Men Ratio, SO12 Fair Compensation	SD9 New Investment Capital	Image and reputation: EN7 Reputation and Transparency	Time indicators	Climate for action: SD2 KPI Weighting, SO9 Assessment: Human Rights and Impact
	Customer satisfaction: SO3 Grievance Mechanisms, SO10 Local Compliance, EC5 Customer Happiness				SD6 Legal Structure		
	Customer profitability: EC8 Customer Lifetime Value						

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 fourth 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 & 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, cooperation 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)

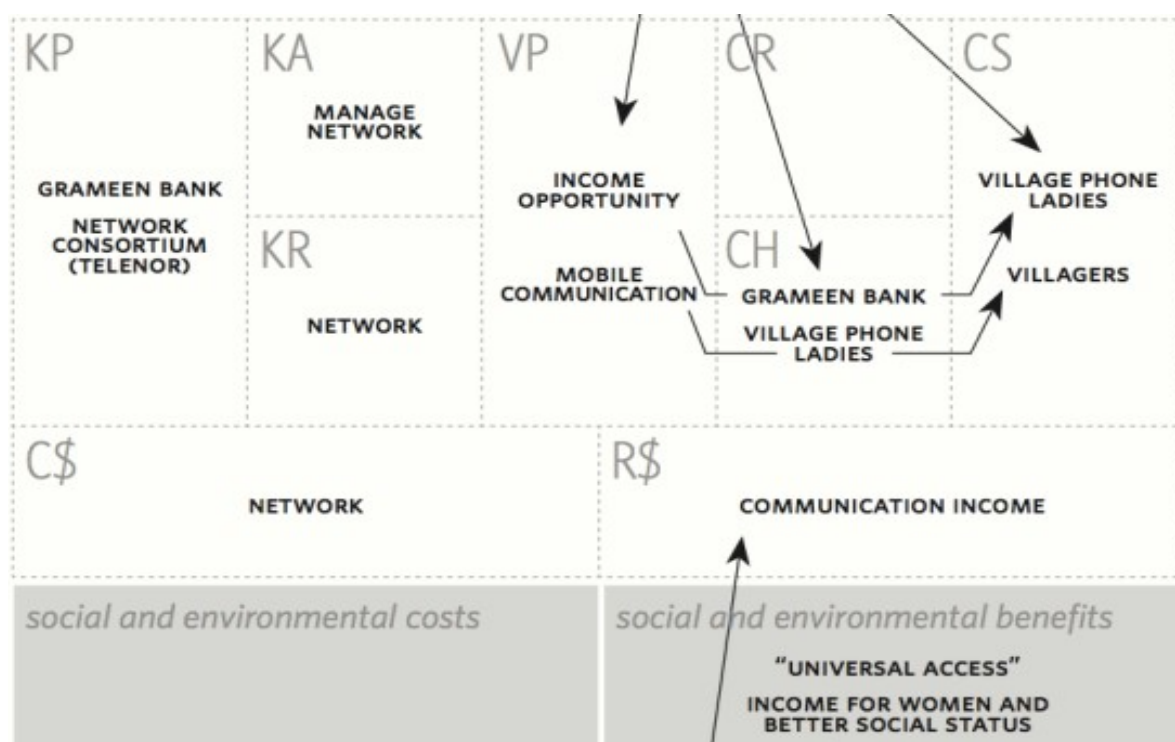


Figure 15: Triple bottom line BMC (Osterwalder et al., 2010, p. 265)

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

All institute and tool descriptions are extracted from the institute’s homepages.

Yellow Colour: Chosen category

Beige Colour: Chosen for a comparing analysis.

Name / Homepage	Type / Code	Organisation Description	Principles, Guidelines, Framework, Indicators or Standard	GRI/IRIS
AccountAbility (www.accountability.org)	Sustainability Accounting Institute	AccountAbility is an international professional institute that focuses on the sustainable development, accountability and public disclosure.	Standard: The AA1000 Stakeholder Engagement Standard provides a principles-based, open-source framework for quality stakeholder engagement and supports the AA1000APS Principle of Inclusivity.	
Arista 3.0 (www.arista-standard.org)	Sustainability Accounting Institute	ARISTA 3.0® has been developed in response to the demands from global investors and companies for Responsible Investment Research (RIR) Groups to incorporate the key principles of quality, integrity, transparency and accountability into their research processes. Responsible Investment Research Standard comprising guidelines and rules.	Standard: ARISTA 3.0® is the first quality standard conceived and developed at a sector level in the field of Corporate Social Responsibility (CSR). The standard: 1) Encourages RIR groups to adopt features that ensure independence and objectivity and professionalism; 2) Improves quality management systems and stimulate transparency; 3) Facilitates assurance processes and form a basis for further verification procedures; 4) Promote research characteristics viewed as best practices.	

ASHOKA (www.ashoka.org)	Social Entrepreneur Network (Sustainability Accounting Institute)	Ashoka is the largest network of social entrepreneurs worldwide, with nearly 3,000 Ashoka Fellows in 70 countries putting their system changing ideas into practice on a global scale. Founded by Bill Drayton in 1980, Ashoka has provided start-up financing, professional support services, and connections to a global network across the business and social sectors.	Guidelines: Ashoka developed with BonVenture, Auridis GmbH, PHINEO and the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) the Social Reporting Guidelines (using GRI indicators). The guidelines: 1) Disclose Social and environmental impact; 2) Tell the vision, mission and business model of a company as a story	GRI
Carbon Disclosure Project (CDP) (www.cdproject.net)	Sustainability Accounting & Rating Institute	The Carbon Disclosure Project (CDP) is an organization based in the United Kingdom which works with shareholders and corporations to disclose the greenhouse gas emissions of major corporations.	Framework: The Carbon Disclosure Leadership Index (CDLI) includes the five programs: Investor CDP, CDP Public Procurement, CDP Water Disclosure, CDP Supply Chain and CDP Cities. The index: 1) Is an environmental disclosure system for companies.	
Corporate Register (www.corporateregister.com)	Sustainability Accounting & Reporting Database	Is the largest online directory of companies that has issued a CRS, sustainability or environmental reports.	Framework/ Guideline: Provides statistics and benchmarking opportunities. The register allows: 1) Reporting of Corporate Responsibility.	
Ernst and Young (www.ey.com)	Sustainability Accounting	Consultancy.	Guideline / Principals: Ernst & Young states to use SASB, GRI and Integrated reporting.	GRI
Future Fit (futurefitbusiness.org)	Sustainability Rating & Standard Development Institute	The Future-Fit Business Benchmark offers a set of performance criteria that describe a company that is fit for the future: one that will flourish while adding to the wellbeing of society as a whole. The Future-Fit Business Benchmark is an open source initiative co-led by 3D Investment Foundation and The Natural Step Canada.	Framework / Principals: Set of future-fit goals that embody the environmental and social constraints within which a future-fit business can thrive. The Benchmark is designed to help business measure – and manage – the gap between what they are doing today and what science tells us they will need to do tomorrow. 8 Principles (base on Natural Step) and 28 future-fit goals spanning 9 areas.	
Global Impact Investing Rating System (GIIRS) (b-analytics.net/giirs-ratings)	Sustainability Rating & Standard Development Institute	GIIRS (2011) Ratings are the gold standard for impact measurement in impact investing. GIIRS Ratings are rigorous, comprehensive, and comparable ratings of a company or a fund's social and environmental impact. The organization behind, B Lab, is a non-profit that serves a global movement of entrepreneurs using the power of business to solve social and environmental problems. Started in 2009, as a presentation to what will become the GIIN outlining the future of two organizations that will become IRIS and GIIRS Ratings & Analytics.	Framework / Standard: B Corp certification is to sustainable business what Fair Trade certification is to coffee. B Analytics (Business Model and Impact rating) is a customizable platform for benchmarking, measuring, and reporting on impact. Through the leadership of the B Corp Community, laws have been passed in 19 US states, plus DC, creating a new type of corporation—the benefit corporation—that best meets the needs of entrepreneurs and investors seeking to use business as a force for good. GIIRS bases on IRIS metrics.	IRIS

Global Initiative for Sustainable Ratings (GISR) (www.ratesustainability.org)	Sustainability Rating & Standard Development Institute	Launched in June 2011, the Global Initiative for Sustainability Ratings' (GISR) mission is to design and steward a global sustainability (i.e., Environmental, Social, and Governance – ESG) ratings standard to expand and accelerate the contribution of business and other organizations worldwide to sustainable development. GISR will not rate companies. Instead, it will accredit other sustainability ratings, rankings or indices to apply its standard for measuring excellence in sustainability performance.	Guidelines/ Principals / Standard: 12 principles aligned with GRI, SASB, IIRC, Arista 3.0, UN Principles for Responsible Investment (UNPRI) Principles ⁵ , Natural Step. IN Q4 2015 KPIs should be ready developed. Aligned with GRI.	GRI
Global Reporting Initiative (GRI) (www.globalreporting.org)	Sustainable Accounting & Standard Development Institute	The Global Reporting Initiative's (GRI) provides reporting guidelines and is the most adopted framework for sustainably reporting. The GRI was formed by the United States based non-profits Ceres (formerly the Coalition for Environmentally Responsible Economies) and Tellus Institute, with the support of the United Nations Environment Program (UNEP) in 1997. It released an "exposure draft" version of the Sustainability Reporting Guidelines in 1999, the first full version in 2000.	Guidelines/ Indicators / Principals / Standard: The G3 (120 indicators, launched 2006) and G4 standard (144 general and specific indicators, launched 2013) include indicators organized into three Categories - Economic, Environmental and Social. The Social Category is further divided into four sub-Categories, which are Labor Practices and Decent Work, Human Rights, Society and Product Responsibility. Metrics aligned to IRIS (2015).	GRI/ IRIS
Impact Reporting & Investment Standard (IRIS) (www.iris.thegiin.org)	Sustainable Accounting & Standard Development Institute	IRIS is managed by the Global Impact Investing Network (GIIN), a non-profit organization dedicated to increasing the scale and effectiveness of impact investing. GIIN offers IRIS as a free public good to support transparency, credibility, and accountability in impact measurement practices across the impact investing industry. IRIS has been an initiative of the GIIN since 2009. Prior to that, IRIS was jointly managed by The Rockefeller Foundation, Acumen, and B Lab, which began development of IRIS in early 2008 with technical support from Hitachi, Deloitte, and PricewaterhouseCoopers.	Guidelines/ Indicators / Standard: 488 metrics that leading impact investors use to measure social, environmental, and financial success, evaluate deals, and grow the credibility of the impact investing industry. IRIS metrics are aligned with widely-accepted standards promoted by many sector leaders and industry bodies, including the Global Reporting Initiative, the International Labor Organization, and the International Financial Reporting Standards among others. In addition to identifying and organizing the most useful and well-established metrics from across different sectors, the IRIS Initiative also collaborates with many different standards-setting bodies to help create more unity and coordination across these different efforts.	GRI/ IRIS
KPMG (www.kpmg.com)	Sustainability Accounting	One of the world's leading consulting companies. It also provides services related to sustainability disclosure and related topics.	Guideline / Principals. Metrics unknown.	

NASDAQ OMX CRD Global Sustainability Index (www.indexes.nasdaqomx.com)	Sustainability Rating & Standard Development Institute	The NASDAQ OMX CRD Global Sustainability Index is an equally weighted equity index that serves as a benchmark for stocks of companies that are taking a leadership role in sustainability performance reporting and are traded on a major US stock exchange. The Index began on June 15, 2009 at a base value of 1000.00.	Indicators / Standard: The Index is made up of companies that have taken a leadership role in disclosing their carbon footprint, energy usage, water consumption, hazardous and non-hazardous waste, employee safety, workforce diversity, management composition and community investing.	
Natural Step (www.naturalstep.org)	Sustainable entrepreneurship network (Sustainability Accounting)	Dr. Robert worked out a first version of system conditions for sustainability and a planning method that later evolved into and became known as the Framework for Strategic Sustainable Development (FSSD). Dr. Robert published these results in 1992 in a book called "The Necessary Step". He also employed a team who began building the non-profit organization The Natural Step with the purpose of facilitating the further development and application of the Framework.	Framework / Principals: 4 Principles to ensure sustainability. 1) we cannot dig stuff up from the Earth at a rate faster than it naturally returns and replenishes. 2) we cannot make chemical stuff at a rate faster than it takes nature to break it down. 3) we cannot cause destruction to the planet at a rate faster than it takes to regrow. 4) we cannot do things that cause others to not be able to fulfill their basic needs.	
OECD library (www.oecd-ilibrary.org)	Sustainability Accounting & Reporting Database	OECD library is the online library of the Organization for Economic Cooperation and Development (OECD) featuring its books, papers and statistics and is the gateway to OECD's analysis and data. It replaced SourceOECD in July 2010.	Guidelines: OECD library contains content published by the International Energy Agency (IEA), the Nuclear Energy Agency (NEA), the OECD Development Centre, PISA (Program for International Student Assessment), and the International Transport Forum (ITF).	
Social Reporting Initiative e.V. (http://www.social-reporting-standard.de)	Sustainable Accounting & Standard Development Institute	Social Reporting Standard (SRS) is a joint project of Ashoka Deutschland gmbH, Auridis GmbH, BonVenture Management GmbH, Phineo gAG, Schwab Foundation, gut.org gAG, Technische Universität München, and Universität Hamburg. The project is supported by PricewaterhouseCoopers AG.	Guidelines / Standard: SRS guide to results-based reporting. The SRS 2014 is optimized with regard to user-friendliness and significance, taking practical feedback and the current state of science into account. Indicators base on GRI.	GRI
Social Return on Investment (SROI) (www.thesroinetwork.org)	Sustainability Accounting Tool	The SROI network (2015) (launched 1997) is a principles-based method that provides a consistent approach to understanding and managing an organization's impact. In brief, it guides the process by which an entity identifies different stakeholders, asks for their perceptions of important outcomes, develops indicators for those outcomes, adjusts the outcomes for an assessment of what would have happened in absence of the organization's work, and values the impact to arrive at a better understanding of the impact of an organization.	Framework / Guidelines / Principals: The SROI method provides a clear process for determining which indicators to measure, and the IRIS library provides a set of performance indicators with standardized definitions. Together these tools provide a valuable framework for organizations to use when reporting impact. The aim of SROI is to account for the social, environmental, and economic value of an organization's outcomes. Indicators base on IRIS.	IRIS

SustainAbility (www.sustainability.com)	Sustainability Accounting Institute	The U.K. consultancy group SustainAbility conducts a biannual survey of the state of CSR reporting in conjunction with the United Nations Environmental Program.	Guidelines: Use of - among other metrics - GRI indicators. Analysis is based on GRI.	GRI
Sustainable Accounting Standard Board (SASB) (www.sasb.org)	Sustainability Accounting & Standards Development Institute	SASB envisions a world where a shared understanding of corporate sustainability performance allows companies and investors to make informed decisions that drive value and improve sustainability outcomes. The mission of SASB is to develop and disseminate sustainability accounting standards that help public corporations disclose material, decision-useful information to investors. That mission is accomplished through a rigorous process that includes evidence-based research and broad, balanced stakeholder participation. SASB: complements the Global Reporting Initiative, the International Integrated Reporting Committee, CDP, and others.	Guidelines / Standard: SASB Standards are comprised of (1) disclosure guidance; and (2) accounting industry-based standards on sustainability (six sectors: Health Care, Financials, Technology & Communication, Non-Renewable, Resources, Transportation, Services) topics for use by US and foreign public companies in their annual filings (Form 10-K or 20-F) with the U.S. The issues that cut across most of the six sectors were as follows • Climate change management, Energy, Air quality and emissions, Impact on communities, Product and operational efficiency, Product quality and innovation, Product environmental impact, Water, Materials and waste, Customer satisfaction, Sourcing practices, Environmental compliance	GRI
The international integrated reporting council (IIRC) (www.theiirc.org)	Sustainability Reporting Institute & Standard Development Institute	The International Integrated Reporting Council (IIRC, 2014) is a global coalition of regulators, investors, companies, standard setters, the accounting profession and NGOs. Together, this coalition shares the view that communication about value creation should be the next.	Framework / Principals: The International Integrated Reporting Framework applies principles and concepts focused on bringing greater cohesion and efficiency to the reporting process, and adopting 'integrated thinking' as a way of breaking down internal silos and reducing duplication.	
The Multi-Capital Scorecard™ (MCS) (www.multicapitalscorecard.com)	Sustainable Accounting Tool	MSC is an open-source management tool that organizations can use to measure, manage and report their performance in a truly integrated (financial/non-financial) way.	Framework: Management tool based on Sustainability Balanced Scorecard.	
The World Business Council for Sustainable Development (WBCSD) (www.wbcsd.org)	Sustainability Accounting & Policy Development Institute	WBCSD is a CEO-led organization of forward-thinking companies that galvanizes the global business community to create a sustainable future for business, society and the environment. The WBCSD aims to be the leading voice of business that will support companies in scaling up true value-added business solutions and in creating the conditions where more sustainable companies will succeed and be recognized. A global association with 200 companies, it provides a platform for companies to explore sustainable development and evolved different standards.	Framework / Standard: The GHG Protocol Corporate Standard provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory. The Corporate Value Chain (Scope 3) Standard allows companies to assess their entire value chain emissions impact and identify the most effective ways to reduce greenhouse gas emissions. The Product Lifecycle Standard enables companies to understand the full lifecycle emissions of a product and focus efforts on the greatest GHG reduction opportunities. The Project Protocol is the most com-	

			prehensive, policy-neutral accounting tool for quantifying the greenhouse gas benefits of climate change mitigation projects.
UN Global Compact (www.wbcsd.org)	Sustainability Accounting & Policy Development Institute	The UN Global Compact (UN GC), funded July 2000, is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. The Global Compact is the world's largest global corporate sustainability initiative, with over 8,000 companies and 4,000 non-business participants based in over 160 countries.	Guidelines / Principals: Ten Principles: Blueprint For Sustainability Leadership: 5 things sustainable business do.

Table 24: Sustainability accounting institutes.

2. Analysis step: Sustainability Accounting Institutes

Tool & type of measure	Social measure	Economic measure	Environmental measure	Philosophy	Extra Knowledge necessary: Conduct	Extra Knowledge necessary: Measure
G4 Guidelines (Guidelines & metrics)	4 Sub category: Labour Practice & Decent work, Human Rights, Society, Product Responsibility	Economic Performance, Market Presence, Indirect economic Impacts, Procurement Practices	Material, Energy, Water, Bio-diversity, Emission, Effluents and Waste, Product & Service, Compliance and transport, Overall, Supplier Environmental Assessment, Environmental Grievance	Context-based sustainability, organization specific, scale of report can be chosen as long as Materiality and Completeness are of honest effort!	<p><i>Implementation Manuel</i> document</p> <p>Step 1 Identify: Identify the Aspects (their boundaries and location in/outside the company).</p> <p>Step 2 Prioritization: Materiality and Stakeholder Inclusiveness.</p> <p>Step 3 Validation: Assess the list of material Aspects against Scope, Aspect Boundaries and Time, enabling stakeholders to assess the organization's performance.</p> <p>Step 4 Review: Review the Aspects that were material in the previous reporting period.</p>	<p><i>Reporting Principles and Standard Disclosures</i></p> <p>Stakeholder Inclusiveness Principle: organization should identify its stakeholders, and explain how it has responded to their reasonable interests</p> <p>Sustainability Context Principle: present the organization's performance in the wider context of sustainability</p> <p>Materiality Principle: report should cover Aspects that reflect the organization's impacts</p> <p>Completeness (C) Principle: report should include coverage of material Aspects and their Boundaries.</p>
IRIS metrics (IRIS metrics catalogue)	Social categories: Education, Health, Housing/ community	Economic categories: Financial service, FS: Micro-finance,	Environmental categories: Agriculture, Energy, Envi-	Deliver credible data about the social and environ-	Metrics in 12 sectors categorized: Agriculture, Education, Energy, Environment, Financial services, Financial	<i>Further explanations and guidelines given online to each indicator. Also a "Getting Started" with IRIS guide is provided.</i>

	development	FS: Micro insurance • Financial performance , standard financial reporting metrics	Environment, Land conservation, Water	mental performance for impact investments .	services: Micro-finance, Financial services: Micro insurance, Health, Housing/ community development, Land conservation, Water, Other. IRIS is not an evaluation tool, nor a data management platform or a reporting framework. It is designed to be used by and with organizational performance measurement tools. IRIS metrics can be used to measure and report performance for many of the sustainability-related topics covered by the GRI framework.	Metrics focus on 5 areas: • Operational performance , metrics to assess your investees' governance policies, employment practices, and the social and environmental impact of their day-to-day business activities. • Product performance , metrics that describe and quantify the social and environmental benefits of the products, services. • Sector performance , metrics that describe and quantify impact in 12 social and environmental sectors. • Social and Environmental Objective performance , metrics that describe and quantify progress towards specific impact objectives such as employment generation or sustainable land use.
Whitepaper aligning GRI and IRIS				Triple bottom line, IRIS providing (Industry/sector specific) metrics for the more general GRI principle and guideline	GRI and the IRIS initiative created Linking GRI and IRIS to help impact investors aggregate and compare standardized performance information across their portfolios in order to align disclosure efforts and ease the reporting burden for organizations that use the IRIS catalogue of metrics and the GRI Sustainability Reporting Guidelines.	The GRI Guidelines are the global de facto standard for sustainability reporting around the globe. Using IRIS metrics in conjunction with the GRI Guidelines allows impact investors and a broader range of stakeholders to compare performance information across portfolios for an increased variety of sectors, align disclosure efforts for diversity of stakeholders, and it reduces the reporting burden for organizations that use IRIS metrics and the GRI G4 Sustainability .
UN Global Compact (10 universal, standard Principles)	#Human Rights P 1: Businesses should support and respect the protection of internationally proclaimed human rights; and P2: make sure that they are not complicit in human rights abuses. # Labour P 3: Businesses should uphold the			Integrate social, environmental and economic dimensions with govern-	5 things sustainable businesses do: 1) 10 Business Principles based 2) Strengthening Society	To be sustainable, companies must do 5 things. Foremost, they must operate responsibly in alignment with universal principles and take actions that support the society around

	<p>freedom of association and the effective recognition of the right to collective bargaining; Principle 4: the elimination of all forms of forced and compulsory labour; P 5: the effective abolition of child labour; and P 6: the elimination of discrimination in respect of employment and occupation. # Environment P 7: Businesses should support a precautionary approach to environmental challenges; P 8: undertake initiatives to promote greater environmental responsibility P 9: encourage the development and diffusion of environmentally friendly technologies. # Anti-Corruption P 10: Businesses should work against corruption in all its forms, including extortion and bribery through the active engagement of the corporate community, in cooperation with civil society and representatives of organized labour. The initiative is not designed, nor does it have the mandate or resources, to monitor or measure participants' performance.</p>	<p>ance.</p>	<p>3) Leadership Commitment 4) Reporting Process 5) Local action</p>	<p>them. Then, to push sustainability deep into the corporate DNA, companies must commit at the highest level, report annually on their efforts, and engage locally where they have a presence.</p>		
<p>IIRF - International Integrated Reporting Framework (7 Guiding Principles and 8 Content Elements, but no KPIs, measurements)</p>	<p>Intellectual, human, social and relationship capital.</p>	<p>Financial and Manufactured capital.</p>	<p>Natural capital.</p>	<p>Integrated thinking: integrated decision making and actions that consider the creation of value over the short, medium and long term.</p>	<p>2 Principles: Strategic focus and future orientation: organization's ability to create value in the short, medium and long term, and to its use of and effects on the capitals • Connectivity of information: combination, interrelatedness and dependencies between the factors that affect the organization's ability to create value over time • Stakeholder relationships: insight into the nature and quality of the organization's relationships with its key stakeholders • Materiality: matters that substantively affect the organization's ability to create value over the short, medium and long term • Conciseness: An</p>	<p>8 Content Elements • Organizational overview and external environment • Governance • Business model • Risks and opportunities • Strategy and resource allocation • Performance: To what extent has the organization achieved its strategic objectives for the period and what are its outcomes in terms of effects on the capitals? • Outlook: challenges and uncertainties, potential implications for its business model and future performance. • Basis of presentation: How does the organization determine what matters to include in the integrated report and how such matters are quantified or evaluated.</p>

					integrated report should be concise <ul style="list-style-type: none"> • Reliability and completeness: material matters, both positive and negative, in a balanced way and without material error • Consistency and comparability: consistent over time; enables comparison with other organizations. 	
GIIRS metrics in B Analysis (IRIS metrics in 5 impact categories)				Triple bottom line, assessment to become a Bcorp	5 impact categories: customer, community, workers, governance, and environment.	Assessing sustainability includes answering unweighted questions and giving KPIS.
MultiCapital Scorecard™ (Context-based Sustainability BSC; Relative Rating: Impact/Standard)	Living wages (Human capital), Workplace safety (Human-, Social & Relationship- and Constructed capital), Innovative capacity (Human-, Social & Relationship- and Constructed capital)	Equity Internal (Economic capital), Borrowings (Internal economic capital) Competitive Practice (External economic capital)	Water supplies, Solid wastes, the Climate system (all natural capital)	Triple bottom line, Context based sustainability	Phase: Scoping and Feasibility –f making materiality determinations of the relevant financial and non-financial Areas of Impact (AOIs), feasibility of operationalizing each one for measurement, management and reporting purposes. Phase: AOI Development researching and developing performance goals and data collection protocols for the material AOIs of interest in an MCS program. Phase: Scorecard all steps required to fully operationalize a MultiCapital Scorecard™ in an organization.	<i>Performance measure:</i> an organization must not put at risk sufficiency of vital capitals or the well-being of stakeholders who depend on them. - economic capitals , the relevant standards might include sector-specific targets for returns on equity case of human, social and constructed capitals , the standards might take the form of not-less-than levels of maintenance - natural capitals , the standards might consist of not-more-than levels of consumption
ARISTA 3.0 Framework (Guidelines; 11 Commitments)	11 Commitments: Independent sources, Global activities, Beyond legal compliance, Social and environmental, Balance, Relevance/Materiality, Consistency and comparability, Stakeholder involvement, Up-to-date, Transparency, Continuous improvement			Corporate sustainability	ARISTA 3.0 guidelines given.	KPIs in development.

SASB Standard (Guideline & research towards core indicators and KPI developing method)	12 Key issues: Climate change management, Energy, Air quality and emissions, Impact on communities, Product and operational efficiency, Product quality and innovation, Product environmental impact, Water, Materials and waste, Customer satisfaction, Sourcing practices, Environmental compliance			Mandatory reporting, industry-based sustainability	Guideline for KPI development. 6 step method. Focus on environmental, social and governance (ESG) factors. States key Definitions and Characteristics of Sustainability Accounting and Disclosure and specifies 5 sustainability dimensions: Environment, Social Capital, Human Capital, Business model and innovation, Leadership and Governance.	KPIs still in development. 12 core issues (in process of research given). But different metrics in the key sector. KPIs for each sector addressing impacts and opportunities specific to US context. Uses GRI indicators as a basis, but tailored for US market and industries
Natural Step (Principles of Sustainability)	Companies... 1. Eliminate their contribution to the progressive build-up of substances extracted from the Earth's crust 2. Eliminate their contribution to the progressive build-up of chemicals and compounds produced by society 3. Eliminate their contribution to the progressive physical degradation and destruction of nature and natural processes 4. Eliminate their contribution to conditions that undermine people's capacity to meet their basic human needs			Strong sustainability	Knowledge about Sustainability and the theory of change.	
Global Initiative for Sustainable Ratings (GISR) (Principles)	12 principles: Transparency, Impartiality, Continuous, Improvement, Inclusiveness, Assurability, Materiality, Comprehensiveness, Sustainability, Context, Long-term, Horizon, Value Chain, Balance, Comparability			Principles : aligned with most other known guidelines and principles	Principles comprise two categories: Process and Content. The interpretive guidance that follows each principle explains its rationale and application.	1) Process: Principles pertaining to the design, application, and maintenance of a rating to ensure excellence, credibility, integrity. 2) Content: Principles pertaining to the scope, quality, and measurement aspects of a rating
Social Reporting Initiative e.V. (Standard Report)	GRI indicators	GRI indicators	GRI indicators	Context-based	Follow single reporting steps of guideline, tell the story of the company.	GRI.
The World Business Council for Sustainable Development (WBCSD) (Frame-	The Framework is based on a four-step methodology that attempts to merge the business perspectives of its contribution to development with the societal perspectives of what is important where that business operates. It is rooted in a business approach and begins with measuring what business does through its			Global Sustainability	Corporate Governance involves a set of relationships between a company's management, its board, its shareholders, and other stakeholders; structure through which the objectives	The Measuring Impact Framework builds on the OECD principles of Corporate Governance to include the governance procedures, principles and practices concerning the way in which a business oper-

work and guidelines)	business activities. The business activities are grouped into four clusters: 1. Governance & Sustainability (Corporate Governance and Environmental Management) 2. Assets (Infrastructure and Products & Services) 3. People (Jobs and Skills & Training) 4. Financial Flows (Procurement and Taxes)		of the company are set, and the means of attaining those objectives and monitoring performance are determined.	ates. It emphasizes business ethics, voice and accountability and compliance with international and national standards on issues concerning relations with employees, government, the local community and suppliers with reference to pertinent human rights and International Labour Organization (ILO) conventions.
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Table 25: Sustainability measurement tools, frameworks and guidelines.

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 assumptions used in the calculation process.	Ec20

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 26: 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	En17

			Gas Emissions of Product (PD9427))	
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 27: 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	So7

			policies including information on safety training, protection gear required, testing of equipment, posting of signs, etc.	
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 28: Extracted social indicators.

Additional Social Indicators

No IRIS metric	G4-LA13	Aspect: Equal Remuneration for Women and Men	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
No IRIS metric	G4-HR1	Aspect: Investment	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'	So10

			used by the organization.	
No IRIS metric	G4-HR4	Aspect: Freedom of Association and Collective Bargaining	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	Aspect: Forced or Compulsory Labor	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	Aspect: Security Practices	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	Aspect: Indigenous Rights	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	Aspect: Assessment	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	Aspect: Human Rights Grievance Mechanisms	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	Aspect: Anti-corruption	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	Aspect: Public Policy	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	Aspect: Anti-competitive Behavior	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	Aspect: Grievance Mechanisms for Impacts on Society	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 29: 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 30: Extracted standard disclosure indicators.

H. DELPHI ROUND 0: FIRST EXPERT CONTACT EMAIL

Contact Email (February 2015): "Expert for sustainable Business Models and KPIS wanted!"

Hi XY,

I hope you got well into 2015 and enjoyed the every first months!

As you might know, I am currently working on my master thesis with the topic "sustainable business models". I want to find out how start-ups, which try to be sustainable can show their benefits to investors and on the other hand want to find a way how investors find the "best" sustainable start-ups, by looking most often only at their business models.

Having done the theory part, I now search experts (with social, ecological or economic focus), who do work already with "sustainable businesses" and manage, control or consult etc. them by the use of key performance indicators.

I would be very delighted if I could get you as a "XY" expert!

Short intro into my master thesis

Inspired by the Research of the Sustainability Center from the Leuphana University and the activities of the Strong Sustainable Business Model Group, I try to supplement the business model canvas by missing, sustainability KPIS.

Expert panel

Experts (consultants, for and non-profit start-ups, NGOs, public institutions, investors), who can give insights into the KPIs used in practice to measure the "sustainability" of start-ups or other business model projects from an environmental, social or economic point of view.

Interviews: Low time afford and Delphi Method

The "interview" would take place as an online Delphi-Survey, in maybe 3 or 4 rounds in the following months (starting in March, April, May, etc.) and would require only the online answer of a ca. 20-40 min questionnaire. All expert's answers would be anonymously investigated and compared against each other.

Research goal

A framework, following the idea of a sustainable balance scorecard, that allows on the one hand start-ups to show the sustainable benefits of their business model and enable all other stakeholders on the other hand to control and investigated the claimed sustainability as well as its impact range. The findings would be shared with all experts and may help you in the future to measure and control the "sustainability" of any start-up or other project of yours in qualitative and quantitative ways!

I am very much looking forward to your answer!

Best wishes,

Lara Obst

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 Taipeh. 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 quantitative 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, *Mango* (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 creation. 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, *Kanscha* (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 example 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

Expert groups contacted in each round (R)	Social Experts	Environmental Experts	Economic Experts	Extra Expert Pool	Total Number
Contacted Experts R0	11	7	8	0	26
Agreeing Experts R0	5	5	5	5	20
Answered R1	5	5	5	5	20
Start-up	Sebastian Gluschak, <i>Kanschak</i>	Holger Heinze, <i>Mangoo</i>	Daniel Bartel, <i>klickreform</i>	Amit Saraogi, <i>Oorja</i>	4
NGO / Non-Profit Start-up	Caroline Rabe, <i>Jyoti fairworks</i>	Christian Kroll, <i>Ecosia</i>	Martin Jähnert, <i>Schülerparte</i>	Lisa Suess, <i>Fair Wear Foundation</i>	4
Consultant	Thorsten Jahnke, <i>iq consult</i>	Christian Rudolph, <i>next-cycle.de</i>	Michael Schulte, <i>förderbar</i>	Daniel Hires, <i>MakeSense</i>	4
Private Investor or Incubator	Markus Freiburg, <i>Fa-Se</i>	Julia Linz, <i>Green Alley</i>	Heiko Franken, <i>Business Angel</i>	Jeremy Küpers, <i>BPO Capital</i>	4
Public Investor or Incubator	Bernd Steinmeyer, <i>Social Impact Lab</i>	Kate Robinson, <i>Climate KIC</i>	Norbert Hermann, <i>TUB Gründer-service</i>	Carsten Wille, <i>Leuphana Incubator</i>	4
Answered R2	Answers: 3, Drop out: Thorsten Jahnke, Sebastian Gluschak	Answers: 5, No drop out	Answers: 5, No drop out	Answers: 4, Drop out: Carsten Wille	17
Answered R3	Answers: 3, No additional drop out	Answers: 5, No drop out	Answers: 2, Drop out: Michael Schulte, Heiko Franken, Norbert Hermann	Answers: 3, Drop out: Daniel Hires	13

Table 31: Participation of expert panel.

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

Expert Name	Self-rated social expertise	Self-rated environ. expertise	Self-rated economic expertise	Self-identified (by expert) main impact area and profession	Chosen (by scholar) expert subgroup and profession (based on recent work)
Group: Environmental					
Christoph Rudolph*	20%	30%	50%	Economic For-profit Start-up	Environmental Consultant (<i>next-cycle.de</i>)
Holger Heinze*	30%	20%	50%	Social For-profit Start-up	Environmental Start-up (<i>Mango</i>)
Christian Kroll	40%	40%	20%	Environmental Non-profit Start-up	Environmental NGO (<i>Ecosia</i>)
Julia Linz	30%	50%	20%	Environmental Private Investor or Incubator	Environmental Private Investor (<i>Green:Alley</i>)
Kate Robinson	20%	70%	10%	Environmental Public Investor or Incubator	Environmental Public Investor (<i>Climate KIC</i>)
Group: Social					
Thorsten Jahnke*	<i>No data</i>	<i>No data</i>	<i>No data</i>	Social Non-profit Start-up	Social Consultant (<i>iq consult</i>)
Sebastian Gluschak	<i>No data</i>	<i>No data</i>	<i>No data</i>	Social For-profit Start-up	Social Start-up (<i>Kanschka</i>)
Caroline Rabe	50%	10%	40%	Social Non-profit Start-up	Social NGO (<i>Jyoti fairworks</i>)
Markus Freiburg	40%	20%	40%	Social Consultant and Private Investor or Incubator	Social Private Investor (<i>Fa-Se</i>)
Bernd Steinmeyer	40%	20%	40%	Social For/Non-profit Start-up, Social Public Investor or Incubator, Economic Consultant, Environmental NGOs	Social Public Investor (<i>Social Impact Lab</i>)
Group: Economic					
Michael	10%	10%	80%	Economic Consultant	Economic Consult-

Schulte					ant (förderbar)
Daniel Bartel	20%	10%	70%	Economic Consultant, Economic For-profit Start-up, Environmental Non-profit Start-up	Economic Start-up (<i>klickreform</i>)
Martin Jähnert	30%	30%	40%	Social For-profit Start- up, Economic Non- profit Start-up	Economic NGO (<i>Schülerparte</i>)
Heiko Franken	10%	10%	80%	Economic Private In- vestor or Incubator	Economic Investor (<i>Business Angel</i>)
Norbert Her- mann	10%	50%	40%	Economic Public Inves- tor or Incubator	Economic Public Investor (<i>TU Berlin Gründerservice</i>)
Extra Expert Pool					
Daniel Hires*	20%	60%	20%	Social For-profit Start- up	Social Consultant (<i>MakeSense</i>)
Amit Saraogi*	40%	20%	40%	Economic Non/For- profit Start-up	Environmental NGO (<i>Ooria</i>)
Lisa Süß	40%	10%	50%	Social For-profit Start- up	Social Start-up (<i>Fair Wear Foundation</i>)
Jérémy Küper*	20%	10%	70%	Economic Consultant, Economic Private In- vestor	Economic Investor (<i>BOP Capital</i>)
Carsten Wille*	No data	No data	No data	Economic Consultant	Economic Public Investor (<i>Leuphana Incubator</i>)

Table 32: Expert self-rated expertise (basing on results of R0, R1, R2).

* Experts market with a star have identified their main impact area and/or profession differently than the researcher did. These experts often show a very diverse working background in various impact areas. The researcher tried to select the best fitting categories, based on the recent work of the experts. In addition, experts were asked whether they agree with the given category. All experts did.

L. DELHI SURVEY ROUNDS: INTRODUCTION OF SURVEYS

1. Survey: Sustainability KPIs for “Sustainable Businesses”

Dear Expert,

thanks a lot for participating in this panel discussion about sustainability KPIs!

I, Lara Obst from TU Berlin/University Twente, have analysed the huge variation of KPIs (key performance indicators) and metrics for sustainability accounting and reporting. As a result, I chose 25 of them in the three areas: social (So1-25), environmental (En1-25) and economic (Ec1-25), following the main stream model of sustainability as a three pillar model (World Commission on Environment and Development, 1987; United Nations, 2005). In addition, I chose 15 standard disclosure (SD 1-15) metrics, which could be of importance as well.

Now, I would like you to rate the findings due to their relevance (in order to choose the most relevant ones later). How relevant do you think the single KPIs are to depict and measure a holistic sustainable business model? Such a sustainable business model (Stubbs & Cocklin, 2008; Lüdeke-Freund, 2010; Bocken, 2013) should be feasible to combine all three dimensions of "Society", "Environment" and "Economy" equally with each other and should not compromising one dimension against another. Also it should be a universal model that should fit to as many different industries and sectors as possible.

Please rate the KPIs from "Highly relevant" to "Irrelevant". Whenever you think you cannot judge about a certain KPI, feel free to choose "Do not know".

Many thanks

2. Survey: 2. Expert Panel Round

Dear Expert,

thanks a lot for taking part in the first survey and for participating again in this panel discussion!

In the previous round 20 experts with various professional backgrounds (Start-ups, NGOs, consultants, public and private investors) working in the social, environmental or economic sector have been rating the first set of sustainability KPIs, found in literature. Thanks to your help, these could be rated and reduced due to relevance. In addition, the qualitative feedback of these 15 and 5 extra experts have been taken into account to alter the wording and content of the single KPIs as well as to add new ones.

As a result, the three social (So), environmental (En) and economic (Ec) KPIs sets could be reduced from 25 to 14, including already the new ones. Moreover, 11 modified standard disclosure (SD) metrics have been selected, representing the "Governance" (Loorbach et al., 2011) perspective within sustainability theory. These SD metrics focus next to the specific sustainability KPIs on the organization's integration of these KPIs from the business strategy, operational and reporting perspective (IFAC, 2011). The SD metrics are supposed to disclose how organizations design and implement an effective structure capable for the management of sustainability within their business model.

The content changes of the KPIs refer mainly to two points: a broader stakeholder perspective and the attempt to formulate measurements more rigorous and flexible to various business models at the same time. The first issue of a wider stakeholder perspective especially changed the "client" term into "client, users and customers". The second issue of more rigorous measurements led to the formulations like "The organization should footnote the type(s) of ... , its context and assumptions made when reporting against this metric". This way, the single KPIs should be more rigorous but nevertheless in accordance with various stakeholder needs. In addition, one new SD metric focus on the "value" for stakeholders and another on the scope and relevance of KPIs for different business models.

All selected KPIs and metrics have been rated through the overall expert's feedback as "Relevant" or even "Highly relevant". KPIs not taken were only partly rated as relevant or not at all. However, the expert sub groups have rated different KPIs most often differently. There-

fore, it is very interesting and important to rate the modified KPIs and metrics again. It is on purpose to see differences between the experts groups, as the attempt to find "Sustainability KPIs for sustainable business models" will have to bridge possible contradictions. Nevertheless, consensus between various expert sub groups will be seen as hint for an agreement on certain KPIs. Thus, your new ratings should consider the other expert's feedback and do not have to be the same as last time.

Please proceed as follow:

- 1.) Re-rate all KPIs on a 6 point scale from "Highly irrelevant" to "Highly relevant".
- 2.) Give feedback to the content, wording or purpose etc. for any KPI, whenever you feel it is needed.

Many thanks!

3. Survey: *Final Expert Panel Round*

Dear Expert,

I highly appreciate that you participate in the final expert panel round! Thanks a lot that you supported already in the last rounds the study with your knowledge, experience and feedback!

In the previous 2. round, 15 experts with various professional backgrounds (Start-ups, NGOs, consultants, public and private investors) working in the social, environmental or economic sector (3 sub groups) have been re-rating the altered sustainability KPI set. This way, the remaining 53 metrics could be re-rated and reduced due to relevance.

Results:

The 2. round showed that the overall opinion about certain KPIs and metrics is approaching towards a "kind of consensus". This means, that most often one sub group rated in the first round a metric lower (e.g. irrelevant, kind of irrelevant, kind of relevant) than the other two sub groups and did now in the 2. round increased this lower rating. Also, the variance of answers become most often lower. However, some KPIs and metrics were still rated lower from one or more sub groups and for some the variance of ratings even increased.

From this result, I concluded that the KPI set consists of generic KEY performance indicators (KPIs), fitting for all three dimensions of sustainability (social, environmental and economic), but also of other performance indicators (PIs), which are not relevant to all businesses and/or sectors. This conclusion is also stressed by the feedback of various experts, who remarked that sustainability performance indicators dependent on the single business and are tied to the lifecycle stage of a company. Nevertheless, the feedback towards the content and wording of the single KPIs and metrics was overall positive and no new one was added or old one included back.

The overall opinion (Median of all experts and Median of sub groups), indicated that 12 social metrics, 10 environmental metrics, 12 economic metrics and 9 standard disclosure metrics are "relevant" or "highly relevant" to manage sustainability in businesses. Thus, 10 KPIs and metrics from the previous set were reduced.

Additional, in the environmental metric set, En1 (Recycled Materials) was put together with the more relevant rated En9 (Recycled Materials Ratio). This should increase significance and avoid doubling. Also in the economic metric set, due to feedback from experts and the rating results, Ec1 (Net Income), Ec3 (Gross Profit), Ec5 (Total Revenue) and Ec9 (Cash Flow: Net Total) were merged together into Ec10 (Growth Rate). This is supposed to provide potential users the choice to define in which way she or he wants to measure "growth". Ec10 advises now to choose at least one economic, one social and one environmental metric.

Hence 12 social, 9 environmental, 8 economic and 9 standard disclosure metrics are remaining.

Next steps:

This final expert panel round is supposed to enable two things. First, the generic KPIs should be selected out of the other PIs. Second, the remaining metrics should be mapped to the business model canvas (Osterwalder et al., 2010). As the experts were chosen due to their knowledge about sustainable businesses and business models, these tasks will be done by them firstly. Later, the final results will be used as a starting point to build a sustainability KPI framework fitting to the business model canvas. For this later research step existing literature will be used to interpret the expert's advises.

As the second round showed on which KPIs and metrics experts might agree on and on which they do not, the 3. round does not "force" a consensus through a repeated rating. Instead, experts are asked to rank the remaining metrics and indicate which of these they see as overall sustainability KPIs (relevant and important for all three dimensions of sustainability) and which as PIs. This way, the different relevance of the metrics for the different expert sub groups should be acknowledged. After the ranking, experts are asked to map the metrics to the single parts of the business model canvas.

Please proceed as follow:

- 1.) Rank metrics and indicate which ones you see as KPI (if possible, in each set not more than 3-5) and which as PI.
- 2.) Name for each of the nine parts of the business model canvas the related metrics. This task should be fulfilled basing on your subjective knowledge, experience and impressions. There is not right or wrong answer.
- 3.) As the online formula might be a little unhandy to oversee all metrics, please use the overview you got attached to your email. It provides a list of all metrics and a short definition of each business model canvas building block. Its usage will help you to track you decisions.

Thank you!

In the next months, the final results and a draft of the framework will be shared with you. If you wish you can give feedback to this resulting construct as well.

Attached Table

Instruction: Social Metrics Ranking	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.				
Metric Code	Metric Explanation	KPI	PI	Rank	BMC element
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				
Instruction: Environmental Metrics Ranking	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.				
Metric Code	Metric Explanation	KPI	PI	Rank	BMC element
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: Units/Volume Sold: Total × (Greenhouse Gas Emissions of Product Replaced –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.				
Instruction: Economic Metrics Ranking	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.				
Metric Code	Metric Explanation	KPI	PI	Rank	BMC element
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: 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 Lifetime 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.				
Instruction: Standard Disclosure Metrics Ranking	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.				
Metric Code	Metric Explanation	KPI	PI	Rank	BMC element
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.				
Instruction: Metrics and Business Model Canvas Mapping	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: https://www.youtube.com/watch?v=QoAOzMTLP5s).				
Nine elements of Business Model Canvas	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)				

Table 33: List of indicators and BMC elements.

M. SURVEY ROUND RESULTS

Survey Round 1a: Indicator Analysis

Indicators are chosen by Median first. Next an internal rank is created by comparing the median, the percentage of experts rating an indicator as “Highly relevant” or “Relevant” (as Weighting: W), the mode and the variance. See below.

Internal ranking criteria.

1. Median	2. WxMode	3. Mode	4. Variance
≥ 5, highest	highest	≥ 5, highest	lowest
selection	ranking	internal rank	internal rank

Key for the following tables (34 - 37).

	Variance
	chosen KPI
number	Median ≥ 5

Code	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of ≥ 5	W x Median	Overall Mode	Varianz	Rank
Ec1	5	3	4	4	46,6666667	186,666667	6	1,928888	
Ec2	5	5	4	5	53,3333333	266,666667	5	1,882222	8
Ec3	5	4	3	4	40	160	4	1,795555	
Ec4	5	4	4	5	53,3333333	266,666667	5	1,530612	7
Ec5	5	5	4	5	66,6666667	333,333333	5	1,128888	3
Ec6	4	2	5	3,5	26,6666667	93,3333333	5	1,41	
Ec7	5	4	4,5	5	46,6666667	233,333333	5	1,313666	9
Ec8	5	5	5	5	66,6666667	333,333333	5	1,801029	4
Ec9	6	5	5	5	73,3333333	366,666667	5	0,8	2
Ec10	5	4	4,5	4	40	160	4	1,017775	
Ec11	4	3,5	2	3,5	26,6666667	93,3333333	4	2,535714	
Ec12	5	4	4	4,5	46,6666667	210	5	1,857142	
Ec13	5	4	4	4	40	160	4	2,122488	
Ec14	6	5	5	5	80	400	6	0,593	1
Ec15	6	3,5	3	4	33,3333333	133,333333	4	2,271428	
Ec16	5	4	3	4	40	160	5	2,066326	
Ec17	6	4,5	5	5	60	300	5	1,02351	6
Ec18	5	3	3	4	26,6666667	106,666667	6	2,485207	
Ec19	5	4,5	5	5	60	300	6	0,923469	5
Ec20	4	4	3	3,5	26,6666667	93,3333333	3	1,520833	
Ec21	4	3	3	3	20	60	3	1,222222	
Ec22	5	3,5	3	4	40	160	6	2,494892	
Ec23	5	3	2,5	4	26,6666667	106,666667	5	1,6875	
Ec24	4	5	2,5	3,5	26,6666667	93,3333333	5	1,222222	
Ec25	4	3	4	3,5	20	70	4	1,6581632	

Table 34: Economic indicator analysis: selection.

Code	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of ≥ 5	W x Median	Overall Mode	Varianz	Rank
So1	5	4	4	4	40	160	4	0,964285	
So2	5	5	3	4,5	46,6666667	210	5	1,454081	
So3	6	3	5	5	53,3333333	266,666667	6	2,106666	13
So4	4	3	2	3	26,6666667	80	5	2,346938	
So5	5	5	5	5	66,6666667	333,333333	5	1,086734	9
So6	5	4,5	3	4,5	46,6666667	210	5	1,346938	
So7	5	6	5	5	80	400	5	1,066326	3
So8	5	6	4	5	73,3333333	366,666667	6	1,333333	4
So9	5	5	4	5	66,6666667	333,333333	5	0,96	8
So10	6	5	4	5	60	300	6	1,55102	10
So11	6	5	5	5	73,3333333	366,666667	5	1,265306	5
So12	4	5	4	4	40	160	4	1,28994	
So13	6	4,5	3	4	40	160	6	2,02551	
So14	4	4,5	3	4	26,6666667	106,666667	3	1,56213	
So15	4	5	3	4	46,6666667	186,666667	6	1,688888	
So16	5	5	5	5	66,6666667	333,333333	5	0,68639	7
So17	6	5	4,5	5	80	400	6	0,739795	2
So18	5	3	5	5	40	200	5	1,454545	14
So19	5	5	4	5	60	300	5	1,229591	11
So20	5	4	5	4,5	40	180	6	1,888888	
So21	5	4	4	4	40	160	5	2,071005	
So22	5	5,5	3	5	60	300	5	2,16204	12
So 23	5	4	5	4,5	46,6666667	210	5	1,632653	
So 24	5	6	5	5	93,3333333	466,666667	5	0,328888	1
So 25	5	5	5	5	66,6666667	333,333333	6	2,489795	6

Table 35: Social indicator analysis: selection.

Code	Social Median	Env Median	Eco Median	Overall Median	Overall Mode	Weighting (W): % of ≥ 5	W x Median	Varianz	Rank
En1	5	4	4	4	5	46,6666667	186,666667	2,026666	14
En2	4	5	4	4	4	40	160	1,928888	
En3	5	5	4	5	5	73,3333333	366,666667	1,626666	1
En4	3	5	3	4	4	33,3333333	133,333333	2,311224	
En5	2	5	3	4	5	40	160	2,673493	
En6	5	5	5	5	5	60	300	2,915555	8
En7	5	4	3	4	4	40	160	2,352041	
En8	5	4	2	4	4	33,3333333	133,333333	2,426666	
En9	5	5	4	5	6	53,3333333	266,666667	1,715555	9
En10	5	5	4	5	5	66,6666667	333,333333	0,472222	4
En11	5	5	2	5	5	53,3333333	266,666667	3,493333	12
En12	4	4	4	4	4	40	160	2,595555	
En13	5	5	3	5	5	53,3333333	266,666667	3,693877	11
En14	2	5	2	3	1	20	60	3,066326	
En15	5	5	3	4	4	40	160	2,352041	
En16	2	4	2	3	1	20	60	2,498795	
En17	5	6	3	5	5	60	300	2,222222	5
En18	5	5	2	5	5	60	300	2,862222	7
En19	6	5	2	5	6	66,6666667	333,333333	2,906666	3
En20	5	4	2	4	5	40	160	1,668639	
En21	5	5	3	5	5	60	300	2,489795	6
En22	4	6	5	4	6	46,6666667	186,666667	2,595556	
En23	5	5	2	5	5	73,3333333	366,666667	2,773333	2
En24	5	5	3,5	5	5	53,3333333	266,666667	1,976333	10
En25	3	2	2	2	2	26,6666667	53,3333333	2,694214	

Table 36: Environmental indicator analysis: selection.

Code	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of ≥ 5	W x Median	Overall Mode	Varianz	Rank
SD1	6	6	2,5	5,5	60	330	6	2,632653	2
SD2	6	5,5	5	6	73,3333333	440	6	1,917159	1
SD3	5	5	5,5	5	53,3333333	266,666667	5	1,020833	6
SD4	6	4	4	5	46,6666667	233,333333	5	1,621301	8
SD5	4	3	2	3	13,3333333	40	3	2,243055	
SD6	5	4	5,5	5	60	300	5	1,597633	4
SD7	6	5	5	5	86,6666667	433,333333	5	0,236668	3
SD8	5	3,5	2	4	33,3333333	133,333333	5	2,390532	
SD9	5	3,5	3	4	33,3333333	133,333333	4	2,122448	
SD10	5	4,5	4	5	53,3333333	266,666667	6	1,80102	5
SD11	5	4	4	4	33,3333333	133,333333	4	0,673469	
SD12	5	3,5	4	4	33,3333333	133,333333	4	1,443786	
SD13	5	4,5	5	5	53,3333333	266,666667	5	1,244897	7
SD14	5	3,5	4	4	40	160	5	1,408163	
SD 15	6	3,5	4	4	26,6666667	106,666667	4	2,265306	

Table 37: Standard disclosure indicator analysis: selection.

Survey Round 1b: Qualitative Feedback and Coding

Expert	Social SPI feedback	Codes	Similar to/ New	Measure or further explanation	Comparable metric / Source
Amit Saraogi	Anti-discrimination policy on hiring-religion, ethnicity, gender etc. (relevant)	Anti-Discrimination	Similar to So9: New: Anti-Discrimination Policy	So9: Rename into policies in place for anti-discrimination, plus: religion and ethnicity.	IRIS code: Employee Policy Documentation (OI5102), GRI G4: G4-HR3 (IRIS and GRI, 2014b). Indicate which employee policy documentation is provided by the organization to its employees. Select all that apply: - Employee handbook - Discrimination/harassment policy - Code of ethics
Amit Saraogi	Social impact assessment before expansion, new project (relevant)	Social Impact	Similar to So 25 and SD7	SD7 as before.	
Amit Saraogi	Displacements and livelihood loss by land acquisition for mining, etc. (relevant)	Displacements and Livelihood loss	Similar to So22: New: Displacement and Livelihood loss	So22: Plus: Displacement and livelihood loss effects.	
Amit Saraogi	Social security protection for employees (relevant)	Social Security	Similar to So7: New: Social Security Protection	So7: Plus: Social security protection in place.	
Christian Kroll	We frequently measure the happiness levels of our team in anonymous surveys and try to improve these by creating better working conditions and more meaningful tasks.	Employee Happiness Index	Similar to So19.	So 19: Plus: Anonymous self-rating of employees, indicating on a 10 point scale the degree of work, team and working condition satisfaction	Measurement and categories: Feedback Christian Kroll. Method for Customer Satisfaction Survey with for example 10 point scale (Larsen & Quartapelle, 1996).
Lisa Suess	Percentage of women (total staff, management positions) (relevant).	Percentage of Women	Similar to So8.	So8 as before.	
Lisa Suess	Due diligence (throughout the supply chain) regarding high risk issues (e.g. child labour) (highly relevant), Business activities (including supply chain) performed in high risk countries (countries without structures and/or laws to enforce certain social standards), in general, the selection of KPIs would	Due Diligence, Business Activities, Supply Chain Dependency	Similar to So16 and So24, En19. Critique to rewrite certain KPIs (being more precise about the context of business activities, the country & supply chain dependency).	So24: Supplier Evaluation plus: Indicate whether an elaborated Due Diligence process is in place, explain which checklists and control metrics are used (Behrens und Julia Lescher, 2002).	Empirical studies confirm the increased use of due diligence, also in Germany, on mergers and acquisitions (M & A). The question is under which determinants, due diligence is actually performed. Determinants of due diligence are according to (Berens and Strauch, 2002), the duration of the due diligence and scheduling in the acquisition process, the size and compositing of the due diligence team, sources of information during the due diligence, the instruments

	depend on the supply chain (structure, relevance, countries etc.) of the enterprise.				used as checklists etc., the economic and commercial legal relevance of due diligence and the documentation and reporting on the due diligence.
Norbert	Note: I estimated how I conceive the importance, not how I would like to have them.				
Expert Name	Env KPI feedback	Codes	Similar	Measure or further explanation	Comparable metric / Source
Amit Saraogi	Landfill waste generated (relevant)	Waste Generated: Total	Similar to En6, En13, En21. New! (En13) Not avoid waste but total waste generated.	New En13: Total amount of waste disposed by the organization during the reporting period. Calculation: Sum up waste amounts from different business operations or by type.	GRI G4: G4-EN23 or IRIS code: (OI6192), according to IRIS and GRI (2014). Amount of waste disposed by the organization during the reporting period.
Caroline Rabe	We try to produce as less waste material (textile) as possible and reuse the waste we produce. The type of waste should be mentioned.	Waste, Reuse	Similar to En6, En13, En21. Critique used to rewrite certain KPIs (En3, En23).	En6, En13, En21 as before.	
Christian Kroll	Not really. The main KPI for us is the number of trees.	Tree	En16.	En16 as before.	
Jeremy	Water-Efficient KPIs more important in Countries with short water supplies.	Region Dependency	Considered in text. New! (SD9)	New SD9: Disclosure of company's scope and boundary (regional, national, international) and the materiality of the given KPIs (indicate whether a weighting for certain KPIs is necessary, due to sector, industry, branch or stakeholder dependency as well as due to the organizational lifecycle stage).	According to GRI G4 (GRI, 2014b), its Sustainability Reporting Guidelines have an increased emphasis on the need for organizations to focus, in the reporting process and final report, on those topics that are "material" to their business and their key stakeholders. This 'materiality' focus makes reports more relevant and more credible. This in turn, enable organizations to better inform markets and society on sustainability matters.
Michael Schulte	Ich finde die Branch e insgesamt noch wichtig. Beispiel: Elektroautos werden von der Industrie sehr ge-	Branch Dependency	Considered in text and SD9.	Benchmarking of KPIs within each branch. Generic KPIs however showcase which metrics should be	

	hypt, weil sie angeblich Null Emissionen haben			investigated.	
Norbert	a) The cross-border aspect - if the indications happens close or far away - is also of importance.	Country Dependency	Considered in text and SD9.		
Norbert	b) The public knowledge of the connection between the service and the indication is also of importance.	Reputation & Transparency	New! (En14)	New En14: 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.	
Thorsten	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. But it's a big KPI in Spain.	Stakeholder & Region Dependency	Considered in text and SD9. Critique taken to define "customer" broader in the sense of "stakeholder (e.g. client, user, etc.)		
Thorsten	Maybe KPIs around fair trade are not represented as needed.	Fair Trade	Included in various KPIs already.	Fair trade core indicators are already included. Soc: Anti-discrimination (So9), employee training (Ec25, So23, Sd15), ban of forced and child labour (So16), trade unions (So12), respect of labour law (conditions) (So20), health and safety of employees (So 6, So7) . Eco: Minimum wages (So16) , Env: Reduced use of chemicals and chemical waste (En6), work security (So21)	Fairtrade Deutschland (2015), publishes online the core standards, divided in ecological, social and economic standards.

				(So7), waste management (En3, En6, En13), biodiversity (En5), water security (En2, En8, En12)	
Expert Name	Eco KPI feedback	Codes	Similar to	Measure or further explanation	Comparable metric / Source
Amit Saraogi	Number of ancillary businesses promoted as a result of a company's operations (relevant)	Ancillary Businesses Promoted	Similar to Ec2, Ec7 and SD12.	SD12: Depends on definition of "Client organization". Client includes here all ancillary businesses.	
Christian Kroll	We mostly look at these numbers on a monthly basis – not annually.	Monthly Measures	Considered in Text. New! (SD10)	New SD10 : Disclose the KPI measure frequency.	
Lisa Suess	Ec 25 might be more important for certain NGOs than for profit organisations.	Legal Structure Dependency	Similar to SD4.	SD4 as before.	
Martin Jähnert	Social Return on Investment	SROI	Similar to SD1 and SD7. Considered in New! (Eco10).	SD7 and SD9 as before. New (Eco10) : Calculate Social Return on Investment (SROI) ratio. Calculation: 1. Projecting into the future (Benefits and Discounted Values) 2. Calculating the net present value ([Present value of benefits] - [Investment Value]) 3. Calculating the ratio (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)	SROI measures the impact of an investment with blended values, thus not only with financial but also with social and environmental values. It indicates the change through an investment and aims to measure its impact. SROI is an approach to understand and manage the value of the social, economic and environmental outcomes created by an activity or an organisation (The SROI network, 2015). It is based on seven principles that are applied within a framework. The SROI framework structures thinking and understanding, however it is a story not a number. The story should show how you understand the value created, manage it and can prove it. Calculation of SROI ratio (ibid.): 1. Projecting into the future (Benefits and Discounted Values) 2. Calculating the net present value ([Present value of benefits] - [Investment Value]) 3. Calculating the ratio (SROI ratio = Present Value/Value of inputs) 4. Sensitivity analysis (Assess the extent to which re-

					sults would change if the assumptions made in the previous stages are changed)
Norbert	With "organization" I understand "start-up".	Start-up or life-cycle Depend- ency	Considered in text and SD9.	Generic BMC and KPIs or different KPIs in various lifecycle stages of an organization?	
Expert Name	SD metric feedback	Codes	Similar to/ New	Measure or further explanation	Comparable metric / Source
Christian Rudolph	Value Creation Definition with regard to where do the organisation create, retain or destroys value. (Relevant)	Value creation statement	New! (SD11). In addition, various KPIs depict already the positive and negative values as a measure.	New SD11: Disclosure of the overall value creation process of the company, with regard to where do the organisation create, retain or destroys value in economic, social and environmental terms.	According to Bocken et al. (2013), a business model describes how a company does business and what its value proposition (benefits or offering to customer), value creation (resources, suppliers and other partners who help create value) and value capture mechanisms (cost structures and revenue streams) are. Sustainable business models consider a much wider group of stakeholders than just customers , and explicitly consider society and environment (as well as network actors) as stakeholders. They go beyond creating value for a customer and include concerns about the benefits and harms to society and the environment by the way business is done. This is a much more systemic view on doing business than making money by delivering benefits and value to customers (Bocken et al., 2013).
Daniel Bartel	Churn Rate (Relevant),	Churn rate	New! (Ec11)	New Ec11: Amount of customers (e.g. 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.	RJMetrics (2015) explain, a churn rate is the amount of customers (e.g. clients or users) who cut ties with a service, product or company during a given time period. These customers have "churned." Calculation: Customers lost in time period/ starting customers in time period.
	User lifetime value (Relevant)	User lifetime value	New! (Ec12)	New Ec12: Prediction of the net profit attributed to the entire future relationship with a customer. . Calcu-	According to MASB (2015), User lifetime value (ULV) is a prediction of the net profit attributed to the entire future relationship with a customer. Customer lifetime value is an

				lation: Avg Monthly Revenue per Customer * Gross Margin per Customer) ÷ Monthly Churn Rate.	important concept that encourages firms to shift their focus from quarterly profits to the long-term health of their customer relationships. Calculation: Average Monthly Revenue per Customer * Gross Margin per Customer) ÷ Monthly Churn Rate.
	Cost per user acquisition (Relevant)	Customer acquisition cost	New! (Ec13)	New Ec13: Customer acquisition costs, including all organizational costs (e.g. marketing and incentives), to introduce new customers to the company's products and services. Calculation: Total acquisition costs divided by total new customers over a set period of time.	On investopedia.com (2015) explains: Customer acquisition costs mean the costs of a business to acquire a new customer. The company recognizes costs, including marketing and incentives, to introduce new customers to the company's products and services. Calculation: Total acquisition costs divided by total new customers over a set period of time.
	Customer Happiness (Relevant)	Customer Happiness	New! (Ec14)	New (Ec14): Indicate whether the organization has a feedback system to solicit customer (e.g. client, user) feedback and an established procedure to measure customer happiness. Organizations should footnote the process and frequency by which they obtain client feedback to measure customer happiness.	Comparable IRIS (IRIS, 2014) metric: Client Feedback (OI5049). Indicate whether the organization has a feedback system to solicit client feedback and an established procedure and/or committee to deal with client feedback. Organizations should footnote the process and frequency by which they obtain client feedback. Definition (Hill et al., 2003): "Customer satisfaction is a measure of how your organization's 'total product' performs in relation to a set of customer requirements." Measure Variations (Larsen & Quartapell, 1996): Critical-Incident Technique to get to know the unknown customer satisfaction aspects).
	Growth Rate (Relevant)	Growth Rate	New! (Ec15)	New (Ec15): Amount of increase that a specific variable has gained within a specific period and context. The organization should footnote which variable was chosen (e.g. revenue, income	Definition of Growth rate (Investopedia, 2015): The amount of increase that a specific variable has gained within a specific period and context. Typically it represents the compounded annualized rate of growth of a company's revenues, earnings and dividends.

				or social and environmental outcome) to calculate the organization's growth.	
Lisa Suess	Sourcing and business practices of the organisation that support social and environmental standards	Supply Chain Standards	Similar to En19.		
Lisa Suess	Existence of sustainability management systems (such as ISO or EMAS)	Environmental Management System	New! (En15)	New (En15): 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.	IRIS code (IRIS, 2014): Environmental Management System (O1254). Indicate whether the organization has an environmental management system in place. Organizations should footnote the relevant details (written policy documents, stated objectives and targets, relevant programming, periodic auditing and evaluation practices, etc.) about their environmental management system. Systems: EMAS (Eco-Management and Audit Scheme) is an environmental management scheme based on EU-Regulation 1221/2009 and the ISO norm 14001.
Lisa Suess	Sustainability certificates received and membership in multi-stakeholder initiatives/rating	Reputation: Certificate or Membership	Similar to New(En14)		
Franken, Rabe, Jähnert	General feedback to survey (given via Email or personal conversation): The SD KPIs were hard to understand, wording and/or relevancy rating did not fit. Also, some KPIs should be formulated more flexible to fit start-ups and bigger companies.	Rewrite KPIs		En, Eco and So KPIs will be rewritten, to adjust them to different company sizes (e.g. possibility to give estimations, explain assumptions or footnote given conditions). SD1-15: Selected SD metrics will be rewritten to increase comprehension.	

Table 38: Qualitative feedback analysis: codes, explanation and sources.

Survey Round 1c: Additional Feedback via Email

Caroline Raabe (18.03.2015):

Einige Fragen waren nicht so leicht so zu verallgemeinern. Manche Sachen kommen stark auf das Business Modell (Rechtsform) Geschäftskonzept und Branche an (ob ökologische KPIs wichtiger sind z.B. bei richtiger Produktion, bei der viel Wasser- und Energieverbrauch entsteht oder soziale KPIs, wenn man wie wir Frauen ausbildet und die Stoffproduktion vorher passiert mit dem ganzen ökologischen Anfall. das ist bei uns weniger. Aber war sehr spannend! :)

Heiko Franken (17.03.2015):

Habe den Fragebogen gerade ausgefüllt. Zwei Anmerkungen – die Fragen sind in aller Regel für ein Startup absolut unbrauchbar. Da liegen Theorie und Praxis weit auseinander. Für einen Weltkonzern mag das Sinn geben, aber nicht für ein junges Unternehmen. Und so richtig Benutzer freundlich ist das Ganze auch nicht, viel Text und Copy & Paste.

Survey Round 1d: Indicator Changes and New Formulation

Key for the following table:

Bold Text	Changed Text
	Merged / Special Analysis

In-ter-nal Rank Survey 1	Survey 1 Code	Survey 1 Name and/or Feedback Code	Explanation Survey 1	Explanation Survey 2	Survey 2 Name	Survey 2 Code
1	En3	Waste Produced: Hazardous Waste	Amount of hazardous waste created by the organization's operations during the reporting period.	Changed: 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.	Hazardous Waste Produced	En14
2	En23	Environmental impacts of transporting products	Measure environmental impacts of transporting products, members of the organization's workforce, and other goods and materials. Report the criteria and methodology used. Where quantitative data is not provided, report the reason.	Changed: Measure environmental impacts of transporting products, members of the organization's workforce or other goods and materials. The organization should footnote the type(s) of environmental impact, its context (e.g. country, point in production process) and assumptions made when reporting against this metric. Where quantitative data is not provided, report the reason. Provide instead reasonable estimations, based on proven facts.	Environmental Impact of Transport	En5

3	En19	Supplier Evaluation + Due Diligence, Business Activities, Supply Chain Dependency	Indicate whether the organization considers environmental performance when evaluating suppliers. Organizations should footnote the type of factors taken under consideration.	Changed: 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.	Sourcing Evaluation: Supplier and Supply Chain	En11
5	En17	Greenhouse Gas Reductions due to 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) and calculation assumptions used when reporting against this metric. Calculation: Units/Volume Sold: Total × (Greenhouse Gas Emissions of Product Replaced – Greenhouse Gas Emissions of Product).	Changed: 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: Units/Volume Sold: Total × (Greenhouse Gas Emissions of Product Replaced – Greenhouse Gas Emissions of Product).	Greenhouse Gas Reductions: Products Sold	En2
6	En21	Recycled Materials Ratio	Percentage of recycled materials used to manufacture the organization's product (including packaging) or 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 through the total weight or volume of materials used in products.	Changed: Percentage 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.	Recycled Materials Ratio	En9
7	En18	Recycled Materials	Amount of recycled materials used in the organization's products (including packaging) during the reporting period.	Changed: Amount of recycled materials used in the organization's products (including packaging) 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.	Recycled Materials	En1

8	En6	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 assumptions used when reporting against this metric.	Changed: 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.	Hazardous Waste Avoided	En6
9	En9	Energy Savings from Products Sold	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×(Energy Consumption of Product Replaced–Energy Consumption of Product)	Changed: 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), the context (e.g. country, lifetime stage of product/service) and assumptions used when reporting against this metric. Calculation: Units/Volume Sold: Total × (Energy Consumption of Product Replaced–Energy Consumption of Product).	Energy Savings: Products Sold	En7
10	En24	Total Environmental Protection Expenditures and Investments by Type	Report total environmental protection expenditures by: Waste disposal, emissions treatment, and remediation costs, Prevention and environmental management costs.	Changed: Report total environmental protection expenditures by type(s) (e.g. Waste disposal, emissions treatment, remediation costs, prevention and environmental management costs). Organizations should footnote the context (e.g. country, lifetime stage of product/service) and assumptions made when reporting against this metric.	Environmental Protection Expenditures	En3
11	En13	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 assumptions used when reporting against this metric.	Changed: 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.	Waste Avoided	En10

12	En11	Energy Purchased: Total	Amount of purchased energy consumed by the organization during the reporting period.	Changed: Total amount of purchased energy consumed by the organization during the reporting period. Organizations should footnote the energy type(s), the context (e.g. country, lifetime stage of product/service) and assumptions used when reporting against this metric.	Energy Purchased	En12
	New (En13)	Waste Generated: Total	Amount of waste disposed by the organization during the reporting period.	New & Changed: 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.	Waste Generated	En4
	New (En14)	Reputation and Transparency, Reputation: Certificate or Membership	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.	New: 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.	Reputation and Transparency	En13
	New (En15)	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.	New: 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.	Environmental Management System	En8
Internal Rank Survey 1	Survey 1 Code	Survey 1 Name and/or Feedback Code	Explanation Survey 1	Explanation Survey 2	Survey 2 Name	Survey 2 Code
1	Ec14	Total Revenue	Value of all revenue received by the organization during the reporting period.	Same: Value of all revenue received by the organization during the reporting period.	Total Revenue	Ec5
2	Ec9	Gross Profit	Value of the organization's residual profit after incurring the direct costs associated with production/delivery, for the reporting period. Calculation: Total Revenue–Cost	Same: Value of the organization's residual profit after incurring the direct costs associated with production/delivery, for the reporting period. Calculation: Total Revenue–Cost of Goods	Gross Profit	Ec3

			of Goods Sold.	Sold.		
3	Ec5	Net Income + Ec8	Value of the organization's net profit, calculated as total income minus total expenses, taxes, and cost of goods sold during the reporting period.	Same: Value of the organization's net profit (NP) and net profit before donation (NPBD). Calculation: NP = Total income minus total expenses, taxes, and cost of goods sold during the reporting period. NPBD = total income, excluding donations, minus total expenses during the reporting period.	Net Income (Before Donations)	Ec1
5	Ec19	Cash Flow: Net Total	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.	Same: 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.	Cash Flow: Net Total	Ec9
6	Ec17	EBITDA	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).	Same: 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).	EBITDA	Ec14
7	Ec4	Target Beneficiary Socioeconomics + Due Diligence, Business Activities, Supply Chain Dependency	Socioeconomic groups of beneficiaries targeted by the organization. Select all that apply: - Very poor/ Poor/ Low income/ Other	Changed: 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.	Target Beneficiary Socioeconomics	Ec8
8	Ec2	Jobs Created at Directly Supported/Financed Enterprises: Total + Ancillary Businesses Promot-	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	Changed: Total net number of new full-time equivalent employees working for ancillary 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 type(s) and context (e.g. country) of jobs created as well as assumptions used	Jobs Created at Ancillary Businesses	Ec7

		ed	definition of full time work used when reporting against this metric.	when reporting against this metric.		
9	Ec7	Jobs Maintained at Directly Supported/Financed Enterprises: Low Income Areas + Ancillary Businesses Promoted	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.	Changed: 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.	Jobs Maintained at Ancillary Businesses: Low Income Areas	Ec11
	New (Ec10)	SROI	Calculate Social Return on Investment (SROI) ratio. Calculation: 1. Projecting into the future (Benefits and Discounted Values) 2. Calculating the net present value ([Present value of benefits] - [Investment Value]) 3. Calculating the ratio (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)	New: 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	SROI	Ec12
	New (Ec11)	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.	New: 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.	Churn Rate	Ec4
	New (Ec12)	User Lifetime Value	Prediction of the net profit attributed to the entire future relationship with a customer. Calculation: (Avg. Monthly Revenue per Customer x Gross Margin per Customer) / Monthly Churn Rate	New: 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	Customer Lifetime Value	Ec13

				type(s) (e.g. stakeholder) and context (e.g. country) of customers as well as assumptions used when reporting against this metric.		
	New(Ec13)	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: Total acquisition costs divided by total new customers over a set period of time.	New: Customer acquisition costs, including all organizational costs (e.g. marketing and incentives), to introduce new customers to the company's products and services. Calculation: 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.	Customer Acquisition Cost	Ec2
	New(Ec14)	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 process and frequency by which they obtain client feedback to measure customer happiness.	New: 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.	Customer Happiness	Ec6
	New(Ec15)	Growth Rate	Amount of increase that a specific variable has gained within a specific period and context. The organization should footnote which variable was chosen (e.g. revenue, income or social and environmental outcome) to calculate the organization's growth.	New: 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, social and/or environmental outcome) to calculate the organization's growth.	Growth Rate	Ec10
Internal Rank Survey 1	Survey 1 Code	Survey 1 Name and/or Feedback Code	Explanation Survey 1	Explanation Survey 2	Survey 2 Name	Survey 2 Code
1	So24	Supplier Evaluation: Forced or Compulsory Labour	Number of operations and suppliers identified as having significant risk for incidents of forced or compulsory labour. Organizations should footnote the measures taken to contribute to the elimination of all forms of forced or compulsory labour.	Changed: 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	Labour Evaluation: Supplier and Supply Chain	So5

				of all forms of forced or compulsory labour.		
2	So17	Fair Compensation Practices	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.	Changed: 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.	Fair Compensation Practices	So2
3	So7	Worker Safety + Social Security	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.	Changed: 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.	Safety and Social Security	So8
4	So8	Equal Remuneration for Women and Men	Ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation.	Changed: 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.	Women and Men Ratio	So10
5	So11	Local Compliance + En10	Indicate whether the organization has been found to be out of compliance with any local labour or tax regulations during the reporting period. + Indicate whether the organization has been found to be out of compliance with any local environmental regulations during the reporting period.	Changed: 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.	Local Compliance	So3
6	So25	Human Rights and Impact Assessment	Total number and percentage of operations that have been subject to human rights reviews or impact assessments.	Changed: 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.	Assessment: Human Rights and Impact	So4
7	So16	Child Labour	Indicate whether the organization has a written child labour policy in	Same: Indicate whether the organization has a written child labour policy in line with	Child Labour Policy	So6

			line with International Labour Organization (ILO) standards.	International Labour Organization (ILO) standards.		
8	So9	Sexual Harassment Policy + Anti-Discrimination	Indicate whether the organization has a written policy and practice to combat sexual harassment of employees in line with internationally-recognized standards.	Changed: 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.	Anti-Discrimination Policy	So9
9	So5	Employee Turnover 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.	Same: 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.	Employee Turnover Rate	So1
10	So10	Human Right Investments	Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening.	Same: Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening.	Human Right Investments	So11
11	So19	Employee Feedback + Employee Happiness Index	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.	Changed: 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.	Employee Happiness	So12
12	So22	Indigenous Rights + Displacements and Livelihood loss	Total number of identified incidents of violations involving the rights of indigenous peoples during the reporting period. Organizations should footnote the status of the incidents and actions taken.	Changed: Total number of identified incidents of violations involving the rights of indigenous peoples, including displacement and livelihood loss effects , during the reporting period. Organizations should footnote the type(s) and context of the incidents as well as actions taken.	Indigenous Rights	So13

13	So3	Market Re-search on Cli-ents	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.	Changed: 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.	Market Re-search on Stake-holders	So7
14	So18	Griev-ance Mecha-nisms for Impacts on Socie-ty	Total number of griev-ances about impacts on society filed through formal grievance mecha-nisms during the report-ing period. Organizations should footnote how many of the identified grievances were: ad-dressed during the re-ported period, resolved during the reporting peri-od, prior to the reporting period but were resolved during the reporting peri-od.	Same: Total number of griev-ances 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.	Griev-ance Mecha-nisms: Impacts on Socie-ty	So14
In-ter-nal Rank Survey 1	Survey 1 Code	Survey 1 Name and/or Feedback Code	Explanation Survey 1	Explanation Survey 2	Survey 2 Name	Survey 2 Code
1	SD2	Operational model	Operational model of the organization. Select all that applies: Production/Manufacturing - Processing/Packaging - Distribution - Wholesale/Retail - Services-Financial Services	Changed: Disclosure of the operational model of the organization (e.g. Production/Manufacturing - Processing/Packaging - Distribution - Wholesale/Retail - Services- Financial Services)	Operational model	SD2
2	SD1	Environmental Impact Objectives	Environmental impact objectives pursued by the organization. Select all that apply: Biodiversity conservation, Energy and fuel efficiency, Natural resources conserva-tion, Pollution prevention & waste management, Sustainable energy, Sustainable land use, Water resources management).	Changed: 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 re-sources management, etc.).	Envi-ronmen-tal Im-pact Objec-tives	SD7

3	SD7	Social Impact Objectives	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.	Changed: 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.).	Social Impact Objectives	SD4
4	SD6	Customer Model	Customer model. Select all that apply: - Business to Business (B2B) - Business to Consumer (B2C) - Business to Government (B2G).	Changed: Disclosure of the customer model(s) (e.g. Business to Business (B2B), Business to Consumer (B2C), Business to Government (B2G)).	Customer Model	SD5
5	SD10	Units/Volume Sold: Total	Amount of the product/service sold by the organization during the reporting period.	Changed: Disclosure of amount of the product/service sold by the organization during the reporting period.	Product/Service Output	SD10
6	SD3	Client Individuals	Number of unique individuals who were clients of the organization during the reporting period.	Changed: Disclosure of number of unique individuals who were clients (resp. users, customers) of the organization during the reporting period.	Client Individuals	SD1
7	SD13	New Investment Capital	Value of funds invested in the organization (both loans and investments) during the reporting period.	Changed: Disclosure of value of funds invested in the organization (both loans and investments) during the reporting period.	New Investment Capital	SD8
8	SD4	Legal Structure	Legal structure of the organization. For example: Benefit Corporation - Co-op - Corporation - Limited Liability Company - Non-Profit/Non-Governmental Organization - Partnership - Sole proprietorship - Other	Changed: 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).	Legal Structure	SD9
	New(SD9)	Region, Branch, Country, Stakeholder & Region, Start-up or lifecycle Dependency	Disclosure of company's scope and boundary (regional, national, international) and the materiality of the given KPIs (indicate whether a weighting for certain KPIs is necessary, due to sector, industry, branch or stakeholder dependency	New: 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	KPI Weighting: Scope and Relevance	SD3

		cy	as well as due to the organizational lifecycle stage).	well as due to the organizational lifecycle stages. Organizations should footnote the type(s), context and assumptions of their proposed weightings.		
	New(SD10)	Monthly Measurements	Disclose the frequency of the KPI measurement.	New: Disclosure of the KPI measurement frequency within one reporting period.	Measure Frequency	SD6
	New(SD11)	Value Creation Statement	Disclosure of the overall value creation process of the company, with regard to where does the organization creates, retains or destroys value in economic, social and environmental terms.	New: 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.	Value Creation Statement	SD11

Table 39: Altered and new indicators: codes for survey 2.

Survey Round 2a: Indicator Analysis

Key for the following analysis tables (40 – 43).

	High Variance
	Same Variance
	Chosen SPI
Number	Median ≥ 5

Code Survey 2	Code Survey 1	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of z	W x Median	Overall Mode	Variance Survey 2	Variance Survey 1	Rank 2	Rank 1
Ec1	Ec5	6	4	5	5	80	400	5	0,92307692	1,128888	1	3
Ec2	New(Ec13)	5	3,5	5	5	53,3333333	266,666667	5	1,31360947	x	12	x
Ec3	Ec9	5	4	6	5	80	400	5	1,38461538	0,8	2	2
Ec4	New(Ec11)	5	4	5	5	60	300	5	0,47222222	x	9	x
Ec5	Ec14	6	3	5	5	66,6666667	333,333333	6	1,25443787	0,593	6	1
Ec6	New(Ec14)	6	4,5	5	5	73,3333333	366,666667	6	0,84023669	x	4	x
Ec7	Ec2	5	4	5	4,5	46,6666667	210	5	1,00591716	1,882222	13	8
Ec8	Ec4	6	5	4	5	73,3333333	366,666667	6	1,97633136	1,530612	5	7
Ec9	Ec19	5	4	5	5	66,6666667	333,333333	5	1,15976331	0,923469	7	5
Ec10	New(Ec15)	5	5,5	5	5	73,3333333	366,666667	6	0,52071006	x	3	x
Ec11	Ec7	5	5	4	5	66,6666667	333,333333	5	1,32544379	1,313666	8	9
Ec12	New(Ec10)	4	5	5	5	60	300	5	2,23668639	x	10	x
Ec13	New(Ec12)	5	5	5	5	53,3333333	266,666667	5	0,90972222	x	11	x
Ec14	Ec17	5	3,5	4	4	40	160	4	0,86390533	1,02351	14	6

Table 40: Analysis of economic indicators.

Code Survey 2	Code Survey 1	Sco Median	Env Median	Eco Median	Overall Median	Weighting (W): % of ≥	W x Median	Overall Mode	Variance Survey 2	Variance Survey 1	Rank 2	Rank 1
So1	So5	6	4	4	5	53,3333333	266,666667	4	0,96	1,086734	12	9
So2	So17	6	5	3	5	73,3333333	366,666667	5	1,09333333	0,739795	6	2
So3	So11	6	5	5	5	86,6666667	433,333333	6	0,72888889	1,265306	1	5
So4	So25	6	5	5	6	73,3333333	440	6	2,51555556	2,489795	4	6
So5	So24	6	5	5	5	80	400	5	1,33333333	0,328888	2	1
So6	So16	6	5	4	5	66,6666667	333,333333	6	1,26222222	0,68639	8	7
So7	So3	5	5	4	5	53,3333333	266,666667	5	0,77333333	2,106666	11	13
So8	So7	5	6	4	5	73,3333333	366,666667	6	0,86222222	1,066326	5	3
So9	So9	5	6	4	5	80	400	5	0,72888889	0,96	3	8
So10	So8	5	5	3	5	66,6666667	333,333333	5	1,30666667	1,333333	9	4
So11	So11	6	4	3	4	33,3333333	133,333333	4	2,19555556	1,265306	13	5
So12	So19	6	5	5	5	73,3333333	366,666667	5	0,99555556	1,229591	7	11
So13	So22	5	4	3	4	26,6666667	106,666667	4	1,49333333	2,16204	14	12
So14	So18	5	5	3	5	53,3333333	266,666667	5	1,12888889	1,454545	10	14

Table 41: Analysis of social indicators.

Code Survey 2	Code Survey 1	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of ≥	W x Median	Overall Mode	Variance Survey 2	Variance Survey 1	Rank 2	Rank 1
En1	En18	5	5	4	5	53,3333333	266,666667	5	1,40816327	2,862222	7	7
En2	En17	5,5	5	5	5	73,3333333	366,666667	5	0,79289941	2,222222	1	5
En3	En24	5	4	3	4	33,3333333	133,333333	4	2,20918367	1,976333	13	10
En4	New(En13)	5	5	4	5	53,3333333	266,666667	5	1,6377551 x		9 x	
En5	En23	4,5	5	3	4	40	160	5	2,13017751	2,773333	11	2
En6	En6	5	5	4	5	53,3333333	266,666667	5	1,31122449	2,915555	8	8
En7	En9	4	5	4	4	40	160	4	1,40816327	1,715555	12	9
En8	New(En15)	5	4	5	5	53,3333333	266,666667	5	1,92346939 x		10 x	
En9	En21	5	5	4	5	60	300	5	1,59693878	2,489795	4	6
En10	En13	5	5	2	5	60	300	5	2,28571429	3,693877	6	11
En11	En19	5	5	3	5	66,6666667	333,333333	5	1,53061224	2,906666	3	3
En12	En11	5	4	3	4	33,3333333	133,333333	3	1,51530612	3,693877	14	12
En13	New(En14)	5	5	5	5	66,6666667	333,333333	6	1,12244898 x		2 x	
En14	En3	5	4	5	5	60	300	5	1,88265306	1,626666	5	1

Table 42: Analysis of environmental indicators.

Code Survey 2	Code Survey 1	Soc Median	Env Median	Eco Median	Overall Median	Weighting (W): % of z	W x Median	Overall Mode	Variance Survey 2	Variance Survey 1	Rank 2	Rank 1
SD1	SD3	4	2,5	3	3	5	20	60	1,53061224	1,020833	11	6
SD2	SD2	5	4	5,5	5	60	300	6	1,30177515	1,917159	7	1
SD3	New(SD9)	5	5	5	5	73,3333333	366,6666667	5	0,91555556 x	1,917159	5 x	3
SD4	SD7	5	5,5	5	5	80	400	5	1,28571429	0,23668	3	3
SD5	SD6	6	4	6	5,5	60	330	6	2,34693878	1,597633	2	4
SD6	New(SD10)	5	4	3	4	40	160	5	1,40816327 x		10 x	4
SD7	SD1	6	6	4	5	66,6666667	333,3333333	6	0,93333333	2,632653	6	2
SD8	SD13	5	4	5	5	60	300	5	1,58222222	1,244897	8	7
SD9	SD4	5	5	6	5	73,3333333	366,6666667	5	0,8	1,621301	4	8
SD10	SD10	5	3	4	5	46,6666667	233,3333333	3	1,32544379	1,80102	9	5
SD11	New(SD11)	6	6	4	5,5	66,6666667	366,6666667	6	0,73979592 x		1 x	5

Table 43: Analysis of standard disclosure metrics.

Survey Round 2b: Qualitative Feedback

Expert Name	Social KPIs feedback	Codes	Similar to/ New	Statement	Further explanation
Lisa Süß	Importance depends on the type of organization/business activities.	Business Model Dependence	SD3	Not all sustainability KPIs fit to all (sustainable) businesses!	
Christian Kroll	Employee Turnover Rate: Would be important for us, but so far nobody really quit his/her job.	Job Turnover	So1	Uncertainty about use for young businesses. But also good sign already in young businesses.	
Julia Linz	So11 is stronger for the human rights assessment than So4	Human Right Investments + Assessment: Human Rights and Impact	So11 and S04	The expert ground judged So4 more relevant than So11. Maybe because it is easier to assess. Investments are a strong commitment, but maybe not so common in today's businesses. Thus, So4 is a starting point to assess the impact of a company in the field of human rights.	So11: Total number and percentage of significant <u>investment agreements and contracts</u> that include human rights clauses or that underwent human rights screening. So4: Total number and percentage of <u>operations</u> 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.
Expert Name	Environmental KPIs feedback	Codes	Similar to/ New	Statement	Further explanation
Julia Linz	The relevance of environmental KPIs strongly depends on the business model, the service and the product (green/social business vs. "normal"): e.g. for En9	Business Model (Product/Service) Dependency	e.g. En9	Not all sustainability KPIs fit to all (sustainable) businesses!	
Christian Rudolph	The level of usage / level of dependency on ecosystem services (pollination, clean water/air, soil, etc.) is essential to measure ecological impact for business.	Level of usage / dependency on ecosystem services	all En KPIs	Not all environmental KPIs fit to all (sustainable) businesses! Important is the level of dependency and usage of the ecosystem.	No measurement found. However, the dependency could be disclosed by the combination of various environmental KPIs.
Expert Name	Economic KPIs Feedback	Codes	Similar to/ New	Statement	Further explanation
Martin Jähnert	SROI is our main focus in my perception.	SROI	Ec12	Strong focus on SROI.	
Christian Kroll	For us SROI would be a very important KPI, but unfortunately it is almost impossible to determine that in the real world	SROI	Ec12	SROI important, but complicated (time consuming and uncertain). Therefore, the other social KPIs should help build up more certainty	

	since measuring social returns is very complicated, highly uncertain and it takes a lot of time.			about investments and reached outcome (non- and monetary) in the social field.	
Julia Linz	KPIs Ec 1, 2, 3, 5, 9, 14 are relevant for evaluation of the overall financial performance but not relevant for sustainability.	Net Income + Customer Acquisition Cost + Gross Profit + Total Revenue, Cash Flow, EBITA	Ec1, Ec2, Ec3, Ec5, Ec9, Ec14	The same expert has rated Ec1, Ec3, Ec5, Ec9 and Ec14 in the 1. round with "highly relevant, in this 2. round with "kind of relevant". The expert has reconsidered the relevance of economic KPIs in the context of sustainability. The new added economic KPIs (Ec12, Ec4, Ec13, Ec6, Ec10) are seen as sustainable in comparison to the above motioned, old ones (accepted of EC2).	Learning resp. reconsidering process. Traditional economic KPIs are considered as not sustainable. However, the concept of strong sustainability asks for the equal combination and integration of all three sustainability dimensions. Therefore, also traditional economic KPIs can belong to a sustainability KPI framework. The other experts have prejudged these KPIs as follow: Ec1 (Net Income) and Ec3 (Gross Profit) still very relevant, Ec5 (Total Revenue) and Ec9 (Cash Flow) not that relevant any longer, Ec2 (Customer Acquisition Cost) kind of relevant and Ec14 (EBITA) irrelevant. It seems as if the experts think that the new economic KPIs fit better resp. are more relevant to measure sustainability.
Christian Rudolph	Economic value added / created for the community, in which the business operates is essential, too.	Economic value added for community	Ec12	The economic value added and created, not only for the company, but also for the community resp. The society or environment are of importance.	The economic value added and created for the community is a more or less vague and hard to define object. However, it could be calculated and explained with the SROI KPI (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).
Expert Name	SD metrics Feedback	Codes	Similar to/ New	Statement	Comparable metric / Source

Martin Jähnert	Working according to SRS (Social Reporting Standard)	Social Reporting Standard	Various KPIs, especially SROI and SD metrics	The expert purpose to work according to the SRS. This "work" would include in the context of this research the indicators proposed by the SRS to manage/measure sustainability. However, the SRS is a reporting and not a "work" advisory tool resp. standard for sustainability management.	The SRS strongly advises to use indicators so measure and report sustainability. Moreover, it claims that for a social/environmental profile of a company appropriate indicators are needed, which could be found in the Global Reporting Standard (GRS) or the AA 1000 Standard. As the KPIs firstly presented to the experts based on the GRS, most KPIs should be mainly in accordance to the GRS or are altered/added by the experts.
Norbert	I judge the different KPIs as the world is today, not as I wish it to be. This judgement takes changes and trends into account for the next 2-5 years.	Perspective and Time Dependence	SD3	The relevance of the KPIs depend on the perspective and values of different sectors, industries and branches. As well as on the time and Zeitgeist.	The KPIs must be evaluated frequently and adapted to future changes. Different sectors may lay a different relevance and focus on sustainability KPIs.

Table 44: Analysis of qualitative feedback.

Survey Round 2c: Variance and Internal Rank Changes of Indicators

Key for the following table:

KPI	Key SPI: more than 60% of experts rate this indicator with "Highly relevant" or "Relevant"
PI	Other relevant performance indicator: 60% or less of the experts rate this indicator as "Highly relevant" or "Relevant"
	Merged Indicators

Survey Round 1/2 Code	Survey Round 1/2 Name	Explanation Survey 3	Variance/ Rank de- or increased	Survey 3 Code	Survey 3 Name	KPI or other indicator
SR1: En17, SR2: En2	SR1: Greenhouse Gas Reductions due to Products Sold; SR2: 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: Units/Volume Sold:	Rank increased, variance decreased. All sub expert groups agreed on the KPI as relevant (Median). The social sub group judged it very relevant (Median).	En3	Greenhouse Gas Reductions: Products Sold	KPI

		Total×(Greenhouse Gas Emissions of Product Replaced –Greenhouse Gas Emissions of Product).				
Sr1: New (En1 4); SR2: En13	SR1: New; SR2: 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.	No comparison to previous round, but a Variance of 1,22 is good compared to the other KPIs. 66,6% of experts rated the KPI as relevant or high relevant.	En7	Reputation and Transparency	KPI
SR1: En19 ; SR2: En11	SR1: Supplier Evaluation; SR2: 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.	Rank stood the same, Variance improved. Experts agreed in both rounds on the (high) relevance of this KPI, this round with 66,66%. However, the economic sub group judge it only as kind of irrelevant (Median). Nevertheless, this is an improvement, as it was the round before irrelevant to them (Median).	En9	Sourcing Evaluation : Supplier and Supply Chain	KPI
SR1: En21 ; SR2: En9	SR1: Recycled Materials Ratio; SR2: Recycled Materials Ratio	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.	Rank and Variance improved. Economic sub expert group judged the KPI as only kind of relevant, others as relevant (Median). Is an improvement as in last round the economic sub group judged it as kind of irrelevant. It seems to be a relevant indicator for, but nor for all dimensions of sustainability and thus an indicator that may have to be chosen.	En2	Recycled Materials Ratio+ Recycled Materials Amount	PI
SR1: En3; SR2: En14	SR1: Waste Produced: Hazardous Waste, SR2: 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.	Both decreased. This round the environmental experts judged it as only kind of relevant, last time the economic sub group (median). 60% agree it is relevant or high relevant. It seems to be a relevant indicator, but not a KPI fitting to all dimensions of sustainability.	En6	Hazardous Waste Produced	PI
SR1: En13 ; SR2: En10	SR1: Non-hazardous Waste Avoided ; SR2: 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.	Both rank and variance improved. Still a high variance with 2,28 compared to other KPIs. This is because the economic sub expert group judge the KPI as irrelevant, last round it was kind of irrelevant for them (Median). It seems to be an indicator that is not (yet) relevant for the measure of sustainability, in the point of view of the economic experts.	En4	Non-hazardous Waste Avoided	PI

SR1: En18 ; SR2: En1	SR1: Recycled Materials ; SR2: Recycled Materials	Amount of recycled materials used in the organization's products (including packaging) 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.	Rank stood the same, Variance improved. Experts agreed in both rounds on the relevance of this KPI, this round with 53,33%. However, the economic sub group judge it only as kind of relevant (Median). Nevertheless, this is an improvement, as it was irrelevant for them last round. It does not seem to be a KPI fitting to all dimensions.		Included in: En2 Recycled Materials: Ration and Amount	PI
SR1: En6; SR2: En6	SR1: Hazardous Waste Avoided ; SR2: 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.	Rank stood the same, variance improved. Economic sub group judge it as only kind of relevant, others as relevant (Median). Last round it was still relevant for all 3 expert sub groups. Seems to be an indicator, not KPI.	En8	Hazardous Waste Avoided	PI
SR1: New (En1 3); SR2: En4	SR1: New; SR2: 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.	No comparison to previous round, but a variance of 1,63 is ok compared to the other KPIs. 53,3 % of experts rated the KPI as relevant or high relevant. Economic expert sub group judge it as only kind of relevant. Seems to be an indicator, not KPI.	En1	Waste Generated	PI
SR1: New (En1 5); SR2: En8	SR1: New; SR2: 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.	No comparison to previous round, a variance of 1,932 is not that good compared to the other KPIs. 53,3 % of experts rated the KPI as relevant or high relevant. Interestingly, environmental expert sub group judge it as only kind of relevant. Maybe it is seen as too complicated or not necessary form they. Seems to be more a "nice to have", instead of totally necessary to fulfil and reach sustainability. seems to be an indicator, not KPI.	En5	Environmental Management System	PI
Survey Round 1/2 Code	Survey Round 1/2 Name	Explanation Survey 3	Variance and Rank de- or increased	Survey 3 Code	Survey 3 Name	KPI or indicator

SR1: Ec5; SR2: Ec1	SR1: Net Income ; SR2: Net Income (Before Donations)	Value of the organization's net profit (NP) and net profit before donation (NPBD). Calculation: NP = Total income minus total expenses, taxes, and cost of goods sold during the reporting period. NPBD = total income, excluding donations, minus total expenses during the reporting period.	Rank increased, variance decreased. The environmental sub group judged it as only kind of relevant, but the social experts as even highly relevant (Median). However, 80% of all experts judged it relevant or highly relevant. Last round, the economic sub group judged it as only kind of relevant, but the others as relevant (Median). It's not yet clear whether it is a KPI or IP, more IP.		Included in: Ec7 Growth Rate	KPI/PI
SR1: Ec9; SR2: Ec3	SR1: Gross Profit ; SR2: Gross Profit	Value of the organization's residual profit after incurring the direct costs associated with production/delivery, for the reporting period. Calculation: Total Revenue–Cost of Goods Sold.	Rank stood the same, variance increased. This round, the environmental sub group judge it as only kind of relevant, last round all experts judged it as relevant. This round 80% judged it as highly and/or relevant. KPI/PI.		Included in: Ec7 Growth Rate	KPI/PI
SR1: New (15); SR2: Ec10	SR1: New ; SR2: 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.	No comparison to last round, but a variance of 0,52 is very good compared to other KPIs. All expert sub groups judge the KPI as highly and/or relevant (Median). 73,3% of all experts rate it highly and/or relevant.	Ec7	Growth Rate	KPI
SR1: New (Ec14); SR2: Ec6	SR1: New ; SR2: 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.	No comparison to last round, but a variance of 0,84 is very good compared to other KPIs. 73,3% of all experts rate it highly and/or relevant. However, the environmental sub group it with 4,5 as only kind of relevant to relevant (Median). As the social expert group rate it with even highly relevant, in this case the average would be "relevant" for all experts. KPI.	Ec5	Customer Happiness	KPI
SR1: Ec4; SR2: Ec8	SR1: Target Beneficiary Socioeconomics; SR2: 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.	Rank improved, variance increased. Economic sub group judged it as only kind of relevant, social SG as highly relevant (Median). Last round environmental and economic SG judged it as only kind of relevant. Improvement, but still more a PI, not a KPI for all dimensions of sustainability.	Ec1	Target Beneficiary Socioeconomics	PI
SR1: Ec14 ; SR2: Ec5	SR1: Total Revenue; SR2: Total Revenue	Value of all revenue received by the organization during the reporting period.	Rank decreased, variance increased. Last round all experts rated the it as highly and/or relevant (Median). This round, the environmental SG judged it as only kind of relevant. Could go in Ec10).		Included in: Ec7 Growth Rate	PI

SR1: Ec19 ; 2: SR2 Ec9	SR1: Cash Flow: Net Total; SR2: Cash Flow: Net Total	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.	Rank decreased, variance increased. Last round all experts rated the it as highly and/or relevant (Median). This and last round, the environmental SG judged it as only kind of relevant. Could go in Ec10).		Included in: Ec7 Growth Rate	PI
SR1: Ec7; SR2 Ec11	SR1: Jobs Maintained at Directly Supported/Financed Enterprises: Low Income Areas; SR2: 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.	Rank and variance increased. Economic SG judged it as only kind of relevant, as last round. Last round also the environmental SG judged it as kind of relevant (Median). Seems to be a PI, not KPI.	Ec4	Jobs Maintained at Ancillary Businesses: Low Income Areas	PI
SR1: New (Ec1 1); SR2 Ec4	SR1: New; SR2: 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.	No comparison to last round, but a variance of 0,42 is very good compared to other KPIs. However, only 60% of all experts rated it as highly and/or relevant. The environmental SG rated it as only kind of relevant (Median).	Ec6	Churn Rate	PI
SR1: New (Ec1 0); SR2 Ec12	SR1: New ; SR2: 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 ration = 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.	No comparison to last round, but a variance of 2,23 is very bad compared to other KPIs. Also, only 60% of all experts rated it as highly and/or relevant. Interestingly, the social SG rated it as only kind of relevant (Median). Maybe they see it as too complicated or not necessary to fulfil and reach sustainability. Maybe it is only relevant for the other SGs as they could better understand social impact with help of SROI.	Ec3	SROI	PI
SR1: New (Ec1 2); SR2: Ec13	SR1: New ; SR2: Customer Lifetime 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.	No comparison to last round, but a variance of 0,9 is quiet good compared to other KPIs. However, only 53,3% of all experts rated it as highly and/or relevant. Interestingly, all expert SG rated it as relevant (Median). Maybe they see it as future orientated KPI (leading), which thus allows to manage sustainability in the long run. KPI.	Ec8	Customer Lifetime Value	KPI

SR1: New (Ec1 3); SR2: Ec2	SR1: New; SR2: 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: 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.	No comparison to last round, but a variance of 1,31 is good compared to other KPIs. However, only 53,3% of all experts rated it as highly and/or relevant. The environmental SG rated it with 3,5 as only kind of irrelevant and/or kind of relevant, other SGs as relevant (Median). Seems to be more a PI than KPI.	Ec2	Customer Acquisition Cost	PI
Survey Round 1/2 Code	Survey Round 1/2 Name	Explanation Survey 3	Variance and Rank de- or increased	Survey 3 Code	Survey 3 Name	KPI or indicator
SR1: So11 ; SR2: So3	SR1: Local Compliance ; SR2: Local Compliance	Indicate whether the organization has been found to be out of compliance with any local regulations (e.g. labor, tax, environmental standards) during the reporting period. Organizations should footnote type(s) and context of actions taken to solve these issues.	Both rank and variance improved. All expert SG judged it as relevant, the social SG even as highly relevant (Median). Seems to be with 86,6% of all experts rating it as highly and/or relevant a strong KPI.	So10	Local Compliance	KPI
SR1: So24 ; SR2: So5	SR1: Supplier Evaluation: Forced or Compulsory Labour ; SR2: 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.	Both rank decreased and variance increased. All expert SG judged it as relevant, the social SG even as highly relevant (Median). Seems to be with 80% of all experts rating it as highly and/or relevant a strong KPI.	So4	Labor Evaluation : Supplier and Supply Chain	KPI
SR1: So9; SR2: So9	SR1: Sexual Harassment Policy ; SR2: 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.	Both rank and variance improved. The economic SG judged it as only kind of relevant (as last round), the environmental SG as relevant and the social SG as highly relevant (median). 80% of all experts rated it as highly and/or relevant. PI, because it does not fit to all dimensions.	So6	Anti-Discrimination Policy	PI
SR1: So25 ; SR2: So4	SR1: Human Rights and Impact Assessment; SR2: 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.	Rank improved, variance stood more or less the same (very small increase). All SG judged it as highly and/or relevant. 73,3% of all experts rated it as highly and/or relevant (Median) and the overall Median is even 6 (highly relevant). Strong KPI.	So9	Assessment: Human Rights and Impact	KPI

SR1: So7; SR2: So8	SR1: Worker Safety; SR2: 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.	Both rank and variance improved. However, economic SG rated it only as kind of relevant, whereas last round they still judged it as relevant (Median). Maybe it is more a PI.	So5	Safety and Social Security	PI
SR1: So17; SR2: So2	SR1: Fair Compensation Practices; SR2: 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.	Rank decreased, variance increased. The economic Sg rated it as kind of irrelevant, last round as still as kind of relevant (Median). Does not seem to be relevant from the economic point of view, thus PI. Even if 73,3% of all experts rated it as highly and/or relevant.	So1 2	Fair Compensation Practices	PI
SR1: So19; SR2: So12	SR1: Employee Feedback; SR2: 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.	Rank and variance improved. All SG rated it as highly and/or relevant. 73,3 % of all experts rated it as highly and/or relevant. Strong KPI.	So1	Employee Happiness	KPI
SR1: So16; SR2: So6	SR1: Child Labour; SR2: Child Labour Policy	Indicate whether the organization has a written child labour policy in line with International Labour Organization (ILO) standards.	Rank decreased, variance increased. The economic SG decreased its rating from last round to this round to only kind of relevance (Median).	So1 1	Child Labour Policy	PI
SR1: So8; SR2: So10	SR1: Equal Remuneration for Women and Men; SR2: 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.	Rank decreased, variance increased. The economic SG rated it as kind of irrelevant, last round they rated it still as kind of relevant (Median).	So7	Women and Men Ratio	PI
SR1: So18; SR2: So14	SR1: Grievance Mechanisms for Impacts on Society; SR2: 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.	Both rank and relevance improved. However, the economic SG rated it as kind of irrelevance, last round they rated it still as relevant (Median). On the other hand, the environmental SG rated it last round as kind of irrelevant and now relevant (Median).	So3	Grievance Mechanisms: Impacts on Society	PI
SR1: So3; SR2: So7	SR1: Market Research on Clients; SR2: 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.	Rank and variance improved. Economic SG rated it as only kind of relevant (Median), last round with relevant. This round the economic SG rated it with relevant, last round with kind of irrelevant.	So2	Market Research on Stakeholders	PI
SR1:	SR1: Em-	Ratio of the number of departing	Rank and variance decreased.	So8	Em-	PI

So5; SR2: So1	ployee Turnover Rate; SR2: Employee Turnover Rate	permanent (full-time and part-time) employees compared to the average number of permanent (full-time and part-time) employees at the organi- zation during the reporting period.	Environmental and economic SG rated it as only kind of relevant, social SG as highly relevant. Last round all expert SGs rated it as relevant. More a PI, than KPI.		ploy- ee Turn- over Rate	
Sur- vey Rou nd 1/2 Cod e	Survey Round 1/2 Name	Explanation Survey 3	Variance and Rank de- or increased	Sur vey 3 Co de	Sur- vey 3 Nam e	KPI or in- di- ca- tor
SR1: New (SD1 1); SR2: SD1 1	SR1: New ; SR2: Value Creation Statement	Disclosure of the overall value crea- tion process of the company, with regard to where the organization creates, retains or destroys value in economic, social and environmental terms.	Overall Median is 5,5 and thus with SD5 the highest one, but for SD11 66,6% of the experts chose "relevant" and/or "highly rele- vant". All SGs agree on the high relevance, thus it is a GSD.	SD5	Value Crea- tion State ment	GS D
SR1: SD6; SR2: SD5	SR1: Cus- tomer Model ; SR2: Cus- tomer Model	Disclosure of the customer model(s) (e.g. Business to Business (B2B), Business to Consumer (B2C), Busi- ness to Government (B2G).	Rank and variance increased. The overall Median is 5,5, how- ever the environmental SG judged it only as "kind of rele- vant", the others "highly relevant" (Median). Social and economic SG increased the relevance from "relevant" (Median), environmen- tal SG judged the same as last round. A voluntary SD.	SD7	Cus- tomer Model	VSD
SR1: SD7; SR2: SD4	SR1: Social Impact Ob- jectives; SR2: Social Impact Ob- jectives	Disclosure of the overall social im- pact objectives pursued by the or- ganization (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 preven- tion and mitigation, employment generation, equality and empower- ment, food security, generate funds for charitable giving, health im- provement, human rights protection or expansion, income/productivity growth, etc.).	Variance and Rank increased. Variance increased as one eco- nomic SG expert, who chose "do not know" last round, chose "ir- relevant" this time (Heiko Frank- en). The overall Median of all SGs however is 5 and 80% of the experts judged the metric "rele- vant" and/or "highly relevant". Strong metric, but not a generic one, fitting to all three dimensions of sustainability.	SD1	Social Im- pact Ob- jec- tives	VSD
SR1: SD4; SR2: SD9	SR1: Legal Structure ; SR2: Legal Structure	Disclosure of the legal structure of the organization (e.g. Benefit Corpo- ration, Co-op - Corporation, Limited Liability Company, Non-Profit/Non- Governmental Organization, Part- nership, Sole-proprietorship, Other).	Rank increased, variance de- creased. All sub expert groups agreed on the metric as relevant (Median). The social sub group judged it very relevant (Median). The economic SG judged it even as "highly relevant" (Median). Economic and environmental SG increased their Median, social SG decreased it. GSD, all SGs agree on.	SD6	Legal Struc- ture	GS D

SR1: New (SD9); SR2: SD3	SR1: New ; SR2: 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.	All SGs judged the metric as "relevant" (Median). No comparison to last round. However, the variance of 0,91 is quiet good compared to other metrics. GSD.	SD2	KPI Weighting: Scope and Relevance	GSD
SR1: SD1; SR2: SD7	SR1: Environmental Impact Objectives ; SR2: 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.).	Variance decreased, rank as well. Social and environmental SG judge the metric as "highly relevant", economic SG as only "kind of relevant". All SG increased their Median. However, it is not a metric fitting to all dimensions. VSD.	SD8	Environmental Impact Objectives	VSD
SR1: SD2; SR2: SD2	SR1: Operational model ; SR2: Operational model	Disclosure of the operational model of the organization (e.g. Production/Manufacturing - Processing/Packaging - Distribution - Wholesale/Retail - Services- Financial Services)	Rank decreased, variance as well. All SGs decreased their Median. The environmental SG judge it as only "kind of relevant", others as "relevant" (Median). VSD.	SD3	Operational model	VSD
SR1: SD1; SR2: SD8	SR1: New Investment Capital ; SR2: New Investment Capital	Disclosure of value of funds invested in the organization (both loans and investments) during the reporting period.	Rank decreased, variance increased. The SGs judged similarly to last round. Environmental SG still judge it as only "kind of relevant".	SD9	New Investment Capital	VSD
SR1: SD1; SR2: SD1	SR1: Units/Volume Sold: Total ; SR2: Product/Service Output	Disclosure of amount of the product/service sold by the organization during the reporting period.	Rank decreased, variance increased. Very diverse and low rating for the metric. However, the overall Median is still 5. VSD.	SD4	Product/Service Output	VSD

Table 45: Qualitative analysis: variance and rank changes, KPI or PI.

Survey Round 3a: Indicators Choice and Rank

In this analysis KPI / PI and GSD / VD were determined, plus a rank order of the indicators.

Criteria for internal rank order.

Criteria 1	Criteria 2	Criteria 3
KPI / GSD	KPI / GSD	Average
	Rank Value	Rank Value

Key to the following tables (46 – 49).

	Chosen as KPI / GSD
	Ranks that are similar between the SGs (2 numbers are the same)
	Rank that is the same between the SGs (3 numbers are the same)

Code: Name	Env PI	Soc PI	Eco PI	Env KPI	Soc KPI	Eco KPI	Env Rank	Soc Rank	Eco Rank	Total Answers	Overall PI	Overall KPI	% of KPI or PI choice	Overall Rank
So1: Employee Happiness	2	3	0	3	2	3	3	3	2	13	5	8	61,538462	3
So2: Market Research on Stakeholders	5	3	2	0	2	1	11	12	10	13	10	3	76,923077	12
So3: Grievance Mechanisms: Impacts on Society	3	2	2	1	3	1	10	11	12	12	7	5	58,333333	10
So4: Labor Evaluation: Supplier and Supply Chain	2	1	3	2	4	0	2	1	3	12	5	7	58	2
So5: Safety and Social Security	2	0	2	2	5	1	1	2	1	12	4	8	66,666667	1
So6: Anti-Discrimination Policy	4	4	3	1	1	0	6	5	7	13	11	2	84,615385	6
So7: Women and Men Ratio	3	3	2	2	2	1	9	7	11	13	8	5	61,538462	9
So8: Employee Turnover Rate	3	3	1	1	2	1	12	6	8	11	7	4	63,636364	11
So9: Assessment: Human Rights and Impact	3	3	2	1	2	1	4	9	4	12	8	4	66,666667	4
So10: Local Compliance	4	4	3	1	1	0	8	10	9	13	11	2	84,615385	8
So11: Child Labor Policy	2	3	2	2	2	1	5	4	5	12	7	5	58,333333	5
So12: Fair Compensation Practices	3	2	2	1	3	1	7	8	6	12	7	5	58,333333	7

Table 46: Social indicators: ranking and KPI choice.

Code: Name	Env PI	Soc PI	Eco PI	Env KPI	Soc KPI	Eco KPI	Env Rank	Soc Rank	Eco Rank	Total Answers	Overall PI	Overall KPI	Overall % (KPI or PI)	Total Rank
En1: Waste Generated	2	1	2	2	4	1	4	3	3	12	5	7	58,333333	4
En2: Recycled Materials Ratio and Amount	1	3	3	3	2	0	5	8	7	12	7	5	58,333333	6
En3: Greenhouse Gas Reductions	2	2	2	3	3	1	3	1	4	13	6	7	53,846154	3
En4: Non-hazardous Waste Avoided	3	3	3	2	1	0	6	6	9	12	9	3	75	7
En5: Environmental Management System	3	2	2	1	3	1	7	5	5	12	7	5	58,333333	5
En6: Hazardous Waste Produced	3	4	3	1	1	0	8	9	6	12	10	2	83,333333	8
En7: Reputation and Transparency	2	2	1	3	3	2	2	2	1	13	5	8	61,538462	1
En8: Hazardous Waste Avoided	4	4	3	0	1	0	9	7	8	12	11	1	91,666667	9
En9: Sourcing Evaluation: Supplier and Supply Chain	2	1	3	3	4	0	1	4	2	13	6	7	53,846154	2

Table 47: Environmental indicators: ranking and KPI choice.

Code: Name	Env PI	Soc PI	Eco PI	Env KPI	Soc KPI	Eco KPI	Env Rank	Soc Rank	Eco Rank	Total Answers	Overall PI	Overall KPI	Overall % (KPI or PI)	Total Rank
Ec1: Target Beneficiary Socioeconomics	2	1	1	2	4	2	3	1	3	12	4	8	66,666667	3
Ec2: Customer Aquisition Cost	4	4	2	0	1	1	8	6	4	12	10	2	83,333333	7
Ec3: SROI	2	1	0	2	4	3	1	2	1	12	3	9	75	1
Ec4: Jobs Maintained at Ancillary Businesses: Low Income Areas	2	4	1	2	1	2	6	5	8	12	7	5	58,333333	8
Ec5: Customer Happiness	2	5	1	2	0	2	4	8	5	12	8	4	66,666667	4
Ec6: Churn Rate	3	4	2	1	1	1	5	7	7	12	9	3	75	6
Ec7: Growth Rate	2	2	1	2	3	2	2	3	2	12	5	7	58,333333	2
Ec8: Customer Lifetime Value	3	1	3	1	4	0	7	4	6	12	7	5	58,333333	5

Table 48: Economic indicators: ranking and KPI choice.

Code: Name	Env VD	Soc VD	Eco VD	Env GSD	Soc GSD	Eco GSD	Env Rank	Soc Rank	Eco Rank	Total Answers	Overall VD	Overall GSD	Overall % (KPI or PI)	Total Rank
SD1: Social Impact Objectives	2	2	1	3	3	2	2	4	2	13	5	8	61,538462	2
SD2: KPI Weighting: Scope and Relevance	1	2	2	4	3	1	4	5	5	13	5	8	61,538462	5
SD3: Operational Model	3	2	0	1	3	3	5	2	3	12	5	7	58,333333	4
SD4: Product/Service Output	4	4	2	0	1	1	6	7	8	12	10	2	83,333333	7
SD5: Value Creation Statement	0	1	1	4	4	2	1	1	1	12	2	10	83,333333	1
SD6: Legal Structure	3	3	0	1	2	3	8	9	7	12	6	6	50	9
SD7: Customer Model	4	3	0	0	2	3	9	6	6	12	7	5	58,333333	6
SD8: Environmental Impact Objectives	1	3	2	4	2	1	3	3	4	13	6	7	53,846154	3
SD9: New Investment Capital	5	4	1	0	1	2	7	8	9	13	10	3	76,923077	8

Table 49: Standard disclosure indicators: ranking and KPI choice.

Survey Round 3b: SPIs mapped to the BMC

SPI indicator	Customer Segments	Value Proposition	Channels	Customer Relationships	Key Resources	Key Activities	Cost Structure	Revenue Stream	Key Partners
So5: Safety and Security	0	0	0	0	7	1	0		2
So4: Labor Evaluation	0	1	0	0	2	0	0	0	4
So1: Employee Happiness	0	1	0	0	8	0	0	1	1
So9: Human Rights	1	1	1	1	2	2	0	0	3
So11: Child Labor Policy	0	0	0	0	7	3	1	0	2
So6: Anti-Discrimination	0	0	0	0	7	2	0	0	1
So12: Fair Compensation	1	0	0	0	3	3	2	0	0
So10: Local Compliance	1	0	0	0	0	3	1	0	4
So7: Women and Men	0	0	0	0	7	0	1	0	1
So3: Grievance Mechanism	1	2	0	3	1	1	0	0	1
So8: Employee Turnover	1	0	0	0	2	0	3	0	1
So2: Market Research	3	0	3	4	0	1	1	0	6
En7: Reputation	0	3	3	3	1	1	1	1	0
En9: Sourcing Evaluation	0	0	1	0	2	1	1	1	6
En3: Greenhouse Gas	1	0	2	0	1	3	4	1	0
En1: Waste Generated	0	0	0	0	2	3	3	0	0
En5: Environmental	0	0	1	0	1	3	0	1	0
En2: Recycled Materials	0	0	0	0	3	2	2	0	0
En4: Non-hazardous Waste	0	0	0	0	1	3	2	0	0
En6: Hazardous Waste	0	0	0	0	1	3	1	0	0
En8: Hazardous Waste	0	0	0	1	1	3	1	0	0
Ec3: SROI	0	3	2	2	0	1	1	3	1
Ec7: Growth Rate	0	0	1	1	1	2	1	5	0
Ec1: Socioeconomics	5	0	0	2	0	1	0	0	3
Ec5: Customer Happiness	3	0	2	7	0	1	1	0	1
Ec8: Customer Lifetime	2	0	2	3	0	1	1	3	1
Ec6: Churn Rate	1	0	2	8	0	1	5	1	0
Ec2: Customer Aquisition	3	0	4	1	1	2	6	0	0
Ec4: Jobs Maintained:	0	0	0	0	2	1	1	0	3
SD5: Value Statement	1	6	1	0	0	1	0	1	0
SD1: Social Impact	1	0	1	1	0	4	0	0	1
SD8: Env.I Impact	1	0	0	1	0	3	0	0	1
SD3: Operational Model	1	2	0	0	1	2	2	3	0
SD2: KPI Weighting	1	1	0	0	0	3	0	1	0
SD7: Customer Model	3	0	1	3	0	0	1	3	0
SD4: Product/Service	0	1	1	0	0	3	1	3	0
SD9: New Investment	0	0	0	0	2	0	3	2	0
SD6: Legal Structure	0	0	0		1	3	1	0	0
Mapped SPIs	5	3	3	6	7	14	6	6	7
Outstanding SPIs (2 highest vote numbers >3)	1 KPI	1 KPI	1 PI	1 KPI / 1 PI	2 KPIs / 3 PIs	1 KPI	2 PIs	1 KPI	1 KPI / 1 PI
Number of experts answering this question	10	10	8	9	10	10	8	9	8

Table 50: SPIs mapped to BMC.