Erasmus School of Economics

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Aligning Sustainability with Management Control Systems

A Full Cost Accounting Multiple-Case Study

Master Thesis

Abstract

The sustainability of organisations is crucial in moving towards a sustainable economy and calls for sustainable practices. Companies have attempted to embed sustainability in management control systems (MCSs). A qualitative multiple-case study on the integration of full cost accounting (FCA) within MCSs is performed to identify the processes of sustainability integration in organizations. The findings reveal intra-organizational processes are more important than extra-organizational factors during the implementation of FCA. FCA functions as an object and mechanism of change. It was used to build awareness and enhance cognitive integration. The main barrier was a lack of top management adoption. The study shows a paradox surrounding the use of FCA as it is intended to be used both diagnostically and interactively creating dynamic tensions. Top management inhibited this dual use providing an organizational barrier to integration. This study provides a processual approach towards understanding the integration of sustainability in control systems from an institutional perspective.

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I remember I started off in February 2016 writing my proposal. Inspired by my wonderful and talented girlfriend, I wanted to take up the challenge to write about sustainability. At first combined with an internship at the sustainability services department of a Big 4 accounting firm, in June I discovered my passion to stand at the frontiers of knowledge. Full cost accounting would provide me with the challenge I was seeking. I want to thank my girlfriend for supporting me during the ups and downs of my journey in writing this final product.

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Chapter 1 Introduction

1.1 Background to the Research

At the Paris climate conference (COP21) in December 2015 a global action plan was agreed upon to combat climate change (European Commission, 2015). This constituted the first universal, legally binding global climate agreement. The governments of 195 countries agreed to limit global warming to under 2^{o}C. Accounting is connected to the challenge of reducing the greenhouse gas emissions. Detailed information about the sustainability of organisations is crucial in order to get a truly sustainable economy (Unerman, Bebbington, & O'Dwyer, 2007). Accounting can provide this information and help to move our society to a sustainable economy. KPMG, one of the Big Four auditors, has played an active role in sharing their insights into the COP21 Negotiations (KMPG, 2016). One of the tools to connect corporate and societal value creation is KPMG True Value (Bergen, Introducing KPMG True Value, 2015). Understanding how firms create and reduce value for society provides a new perspective to inform strategy and increase performance. In the Netherlands railway operator NS conducted a social impact analysis with a methodology based on KPMG's True Value methodology (NS, 2015; Bergen, 2015). NS transports more than 1 million passenger on a daily basis, hence has a great impact the society in terms of mobility, safety and emissions (NS, 2015). Hence, NS aims to address sustainability issues by identifying their impact on society, positive or negative, and therefore, facilitate a potential dialogue between the organization and its stakeholders.

Such impact analyses are of significance to the Netherlands, for the Dutch Parliament is taking measures to mitigate the consequences of climate change (Rijksoverheid, 2016). The Netherlands agreed to contribute an annual amount of 91 billion euros to the financing of combating climate change starting from 2020 (Dijksma, 2015). Investment in fighting climate change is justified by the government who believe that global warming can best be tackled by collective, business and government, cooperation on a global scale to reduce greenhouse gas emissions (Rijksoverheid, 2016).

It is not only in the Netherlands addressing sustainability issues by means of sustainability strategy and impact analyses is perceived to be of significance. Impact analyses which aim to assess sustainability on economic, environmental and social dimensions by internalizing externalities are becoming more common across the globe (Sawahata, 2014; Kerai, 2014; Hayes, Bell, Olesson, Lloyd, Sciascia, & Hakaraia, 2016). This type of accounting has become known as True Cost Accounting in practice. In academia this type of accounting is more commonly is referred to as Full Cost Accounting

(FCA) and has become a part of sustainability management accounting and control (Bebbington, Gray, Hibbitt, & Kirk, 2001).

However, research has often focused on the individual systems and tools of environmental and sustainability management control (Gond, Grubnic, Herzig, & Moon, 2012). FCA can contribute to the effective integration of sustainability within strategy only when it informs Management Control Systems (MCSs) (Simons, 1995). Various techniques have attempted to expose the economic, social and environmental impacts, but FCA is seen as the most promising (Bebbington & Larrinaga, 2014). Yet, initiatives such as FCA cannot reshape strategy when such a system is decoupled from core business activities (Gond, Grubnic, Herzig, & Moon, 2012; Simons, 1995; Maas, Schaltegger, & Crutzen, 2016). Many organizations have signalled their commitment to applying the principles of sustainability to their business by responding to internal and external pressures (Searcy, 2011; Benn, Dunphy, & Griffiths, 2014). However, lasting attempts at integrating sustainability within strategy should be reflected within formal control systems (Gond, Grubnic, Herzig, & Moon, 2012). A research gap has opened to develop and implement a more comprehensive approach towards understanding the integration of sustainability in control systems (Chenhall, 2003; Maas, Schaltegger, & Crutzen, 2016; Gond, Grubnic, Herzig, & Moon, 2012; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016).

Integration of sustainability and control systems is inherently difficult because it involves management accounting change. Management accounting changes have failed, because of implementation challenges during the change process (Cobb, Heliar, & Innes, 1995; Waweru, Hoque, & Uliana, 2004; Youssef, 2013). Implementation of management accounting change needs to be structured effectively incorporating processual aspects of change in order to have a successful change process (Perego, 2005). Limited attempts have been made to study the integration of sustainability in control systems. George et al. (2016) made an attempt at filling the gap in the literature by depicting the role of control systems in supporting sustainability integration within strategy. The authors focus on performance management systems in their single case study, providing a more holistic version of Gond's (2016) theory on MCS. However, no attempts have been made to focus on the role of FCA, as a specific and promising application of a Sustainability Control System (SCS). This thesis will address this shortage of literature.

1.2 Research Question

The research question which will be addressed in this paper is:

How do processual aspects of management accounting change affect the integration of FCA in traditional Management Control Systems?

This paper will examine three main bodies of literature being management accounting change, SCSs and sustainability science. Most importantly, the integration of SCSs in traditional MCSs (Gond, Grubnic, Herzig, & Moon, 2012; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016), FCA as a specific Sustainability Performance Measurement System (SPMS) (Herbohn, 2005; Bebbington, Gray, Hibbitt, & Kirk, 2001) and using Sustainability Science for developing integrated and process-oriented theories for understanding sustainability issues (Jerneck, et al., 2011; Quental, Lourenco, & Silva, 2011; Bebbington & Larrinaga, 2014).

The implementation of management accounting change requires more than the selection of a technologically optimal accounting system (Perego, 2005). Behavioural and cultural factors can be observed during the change process. There are difficulties in planning and predicting the path of change initiatives during the design phase, because people's interactions lead to unpredictable outcomes (Liebhart & Lucia, 2010). Literature proposes using a processual approach to the study of change in organisations (Dawson, 2014). This approach recognises that the unexpected will occur and does not reduce change to a list of sequential steps.

Literature suggests an integration of sustainability within strategy cannot occur when SCS are used as 'autonomous strategic tools' (Simons, 1995; Gond, Grubnic, Herzig, & Moon, 2012). Little research has paid attention to interplay of SCSs with MCSs. Several ideal configurations have been theorized, but empirical research has remained scarce (Maas, Schaltegger, & Crutzen, 2016). Maas et al. (2016) state there is a need for research on these integrative questions.

Interest in FCA research has spread the last decade (Antheaume, 2007; Bebbington, Gray, Hibbitt, & Kirk, 2001; Bebbington & Larrinaga, 2014; Frame & Cavanagh, 2009; Unerman, Bebbington, & O'Dwyer, 2007). FCA has the potential to make the concept sustainability operational, because this approach addresses the interrelations between the issues of sustainability development and an entity (Bebbington & Larrinaga, 2014).

Kates et al. (2001) advanced the emerging field of sustainability science by formulating an initial set of core questions to guide society along sustainable trajectories. Kates et al. (2001) indicated the need for control systems for environmental and social conditions to be integrated, to facilitate a transition toward sustainability. Sustainability science is exploratory in nature and suitable for the sustainable development problem set, because for this topic the 'right' answer cannot be found with a specific set of models constrained to a specific discipline (Kates, et al., 2001). The emerging field has focused on combining disciplines from natural sciences as well as ecological economics (Vries, Sustainability Science, 2013). Accounting has yet to contribute to this discipline. Several researchers

have indicated the fruitful avenue for future research of accounting in sustainability science (Bebbington & Larrinaga, 2014). The relevance of sustainability science to this research will be briefly discussed in the next section which elaborates on the practical and social relevance of this paper.

1.3 Justification for the Research

This research is of significance to academia and practice.

It is widely recognized organizations need to address the issue of sustainability (Searcy, 2012). However, many organizations struggle with the integration of sustainability initiatives into traditional activities. Properly addressing this issue involves developing a SPMS. The performance measurement system (PMS) is part of the MCS which supports strategy and shape agents'[1] practices (Gond, Grubnic, Herzig, & Moon, 2012). Thus, these systems could be used to drive organizations towards sustainability. It has been widely recognized PMSs play an integrating role as part of a wider MCS (Simons, 1990; Ferreira & Otley, 2009; Giovannoni & Maraghini, 2013). Giovannoni & Maraghini (2013) describe this role in a general sense, claiming it consists in the PMSs' ability to connect different parts of the organization by aligning actions of individuals according to the organizations' strategy. Therefore, SPMSs play a pivotal role in the effective integration of sustainability concerns into business management (Cresti, 2009; Durden, 2008).

Sustainability integration in PMSs is an emerging field (Durden, 2008; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). George et al. (2016) state there has been limited focus on this subject and has not been well researched within organizations. Similarly, Abdalla et al. (2014) mention social and environmental accounting and reporting (SEAR) research has focused on corporate social reporting issues, but has given limited attention on how sustainability issues are managed internally. The introduction of a SPMS constitutes a management accounting change. This study explores the organizational dynamics of management accounting change. A dynamic approach provides a richer comprehension of the implementation of sustainability performance measures (Perego, 2005). Neo-classical economic theory has difficulty in analysing processes of change (Burns & Scapens, 2000). Studying the processes of management accounting change, Burns & Scapens' (2000) conceptualization of management accounting change will be used. This framework is particularly helpful in providing a processual view of change because of the Old Institutional Economics (OIE) theoretical perspective applied to this framework (Contrafatto & Burns, 2013).

[1] An agent in the economic sense being a decision-maker

There are two challenges surrounding SPMSs being its integration into mainstream business activities and using it for decision-making. In addressing these challenges, Burns & Scapens' (2000) framework is used to analyse the processual aspects during the implementation phase of FCA.
Searcy (2012) states the literature on SPMS has overemphasized the design aspects of a SPMS. The first challenge is to ensure that the SPMS is integrated into more traditional business processes. Hence, a focus on the implementation and evolution of a SPMS is needed. Searcy (2012) highlights:

"While the need to successfully implement a SPMS is widely recognized, few studies explicitly focus on this critical issue." (Searcy, Corporate Sustainability Performance Measurement Systems: A Review and Research Agenda, 2012)

The second challenge is to use SPMS as part of the decision-making process (Searcy, 2012). Many existing performance evaluation systems focus too strongly on external reporting and underestimate the internal information needs for decision-making (Staniskis & Arbaciauskas, 2009). The internationally acknowledged Global Reporting Initiative is an example of a system overemphasizing external reporting. Staniskis & Arbaciauskas (2009) mention the overemphasis on sustainable development indicators as part of SPMSs leaves the fundamental issue of selecting appropriate performance indicators which support operational decision-making. Selecting FCA as a SPMS can reverse this overemphasis on external reporting, because the dominant reason of adopting FCA is to inform decision-making (Bebbington, Gray, Hibbitt, & Kirk, 2001). FCA allows companies to make comparisons between the externalities created by different options. Abdalla et al. (2014) state there is a need to investigate how sustainability practices relate to MCS dimensions. In response to this development, several researchers have stressed the need for more case-based research (Adams & Larrinaga-Gonzalez, 2007; Gond, Grubnic, Herzig, & Moon, 2012).
Contrafatto and Burns (2013) conduct an in-depth case study of an Italian multinational organisation and examine the relationship between organisational change and SEAR practices. The authors state an OIE theoretical approach poses a good starting point of interpretative case studies.

"We certainly recommend more similar case studies of real organisations in the future." (Contrafatto & Burns, 2013)

In the investigation of environmental issues, case studies are relevant especially where there is insufficient knowledge on a subject (Rodrigue, Magnan, & Boulianne, 2013). In particular, Maas et al. (2016) highlight the need for research to examine how to strategically integrate internal systems to

become true transition leaders towards sustainability. The authors highlight the need for case-based research in the integration of the concepts of sustainability assessment and management accounting and control:

> *"This Special Volume describes aspects of integrating these concepts by using conceptual approaches, case studies, and/or qualitative analysis."* (Maas, Schaltegger, & Crutzen, 2016)

Bebbington & Larrinaga (2014) highlight the need for accounting to play a more prominent role in advancing the 'science for sustainability' such that demands for sustainable development knowledge[2] are acted upon. A sustainability science infused conception of FCA can provide an understanding how sustainable development can be operationalized at an entity level (Spangenberg, 2011; Bebbington & Larrinaga, 2014). Therefore, adopting a processual view on the implementation of FCA in particular may provide useful insights into successfully integrating sustainability into traditional business activities. In turn, accounting may advance the 'science for sustainability'.

The theoretical contribution of this paper is to fill the gap in empirical SPMS literature by using an in-depth case study applying Burns & Scapens' (2000) framework of management accounting change for describing the processual and dynamic aspects of the implementation of FCA. This paper aims to gain insights on the integration of FCA within regular MCSs by adopting a sustainability science approach to the management accounting change process. The nature of sustainability science invites transdisciplinary approaches to the research process. Hence, this invites the amalgamation of various theoretical perspectives being OIE (Burns & Scapens, 2000), socio-technical processes (Trist, 1981), Laughlin's (1991) framework of environmental disturbances and Simon's (1995) framework of Levers of Control (LOC).

The findings related to the processual catalysts in the implementation phase of FCA are important to practice. Academia and praxis have started the joint-development of FCA solutions. FCA research has spread with variants emerging such as the Sustainability Assessment Model (Xing, Horner, El-Haram, & Bebbington, 2009; Fraser, 2012) and the True Value methodology (KPMG, 2014). Growing regulations and external stakeholder pressures are increasingly driving the internalization of business externalities (KPMG, 2014). The insights from this study will lead to a better understanding of the internal and external disturbances during the introduction of FCA and how organizations can institutionalize sustainability. This sustainability case for business is of significance to the world

[2] Knowledge appropriate for decision-making

governments who have signed the universal agreement to curb carbon emissions at the COP21 (European Commission, 2015). This sustainability case implies acknowledging the way towards a sustainable future requires balancing the trade-offs of social, environmental and financial performance rather than applying a win-win rhetoric. The future policies surrounding the implementation of the COP21 will benefit from the insights, for this study explains how to most effectively utilize internal and external pressures to create an organization-wide sustainability mind-set.

1.4 Methodology

In this research a conceptual model is built based on several theories. The processual aspects of change include intra-organizational and extra-organizational factors. Burns & Scapens' (2000) and Gond et al.'s (2012) frameworks will be used to investigate the former. Burns & Scapens (2000) provide an institutional perspective of management accounting change and focus on the intra-organizational *processes* over time. This framework is complemented by Gond et al's (2012) theory of the integration of sustainability in MCSs. As will be further described in the following chapter, technical, organizational and cognitive dimensions of integrations relate to Burns and Scapens' (2000) institutional framework during the enacting and reproduction of rules and routines. Gond et al. (2012) use Simons' (1995) framework to specify modes of SCSs and MCSs integration. Thus, this approach is used in this conceptual model too to provide a nuanced understanding of how rules and routines can become institutionalized over time. The extra-organizational factors are investigated by using Laughlin's (1991) framework.

This conceptual model was tested using a multiple-case study methodology of four cases. In order to predict similar results two cases applying a True Value methodology for FCA were selected (Yin, 2014). Two cases which applied a People, Planet & Profit version of FCA were selected in order to predict contrasting results. In-depth interviews were held with the key people involved in the FCA initiatives. Data was gathered by means of interviews and will be complemented by other sources of information.

1.5 Outline of the Paper

This paper consists of five chapters. The Introduction is followed by the second chapter which discusses the theoretical framework. Chapter 3 describes the methodology used in this study. This is followed by the findings and discussion (Chapter 4) and the conclusion (Chapter 5).

The theoretical framework consists of three sections. The first section is introduced by an initial framework which describes the broad relationships between the concepts used in this study. The first section compromises the literature overview in which three parent literature streams are

discussed being management accounting change, SCSs and sustainability science. This first section is concluded by a preliminary framework. The second section reviews the empirical literature on the factors laid out by the preliminary framework. The last section of this chapter presents the conceptual model which presents the theoretical ideal situation of integration of FCA within MCSs.

The methodology is discussed in Chapter 3. The case study methodology is justified and a rigorous procedure is described which enables the validity and reliability of this study. In order to have polar cases, two cases are selected which monetize sustainability impacts (True Value) and two FCA cases are selected based on their People, Planet & Profit-conception of sustainability.

Chapter 4 present the findings of the case studies in a cross-case analysis. The discussion section of this chapter evaluates this data based on the conceptual model described in Chapter 2. Two additional themes unfolded from the in-depth analysis of the implementation of FCA.

The last chapter concludes and summarizes the paper. An answer to the research question is provided and theoretical and practical implications are mentioned. Lastly, limitations and directions for future research are provided.

Chapter 2 Theoretical Framework

2.1 Introduction

The second chapter introduces three literature streams and the theory behind this paper. The theoretical framework consists of three main sections. These sections are introduced by an initial framework which gives a broad introduction to the relationships between the concepts used in this research.

The first section presents the literature overview in which the background of the literature is presented. The first part introduces change with specific emphasis on the processual aspects of management accounting change. The second part introduces the strand of research 'accounting for sustainable development' with a focus on FCA, sustainability science and integration. A preliminary framework and a brief summary conclude the first section.

The second section reviews the empirical literature. This part refines the preliminary framework by examining the results of previous studies into management accounting change. The framework is categorized according to the three different dimensions[3] of integration proposed by Gond et al. (2012) and environmental disturbances according to Laughlin's (1991) framework. The section is concluded by a brief summary.

The third and final section of this chapter discusses to the conceptual model which portrays an ideal situation in which the introduction of FCA leads to a sustainability mind-set in an organisation. This final framework combines the insights from the literature overview and empirical review. A conclusion is presented at the end of the chapter.

2.1.1 Initial Framework

Management accounting change is at the heart of this paper's theoretical framework. This research revolves around how new systems become embedded in in the organisation. Therefore, processual aspects of change are studied. Several models have been developed to describe these aspects (Pettigrew, 1985; Waggoner, Neely, & Kennerley, 1999; Dawson, 2005; Burns & Scapens, 2000). There are two dominant perspectives which seek to describe the intra-organizational and extra-organizational factors which affect change in management accounting. These are the processual-contextual perspective and institutionalism. The processual-contextual perspective provides a holistic view of change. This perspective analyses change in its historical context by understanding the organisational culture (Dawson, 2014). Institutionalism portrays change as a path-dependent process (Burns & Scapens, 2000). Thus, changes in management accounting practices are framed

[3] Technical, Organisational and Cognitive Integration (Gond, Grubnic, Herzig, & Moon, 2012)

according to previously adopted mindsets. These mindsets are subject to change. However, this happens in the long run as previous institutions slowly get replaced by new institutions. The institutional framework further unfolds into two dominant perspectives: OIE and New Institutional Sociology. OIE deals with the intra-organizational effects on accounting practices, so deals with change processes within the organisation (Siti-Nabiha & Scapens, 2005; Burns & Scapens, 2000). New Institutional Sociology discusses the institutions in the organisational environment and extra-organizational factors which affect organisational systems (Hoque, 2002). This starkly contrasts OIE, because this perspective is concerned with institutions which shape the individuals' actions (Scapens, 2006).

The introduction of a change in management accounting, more specifically a change in the SCS, covers several phases: the design, implementation and evolution phase (Searcy, 2012). The processes of change can be examined in either the implementation or the evolution phase. Innovation and control must be balanced subsequent to the change in SCS by balancing different levers of control (Vaassen, Meuwissen, & Schelleman, 2009). Simons' (1995) LOC framework is used to study the enabling and constraining effects of these levers. Enabling levers are the belief system (core values) and the interactive system (forward-looking management involvement), whereas the constraining levers are the boundary system (behavioural constraints) and diagnostic control system (monitoring) (Widener, 2007; Simons, 1995).

It is expected that the integration of SCS within MCSs depend on several processual factors, intra- and extra-organizational aspects, to balance innovation and control. Sustainability science will be used as an approach to combine several frameworks which provide insights into how changes in management accounting become embedded into organisations.

2.2 Literature Overview

The parent disciplines of this research are management accounting change, SCSs and sustainability science. Firstly, a processual view of management accounting change is discussed. The institutional approach to studying the processual aspects of change is stressed. In particular, the framework of Burns and Scapens (2000) lays the foundation of the conceptual model developed in the third section of this chapter. Secondly, SCSs are examined. Emphasis is given on FCA as a specific and promising application of a SPMS. Lastly, the final parent discipline is sustainability science. Its interdisciplinary nature is used to unite FCA and the institutional framework of management accounting change.

2.2.1 Change

In organizations today, change is complex and occurs at a rapid pace (Struckman & Yammarino, 2003). Todnem (2005) indicates there is a consensus that change, triggered by either internal or external factors, affects all organisations in all industries. An organization needs to implement the required changes in order to move to where it needs to be in the future. Increasing globalisation, technology improvements and increasing interest in sustainability and social responsibility calls for organizational change (Benn, Dunphy, & Griffiths, 2014; Todnem, 2005; Struckman & Yammarino, 2003). Scapens (2006) highlights the need for studies of organisational change to go inside the organisation and study how management accounting practices are shaped. By doing so, a fuller understanding of inter-related factors can be reached.

2.2.1.1 Change in Management Accounting

Around the turn of the century many broad changes have taken place, implying a need for management accounting to change also (Burns & Vaivio, 2001). The business environment had become global and technology driven, increasing the information requirements of business managers. Advanced management accounting techniques, such as the Balanced Scorecard (BSC), were developed to provide managers the information that they demanded.

Hopwood (1987) called for further research in accounting change. He claimed very little is known about accounting change, highlighting the importance of research areas such as accounting change drivers, processes and organisational consequences. Researchers have addressed this gap in the literature. Innes and Mitchell (1990) developed a general model describing the process of change in management accounting. The originating factors of the process of change are allocated to three different categories based on the nature and timing of their influence on change: facilitators, motivators and catalysts. Facilitators are factors necessary to management accounting change, but are, by themselves, not sufficient for change to occur. The second set of factors influence the observed changes in a general sense, such as production technology and the competitiveness of the market. Catalysts are directly associated with changes. The timing of the change corresponds closely to the occurrence of these factors. An example is the arrival of a new accountant. The interaction of all three types of factors promotes management accounting change to occur.

This model was extended by Cobb et al. (1995) by emphasizing two other factors being the role of leaders in change and the expectation of continuing change which is referred to as momentum. Together with the three categories described in Innes and Mitchell (1990) these factors are collectively defined as advancing forces of change. Cobb et al. (1995) also introduce factors which hinder or prevent change labelling these factors as barriers. However, the change model was limited because only a general category of barriers existed. Therefore, Kasurinen (2002) divided the barriers

into three sub-categories: Confusers, frustrators and delayers. Confusers are factors which seem to 'disrupt' the change attempt, whereas frustrators seem to 'suppress' it. The last group of barriers, delayers, are temporary and 'technical' by nature.

2.2.1.2 Change in Performance Measurement Systems

As an organization's business environment is changing, organizations require a process to ensure that measurement systems are reviewed and modified (Kennerley & Neely, 2002). Performance measurement is crucial in focusing people on certain aspects of an organization (Waggoner, Neely, & Kennerley, 1999). Waggoner et al. (1999) refer to a 'what gets measured gets done'-mentality. Organizations have the tendency to focus on the aspects which are measured leaving the other aspects considered as less important. By the 1980s, there was a realization in performance measurement literature that financial measures could not be the sole criteria to assess performance (Kennerley & Neely, 2002). Financial measures failed to reflect the complexity of organizations and the markets in which they operated. Kennerley & Neely (2002) assume change is continuous and hence, they state Performance Measurement Systems (PMSs) should be dynamic and change over time to remain relevant. Change in PMSs has been studied by using the model of Kasurinen (2002). Munir et al. (2013) use this model, in combination with institutional theory, as a theoretical lens to understand PMS change in an emerging economy bank. This approach is justified by following a reasoning which is similar to Kennerley & Neely's (2002). PMSs become redundant if they are not able to adapt to changes in their institutional environment (Munir, Baird, & Perera, 2013). The institutional factors were reviewed according to their ability to facilitate, motivate or provide the catalyst for change.

These studies use a process model of implementation of PMS-change and assume that implementation of a change constitutes more than the selection of a perceived 'technically optimal' system (Perego, 2005). This brings us to the next section of studying processual aspects of change.

2.2.1.3 Processual aspects of change

Processual aspects of change is a topic which is rooted in studies focusing on intra- and extra-organizational factors affecting change in management accounting and PMSs (Perego, 2005). The landmark work of Pettigrew (1985) provided insights into how change, process and structure are inextricably linked. The interaction between internal contextual variables[4] and external variables that bring about change is examined. Pettigrew (1985) shows how strategic change is a continuous process often emerging from deep-seated political and cultural roots that. Hence, strategic change

[4] Culture, history and political process (Pettigrew, 1985)

processes are best understood in context. Examples of contextual factors constraining change include the absence of leadership and lack of vision.

Dawson (2005) builds upon this foundational work by dividing the intra- and extra-organizational factors into three groups of determinants that shape the process of change, being the politics, substance and context of change. From this perspective, change processes are assessed within their historical and organisational context. To illustrate, Dawson (2005) discusses the politics of change occur within and outside an organization during the change process. External political activity can be in the form of competitor alliances and government pressures. An example of political activity within an organization is negotiations between managerial and operative personnel. The context of change goes deeper into the historical context by incorporating both an understanding of organizational culture and an historical perspective. However, Siti-Nabiha & Scapens (2005) argue this processual-contextual perspective merely identifies a general approach. A theoretical framework is needed to investigate why there is resistance to change, or how new systems become embedded in the organisation (Siti-Nabiha & Scapens, 2005). The latter question is particularly important to this research.

The theoretical framework of Burns and Scapens (2000) will be used to address this question. This framework draws mainly from OIE and has similarities with the processual-contextual perspective. OIE is particularly useful in the present context and suited for studies of institutional change, for it focuses on organisational routines and their institutionalization. The framework has similarities with the processual-contextual perspective, because a holistic, *processual* and historical approach is used.

2.2.1.3.1 The Institutional Framework

The framework which will be used in this research to address processual aspects of change comes from the seminal work by Burns & Scapens (2000). An institutional approach focuses on intra-organisational *processes* over time (Contrafatto & Burns, 2013). Burns & Scapens (2000) framework is based on OIE hence; organisations are conceptualized as compromising a myriad of rules and routines. These rules and routines, in turn, bring cohesion to organisational practice.

2.2.1.3.1.1 The nature of rules and routines in OIE

Rules can be recognized as the way 'things should be done', whereas routines resemble the way 'things are actually done' (Burns & Scapens, 2000). Similarly, rules can be seen as formalized processes[5], whereas routines are the processes habitually in use (Siti-Nabiha & Scapens, 2005; Burns & Scapens, 2000). During the process of routinization, the formalized rules may be altered provided that it is a mutually acceptable way of implementing the rules. To illustrate, the rules of a new

[5] An example would be a set of procedures such as a budgeting manual (Burns & Scapens, 2000)

budgeting procedure may be modified either deliberately or unconciously due to resistance or a misunderstanding of the rules respectively. Even though alterations may occur, the rules will be reproduced over time and through their implementation, routines will emerge. However, the reversed process may also occur. Routines may have emerged, whereas rules have not been explicitly formulated. Hence, to prevent knowledge from being lost, the routines may be formalized in a manual of procedures in order to train new staff. Burns & Scapens (2000) indicate rules are changed at discrete intervals. Routines can be regarded to be in the *cumulative* process of change, because they are continually reproduced. Management accounting practices can be viewed as organisational routines (Siti-Nabiha & Scapens, 2005). These practices can become institutionalized as they are reproduced over time. The following sections will go into this institutionalization process.

2.2.1.3.1.2 Institutionalization process

The interaction between rules and routines can become institutionalized over time (Contrafatto & Burns, 2013). Institutionalization is generally understood as the outcome of a process and the process itself by which behaviour becomes desirable and taken-for-granted (Larrinaga-Gonzalez, 2007). The section above showed that rules and routines were grounded in their historical circumstances. Burns & Scapens (2000) argue institutions are disconnected from the historical context and only exist in the actors' understanding, expressing institutions as 'the way things are'. An institution is defined as "*the shared taken-for-granted assumptions which identify categories of human actors and their appropriate activities and relationships*" (Burns & Scapens, 2000). Taken-for-granted assumptions shape the actions of individual agents, while, simultaneously, these assumptions are themselves outcomes of social actions. Hence, simultaneously, institutions are socially constructed. This relationship between actions and institutions can be illustrated by an analogy. The relationship between speech and language behaves in a similar way. Speech follows language, because the underlying structure of language has to be understood for effective communication (Marschan-Piekkari, Welch, & Welch, 1999). Similarly, language follows speech, for language changes over time through the speech acts of its users. Likewise, institutions are the outcome of behaviours of its users (Burns & Scapens, 2000).

However, a management accounting change does not happen in an extra-organisational void (Perego, 2005; Siti-Nabiha & Scapens, 2005). This brings us to the next section which elaborates on extra-organisational factors.

2.2.1.3.2 Extra-Organizational Factors

Studying external influences can contribute to an understanding of the processual aspects of change (Perego, 2005). Laughlin's (1991) framework has been in adopted in several studies to account for extra-organizational factors (Perego, 2005; Contrafatto & Burns, 2013; Bouten & Hoozee, 2013).

More recent work has applied processual change frameworks to SEAR (Contrafatto & Burns, 2013; Bouten & Hoozee, 2013). Contrafatto & Burns (2013) draw insights from the Burns and Scapens (2000) and combine it with Laughlin's (1991) framework. Bouten & Hoozee (2013) use the latter framework to understand the change process towards organizational greening. The authors investigate the interplay between environmental management accounting practices and environmental reporting. The following sub-section will briefly discuss the key aspects of Laughlin's (1991) framework.

2.2.1.3.2.1 Environmental Disturbances and Organisational Change

Laughlin (1991) states the pathway or process of some form of initial 'jolt' must be traced to comprehend organizational change. The processual dynamic of organisational change are be explored by conceptualizing these dynamics in relation to an environmental disturbance or 'jolt' (Laughlin, 1991). Organisations are assumed to be in a state of equilibrium, until they are disturbed. Organisations are made up of a set of interpretive schemes, design archetypes and sub-systems. The organisation will remain mostly stable until an internal or external jolt disturbs the equilibrium and change is needed to restore the balance of interpretive schemes, design archetypes and sub-systems.

Laughlin (1991) describes the pathways an environmental disturbance may take through an organisation. Change is understood as being of a morphostastic (first order) or a morphogenesis (second order) nature. First order changes involve 'making things *look* different while fundamentally remaining as they have always been' (Laughlin, 1991). This type of change does not penetrate to the beliefs, values and norms of an organisation, but merely changes the organizational structure. Hence, first order change does not penetrate interpretive schemes, but merely changes its design archetypes. Second order changes consist of changes which permeate the 'genetic code' of an organisation. Hence, this type of change does affect interpretive schemes. The disturbance affects the real heart of the organisation. Thus, this characteristic distinguishes first from second order changes. The nature of first order changes reflects a transition rather than a transformation.

Accounting is recognized to play a role in bringing about change to re-establish stability (Contrafatto & Burns, 2013). Recently, SEAR studies have adopted processual change models such as Laughlin's (1991)'s framework (Bouten & Hoozee, 2013; Contrafatto & Burns, 2013). Sustainability issues have acquired a more salient role in a firm's strategic planning, bringing about a growing importance of management accounting. The folllowing section will discuss this introduction of sustainability issues in accounting.

2.2.2 Accounting and Sustainable Development

Sustainable development is a debated topic in which complexity and uncertainty are the norm (Bebbington, Brown, & Frame, 2007). The concept of sustainable development has evolved over time (Vries, 2013). It was first introduced in the 1970s with reference to an environmental target state. It combines the ideas of a situation that can be continued and a process that is growing in complexity, while simultaneously maturing towards 'natural' fulfilment. In the 1990s social scientists brought in their own concepts and theories, for they believed social and economic criteria should be included as well. Clarifying the concept of sustainable development has proven difficult (Lamberton, 2000). There is no universally accepted definition. De Vries & Peterson (2009) state hundreds of definitions have been given to the notion of sustainable development since the 1970s. Multiple of these examples are described in the book 'Sustainability Science' (Vries, 2013). Sustainable development is now viewed as the unifying theme that is being used to motivate and integrate social, economic and environmental concerns (Unerman, Bebbington, & O'Dwyer, 2007; Bebbington, 2009; Lamberton, 2000). However, literature has had problems defining a singular point of sustainable development (Bebbington & Larrinaga, 2014). This has resulted in a focus on seeking to move away from being unsustainable and in no articulation of the differences in terms such as sustainable development, sustainability and organizational sustainability (Unerman & Chapman, 2014; Peattie & Peattie, 2009; Gray & Bebbington, 2000; Lamberton, 2000). Therefore in this paper, the definitions used by Bebbington & Larrinaga (2014) will be used. Sustainable development is regarded as the overarching concept under which research and praxis takes place. Sustainability is the endpoint of achieving sustainable development and organisational sustainability indicates the actions firms undertake which are in accordance with sustainable development.

Accounting is connected to the challenges of sustainable development. Detailed information about organisational sustainability is crucial in order to get a truly sustainable economy (Unerman, Bebbington, & O'Dwyer, 2007). Accounting can provide this information and help to move our society to a sustainable economy. In the 1980s, the Brundtland Report created a stimulus for a new research area to emerge from social accounting: environmental accounting (UNWCED, 1987). This new field of research was strongly influenced by the economics and science of sustainable development. The report highlighted the need to integrate the environment and economics in decision making. Within environmental accounting, many attempts have been made to account for sustainable development (Bebbington & Larrinaga, 2014).

There are three strands of literature among the diverse range of sustainability accounting. The first strand seeks to correlate social and environmental reporting and social, environmental and economic performance. An implicit assumption of this research is that elements of sustainability can

be addressed by the market mechanism (Unerman & Chapman, 2014). The second strand of literature starkly contrasts the first which believes that social and environmental unsustainability is caused by the market mechanism. Externalities are not taken up in the market model and thus, represent a market failure (Rosen & Gayer, 2014). The second strand believes the way to a sustainable society is to radically reform or overthrow the market system (Unerman & Chapman, 2014). The third strand of literature seeks to identify sustainability risks and opportunities by critically engaging with firms and make changes to have more sustainable operations. The motivation for this approach is to defer the time by which we reach the tipping point of the climate system in order to develop novel techniques to curb the impending catastrophic impacts of climate change, rather than waiting for radical reform to happen in the case of a major social or environmental external shock. This last strand of research is referred to as 'accounting for sustainable development' and is the focus of this paper.

There has been a growth in the critiques on how accounting for sustainable development might advance (Gray, 2010). Gray (2010) articulated whether sustainability may have an empirical meaning at the level of organisation by examining the meanings and contradictions in sustainable development. Two complex issues arise. Firstly, any simple assessment of the relationship between a single entity and planetary sustainability is deemed impossible, because the relationships and interrelationships are too complex. Secondly, 'sustainability' does not have a tangible meaning at the level of organisation, because sustainability is at least a system-based concept at a planetary or species level. Hence, sustainability is a notion which is filled with potential contradiction.

To overcome this complexity, fruitful avenues for advancing accounting for sustainable development have been identified. Accounting has sought to engage with sustainable development through Sustainability Control Systems (SCSs) (Gond, Grubnic, Herzig, & Moon, 2012; Bebbington & Larrinaga, 2014). SCSs will be discussed in the following sub-section.

2.2.2.1 Sustainability Control Systems

Gond et al. (2012) coined the term SCSs describing these as systems being derived from accounting control systems. There is a growing stream of research on SCS, focusing on eco-control (Henri & Journeault, 2010; DeSimone & Popoff, 1997), the Sustainability Balanced Scorecard (Figge, Hahn, Schaltegger, & Wagner, 2002; Moeller & Schaltegger, 2005) and FCA (Bebbington, Brown, & Frame, 2007; Frame & Cavanagh, 2009; Bebbington, Gray, Hibbitt, & Kirk, 2001). This paper will focus on the hybrid measurement system FCA.

2.2.2.1.1 Full Cost Accounting

There is an increasing understanding that firms need to address sustainability (Searcy, 2012). A broader PMS was needed to address issues relevant to sustainability. A wide range of approaches have been used to address sustainability. Monitoring the progress of these approaches has become more widespread (Searcy, 2011). Therefore, a SPMS was developed to implement sustainability at the corporate level (Searcy, 2011; Searcy, 2012). FCA is a specific application of a SPMS.

The Fifth Action Programme of the European Commission (1993) provided the incentive for the accounting profession to develop FCA. Market prices can be corrected by taking into account the use of environmental resources in the full cost of production. Such a system is more likely to deliver sustainable development. FCA can potentially provide a radical tool to transform the current economic context in which our society operates (Kirk, Hibbitt, Gray, & Bebbington, 2001). Kirk et al. (2001) describes FCA as a system in which current accounting and economic numbers are allowed to incorporate all costs and benefits from social and environmental externalities to 'get the prices right'. Hence, the concept of external effect and costs underlies this system (Antheaume, 2007).

2.2.2.1.1.1 External Cost

The principles of external effect and cost originate from neoclassical economic theory (Antheaume, 2007). There is external cost when an external effect influences an economic agent in terms of benefits and costs while taking place outside the market mechanism (Rosen & Gayer, 2014). On the one hand, remedying external effects can be done by imposing green taxes, inspired by the Pigouvian school (1920). On the other hand, emission trading systems can be set up, taking a Coasian approach (1960). The two different schools share the need for a monetary evaluation to ensure the full cost of goods and services are accounted for by economic agents. Hence, there is an internalization of externalities (Antheaume, 2007). The idea of giving a monetary value to certain 'non-market' goods such as human life has been opposed in the literature (Gray, 2010). However, FCA does provide the foundation for addressing the interlinkages between sustainable development issues and an entity, because external costs are central to its approach (Bebbington & Larrinaga, 2014).

2.2.2.1.1.2 Monetization

Research attempts at FCA surged around the 1990s, because environmental threats such as global warming received public attention (Antheaume, 2007). As a result, a Sustainability Assessment Model (SAM) has been developed in the United Kingdom by BP, Genesis Oil and Gas Consultants and Jan Bebbington using a FCA approach (Frame & Cavanagh, 2009). This particular model was designed to include monetization of the costs of externalities arising from social, environmental and economic impacts. Under FCA one can monetise externalities hence, bringing about the problem of making all

elements of the natural world part of the economic world (Unerman, Bebbington, & O'Dwyer, 2007). This nullifies the argument that the environment should be valued for aesthetic and moral reasons and not solely for economic reasons. This way, the social, environmental and economic dimensions are reduced to only one monetary dimension and a ranking is forced upon user of FCA information. Monetizing sustainability impacts is not always appropriate hence, because of moral obligations organisations can decide not to monetize in taking sustainability impacts into account (Bebbington & Larrinaga, 2014). In recognizing this issue, Antheaume (2007) redirects attention to successful implementation of monetizing externalities. He mentions external cost evaluation methods only reveal existing choices by making them more explicit. In turn, more informed decisions can be made. Antheaume (2007) states experimenting with external cost evaluation methods is better than discarding them. Despite inheriting the limitations of cost-benefit analysis, FCA shows potential (Bebbington & Larrinaga, 2014). Bebbington & Larrinaga (2014) argue the inherent contestability of a FCA exercise should not be perceived as a limitation, but as a reality with which any account must work. This leads to the discussion of sustainability science.

2.2.2.2 Sustainability Science

Sustainability science is concerned with the understanding of nature-society interactions (Bebbington & Larrinaga, 2014). This requires an understanding of the particular systems involved as well as the interactions that occur at the interaction of the systems. Sustainability science uses an interdisciplinary approach to problem analysis. The approach moves away from the trend of knowledge production towards generalizability and focuses on particular settings hence, creating a nuanced perspective of the problem. Sustainability science is exploratory in nature and suitable for the sustainable development problem set, because for this topic the 'right' answer cannot be found with a specific set of models constrained to a specific discipline.

2.2.2.2.1 Motifs of Sustainability Science

Kates et al. (2001) are most commonly credited with coining the term. There are various motifs that are typical for a sustainability science approach. These motifs are that sustainability science takes a problem-focused approach which is also participatory in nature, recognises the normative and politically infused nature of sustainable development and is interdisciplinary.

The first motive is that sustainability science has a problem-drive nature (Quental, Lourenco, & Silva, 2011). Problems arise from complex interactions between systems, so in line with this belief, this focus is necessary (Bebbington & Larrinaga, 2014). It is assumed that problems are driven by particular convergence of factors in *particular* settings. Hence, the questions addressed by sustainability science are particular in exuction while being fundamental in nature (Kates, et al.,

2001). In turn, this focus on the particular will allow for a more nuanced view of individuals' experience of the particular problem.

Sustainability science tends to be more participatory in nature than traditional science (Vries, 2013). Thus, this second motive relates to the understanding required to assess the robustness of knowledge created (Spangenberg, 2011) One should seek to gather insights from those who are directly affected in a particular context to better comprehend complex problems.

The third motif of sustainability science is that there is a recognition that action is likely to precede full understanding (Kates, et al., 2001). As described in the first part of this section, this corresponds with the approach 'accounting for sustainable development' takes (Unerman & Chapman, 2014).

The last motif is related to its domain of concern. Sustainability science is inherently an interdisciplinary activity (Kates, et al., 2001; Vries & Petersen, 2009). While sustainability science is not yet an autonomous field or discipline, the aim is to create a coherent interdisciplinary system of research planning and practice which fosters collaboration in research among disciplines (Jerneck, et al., 2011). Sustainability science has mainly been approached from natural and engineering sciences (Vries, 2013). However, the literature recognizes global sustainability challenges can only be addressed by equal efforts from other disciplines (Jerneck, et al., 2011; Vries, Sustainability Science, 2013). Accounting has yet to make a significant contribution to sustainability. The following sub-section will discuss the prospects of such a contribution to sustainability science.

2.2.2.2.2 Accounting and Sustainability Science

Bebbington & Larrinaga (2014) acknowledge academia and praxis have been unable to make robust accounts of organisational sustainability. Simultaneously, society is facing real challenges in social, economic and environmental terms. Current attempts to account for sustainability have drawn too closely on accounting and not adequately on sustainable development thinking. Therefore, Bebbington & Larrinaga (2014) try to reinvigorate accounting for sustainable development by conceptually exploring possible uses of sustainability science for accounting, and vice versa.

2.2.2.2.2.1 Full Cost Accounting

Sustainability science can be applied to FCA. A direct link between sustainability science literature and FCA was established by the seminal work of Functowicz and Ravetz (1994). The authors focused on ecological valuation by attempting to establish ecological economics as an effective post-normal science. Sustainability science is considered post-normal science, because of its openness, high uncertainty, interdisciplinarity and problem-driven nature (Quental, Lourenco, & Silva, 2011). Spangenberg (2011) states sustainability science adresses the "understanding of complex dynamics

arising from interactions between human and environmental systems". Bebbington & Larrinaga (2014) state FCA can shed light on this and more specifically, on the SPMSs of organisations.

Kates et al. (2001) provide core questions sustainability science has to address. One of these is highlighted for the purpose of this paper being:

*"How can today's operational systems for monitoring and reporting on environmental and social conditions be **integrated** or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?"*

This brings us to the following section which discusses the possibility of such integration between FCA and MCSs.

2.2.2.3 Integration

SCSs can contribute to the integration of sustainability within strategy when they inform MCSs (Gond, Grubnic, Herzig, & Moon, 2012). Gond et al. (2012) theorized the relationship between SCSs and MCSs and their co-influence on strategy-making. Central to their argument stands the uses and integration of MCSs and SCSs. The former is based on Simon's (1995) levers of control (LOC) framework. The latter is approached as a thick 'socio-technical' process.

2.2.2.3.1 Levers of Control

Gond et al.'s (2012) framework draws from Simon's (1995) LOC to distinguish two possible uses for SCSs and MCSs. These are a diagnostic and interactive use. Diagnostic control systems are tools that contribute to the realization of the firm's strategies (Gond, Grubnic, Herzig, & Moon, 2012). Interactive control systems provide input into the formation of strategy. The purpose of the latter is to stimulate dialogue between senior managers and their subordinates and direct attention to strategic uncertainties (Simons, Levers of Control, How Managers Use Innovative Control Systems to Drive Strategic Renewal, 1995). This way, new ways of strategically responding to a changing environment can be found. Similar to Gond et al. (2012), the focus of this paper is on two levers of control within the LOC framework. The reasoning of this focus is that diagnostic and interactive controls are used analyse configurations of MCSs and allows for theorizing the integration of sustainability into strategy.

2.2.2.3.2 Socio-technical Process: Dimensions of Integration

Integration can be conceptualized as a socio-technical process (Gond, Grubnic, Herzig, & Moon, 2012). It is a thick interface which includes technical, organisational and cognitive dimensions (Trist & Bamforth, 1951; Fox, 1995).

The first dimension of integration is technical integration. Single practices of sustainability control need to be considered within a MCS (Gond, Grubnic, Herzig, & Moon, 2012). There is potential for methodological integration of SCS within MCS. Therfore, the degree of technical integration is dependent on the relative strength of the methodological ties between the two systems. Gond et al. (2012) describe an example of a high amount of integration would be present when there is common calculability infrastructure to gather information for the systems. A state of no integration is present when SCSs are run in parrallel to MCSs.

The second dimension is organisational integration. These organizational dimensions point to agent's practices in relation to both control systems. Central to this dimension is that integrating sustainability into management control is something one *does*, rather than merely something one *has.* Gond et al. (2012) illustrate this with an example of 'community of practice' in which managers and accountants use different systems, but share a common set of practices across the organisation.

The last dimension is cognitive integration in which SCSs are viewed as communication platforms facilitating interaction among people who may have different perceptions of sustainability. The aim is to ultimately reach a shared perception of reality (Levine & Moreland, 1991).

The three dimensions can coexist and compensate for each other (Gond, Grubnic, Herzig, & Moon, 2012). More specifically, this means a lack of technical integration can be compensate for by collective cognition or shared practices.

2.2.3 Preliminary Framework

Burns & Scapens (2000) framework is combined with Laughlin's (1991) framework to better understand the processual and contextual issues that affect sustainability integration in MCSs. Figure 1 portrays this relationship. It is expected that the intra-organizational factors will be more influential than extra-organizational factors in later stages of integration (Perego, 2005).

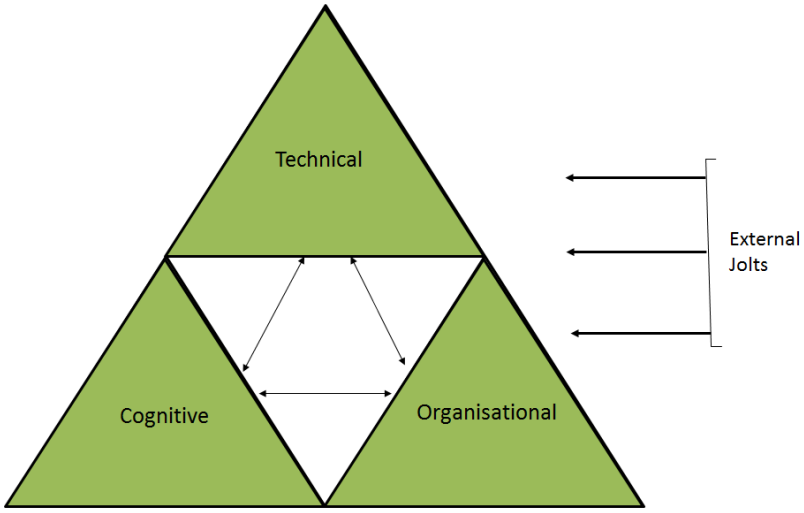


***Figure 1**. Preliminary Framework.*

Following Burns & Scapens (2000), it is expected FCA is first infused in the organisation as rules and over time may become a routine. Antheaume (2007) states FCA may eventually become an institution. The first insights from FCA experiments showed that it helped change several taken-for-granted ways of doing business (Antheaume, 2007). The main catalysts of FCA should be examined due to their direct association with change (Kasurinen, 2002). Main catalysts of the processual aspects of change can arise from both intra- and extra-organizational factors. Different frameworks should be used to capture these different types of factors. Therefore, a sustainability science infused perspective on FCA allows the osmosis of Burns & Scapens' (2000) and Laughlin's (1991) framework. The former capturing intra-organizational factors and the latter providing insights into extra-organizational factors. The triangle in figure 1 describes the enacting and reproduction of rules and routines hence, represents the intra-organizational factors (Burns & Scapens, 2000). It represents a reliagnment of FCA within existing rules and routines and hence, depicts the integration of sustainability within MCSs. It will be referred to as the realigment triangle. The dimensions of integration capture the critical success factors needed for this integration (Gond, Grubnic, Herzig, & Moon, 2012). The external jolts in the figure capture the extra-organizational factors (Laughlin, 1991).

Studying FCA using Burns & Scapens (2000) framework would bring insights into the role FCA can play in accounting for sustainable development. This approach seeks to explain that integrating sustainability into management control is something one *does* (Gond, Grubnic, Herzig, & Moon, 2012). This organisational dimension, described by Gond et al. (2012), is interrelated with the technical and cognitive dimensions of integrating SCSs within MCSs. The interrelationships among these dimensions can be seen in the realignment triangle of figure 1. Simon's (1995) LOC framework will be used to study the use of SCSs and MCSs: diagnostic vs. interactive. Interactive use of MCSs and SCSs is perceived to be the most ideal for integration purposes (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). Thus, the realignment triangle will represent a high degree of integration when MCSs and SCSs are used interactively.

The degree of integration depends on the three categories of integration in the socio-economic process. These integration dimensions are intertwined with processual aspects and hence, behavioural and contextual variables should be studied (Perego, 2005). Contextual variables will be studied by using Laughlin's (1991) framework. This framework will help identify external factors. Following an environmental disturbance first order or second order change can be expected.

2.2.4 Summary of Literature Overview

Processual aspects of change are rooted in research into the intra- and extra-organizational factors of management accounting change. Burns & Scapens (2000) developed a conceptual framework which explains how new systems become embedded in the organisation. The framework takes an institutional approach to change, focusing on intra-organizational processes. The theory by Burns & Scapens (2000) conceptualizes management accounting change as change in rules and routines. Hence, it is conceptualized as a process rather than an outcome. During the reproduction of rules and routines, these can become institutionalized.

These processes do not happen disconnected from external pressures (Perego, 2005). Thus, extra-organizational factors are examined using Laughlin's (1991) framework of environmental disturbances. Environmental 'jolts' can lead to first order or second order changes within the organisation. FCA constitutes a management accounting change rooted in external stakeholder pressures due to its relationship with sustainable development. FCA is seen as a promising application of SPMS which could make the concept of sustainability operational (Spangenberg, 2011).

In order for FCA to become institutionalized or for second order changes to emerge, FCA should be integrated into MCSs by means of a socio-technical process (Gond, Grubnic, Herzig, & Moon, 2012). The empirical findings on these dimensions of integration will be discussed in the next sub-section.

2.3 Empirical Literature review

The second part of the theoretical framework reviews the empirical literature.

Several researchers have called for more focus on the integration of sustainability issues into organizational processes and systems (Cresti, 2009; Maas, Schaltegger, & Crutzen, 2016; Durden, 2008; Gond, Grubnic, Herzig, & Moon, 2012). Researchers have recently attempted to fill this gap with empirical studies (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Garcia, Cintra, Torres, & Lima, 2016; Battaglia, Passeti, Bianchi, & Frey, 2016). The findings will be categorized into the technical, organisational and cognitive dimensions proposed by Gond et al. (2012). The empirical results relating to Laughlin's (1991) environmental disturbances will be discussed after the findings on the socio-technical process.

2.3.1 Technical Integration

Gond et al. (2012) first describe the existence of a barrier hindering the integration of SCSs in MCSs. George et al. (2016) extend this concept to include their counterpart, 'enablers', enhancing the integration. The authors conduct a qualitative single case study to investigate the role of control systems in supporting the integration of sustainability within strategy. A holistic overview of performance is created by using a Performance *Management* Framework and New Institutional Sociology. This latter theory was used to understand the effect of institutional pressures on management control. By using a longitudinal research design, the authors study the evolution of integration over time. They find several technical barriers and enablers for four different configurations: dormant decoupled strategy, compliance driven strategy, peripheral sustainability integration and movement towards better integration. Four categories were discerned in the literature being deployment, systems in place, systematic process and signalling.

2.3.1.1 Deployment

George et al. (2016) mention one of the technical barriers being that the measurement and evaluation of sustainability was limited to certain departments. Hence, not the entire organization was engaged with sustainability measurement and evaluation, because a lack of organization-wide deployment. Garcia et al. (2016) find similar results relating to technical enablers, stating engagement with sustainability planning and control promotes the integration of sustainability into strategy. Garcia et al. (2016) build a multi-criteria decision aid model to find a single balanced performance measure for sustainability. The authors find the model potentially supports the integration of SCSs[6] with traditional MCSs. Battaglia et al. (2016) conduct an eight-year case study studying the development and use of SCSs in a large Italian food co-operative. The company adopted

[6] Specifically, Sustainability Performance Measures and Sustainability reporting

Global Reporting Initiative guidelines to transform their social report into a sustainability report. Setting up the sustainability report was crucial in effectively promoting sustainability within the organizational strategy (Battaglia, Passeti, Bianchi, & Frey, 2016). Similarly, during the compliance driven strategy, George et al. (2016) find the establishment of Health, Safety and Environment department and its integration throughout the entire supply chain to be a technical enabler. This department set up a structured management system alongside health and safety policies. These procedures were communicated to all suppliers, allowing for the implementation of technical enablers along the supply chain. However, Arjalies & Mundy (2013) find conflicting results to George et al. (2016) showing that although the establishment of a central Corporate Social Responsibility (CSR) department provides a central focus for the development and implementation of CSR strategy, it can be a technical barrier. The authors conduct a survey study on the role of MCSs in managing the strategic processes underlying CSR by using data from France's largest listed companies[7]. They find that the presence of the CSR department impedes a direct information flow between junior and senior managers, while simultaneously diluting the CSR responsibilities of other departments for these activities. This resulted in CSR activities not being uniformly managed and deployed across different entities with the large, complex organizations. Therefore, Arjalies & Mundy (2013) implicitly advocate the use of decentralized CSR responsibilities across the organization. However, theory states managers may not comprehend the goals and strategies, nor how they can contribute to them (Anthony, Govindarajan, Hartmann, Kraus, & Nillson, 2014). They might not automatically agree with the goals developed, or have the resources to act with them. Therefore, in the case of CSR, or sustainability in general, this may lead to enhanced organization-wide myopia. The vision of top management must firstly become institutionalized through 'rules' developed by the CSR department before it is decommissioned, because rules and routines require a long time to be reproduced in order for institutionalization to occur (Burns & Scapens, 2000). Adequate rules will not dilute responsibilities of other departments, because they define what *should* be done and hence, responsibilities are known.

2.3.1.2 Systems in Place

Garcia et al. (2016) mention the availability of data in information systems is a critical success factor for technical integration. A lack of data concerning sustainability issues can be attributed to the technical barrier of inadequate information systems for data collection (Battaglia, Passeti, Bianchi, & Frey, 2016). Despite introducing several types of SCSs[8], Battaglia et al. (2016) find formal monitoring systems for monitoring the consumption of energy resources were lacking. Similarly, George et al.

[7] The CAC 40
[8] Sustainability report, sustainability annual plan and participatory social plan

(2016) show during the first stage[9] of integration MCSs were not fully developed. Thus, there was a technical barrier during the dormant decoupled strategy. However, this barrier was overcome when moving to high integration of control systems: peripheral sustainability integration. Therefore, already having adequate systems in place enhances technical integration (Garcia, Cintra, Torres, & Lima, 2016).

2.3.1.3 Systematic Process

Having no systematic process is a technical barrier (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). George at al. (2016) findings show several technical barriers related to systematic processes including no systematic performance evaluation process, separate planning in departments and the organization's headquarters and an unsystematic calculation of monetary impacts. Battaglia et al. (2016) find that the impact calculation process can be a technical enabler when companies already have experience with sustainability indicators.

2.3.1.4 Signalling

The introduction of new SCSs gives the opportunity to promote sustainability initiatives (Battaglia, Passeti, Bianchi, & Frey, 2016). Positive signals can be given to stakeholders by communicating the actions top management has chosen within a sustainability annual plan. Battaglia et al. (2016) mention this plan assessed social, environmental and economic impacts of the planned initiatives. Qualitative information regarding these initiatives was promoted in the organization's balance sheet and mandatory social report. George et al. (2016) found signaling minimal commitment to sustainability issues by providing minimal information in sustainability reports to be detrimental to technical integration.

2.3.2 Organizational Integration

The literature on the integration of SCSs within MCSs has studied organizational integration and has found barriers and enablers corresponding to this dimension. Three categories were distinguished: collaboration, communication and top management support.

2.3.2.1 Collaboration

Battaglia et al. (2016) provided an example of an organizational barrier being weak collaboration across work roles. In 2009[10] the CSR manager of the co-operative promoted a change to the development and use of tools and processes to enhance the structure of their SCSs. Consequently, a change in their reporting guidelines was made, transforming their social report into a sustainability report. This change improved collaboration, resulting in the organizational barrier. Hence, this illustrates the overlap of the technical and organizational dimension (Gond, Grubnic, Herzig, &

[9] Configuration A (Gond, Grubnic, Herzig, & Moon, 2012)
[10] The case study was conducted from 2006-2014

Moon, 2012). A lack of collaboration was compensated for by the deployment of the sustainability report. Giovannoni & Maraghini (2013) conduct a case study of an medium sized garment company in Italy and find similar results. The sustainability champion[11], in this case the founder, made a direct change to improve collaboration. An inter-departmental workgroup was set up increasing social interaction amongst various experts. In turn, the process of social interaction improved organizational and cognitive integration. Collaboration was improved and knowledge was integrated on various aspects of the business. George et al. (2016) found establishing working groups fosters greater intra-organizational collaboration. The working groups were central to providing sustainability education to employees. However, these groups were limited to personnel working with key people involved in analyzing sustainability data and certain Health, Safety and Environmental personnel. The exclusion of finance personnel in these workgroups resulted in limited communication which the next sub-section will elaborate on.

2.3.2.2 Communication

Cross-departmental communication is required to ensure effective information flows (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). As discussed in the previous section, the working groups excluded certain departments leading to organizational silos (Herzig, Viere, Burritt, & Schaltegger, 2006). George et al. (2016) state interaction should be stimulated between key sustainability and finance personnel to support greater organizational integration. Likewise, Battaglia et al.'s (2016) results show difficulties of communication between middle managers and operational personnel surrounding sustainability projects should be overcome to foster greater integration of SCSs and MCSs.

2.3.2.3 Top management support

Garcia et al. (2016) show top management commitment can contribute to the successful integration of SCSs. However, Battaglia et al. (2016) show this is not a sufficient condition for integration stating:

"The strong commitment of some of the top managers and of the president cannot guarantee the effectiveness and the stability of the integration process" (Battaglia, Passeti, Bianchi, & Frey, 2016)

Similarly, George et al. (2016) mention the potential positive effect of appointing sustainability champions in subsidiaries is reduced when they are not adequately trained in sustainability. However, George et al. (2016) do recognize top management commitment is an organizational enabler. Thus, it is expected top management support is an organizational enabler. It may be a necessary, but not a sufficient condition for integration.

[11] A sustainability champion is the leader of change in the organisation. This person leads change to transform the organisation in a more sustainable organisation by making links between the organisations social, environmental and economic purpose (Schaefer, 2004).

2.3.3 Cognitive Integration

Two categories were found for cognitive integration being myopia and vision.

2.3.3.1 Myopia

External jolts can influence sustainability integration. Battaglia et al. (2016) illustrated the ongoing negative economic results since the financial crisis in 2008 resulted in myopia by finance managers as a means of financial recovery. However, this behaviour pursued even in the 2012-2014 period. The resistance against incorporating sustainability performance measures into their organization was also recognized by George et al. (2016). In this case study there was a lack of cooperation and communication between finance and sustainability personnel. Hence, this illustrates the interconnection between the organizational and cognitive dimension. The finance managers were not involved in training sustainability personnel in calculating financial impacts. So, various sustainability impacts were not measured. Thus, a lack of cooperation and communication resulted in resistance and myopia of finance managers.

2.3.3.2 Vision

Battaglia et al. (2016) refer to the vision of the company's President as a cognitive enabler. Similarly, George et al. (2016) state a change in the mind-set of top management regarding the significance of sustainability leads to increased support. Ultimately, this results in a clearly formulated vision of sustainability which enables focus on economic and national social development throughout the organization. The role of the company's president in providing the momentum of change was found to be a major catalyst of change in the case study by Munir et al. (2013). Using Kasurinen's (2002) accounting change model the major catalysts of change were identified in an emerging economy bank. The appointment of a new president led to a focus on efficiency and effectiveness while also focusing on accountability. This vision entailed the need to change the PMS of the bank in order to improve and hence, the president played the role as 'leader of change' in overcoming resistance to change. The appointment of a new president may be considered as a strong internal jolt (Bouten & Hoozee, On the interplay between environmental reporting and management accounting change, 2013). Giovannoni & Maraghini (2013) find conflicting evidence indicating the founder's vision did not improve the integrated nature of PMSs. In the longitudinal case study of an Italian firm the founder would intervene to manage the challenges that would occur during the PMS development process. Direct intervention would occur when the integrated nature of PMSs were compromised by performance measures not being in line with the strategy or not reflecting all the relevant measures of organizational performance inspired by the founder's vision. One problem was that targets were inconsistent with each other and thus, the founder's direct intervention acted as an alternative integrating mechanism. However, it did not improve the integrated nature of PMSs and left the

targets inconsistent with each other. Hence, Giovannoni & Maraghini's (2013) results show the president's vision had no effect on cognitive integration of the PMS, but substituted the PMS when necessary as an alternative integrating mechanism. The monitoring of the founder is a form of diagnostic control (Simons, 1995) leaving the PMS incomplete, for inconsistencies among the targets were not resolved (Giovannoni & Maraghini, 2013). Giovannoni & Maraghini (2013) provided useful insights into the role of the president's vision in Gond et al.'s (2012) cognitive dimension. When the president facilitates integration through direct monitoring, this precludes an exchange of knowledge in an organization. The main aim of this exchange is to redefine cognitive boundaries (Gond, Grubnic, Herzig, & Moon, 2012). In this regard, the implementation of the president's vision may inhibit the exchange of knowledge and be a cognitive barrier if direct monitoring is used. Hence, the president's vision is expected to be a cognitive enabler (Battaglia, Passeti, Bianchi, & Frey, 2016; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Munir, Baird, & Perera, 2013) conditional on the implementation of the president's vision.

2.3.4 Environmental Disturbances

Research has empirically investigated external jolts which Laughlin's (1991) framework describes. The focus of these papers can generally be categorized as the effect of external stakeholders on the socio-technical process. Tension can be found in the literature in regards to the effect environmental disturbances have on Gond et al.'s (2012) dimensions of integration. The tension will be addressed in this sub-section.

Pondeville et al. (2013) study the role of strategic and contextual factors in the development of environmental management control systems (EMCSs) in Belgian manufacturing companies. The authors surveyed 256 different companies on their perceived stakeholder pressures. Stakeholders were divided into four groups being organizational, market, community and regulatory stakeholders. The first are regarded as the internal stakeholders and the latter three as external stakeholders. The results show external stakeholders have no impact on organizational and cognitive integration. More specifically, the authors find no significant association between community and regulatory stakeholders' influence and the development of EMCSs. Market stakeholder's influence is found to influence technical integration. Pondeville et al. (2013) show market stakeholders' pressures are significantly[12] related to the development of formal EMCSs, but not informal EMCSs. The former relating to technical integration dimensions such as integration of EPIs in rewarding systems and the latter to organizational and cognitive dimensions such as top management commitment and cross-departmental collaboration respectively. Regulatory stakeholder pressures only influence the supply

[12] At an alpha of 5%

of information (Pondeville, Swaen, & Ronge, 2013). More specifically, Pondeville et al. (2013) mention regulatory pressures only induce companies to collect information rather than influence the degree of corporate environmental proactivity once the companies are already proactive. Contrary to this result, evidence for environmental jolts is found by researchers (Bouten & Hoozee, 2013; Rodrigue, Magnan, & Boulianne, 2013; Villiers, Rouse, & Kerr, 2016; Arjalies & Mundy, 2013). Bouten & Hoozee (2013) find evidence for strong environmental jolts. The authors conduct a case study on four Belgian companies examining the interplay between environmental reporting and environmental management accounting practices by using Laughlin's (1991) framework. The results indicate all four case companies responded to environmental disturbances either directly or indirectly through the subscription to an environmental management system. The external pressures arise from environmental legistlation, consumer behaviour and/or public opion, hence, following Pondeville et al.'s (2013) classifaction, from regulatory, market and community pressures respectively. Bouten & Hoozee's (2013) indepth study finds a nuanced explanation for Pondeville et al.'s (2013) result. The magnitude of the environmental kick may not be strong enough and hence, companies may respond to it for conventional business reasons such as increased legitimacy and savings (Bouten & Hoozee, 2013). Thus, companies may not develop a EMCS due to the kick alone. Similarly, Rodrigue et al. (2013) find environmental impact is of paramount significance to its industry peers, for negative environmental externalities can damage the industry's reputation. Rodrigue et al. (2013) adopt a case study approach to examine stakeholders' influence on environmental strategy and EPI. The authors find the strong benmarking influence of the industry peers[13] suggesting firms implement a formal EMCS on the basis of stakeholder requirements. However, Bouten & Hoozee (2013) add the magnitude of the environmental disturbance may be strong enough to enhance top management's personal concerns about the environment. In a similar vein, Villiers et al. (2016) study the sustainability integration in the balanced scorecard in a large industrial in New Zealand using a single case study methodology. The authors find stakeholder engagement by means of sustainability reporting ensures the integration of sustainability in the BSC such that sustainability becomes a normal part of manager focus and of management discussions Hence, besides technical integration being affected by market stakeholders as Pondeville et al. (2013) indicate, the organisational dimension of the socio-technical process is also affected by external stakeholder pressures (Bouten & Hoozee, 2013; Villiers, Rouse, & Kerr, 2016). Similarly, Rodrigue et al. (2013) state changes in organisational practices are possible by taking external stakeholder influences into account. Arjalies & Mundy (2013) find similar evidence of changes in organisational practices. Even those companies who engage in CSR motivated by legitimacy reasons

[13] In combination with relatively strong pressures from social stakeholders such as governments and communities

or compliance purposes experience changes in organisational practices (Arjalies & Mundy, 2013). Contrary to Pondeville et al.'s (2013) findings, a nuanced view of external stakeholder influence has been found (Arjalies & Mundy, 2013; Bouten & Hoozee, 2013; Rodrigue, Magnan, & Boulianne, 2013). External jolts are mainly found to infuence Gond et al.'s (2012) technical and organisational integration dimensions.

2.3.5 Summary of Empirical Review

The common themes of the technical dimension in the socio-technical process can be grouped under deployment, systems in place, systematic process and signalling. The authors discuss several barriers and enablers to technical integration of organisational sustainability within MCSs. Most notably, there is tension surrounding the role of setting up a separate sustainability department. CSR responsibilities were argued to be diluted for other departments. However, it is argue that formalized rules create clear responsibilities for these departments (Burns & Scapens, 2000) and hence, creating a separate sustainability department is seen as a technical enabler.

Organisational integration can be separated into three themes being collaboration, communication and top management commitment. In particular, it was found that top management commitment constitutes a necessary but not sufficient condition for the integration of sustainability within MCSs (Battaglia, Passeti, Bianchi, & Frey, 2016; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016).

Myopia and vision were discerned as two common themes among cognitive integration. The former category showed the interconnectedness between the organizational and cognitive dimension. Results showed a lack of collaboration and communication could lead to myopia (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Battaglia, Passeti, Bianchi, & Frey, 2016). There was tension in the empirical results of the latter category. The president's vision was seen as a cognitive enabler (Munir, Baird, & Perera, 2013) or as a barrier (Giovannoni & Maraghini, 2013). However, it was argued given a situation in which monitoring is not used to implement the president's vision, it constitutes a cognitive enabler.

Empirical literature provided conflicting results on environmental disturbances (Pondeville, Swaen, & Ronge, 2013; Bouten & Hoozee, 2013; Villiers, Rouse, & Kerr, 2016). A nuanced view of external stakeholder influences was found. Furthermore, external jolts were found to influence technical and organisational integration. Table 1 summarizes the findings of the empirical literature review. The next section will combine these insights with the preliminary framework of the previous section.

Table 1 - Summary Empirical Findings

Authors	Findings
(Arjalies & Mundy, 2013)	**Intra-organizational factors:** The authors gathered data from the CAC40 by using a survey on the how MCSs are leveraged to trigger organizational change and support the sustainability agenda. The authors find the establishment of a central CSR department can be a technical barrier. **Extra-organizational factors:** Other findings relate to environmental disturbances being companies who respond to external stakeholder pressures for compliancy and legitimacy purposes do experience changes in their organisational practices. Thus, providing a nuanced view of external stakeholder influence.
(Bouten & Hoozee, 2013)	**Extra-organizational factors:** In this paper a multiple case study was performed. Results show the appointment of a new president can be a strong internal disturbance leading to cognitive integration. Furthermore, the authors find the companies resulted to environmental jolts by developing a EMCS. However, the kick might not be strong enough to induce companies to implement a EMCS. Indirect effects of the environmental disturbance may play a role in developing such a system. Top management concern about environmental issues is shown to be enhanced and through cognitive integration affecting the adoption of an EMCS.
(Giovannoni & Maraghini, 2013)	**Intra-organizational factors:** A case study was performed in which findings point towards the cognitive and organisational benefits of the sustainability champion. An inter-departmental workgroup enhanced the socialization process and improved collaboration. The authors find that the president's vision may pose a cognitive *barrier* if the president decides to implement his vision by *monitoring* progress.
(Munir, Baird, & Perera, 2013)	**Intra-organizational factors:** Multiple data sources covering a period of ten-years were used to study a PMS change in an emerging economy bank. Results show the appointment of a new president was a major catalyst of change.
(Pondeville, Swaen, & Ronge, 2013)	**Extra-organizational factors:** A survey on the role strategic and contextual factors in the development of a EMCS showed no external stakeholder pressures led to this development. Market stakeholder pressures contributed to the development of a formal EMCS, but not informal EMCS pointing towards the presence of weak environmental jolts.
(Rodrigue, Magnan, & Boulianne, 2013)	**Extra-organizational factors:** The authors' case study finds external stakeholders influence the development of a formal EMCS. Environmental impact is of major importance to industry peers, because it may damage industry reputation.
(Battaglia, Passeti, Bianchi, & Frey, 2016)	**Intra-organizational factors:** The longitudinal case study investigates the development and use of a SCS. The authors find technical, organisational and cognitive barriers and enablers. Most notably, the authors find that top management commitment is a necessary but not a sufficient condition for cognitive integration.
(Garcia, Cintra, Torres, & Lima, 2016)	**Intra-organizational factors:** In this study a model is developed which may aid the integration of SPMSs within MCSs. The authors find several examples of technical enablers with the availability of information systems being a critical success factor.
(George, Siti-Nabiha, Jalaludin, & Abdalla, 2016)	**Intra-organizational factors:** The authors find evidence for technical, organisational and cognitive barriers and enablers in their case study. In particular, the establishment of a Health, Safety & Environment department was seen as a technical enabler, contrasting the results of Arjalies & Mundy (2013).
(Villiers, Rouse, & Kerr, 2016)	**Extra-organizational factors:** A single case methodology is used to study the integration of sustainability in the BSC. The results indicate the external stakeholder pressures affect the organisational dimension of the socio-technical process as the case showed sustainability became a normal part of manager focus and discussions.

2.4 Conceptual Model

In this section the theoretical insights from Gond et al. (2012) related to the socio-technical process of integration of SCSs within MCSs will be combined with Burns & Scapens' (2000) framework of the institutionalization process and Laughlin's (1991) framework of environmental disturbances. The combination of theories will lead to a better understanding of the processual and contextual issues that affect sustainability integration in MCSs.

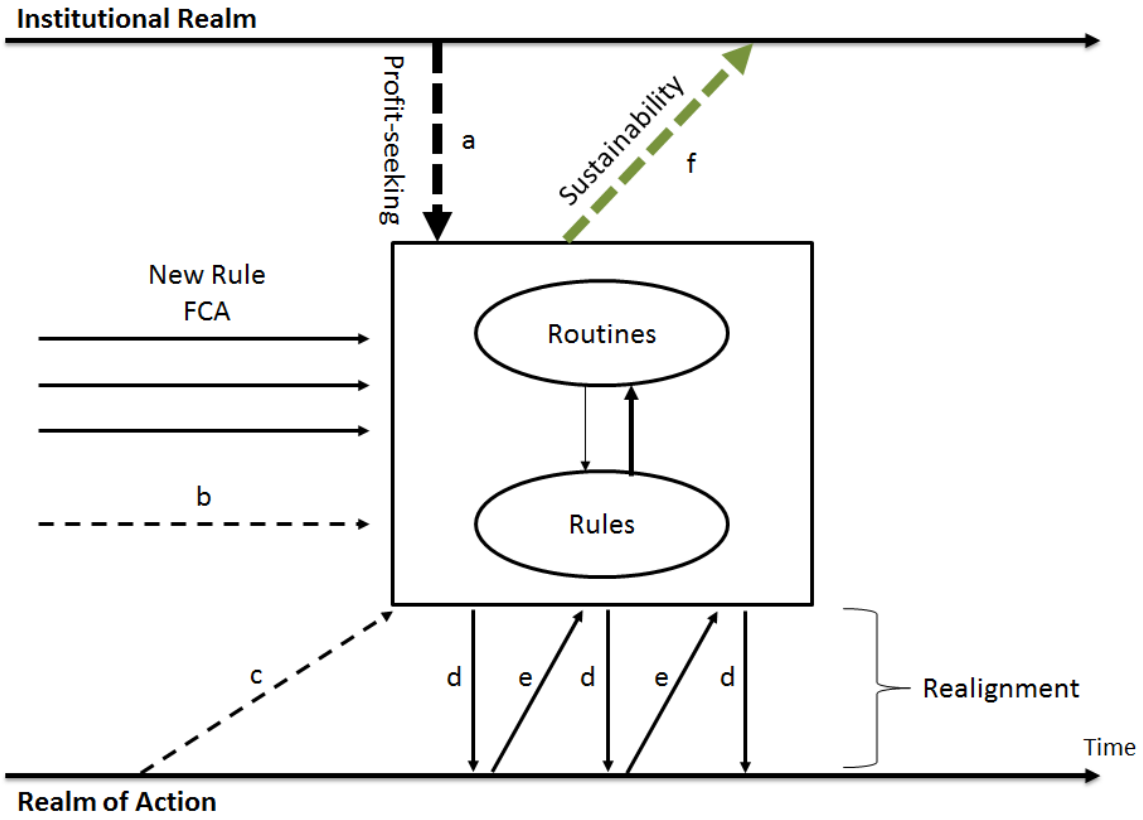
2.4.1 The Process of Institutionalization

Management accounting systems and their corresponding practices constitute stable rules and routines (Burns & Scapens, 2000). It is recognized that these can change. Burns & Scapens (2000) indicate in studying management accounting change, one is studying organizational routines. The authors are mainly concerned with change within individual organizations and hence, adopt an intra-organizational view of the processes of change. Management accounting is regarded an institution in itself which starkly contrasts New Institutional Sociology which focuses on the effects of extra-organizational institutions on accounting practices. Management accounting is understood as a routine which can potentially become institutionalized due to its reproduction over time.

In this framework, the introduction of FCA in an organization is conceived as the introduction of a new rule, for FCA is a formalized process or tool which seeks to internalize externalities (Antheaume, 2007). FCA has highlighted to have the potential to make sustainability operational (Bebbington & Larrinaga, 2014). The sustainability-accounting practices Bebbington & Larrinaga (2014) propose are rooted in the need to develop a profound understanding of the sustainability programmatic. Hence, there is a need for a 'sustainability case' for business as opposed to the desire for the business case for sustainability (Thomson, 2015). However, the way to a sustainable future does not stop at the design of FCA practices, because these become part of the institutionalization process. New rules are influenced by the institutional realm (Burns & Scapens, 2000). The introduction of FCA is path-dependent, in that the implementation process is shaped by existing routines and institutions. Bebbington et al. (2001) have highlighted FCA's radical nature. FCA fundamentally challenges the prevailing profit-seeking institution[14] as well as the idea of the 'triple bottom line'. Elkington (1997) coined the term Triple Bottom Line (TBL) and promoted the idea that businesses can manage, measure and report on its environmental, social and economic impacts. Thus, as a result, businesses have interpreted the overlap of these three dimensions as sustainability (3M, 2012; Smith, 2010). However, Milne et al. (2013) argue the TBL is an insufficient condition for sustainability and it

[14] Profit-seeking is used here to represent Frank and Cartwright's (2013) notion of opportunity cost. It reflects the attempts made to ensure scarce resources are used efficiently. Thus, it is not restricted to business profit, but can also reflect the institution of striving towards cost-efficiency.

portrays a form of change-but-no-change rhetoric. Similarly, Gray (2010) mentions sustainability is a social and ecological concept which rarely coincides with organisational boundaries. A sustainability science infused FCA conception can create a robust account of organizational sustainability (Bebbington & Larrinaga, 2014). Trade-offs between the sustainability dimensions can arise and hence, profit-seeking behavior is not always aligned with the sustainability programmatic. For sustainability institutions to emerge sustainability-infused organizational practices must be reproduced over time and, despite their radical nature, they are path-dependent (Burns & Scapens, 2000). Burns & Scapens (2000) state the process is path-dependent even though specific changes in management accounting can be quite revolutionary. Hence, due to the path-dependency, FCA will be influenced by the profit-seeking institution, existing rules and routines and by the reproduction of previous routines. These influences are illustrated in figure 2 by the arrow a, arrow b and arrow c respectively.



Key: a = profit-seeking institution
b = existing rules and routines
c = reproduction previous routines
d = enacting
e = reproduction
f = sustainability institution

Figure 2. *Introduction Full Cost Accounting in the process of institutionalization.*

Change processes in the institutional realm take longer periods of time as opposed to the realm of action (Burns & Scapens, 2000). The former realm is more abstract than the latter. Actions are observable, whereas institutions are disassociated from their historical context as taken-for-granted assumptions in the understandings of the individuals and group. These realms are represented by the solid arrows at the top and bottom of figure 2. The arrows are solid, because they represent cumulative processes of change through time and are ongoing (Burns & Scapens, 2000). Arrow a represents the first process which encodes the institutional principle of profit-seeking into rules and routines. Thus, the profit-seeking institution will shape the whole process of FCA's introduction as a formal procedure, because institutions always exist prior to the attempt of agents to introduce change (Bhaskar, 2014). Following, Burns & Scapens (2000) this paper recognizes rules and routines are also in a cumulative process of change. Hence, the initial encoding of figure 2 is by no means the starting point of the ongoing process. However, figure 2 does represent the introduction of a new rule: FCA. The box contains the rules and routines which interact, for routines can emerge from rules which are reproduced over time as well as the reversed process to formalize tacit knowledge (Burns & Scapens, 2000). In this paper, the former process is regarded the most significant, as the first step towards a sustainability institution requires FCA to turn into a routine. Routines are placed closer to the institutional realm, because they are perceived to be more abstract than rules. Arrow d represents the agents enacting FCA and the existing routines which embody the profit-seeking institution. The process of enactment is generally the result of applying tacit knowledge about how things are done (Burns & Scapens, 2000). Therefore, this illustrates the link with the socio-technical process. How things are done depends largely on collective cognition and shared practices (Gond, Grubnic, Herzig, & Moon, 2012). It is expected the enactment of FCA may be subject to resistance, because its introduction challenges the profit-seeking institution. Arrow e illustrates the manner in which routines are reproduced by repeated behaviour. The routines are reproduced in the same form or in a changed way (Burns & Scapens, 2000). This change happens either consciously in which the existing rules and routines are collectively questioned or unconsciously in which agents do not fully comprehend the rules and routines. Therefore, the repeated process of arrows d and e incorporates the possibility of existing routines being reproduced in a different way in order to include the FCA routine. As described above, FCA procedures must firstly be transformed into a routine. FCA will have been enacted (arrow d) by this point. The repeated process of enacting and reproduction of routines allows for existing routine being reproduced in a different way in order to include the FCA routine (arrow e at one point in time). Thus, the introduction of FCA leads to a process of realignment between enacting and reproducing existing rules and routines and FCA rules and routines. The degree of how FCA will be realigned within the organization depends on external

and internal processual factors (Perego, 2005). However, Burns & Scapens' (2000) perspective of processes of change is limited to an intra-organizational one. Following Contrafatto & Burns' (2013) reasoning, the Burns & Scapens (2000) and Laughlin (1991) framework are seen as complementary. Laughlin's framework is more known to SEAR research (sources). Similar to the purpose of Burns & Scapens' (2000) framework, it can be used to study intra-organizational change. The OIE perspective from Burns & Scapens' (2000) framework accounts for the processual dimension of this model, providing a useful starting point for SEAR-related interpretive case studies (Contrafatto & Burns, 2013). Laughlin's (1991) framework lacks the cumulative dynamics over time. However, it does provide structure to the model in terms of external developments and broader co-developing changes at the organizational level. Laughlin's (1991) framework is integrated into Burns & Scapens' (2000) which will be discussed in the next sub-section.

2.4.2 Realignment Triangle

Gond et al. (2012) explain the process by which SCSs and MCSs can be integrated is regarded a socio-technical process. During a change process, the technical and social aspects can be found to be interactive (Trist, 1981). The technical and social systems are independent of each other. Yet, they are directly correlated to produce a given goal state. The former system requires the latter to transform inputs into the output. Thus, they are co-producers of the outcome. The socio-technical system is a 'thick' interface encompassing technical, organizational and cognitive dimensions of integration (Gond, Grubnic, Herzig, & Moon, 2012). Following Gond et al. (2012), this paper considers an aggregated level of systems' integration encompassing the three forms of integration. Thus, integration is regarded as having two modes being an overall low or high level of integration. The interaction between the three dimensions determines the degree of overall integration. The creation of a sustainability institution (arrow f, figure 2) is the goal of the sustainability case for business (Thomson, 2015). Achieving this goal depends on the degree of realignment between existing rules and routines and FCA rules and routines until a state of equilibrium (or dynamic stability) (Laughlin, 1991) is reached. Gond et al. (2012) state sustainable development should be something one *does*. As mentioned in the previous sub-section, shared practices and collective cognition (Gond, Grubnic, Herzig, & Moon, 2012) imply 'how things are done' (Burns & Scapens, 2000). Hence, the degree of integration of SCSs within traditional MCSs implies routines. To illustrate, a low degree of integration of FCA within MCSs, FCA will be perceived as an extra procedure. The SCSs are used parallel to the traditional MCSs. Hence, the existing rules and routines would be slightly adjusted to incorporate FCA providing a limited understanding of sustainability. The profit-seeking institution will not change as the reproduction of routines will be mainly dominated by existing rules and routines. The taken-for-granted assumptions in the case of low

integration of FCA will not change into a sustainability institution, but rather a legitimacy and win-win variant (Milne & Gray, 2013). A high degree of integration will result in existing routines being reproduced in a different way incorporating sustainability into regular MCSs. However, empirical literature has indicated technical, organizational and cognitive barriers prevent sustainability integration (Contrafatto & Burns, 2013; Giovannoni & Maraghini, 2013; Battaglia, Passeti, Bianchi, & Frey, 2016; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Garcia, Cintra, Torres, & Lima, 2016). The categories identified in the empirical review section will complement the dimensions of integration which are captured in figure 1. Empirical investigations into the effect of environmental disturbances on the socio-technical process have shown external stakeholder pressures strongly influence technical and organizational integration (Arjalies & Mundy, 2013; Bouten & Hoozee, 2013; Munir, Baird, & Perera, 2013; Rodrigue, Magnan, & Boulianne, 2013). Figure 1 illustrates these integration barriers & enablers. The organization remains for a large part in a state of equilibrium until it is 'disturbed' (Laughlin, 1991). Internal or external disturbances cause a shift in the balance and change begins to restore stability. Stable configurations of sustainable organizational development enhance sustainability performance (Gond, Grubnic, Herzig, & Moon, 2012). Thus, realignment of rules and routines into a stable state will occur at high integration connecting figures 1 and 2.

2.4.3 Control System Usage

Simons' (1995) LOC framework is the framework which is used to connect the realignment process with the institutionalization of sustainability[15]. Figure 3 illustrates this connection and should be seen as the process which is happening in the background of figure 2. It bridges the gap between the realignment process and the potential institutionalization of rules and routines which Burns & Scapens (2000) could not describe.

Simons (1995) investigates how MCSs influence the strategy-making process and discerns between interactive and diagnostic control systems. Interactive control systems are tools that help provide input into the formation of strategy, whereas diagnostic control systems support the achievement of pre-established goals. Thus, opportunities and threats arising within a firm's operating environment are responded to by emergent strategies. Interactive control systems guide and stimulate emergent strategies. Managers' attention is steered towards strategic uncertainties and to learning how to adapt strategies in a changing business climate. Diagnostic control systems are used on a management-by-exception basis to monitor and coordinate the implementation of intended strategies effectively. Simons (1995) mentions these control systems allow maximum autonomy. However, pre-set standards must be developed implying managers know ex ante what types of

[15] Arrow f, figure 2

outputs are desired. Diagnostic control is difficult to implement when dealing with an innovative process. Another condition suggests this type of control is only suitable for organizational processes individuals can influence. Similarly, Perego & Hartmann (2009) conducted a survey of Dutch manufacturing firms on the alignment of PMSs with environmental strategy. The findings indicate this alignment is mostly attributed to the increased sensitivity to managerial actions. This measure captures the influenceability of environmental performance through the individual's action. Hence, strategy and PMSs will be aligned when there is perceived controllability over results. In this case, diagnostic control will be appropriate and the PMS can align the individual's actions with the organization's strategy (Giovannoni & Maraghini, 2013; Simons, 1995). Diagnostic control systems are primarily concerned with checking if 'everything is on track'. In the case of sustainability, diagnostic control systems will be inappropriate, for there has been difficulty in measuring sustainability at the corporate level (Whiteman, Walker, & Perego, 2013; Gray, 2010). There has been a disconnect between corporate sustainability and the decline of Earth systems. Rockstrom et al. (2009) have created a framework which defines planetary boundaries within which humanity can safely operate. In the Netherlands companies have made a first step at aligning business with a resilient planet (OPT, 2016). The One Planet Thinking (2016) methodology attempts to monitor plantery boundaries applied to business. However, these new methodologies have had limited adoption and hence, when dealing with a novel sustainability process it is expected diagnostic control is not appropriate.

Similar to Gond et al. (2012), this paper acknowledges interactive and diagnostic controls are not seperated from the other two levers[16]. However, interactive and diagnostic controls are more amenable to systematic analysis. The authors describe several configurations depending on their level of control systems' integration and the use of control systems. Eight different configurations are described, four of these fall in the category of high integration. As explained in the previous sub-section the realignment process will have a higher probability generating a sustainability institution in the case of high integration of control systems. Interactive control systems stimulate dialogue throughout the organisation (Simons, 1995). There is an inherent link between strategy-formation and interactive control as the dialogue between managers and sub-ordinates stimulates organizational learning and the development of new strategic initiatives (Gond, Grubnic, Herzig, & Moon, 2012). Therefore, Gond et al. (2012) present the most ideal configuration[17] as the high degree of integration as well as interactive use of MCSs and SCSs. Figure 3 illustrates the combined effect of the realignment triangle and the use of control systems on the institutionalization process. Following

[16] Boundary and belief systems (Simons, 1995)
[17] The 'integrated sustainability strategy' (Gond, Grubnic, Herzig, & Moon, 2012)

Gond et al. 's (2012) configurations, eight different strategies can emerge. Gond et al. (2012) describe three different configurations with a high degree of stability in the long-run being compliance-driven strategy, peripheral sustainability integration and integrated sustainability strategy. This high stability will in turn lead to institutionalization (Figure 3 & arrow f, Figure 1).

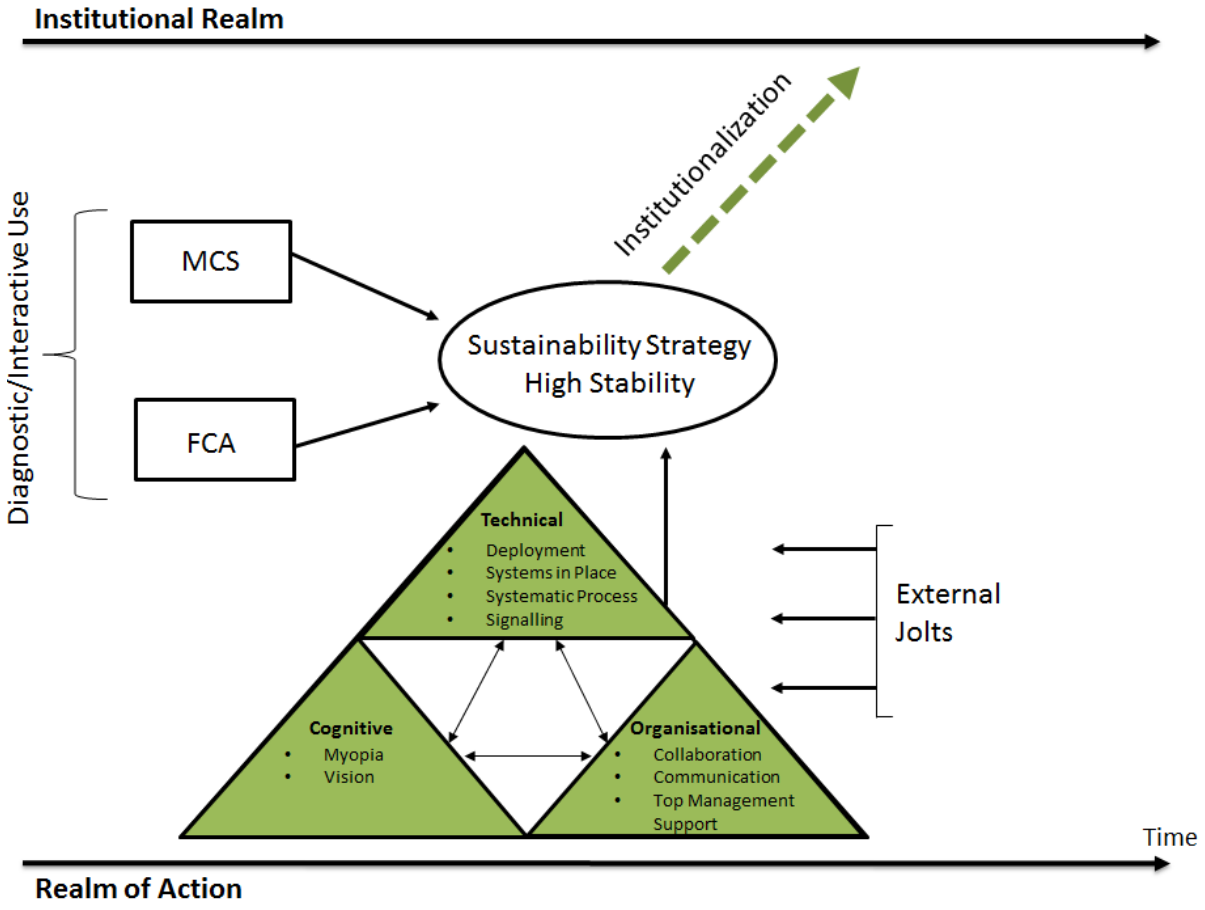


Figure 3. *Coinfluence of Realignment and Control System Usage on Institutionalization.*

2.5 Chapter Conclusion

This chapter has discussed the literature relevant to this study. The chapter was introduced by an initial framework which described the broad relationships between the concepts used in this research. The literature overview provided an overview of the three parent disciplines which are used in this research. Management accounting change, SCSs and sustainability science literature were discussed. A preliminary framework concluded the literature overview and refined the initial framework by focusing on the most relevant relationships. It described the expectations of how processual aspects of management accounting change affect the integration of FCA within MCSs. A review of the empirical literature was given in which common themes were distinguished according to the integration dimensions in the socio-technical process (Gond, Grubnic, Herzig, & Moon, 2012) and environmental disturbances framework (Laughlin, 1991). The findings from the empirical literature review refined the preliminary framework. This refined framework was complemented by Burns & Scapens' (2000) and Simons' (1995) framework creating the conceptual model. The model was based on Burns & Scapens (2000) institutional framework of management accounting change, Laughlin's (1991) framework of environmental disturbances, the socio-technical process (1981) and Simons' (1995) LOC framework and was complemented by the findings from the empirical literature review.

The next chapter discusses the methodology used to answer the research question.

Chapter 3 Methodology

3.1 Introduction

Chapter 2 discussed a preliminary framework arising from the literature overview. This framework was combined with the insights from the empirical literature review. A conceptual model and final framework unfolded from these combined insights. This model will be tested in this study. Specifically, this research aims at providing insights into previous literature's lack of focus on the implementation phase of SPMS. FCA is a very recent application in the Netherlands with methodologies which monetize impacts being designed and applied from 2014 (Bergen, 2015; KPMG, 2014). Given this contemporary management accounting change, a dynamic approach should be taken to study the processual aspects of the introduction of FCA and its integration within MCSs.

The third chapter is divided into five parts in which the research methodology and case selection is justified, followed by the description pre-specified procedures taken to systematically analyse the cases. The final part looks into the ethical considerations which discusses how potential negative consequences for the participants were prevented and avoided.

3.2 Justification for the use of a case study research methodology

The aim of this research is to investigate how processual aspects affect the implementation of FCA and its potential integration in traditional MCSs. 'How' questions are more explanatory in nature, and lead to case studies or field experiments as preferred methodologies (Yin, Case Study Research: Design and Methods, 2014). However, in case studies the investigator has little or no control over the events happening. The case study studies contemporary events and retains the meaningful characteristics complex social phenomena. Traditional concerns against the case study exist, for it is seen as a less desirable form of inquiry than surveys or experiments. Yin (2014) argues this is because case studies often involve a lack of rigor and they provide little basis for scientific generalization. The first concern can be attributed to sloppiness in the followed procedures by the researcher. Therefore, this research attempts to alleviate these concerns by following the systematic procedure laid out by Yin (2014) of conducting case study research, increasing the reliability of the case study. The second concern is mitigated because this case study does not generalize to a population[18], but attempts to expand and generalize the theory[19] developed in the theoretical framework.

Burns & Scapens' (2000) institutional framework share similarities with the processual-contextual perspective, because of its holistic and processual approach. Therefore, a case study is appropriate

[18] Statistical generalization (Yin, Case Study Research: Design and Methods, 2014)
[19] Analytical generalization (Yin, Case Study Research: Design and Methods, 2014)

to study the conceptual model developed in this paper, because a case study attempts to understand a phenomenon in depth within its real-life context (Yin, Case Study Research: Design and Methods, 2014). The boundaries between the context and the phenomenon are not clear. In the case of FCA, the introduction of this particular SPMS represents a management accounting change. Comparative case studies are particularly useful in studying management accounting changes (Yan & Gray, 1994; Ven & Poole, 1990).

3.3 Case Selection

The sampling of cases from the chosen population is unusual, because cases are chosen for theoretical instead of statistical reasons (Eisenhardt, 1989). Eisenhardt (1989) states: "random selection (of cases) is neither necessary, nor even preferable."

Addressing external validity, multiple-case studies should follow a 'replication' design (Yin, Case Study Research: Design and Methods, 2014). Each case must be selected to either predict similar results[20], or predict contrasting results[21] but for anticipatable reasons. Multiple cases are chosen for theoretical reasons such as replication, contrasting polar types and extension of theory (Eisenhardt & Graebner, 2007; Celeski, 2011). Eisenhardt & Graebner (2007) highlight contrasting polar types is of particular significance as a theoretical sampling approach. When extreme cases are sampled, contrasting patterns in the data can more easily be observed.

Multiple case studies typically provide more robust results as opposed to single case studies (Rowley, 2002; Yin, 2014; Eisenhardt, 1989). They augment the external validity, because adding three cases would imply four times the analytical power (Leonard-Barton, 1990; Eisenhardt & Graebner, 2007).

In this study two True Value (KPMG, 2014) approaches to FCA are studied and are contrasted with two other cases which apply FCA, but do not monetize the sustainability impacts. Specifically, the latter cases have developed their SPMS around balancing People, Planet and Profit (TBL[22]). This rhetoric starkly contrasts the first cases which frame balancing the economic, environmental and social impact as inherently having trade-offs. Therefore, the selected cases are polar types in their approach to give a full account of the benefits and costs on society, the environment and the economy.

The cases were selected in close consultation with a Manager and Senior Manager in the field of Advisory and Assurance services for sustainability services in the Netherlands at one of the Big 4

[20] Literal replication
[21] Theoretical replication
[22] Triple Bottom Line

accounting firms. Several informal interviews were held with the managers in June 2016. The informants had a combined experience in the industry of over 15 years. Yin (2014) states such key informants can initiate access to "*corroboratory or contrary sources of evidence*" (Yin, Case Study Research: Design and Methods, 2014). Hence, they are viewed as being of key significance to the success of a case study. Projects most appropriate to the research were selected. Selection criteria included the qualification of one of the extremes (advanced forms of FCA or TBL FCA) and the availability of key personnel working on FCA in their organisation. Advanced forms of FCA were required to conduct monetary valuation of sustainability impacts. Together with the Manager and Senior Manager an overview of the companies which implemented FCA was prepared and distinction was made between TBL FCA and advanced FCA. Examples of the most recent methodologies for advanced FCA include 1) KPMG True Value, 2) Redefining Value: World Business Council for Sustainable Development and 3) Environmental Profit & Loss (KPMG, 2014). Firstly, the companies with advanced FCA were approached and two cases with True Value engagements participated. This methodology recognises the inherent trade-offs related to sustainability and follows an integrated approach. In order to contrast polar types and create a multi-case study based on literal and theoretical replication, other cases were approached based on whether FCA was used to measure the TBL. TBL is expected to represent a change-but-no-change rhethoric (Milne & Gray, 2013). Two organisations, one company and one governmental, responded and were included in the multi-case study. The two cases were included for theoretical reasons following Yin's (2014) replication design. Thus, the TBL FCA cases were selected in consultation with the managers based on whether contrasting results were predicted.

3.4 Data Collection

The main source of data is semi-structure interviews conducted in July, September and November 2016. Other sources of information include documents from the websites of the case companies such as documents on the methodology of the organisation's FCA. The unrecorded interviews with the key informants were also included. The interviewer was employed at the big four accounting company during the time of these interviews with the key informants. However, the interviewer was not affiliated with any of the interviewees of the cases, but informants[23] were asked to contact the key members involved in the FCA initiatives at the cases to ask to participate in this study. If the participants agreed to an interview, their contact information was shared with the researcher. Initial contact was made with the first interviewees at the beginning of June 2016 and the interviews dates can be found in table 2. The sustainability champions (referred to as 'SC' in table 2) in the organisation can also be found in this table. Furthermore, an unrecorded conversation was held over

[23] Who were part of the professional network of the interviewer

the phone with the Sustainability Manager of case D. The special advisor for FCA played a significant role in the design of the True Value approach to FCA in company B & C. The special advisor was also involved during the implementation phase and therefore, was included as an interviewee. The interviews lasted between 1 and 1,5 hours and took place at a place in the Netherlands and date convenient to the interviewee. The interviewees held different positions, but the SCs of the all agreed to participate.

Table 2 - Interview information

Data Source	Case A	Case B	Case C	Case D
Interview 1	Strategic Advisor A (SC) Controller A	Sustainability Manager B (SC)	FCA trainee C (SC)	Manager D
Date & Duration Interview 1	12-07-2016 56 minutes	13-07-2016 49 minutes	20-07-2016 96 minutes	18-07-2016 35 minutes
Interview 2	Manager A (SC)	Special advisor for FCA		CS Manager D[24]
Date & Duration Formal Interview 2	12-09-2016 54 minutes	15-07-2016 86 minutes		01-11-2016 54 minutes
Other	Informal discussions & secondary documentation	Informal discussions & secondary documentation	Informal discussions & secondary documentation	Informal discussions & secondary documentation
Selection Criteria	Perceived as TBL-conception of FCA	Perceived as more advanced FCA	Perceived as more advanced FCA	Perceived as TBL-conception of FCA

The semi-structured interview consisted of open-ended questions, allowing for better communication of field insights. The interviewees were asked about topics concerning the realignment triangle, MCS and FCA usage and other topics integrated within the conceptual model developed in Chapter 2. An excerpt of the interview guide can be found in Appendix A. Furthermore, background information of the cases is provided in Appendix B to facilitate an understanding of the context of the study.

[24] Customer Service Manager D, in Appendix B case description D

3.5 Data Analysis

All interviews were recorded, except for the phone interview with Manager D and the interview with the special advisor as this interview took place in a more informal setting and took a conversational approach. In these cases, Yin (2014) recommends this type of in-depth interviews as the questions put forth seem nonthreatening while simultaneously satisfying the needs of the line of inquiry. Notes were subsequently taken during the interview in order to also transcribe this interview. All interviews were transcribed for analysis on a later date. Case study databases were prepared in *Atlas.ti* for all four cases which included secondary data and notes of informal interviews.

Yin (2014) proposes four general strategies to analyse either single- or multiple-case studies. The first strategy is the most preferred strategy which is also taken in this study being relying on theoretical propositions. Given a general strategy, a specific analytic technique can be chosen to lay the foundation of a high-quality case study. In case of multiple case studies, Yin (2014) proposes cross-case synthesis. Findings in cross-case synthesis are more robust than having only a single case (Yin, 2014). Therefore, to increase the internal validity of multiple case studies, cross case analysis is preferred.

Following Rodrigue et al's (2013) analysis, codes were generated from the interview transcripts using *Atlas.ti* software. These codes were grouped into main categories corresponding to the themes of the conceptual model in Chapter 2. *Atlas.ti* is a tool which can give every quote a certain code and these can be ultimately combined to aid in cross-case analysis. Furthermore, the software will be used code secondary data and the notes of unrecorded interviews. This way, each individual case can be treated as a separate study in which word tables displaying data unfold according to the conceptual framework of chapter 2. These word tables will be examined for cross-case patterns (Yin, 2014).

Firstly, data analysis consisted of screening and analysing the data along the theoretical propositions. Secondly, transcripts of the interviews were read and re-read and coded in *Atlas.ti*. Thirdly, the case data was analysed separately and to allow for analysis beyond the states propositions, was subsequently reduced by means of summarizing and separating common themes. Lastly, interrelations across cases were compared using cross-case analysis, relying on argumentative interpretation to interpret patterns.

3.6 Ethical Considerations

The in-depth interviews are potentially exposed to sensitive information. Especially in the case of sustainable development, stakeholder interests play a significant role and need to be taken into account. Negative consequences for the research participants should be considered and avoided. Hence, ethical issues were considered beforehand.

Several steps were taken to prevent unfavourable consequences for the participants. Firstly, at least one week prior to the interview the participant was contacted to explain the nature of the interview and object of study. Secondly, the individuals of the cases were assigned pseudonyms to promote confidentiality. Lastly, prior to handing in this research, the participants were sent a copy of the interview transcript by email to review their remarks and potentially make changes.

3.7 Chapter Conclusion

This chapter discussed the use of a multiple case study methodology and the selection of the four cases. Data collection and data analysis were described explaining the pre-specified procedures taken to promote a systematic study of the four cases. The next chapter will discuss the cross-case analysis of the cases.

Chapter 4 Findings & Discussion

4.1 Introduction

Chapter 3 discussed the methodology used in this study in order to make a comparison between the cases and the ideal situation portrayed by the conceptual model described in Chapter 2. An evaluation of the processual factors of management accounting change and of control system use is tested through a multiple-case study. This chapter describes and discusses the cross-case findings.

This chapter consists of 3 sections. The first section provides an in-depth analysis of the processual factors surrounding the introduction of FCA. Intra-organizational factors are grouped in three categories: technical, organisational and cognitive integration. The sub-categories of these factors are based on the common themes discovered in the empirical review section of Chapter 2. For technical integration these include deployment, systems in place, systematic process and signalling. The sub-categories for the organisational dimension are collaboration, communication and top management support. For cognitive integration these are vision and myopia. The extra-organizational factors are identified using Laughlin's (1991) framework and categorized according to Pondeville et al.'s (2013) classifications[25] of internal and external stakeholders. Furthermore, an additional theme is introduced in the first section. The second section evaluates the use of control systems. This section also introduces an additional theme uncovered during the in-depth interviews. The findings are summed up and discussed to conclude the chapter.

4.2 Evaluation of Processual Factors of Management Accounting Change

4.2.1 Technical Integration

4.2.1.1 Deployment

The cross-case findings on the factors relating to technical integration are presented in table 3.

Table 3 - Citations about technical integration

Technical Integration	Case A	Case B	Case C	Case D
Deployment	T-barrier: *"All the purifications measure how much energy they use … but this is at best output measurement rather than impact measurement." (Controller A)*	T-enabler*: "We use an integrated approach. Energy-related impacts are handled by our Technology manager, while customer satisfaction is done by Market Insights." (Sustainability Manager B)*	T-enabler*: "For the analysis I gather information on sustainability impact from the different departments" (FCA Expert C)*	T-barrier: *"From 1990 health and safety statistics were conducted … but environmental issues are centrally conducted by the Real Estate unit." (Manager D)*

[25] Internal stakeholder: organizational stakeholders, external stakeholders: market, community and regulatory stakeholders (Pondeville, Swaen, & Ronge, 2013)

Systems in Place	T-barrier: *"for the primary processes a lot of data is available … but non-financial data availability is for some departments very rudimentary " (Controller A)*	T-enabler*: "We even established the model in 2.5 months due to the high quality of our core data." (Sustainability Manager B)*	T-barrier: *"Some parts we did take into account in the model and some we did not. That is because of the availability of data. " (FCA Expert C)*	T-enabler*: "Our people are always provided safety measures and we have statistics on that since 1990." (Manager D)*
Systematic Process	T-barrier: *"There is data, but it is not systematically measured or easily retrievable." (Controller A)*	T-enabler*: "You are steering on certain themes such as CO2 … but this is the first time we have monetised these issues." (Sustainability Manager B)*	T-barrier: *"[for the FCA model] I do not get the data from the Sustainability department, but from the individual departments. Everyone has its own method to collect data." (FCA Expert C)*	T-enabler*: "Behind Health & Safety targets is an entire statistical cycle … there are continually statistics being conducted and controlled to minimize absenteeism of our employees." (Manager D)*
Signalling	T-enabler: *"You need a few successful projects to signal that it is possible. We placed solar panels on our purification plant which is a small but realised success." (Manager A)*	T-enabler: *"The stakeholder dialogue showed we are pioneers and people believe this adds value." (Sustainability Manager B)*	T-enabler*: "FCA is used to integrally show their impacts and stimulate a fact-based dialogue." (Special Advisor)*	T-enabler: *"Those kinds of [energy-saving] projects are highlighted to signal what we do for the market." (Manager D)*

T - Technical; O - Organizational; C - Cognitive

Technical Enablers

The results are consistent with the findings on deployment which highlights the lack of organization-wide deployment of sustainability measurement and evaluation is a technical barrier (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). The underlying reason for the technical enablers in cases B and C is that both use an integrated approach of sustainability in which departments are involved organization-wide. Manager B states:

"I notice more people who have do not have the function of sustainability manager - for example, Marketing manager - but are involved with sustainability." Sustainability Manager B

The advanced method of FCA enables an integrated approach to the evaluation of sustainability impacts as FCA expert C notices:

"The model is one of the places where the impacts come together, because the different components of sustainability are spread out across the organisation. The environmental impact is closely related to the Energy department, whereas social impact is related to our Safety department." FCA Expert C

Technical Barriers

The technical barrier of limited deployment in cases A and D can be attributed to their centralized organisational structure. The departments involving case A's primary processes measure sustainability outputs.

"Our purification department has a lot of non-financial information available, but for other departments that is very rudimentary." Controller A

Attempts to involve the other departments in the measurement and evaluation of sustainability impacts are hindered by myopia. The prevailing perception of contributing to FCA is built on existing routines in which the departments draft reports to be held accountable. Therefore, there is reluctance to evaluate sustainability Key Performance Indicators (KPIs) which would help the organisation to use FCA to monitor sustainability performance.

"Currently people feel they have to make a 'list' for Control or draft a report for <u>others</u> … rather than believing it would help them have an organized overview." Controller A

Thus, in Case A deployment is related to myopia. The centralized structure of the organisation developed routines directly affected the resistance to change following the introduction of FCA. Technical integration was constrained by a lack of organisation-wide deployment of the new rule. This was due to the perception of employees of uninvolved departments of having to prepare another list. Therefore, the technical dimension and the cognitive dimension are interrelated.

In case D it is highlighted the Dutch environmental footprint is perceived to be relatively low compared to the overarching footprint at their headquarters in Germany. Many production facilities with a high relative impact are not included in the Dutch branch of the organisation. The environmental impact revolves around offices and the use of company cars. To illustrate:

"We have a direct role to follow the advice of Real Estate" CS Manager D

"These strategies surrounding sustainability are determined at corporate level at our Headquarters which we have to follow." Manager D

The real estate department has the central responsibility to direct and measure environmental impacts in the Netherlands. The centralized structure in case D introduces another aspect of deployment being the central sustainability department.

Central Sustainability Department

There is tension in the empirical literature on whether establishing a central sustainability department represent a technical barrier or enabler (Arjalies & Mundy, 2013; George, Siti-Nabiha,

Jalaludin, & Abdalla, 2016). Case D did not introduce a separate central sustainability department, but divided responsibilities of evaluating different impacts among divisions. Case C did establish a central sustainability department. This programme was created to promote sustainability within the organisation. However, in the introduction of FCA it was specifically chosen not to have this done by the sustainability department. The Finance department took up the introduction of the model within the organisation. This was more appropriate for the deployment of evaluating sustainability, because the model uses an integrated approach.

"If we as Finance do this there will be a stronger image in introducing FCA. I can imagine if Sustainability does this it will be categorized as being purely about the environment, but it is much more than that." FCA Expert C

Thus, rather than building upon the pre-existing structures which were developed before in the organisation, Case C decided to appoint Sustainability Champions with finance-expertise. A stronger signal was provided when the Finance department was collaborating. Hence, the environmentally-focused sustainability department would have provided a signal that there are organizational silos which was avoided by involving the Finance department. Institutions are path-dependent (Burns & Scapens, 2000) and sustainability conceptions are slowly changing from an environment-focused TBL to an integrated approach (Bebbington & Larrinaga, 2014; Maas, Schaltegger, & Crutzen, 2016). Control systems are changing from EMCSs to SCSs (Pondeville, Swaen, & Ronge, 2013; Perego, 2005; Searcy, 2011). Case C illustrates a move from environmentally-focused to the integrated approach was done by involving the Finance department. This overcame the technical barrier which the central sustainability department provided by signalling organizational integration by means of collaboration with the Finance department.

4.2.1.2 Systems in Place

Technical Enablers

Case B's design of the advanced FCA model went smoothly due data availability in their information systems. This information was measured from 2001 onwards. This corresponds with findings of prior literature which showed having adequate systems in place enhances technical integration (Garcia, Cintra, Torres, & Lima, 2016).

Health & Safety information was measured from 1990 in Case D. This benefited greatly towards the FCA-policy established in 2015 and the 'Zero Harm Culture' they strive towards. However, only this effect only contributed towards the measuring the social dimension of sustainability. The company only started measuring environment performance from 2012. The experience in frequently and

consistently measuring social impacts did not compensate for the lack of experience of measuring environmental impacts.

"Our experience with measuring social impacts does not extrapolate to the environmental, because you are dealing with different units of measurement." CS Manager D

Thus, the critical success factor 'systems in place' in Case D is closely connected to having systematic processes which will be discussed in the next section.

Technical Barriers

The technical barrier in Case A arises from not fully developed MCSs. The organisation is in the process of steer the organisation towards being more process-oriented.

"We are thinking: 'now something is needed and we will make that now', rather than what is the process behind that and how do you design something efficiently beforehand." Controller A

This indicates a lack of systems in place which impedes technical integration of the sustainability policy to measure People, Planet & Profit the company introduced. This confirms the empirical results from prior literature which finds a lack of sustainability data and not fully developed MCSs to be technical barriers to the integration of SCSs within MCSs (Battaglia, Passeti, Bianchi, & Frey, 2016; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016).

Case C did not have adequate data available for the environmental component. This way the relative impact of the environmental dimension in the FCA analysis could not be estimated properly. This presented a technical barrier and resulted in an overlap of the design and implementation phase. Data is scattered across the organisation and hence, data had to inefficiently be hand-collected from each of the separate departments.

"If I need data on waste, I will go to the departments myself to ask how much waste they produced." FCA Expert C

This technical barrier resulted in the overlap of the design phase and implementation phase. The Sustainability Advisor stayed involved in the process after FCA was implemented in Case C.

"My team was involved in the design of the model for Case C … we stay involved with them to work out further problems they experience." Sustainability Advisor

"They help to further develop the model based on questions we receive from the business. They are more aware of the latest developments in the field." FCA Expert C

Searcy (2012) states this overlap is possible, because the phases are conceptual and are used to structure research questions around the key stages in the development of FCA. Therefore, the design and implementation phase can be interrelated, but they do represent the stages through which any SPMS should progress. The inherent complexity and uncertainty of sustainable development is apparent in Case C through the difficulties of monetizing sustainability impacts. Specifically, rather than waiting for a major social environmental shock, the organisation seeks to identify sustainability risks and opportunities to work towards sustainability (Unerman & Chapman, 2014). Thus, Case C embodies the strand of literature which is the focus of this paper: accounting for sustainable development.

4.2.1.3 Systematic Process

Technical Enablers

Case D illustrates the evaluation of social impacts has always proceeded systematically. This is a technical enabler, but it does not necessarily extrapolate to environmental impacts. This contrasts prior literature which states effective and smoother integration of sustainability happens when the following requirements are met: experience with sustainability indicators and availability of data in the information systems (Garcia, Cintra, Torres, & Lima, 2016). However, as explained in the last section, CS Manager D discusses environmental impacts deal with different units of measurement requiring different expertise. This view is confirmed by Sustainability Manager B which was involved in monetizing the sustainability impacts. Transforming sustainability impacts into monetary impacts is a different process which requires different expertise which Case B was not familiar with.

"The experience with evaluating sustainability impacts has not helped us in monetizing FCA … I believe that especially my financial background has helped do this." Sustainability Manager B

Thus, experience with sustainability indicators is not a requirement to effectively integrate sustainability within MCSs in cases where expertise, with estimating environmental impacts or monetizing impacts, is lacking. As Case B shows, sustainability champions which have the capabilities needed for FCA can compensate for the lack of expertise.

Technical Barriers

There is difficulty to retrieve required data when there is no systematic process to collect it. This is a technical barrier in both cases A and C. Strategic Advisor A mentions:

"The Klimaatmonitor[26] has to be filled in once every two years and it is always a big job to gather the data we need." Strategic Advisor A

[26] An external report Case A has to provide containing climate- and energy-indicators

The FCA Expert in Case C had to hand-collect the data she needed. Thus, some aspects of the FCA model do not contain the same amount of detail on environmental impacts.

"The waste of the maintenance of trains is not taken into account, whereas the water usage is used … that has to do with the availability of data." FCA Expert C

4.2.1.4 Signalling

Technical Enablers

Commitment to sustainable development projects was signalled to stakeholders following the introduction of FCA. Similar findings to previous studies were found (Battaglia, Passeti, Bianchi, & Frey, 2016; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). Table 3 shows positive signals to internal and external stakeholders were present in all the FCA initiatives. This confirms the results of Battaglia et al. (2016) and George et al. (2016) that signalling commitment is a technical enabler.

"I think we have been quite successful at inspiring others to use FCA. So not only within our own company, but also in inspiring companies to adopt this." Sustainability Manager B

4.2.2 Organizational Integration

Table 4 - Citations about Organizational Integration

Organizational Integration	Case A	Case B	Case C	Case D
Collaboration	O-enabler: *"What you notice is that the group with which we work together on sustainability is increasing." (Manager A)*	O-enabler*: "We involve people from all different departments." (Sustainability Manager B)*	O-enabler*: "The best thing for FCA is to involve people of Finance." (Sustainability Advisor)*	O-barrier: *"There is a workgroup at corporate level" (Manager D)*
Communication	O-barrier: "[The current attitude] in our organisation is that nothing happens with our ideas." *(Strategic Advisor)*	O-barrier*: "We have published the FCA results, but have not received any responses from employees" (Sustainability Manager B)*	O-barrier: *"My Finance colleagues do not do anything with the model … they have nothing to do with it." (FCA Expert C)*	O-barrier*: "Someone from Real Estate is topic owner [for environmental issues] in such an investigation." (Manager D)*
Top Management Support	O-enabler: *"Our board has considered CO2 emissions as an important element since 2009 and had freed up a large budget for it." (Strategic Advisor A)*	O-enabler*: "I notice my CFO gets this, he is on such a level that you can expect that of him." (Sustainability Manager B)*	O-enabler: "*Our last CFO was the ambassador of this topic … after my conversation with the new CFO I can tell he is enthusiastic about the topic." (FCA Expert C)*	O-enabler*: "Our board has an important role to signal we find sustainability important" (Manager D)*

T - Technical; O - Organizational; C - Cognitive

4.2.2.1 Collaboration

Organizational Enablers

It was found Sustainability Champions can directly improve inter-departmental collaboration fostering the integration of knowledge across work-roles (Giovannoni & Maraghini, 2013; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016).Case C established workgroups at the top and bottom of the organisation in which sustainability issues were discussed. This supported organisation-wide collaboration on the subject. These discussions could range from insights about the FCA model to more general sustainability topics.

"Everyone discusses what they are dealing with in the field of sustainability, so people stay up to date and experience and knowledge can be shared so we do not do the same things twice." FCA Expert C

The workgroups facilitate a platform for an efficient exchange of knowledge. However, a forward-looking component is lacking, so rather than formulating a procedure to prevent specific sustainability issues, ad-hoc solutions are found during these discussions. Workgroups were used by Sustainability Manager B to show different departments that integrating sustainability into management control is something people *do* (Gond, Grubnic, Herzig, & Moon, 2012). He states:

"You try to create as much resonance for the field of sustainability in the organisation, you are steering your KPIs in that direction. These KPIs can be very basic such as opening a completely sustainable office… making it very practical." Sustainability Manager B

Thus, diagnostic use of FCA helps organisational integration by making the concept of sustainability feel more tangible. Similarly, Case A finds small, practical and realised successes to improve collaboration across work-roles[27].

"How we currently do it is for people to incite others[28]. I cannot do that by myself, the Strategy Advisor A also plays a big role in this." Manager A

Thus, in these three cases Sustainability Champions promoted change and stimulated collaboration creating an organizational enabler (Battaglia, Passeti, Bianchi, & Frey, 2016; Giovannoni & Maraghini, 2013).

Organizational Barriers

In case D there was no Sustainability Champion which encouraged collaboration as sustainability workgroups were only formed at the top rather than at the bottom of the organisation. Similar to Battaglia et al. (2016), weak collaboration across work roles resulted in an organisational barrier.

"Many of the environmental issues are handled by the Real Estate department." CS Manager D

Organisational silos are present in Case D, because other departments are excluded from the environmental dimension of sustainability (Herzig, Viere, Burritt, & Schaltegger, 2006). However, occasional cooperation does occur, contingent on Real Estate bringing in an expert to find a solution. Manager D refers to them as being 'topic owners' of such an investigation. Thus, in these investigations the Real Estate department plays a consultative role rather than a collaborative one. Hence, weak inter-departmental collaboration was an organisational barrier.

4.2.2.2 Communication

Organizational Barriers

Communication between managers and operational personnel posed an organisational barrier in all cases. Similar to George et al. (2016) and Battaglia et al. (2016), Case A and B show difficulties in communication should be overcome to encourage greater integration of FCA within MCSs. In Case A a contest was created for the interactive use of their SCS. Employees from all departments could submit their ideas on organisational sustainability. However, there the initial lack of a proper follow

[27] Quote Collaboration Case A in Table 3
[28] Translation from 'olievlekwerking' in Dutch

up of these ideas created a negative perception that the employees' ideas are not valued[29]. To combat this feeling, Manager A proceeded to involve departments personally. Interaction between finance and sustainability personnel was stimulated:

"Finance can provide their expertise about the measurement of sustainability aspects. They know about how make things tangible." Manager A

Hence, attempts were made to improve communication and collaboration by the Sustainability Champion. Sustainability Manager B wants to improve communication by promoting the FCA model of the annual report to top management such that they will involve the Finance department.

"Currently we are receiving zero responses [on the FCA model], but when top management starts asking questions to financial functions about the total impact then it will start to play a role." Sustainability Manager B

Top Management Support was required by the Sustainability Champion in Case B to improve communication and collaboration among finance and sustainability personnel. This brings us to the next organisational enabler.

4.2.2.3 Top Management Support

Commitment of some of the top managers was found to be an organisational enabler. However, consistent with prior empirical research this commitment is a necessary, but not a sufficient condition (Battaglia, Passeti, Bianchi, & Frey, 2016). Battaglia et al. highlight the organisational enabler arises from some top managers committing to the importance of sustainability issues. In this multiple-case study similar results were found. As the quotes in table 4 illustrate, all cases report top management recognises the importance of sustainability issues. However, this commitment is not sufficient. In Case B, the Special Advisor mentions:

"It is necessary that someone in the board really adopts it … but you can only get so far, you have to really be willing to break through the glass ceiling." Special Advisor

However, top management did not adopt FCA interactively as there were barriers to their support. Sustainability Manager B illustrates:

"We have a reported climate-revenue of €435 million. I want it to rise by 5%. That should be our new goal. There has not been a chance to do this internally yet, but I would want it."

[29] Quote Communication Case A in Table 3

Case D has salespersons that drive many kilometres on average per year. However, SC Manager D highlights:

"Full electric [vehicles] are still not an option yet. So we keep on hitting certain boundaries." SC Manager D

Case C wanted to develop one comprehensive KPI which incorporated the insights from the FCA analysis.

"With the help of the FCA analysis we are evaluating the possibilities of developing one KPI such that it becomes part of our main goals in our organisation." FCA Expert C

However, four months after the recorded interview with FCA Expert C the expert told the discussions surrounding the potential interactive use of FCA ultimately did not lead to an introduction of the KPI. Thus, the importance of sustainability issues was recognised but there were barriers to applying FCA in all cases. Hence, this confirms that top management support is a necessary condition but not a sufficient condition for the integration of FCA within MCSs.

4.2.3 Cognitive Integration

Table 5 - Citations about Cognitive Integration

Cognitive Integration	Case A	Case B	Case C	Case D
Myopia	C-barrier: *"If we are in an economic crisis, then it's not popular to say you also want to save the world" (Controller A)*	C-barrier*: "Finance can hardly think in non-financial KPIs" (Sustainability Manager B)*	C-barrier: "There are always people who are sceptical [about the analysis]." *(FCA Expert C)*	C-barrier*: "I think in the beginning people experienced it was a hassle." (Manager D)*
Vision	*"A modern organisation should cooperate with NGOs and companies to make sustainability initiatives possible" (Strategic Advisor)*	*"To measure the total value we create … we must find the right balance between social and financial values." (CEO B)*	*"The CFO was the initiator of this change … he was very passionate about sustainability" (FCA Expert C)*	*"We have a particular strong moral obligation, because our technology can help go through this decarbonisation process." (CEO D)*

T - Technical; O - Organizational; C - Cognitive

4.2.3.1 Myopia

As Table 5 shows, Case D experienced myopia before the introduction of FCA, believing environmental responsibility projects were only executed for legitimacy reasons. This institution changed over time and turned into a TBL conception of sustainability.

"It has become expensive to not concern yourself with CO2 emissions … having a good environmental footprint is seen as a necessity to control your costs." SC Manager D

"Now I believe it is separated from the cost-trigger, I believe it has become more like culture and habit." SC Manager D

4.2.3.2 Vision

As Table 4 highlights, the organisations created a long-term vision backed by the president and top management. This vision defines *how* the organisation wants to do their work. The visions were communicated to external stakeholders, but were also used internally.

It was expected the president's vision was a major catalyst of change (Munir, Baird, & Perera, 2013; George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Battaglia, Passeti, Bianchi, & Frey, 2016). However, contrasting results were found. The vision was a necessary condition, but it was the use of FCA that contributed to overcoming cognitive barriers. This introduces a new theme which will be discussed below.

4.2.3.3 Additional Theme: Awareness through FCA and Monetization

Studies which have investigated the introduction of a new PMS, or a new rule according to this paper's theoretical framework, have often viewed those systems as an object of change (Munir, Baird, & Perera, 2013; Briers & Chua, 2001; Yang & Modell, 2012). However, in this study the introduction of FCA was both an object of change and a *mechanism* of change. In all cases, FCA was used to increase awareness of the importance of total impact on society to the sustainability of the business. It was used as a mechanism to reinforce the vision of top management and facilitate cultural change. In the TBL cases FCA was used to make people aware of and respond to an invitable social movement.

"What I believe is that we keep on showing people it is actually inevitable. It will happen whether or not we participate … I think it is the zeitgeist. People are slowly starting to realise the world is changing and that we will not go back to the way it was." Strategic Advisor A

"I believe our car policy plays an important role in building awareness … our lease cars are used by everyone, so many layers in the organisation are affected in showing we - as a company - find this important. So with this you are using a culture-changing mechanism … it helps to build awareness." CS Manager D

In the True Value cases monetization was used to further overcome cognitive barriers. Social and environmental impacts were reduced to a monetary unit of analysis making it easily comprehendible for a broad range employees who do not have any sustainability expertise. The cases note:

"We translated it to euros to improve internal engagement … a month ago I trained the entire Sales Force (200 employees) with the message that we generate a positive climate-revenue. Positive

revenue in real euros and that is what they understand … environmental euros[30] are meaningless to them." Sustainability Manager B

"The FCA analysis is currently used for awareness, so that people understand that our operations have an impact on society ... we could never make our social function tangible before… the model helped make it tangible." FCA Expert C

Being able to present a monetary value improves decision-making and overcomes myopia, because a monetary unit makes the concept of sustainability tangible. Hence, this provides empirical evidence which contrasts Gray's (2010) critique that sustainability cannot be reduced to the organisational level because at this level it does not have a tangible meaning. From an institutional and evolutionary perspective of change, FCA builds upon existing institutions which shape the rules and routines used in the organisation. Monetization in FCA seeks to reinforce cognitive enablers (vision) and reduce cognitive barriers (myopia) and enables a concious change of routines. It reveals existing choices which could lead to more informed decision-making (Antheaume, 2007). The profit-seeking institution, which the existing routines embody (Burns & Scapens, 2000), is challenged by FCA. Besides financial impact, this new rule simultaneously stresses social and environmental results. However, by monetizing these impacts the resistance to change is mitigated.

"The benefits of monetary valuation are that everything is expressed in one unit of analysis and everyone understands it, it is the same language." Special Advisor

The process of creating a shared awareness and understanding is crucial to overcome socially and environmentally dysfunctional cognitive biases (Levine & Moreland, 1991). Thus, an expansion of perspectives is required to come to a sustainability institution. This expansion asks for the exchanged knowledge to be comprehended by the individual's own knowledge structures (Godemann, 2008; Gond, Grubnic, Herzig, & Moon, 2012). The Special Advisor indicates the 'same language' is used. Therefore, monetary valuation builds on the existing knowledge structures which were built by the profit-seeking institution. In turn, cognitive biases which perpetuate unsustainable practices can be overcome by building awareness through monetization.

However, building awareness does not imply a morphogenetic change (Laughlin, 1991) will occur. As explained in the conceptual model, the integration of FCA within MCSs depends on the realignment triangle and the use of control systems. To illustrate, FCA Expert C states:

[30] In 2014 the methodology was developed in Case B which estimated the environmental impacts in environmental euros. This methodology was further developed to reflect a monetary unit of analysis in order to improve organisation-wide understanding of environmental impacts.

"Understanding throughout the entire organisation is a milestone … It is great if everyone is aware, but it should also be applied."

The implementation around FCA is more complex than explained by the conceptual model. The conceptual model portrays FCA as the introduction of a formal and intentional management accounting change (Burns & Scapens, 2000).Burns & Scapens (2000) provide a conceptual framework, but they acknowledge that empirical investigations should take into account intended and uninteded elements. Thus, in understanding management accounting change the changes flowing from the introduction of FCA should be complemented by changes which happen at a more institutional and tacit level. The cases provide insights into the potential of FCA to be used as a mechanism to facilitate changes at the tacit level. FCA provides the basis for building awareness. It provides a tool for Sustainability Champions to overcome cognitive biases. However, FCA's dual functions cannot be separated from each other. It is both an object of change and a mechanism of change. Were FCA to be treated as a mechanism in isolation, morphostastic chance would occur (Laughlin, 1991). The ceremonial use of management accounting rules and routines[31] can restrict change and preserve vested interests (Burns & Scapens, 2000). Thus, solely using FCA as a mechanism for change will not lead to the integration of FCA within MCSs. The opposite would occur, because the ceremonial role of MCSs may be used to resist the change FCA was promoting. Therefore, FCA should be simultaneously used as an object of change to challenge the existing rules and routines and as a mechanism of change to build awareness. As stated above, understanding management accounting change requires understanding the duality of actions and institutions. Hence, the use of the levers of control (Simons, 1995) are required to bridge the institutional realm and the realm of action. The use of control systems will be discussed later in this chapter.

4.2.2 Environmental Disturbances

External stakeholders provided the extra-organizational push needed for companies to adopt FCA. The companies responded to the environmental disturbances by subscribing to a FCA system. The cases describe community stakeholders to have provided the main effect.

"It is an overall trend of increasing awareness of sustainability concerns … it's starting to gain increasing support in the world." FCA Expert C

"I think it was a social movement which resulted in a push effect: sustainability could no longer be ignored." Manager D

[31] This is present in the enacting and reproduction of rules and routines, arrow d and e in figure 2

"Movies like the one Al Gore made[32] which show the Netherlands would no longer exist if we continue like this has had an enormous impact on people … I think the average person was ready for the idea of sustainability." Manager A

"The government made a FCA analysis on the roundabout in Eindhoven[33] and decided it would not be a sustainable solution even though it would result in a high financial impact … then I thought: we should be able to do that as well." Sustainability Manager B

However, also market and regulation stakeholders provided external pressures for case A:

"You are seeing market developments and because it happens everywhere … then why not here?" Controller A

Our regulators have proposed a goal of 40% renewable energy-generation for our organisation … our board was driven by complying with this goal." Manager D

Thus, strong environmental jolts were found similar to Bouten & Hoozee (2013). Public opinion was found to be the main extra-organizational driver of subscribing to FCA.

4.3 Evaluation of Control System Use

Diagnostic control for SCSs is deemed inappropriate as explained in the theoretical framework. It was expected this type of control system use is based on organisational sustainability (Bebbington & Larrinaga, 2014). This implies organisations will monitor the sustainability goals which are regarded as 'feasible' to achieve rather than 'necessary' to achieve a state of sustainability. Simons (1995) mentions pre-set standards must be developed implying desired sustainability outputs are known ex ante.

4.3.1 Interactive Use FCA

Cases A, B and C are using their MCSs interactive and are intending to use FCA interactively as well. The success of these attempts is grounded in the organisations' institutions because these shape behaviour. Case A provides a clear depiction of this.

"We are stimulating sustainable ideas in the organisation and help our people realise their ideas in our implementation of MVO[34]"

[32] An Inconvenient Truth (Gore, 2006)
[33] 'Eindhoven niet achter tracé Ruit van provincie' (Wouters, 2014)
[34] Maatschappelijk Verantwoorde Organisatie - Socially Responsible Organisation (in Appendix B Description Case A)

The interactive use of FCA is grounded in the institution that people feel their ideas are not valued. This can be found in the communication quote of Table 3. Hence, the Sustainability Champions (Strategic Advisor A and Manager A) had to play an active role in signalling the successes of the execution of ideas. Another way interactive use of FCA was ensured was to make participation mandatory.

In the True Value cases interactive use was not made mandatory. It arose from the insights of the monetary valuation.

"Sometimes organisations discover new insights … this can in turn lead them to make changes of and to fine-tuning their sustainability strategy." Special Advisor

In case B the analysis provided insights into the materiality of specific sustainability impacts. It was found 80% of the total impact of their telecommunications is related to CO2 emissions.

"I started an initiative for circular economy. Now I am not doing that anymore, because the decision was made: it is not material enough." Sustainability Manager B

To add, a message from the CEO shows:

"With this information, we can create new insights that enhance the strategic decisions we make every day." CEO Case B

Two changes were made based on the insights of FCA analysis. Firstly, based on these results they want to become climate-neutral. Case B wants to neutralise their CO2 emissions. Secondly, the analysis revealed they have a positive CO2 impact.

"The second big thing we did was to look commercially at the products we have and to make sure consumers use more of our products such that we save more CO2 and can save the world." Sustainability Manager B

Case C attempted to use the insights of the FCA analysis for enhancing strategic decision-making. However, these attempts were seized in November 2016. The organisation tried to introduce a KPI which would cover the total impact on society. The previous CFO was adamant to realise this and turn the organisation's sustainability impact into a positive one. However, the CFO left and a new CFO was appointed late September. The Special Advisor warned about using one KPI to measure total impact.

"Some people are afraid of off-setting. Plusses and minuses can lead people to misinterpret the figure … that they see it as a sum." Special Advisor

4.3.2 Diagnostic Use FCA

Case D used FCA diagnostically. The social impact is kept track of by means of health and safety statistics.

"We get Health & Safety feedback every quarter and based on this we define appropriate measures … during the meetings we look at our initial goals, what we achieved and which measures we should take to steer if it did not go according to plan." Manager D

Similar to case D's centralized approach discussed in the deployment sub-section of this chapter, environmental impacts were centrally determined. FCA was also used diagnostically for this dimension of sustainability.

"For kilos paper I do not know the targets because this is centrally monitored … it is measured and then on national level there are targets for it. So, we steer on that." CS Manager D

However, Case D was not the only case which used their SCS diagnostically. All the cases have are attempting to use it diagnostically. In Case A the lack of MCS development resulted in a lack of experience of impact measurement. However, ambitions to use FCA diagnostically were highlighted:

"If you think about smart targets, who is going to do it and assigning responsibilities then you are going to monitor. That would be the start." Controller A

In the True Value cases, the organisations were attempting to use FCA diagnostically.

"They should use it to improve sustainability performance." Special Advisor

In particular, case B the CEO highlighted the FCA diagnostic use in the annual report of 2015:

"With this [FCA] information we attempt to measure our impact on society at large and are able to steer our performance more responsively."

However, the ability to completely steer towards societal output is a future ambition. The sustainability manager states:

"In 10 years I believe we will be fully ready to steer towards societal output." Sustainability Manager B

Similarly, in Case C shows the introduction of a KPI would have led to organisation-wide involvement in which employees will be stimulated to keep track of sustainability. Hence, they will perceive sustainability as being part of the MCS.

"I believe the moment when there is a KPI, people will be triggered to keep track of it. So, it should be used as a benchmark." FCA Expert C

The dual use of diagnostic and interactive in FCA creates dynamic tensions. This topic will be discussed in the next section.

4.3.3 Additional Theme: Dynamic Tension

In three of the four FCA cases, the SCS was intended for dual use of Simons' (1995) diagnostic and interactive levers of control. In both True Value cases the goal is to work towards one target: a positive true value. The Special Advisor indicates this target is not yet possible because of too many inaccuracies in estimating what would be necessary to work towards sustainability. Mundy (2010) states balance is implicit in Simons' (1995) LOC framework. Central to this framework is the need to balance innovation and control (Vaassen, Meuwissen, & Schelleman, 2009). The two types of use (diagnostic and interactive) work simultaneously (Henri, 2006), but for different purposes as explained in the theoretical framework. Similar to Tessier & Otley (2012), the labels 'enabling' and 'constraining' will be used for the dual role of interactive and diagnostic use respectively. The terms 'coercive' and 'controlling' have been used to describe diagnostic use in the literature. The negative connotation of these labels implies diagnostic controls are regarded as 'bad' controls (Tessier & Otley, 2012). Thus, terms related to the quality of control are omitted in order to focus on the dual role of SCSs as a design attribute. The joint use of diagnostic and interactive manners of the SCS to manage inherent organisational tensions creates dynamic tensions (Henri, 2006). Conflict literature suggests these tensions created by the balanced use of the dual roles could be beneficial to organisations (Henri, 2006; Amason, 1996). This balance is a complex challenge to organisations as the notions of competition and complementarity have to be simultaneously balanced (Mundy, 2010; English, 2001). Through the dual use in a diagnostic and interactive fashion, the dynamic tensions reflect competition because of the enabling and constraining forces (Henri, 2006). However, they also reflect complementarity through intended and emergent strategies[35]. Dynamic tension is not new to academia as the notion is also captured by the terms paradox, contrast and conflict (English, 2001). Dynamic tensions promotes mutual understanding by continually stimulating communication (Henri, 2006). Sustainability issues can be discussed in open discussions as employees group their ideas (Amason, 1996). Furthermore, the employees can integrate seemingly opposing elements because tension prompts the identification of alternative ways of doing things. Thus, organizational and cognitive boundaries are overcome by balancing the dual use of FCA. Henri (2006)states the

[35] Henri (2006) elaborates on the distinguishing of intended and emergent strategies by associating the former with the precise intentions of the organization and the latter with the absence of intentions which occur during action. Both of these types can lead to 'realized strategies'.

tension contributes to focusing organizational attention. This corresponds with case B's focus on material sustainability issues. FCA provided a tool for the organisation to uncover insights on their sustainability impacts and through the dynamic tensions related to FCA organizational attention was focused on CO2 emissions rather than circular economy. However, the cases also indicate the opportunities to develop dynamic tensions are limited by top management support. Mundy (2010) mentions understanding when the use of control systems is suppresed can yield insights into interrelations between the different uses of SCSs. As can be seen in table 6, the complete interactive use of FCA was surpressed by top management. Subsequent diagnostic use by defining targets on a divisional level were not made and hence, the opportunities for dynamic tensions were limited. It reduced the managers' ability to deal with inherent organisational conflicts (Mundy, 2010).

*Table 6 - Citations about barriers to full interactive use of FCA**

Case A	Case B	Case C
"*We want our employees to drive using bio-gas which we generate in our purifications, but there was resistance about the new tender process for the cars."* (Strategic Advisor)	*"An increase by 5% of our climate-revenue should be our new goal, I would really want that. However, there has not been a chance internally yet."* (Sustainability Manager B)	*"I do not think that we are ready for the FCA analysis to become part of what happens at the top with strategy."* (FCA Expert C)

*Case D is excluded because FCA was not used in a dual fashion (diagnostically and interactively)

In the sub-section on top management support of this chapter it was discussed it is a necessary, but not a sufficient condition. This statement can be nuanced when we take into account barrier top management can pose for dynamic tensions. It is necessary for top management to acknowledge the importance of sustainability issues and express their conviction and their support for the FCA initiative during the introduction of this new rule. However, it is not sufficient to express their view, because top management has to fully adopt it for dynamic tensions to arise. Thus, the cases showed organisational barriers have to be overcome to use FCA interactively. In turn it may be used diagnostically when targets can be set according to the insights FCA provides. Empirical evidence is found for the Lewis' (2000) view of tension as a double-edged sword. Tension can have beneficial (Henri, 2006; Amason, 1996) and negative effects. Tension may trigger change, while simultaneously activate defensive routines that inhibit change (Henri, 2006). The positive effect of dynamic tension in FCA was inhibited by a lack of full adoption by top management.

"The topics the board discuss relate to 'how much is product X sold' and 'how much did our customers pay'. It is not yet 'how much CO2 can we reduce', these questions are not asked yet." Sustainability Manager B

The sustainability champions of the cases which attempted to use FCA diagnostically and interactively experienced difficulty in their ability to deal with organisational conflicts. The lack of top management support reduced their ability to introduce a sustainability institution. This study recognises that a change from a profit-seeking institution to a sustainability institution was not found. Institutions are subject to change, but generally take longer to develop. The introduction and implementation of FCA was still in its initial phases. The sustainability manager in case B confirms the evolution of institutions will require a longer period of time. He notes:

"Financial performance of a company is the indicator of how you are doing as a company. You want to make the step from financial performance to total value added for society … That will take 10, maybe even 20 years. The upcoming years many non-financial indicators will be added, but it will still be about finance: that is the main mode of business. A change has to happen. My prediction is non-financial indicators will become 'increasingly important', because financial performance will stay the most important. But in 10, 15 years we will be ready to steer more towards societal output."
Sustainability Manager B

This implies that the way towards a sustainability case for business is going to be built on existing institutions. Financial performance is regarded as the main indicator of firm performance and while sustainability impacts are becoming increasingly important financial performance will stay at the core of the business. Thus, the business case for sustainability is expected to remain for the next years. However, as the sustainability manager notes, in a decade the organisation will be ready to steer actively towards sustainability. The lack of adoption by top management will be gone and discussions between them would be about total value for society rather than having only financial performance at the core of its goals. In turn, the negative effect of tension would be removed and FCA can be used diagnostically and interactively to generate and balance dynamic tensions as a potential source of competitive advantage (Henri, 2006).

4.4 Discussion

The implementation surrounding FCA is complex. Table 7 provides an overview of the findings of the cross-case analysis. The effect of the majority of processual factors on the integration of FCA within MCSs was supported or partly supported. However, the evaluation of diagnostic or interactive use provided insights about dynamic tensions in FCA. Thus, the expectations about the use of FCA, interactive use as ideal and diagnostic as inappropriate, were not supported.

Table 7 - Summary of evaluation processual factors and use of control systems

General Theme	Sub-category	Supported/not supported	Comments
Technical Integration	Deployment	Supported	Lack of organization-wide deployment is a technical barrier
	Systems in Place	Supported	High availability of data in information systems is a technical enabler
	Systematic Process	Partly supported	Separate planning in departments is a technical barrier, but experience with sustainability indicators is not a technical enabler
	Signalling	Supported	Signalling commitment is a technical enabler
Organizational Integration	Collaboration	Supported	Inter-departmental collaboration is an organizational enabler Sustainability champion compensates for lack of collaboration
	Communication	Supported	Difficulties in communication are overcome leading to greater integration
	Top Management Support	Partly supported	Top management support is a necessary condition, but not sufficient
Cognitive Integration	Myopia	Supported	Myopia is an cognitive barrier
	Vision	Partly supported	Vision is a necessary condition, but not sufficient, FCA used as an object and a mechanism of change
Environmental Disturbances		Supported	Strong environmental jolts induced the design of FCA
Use of Control Systems	Diagnostic	Not supported	Dynamic tensions
	Interactive	Not supported	Dynamic tensions

Three factors of technical integration were supported. Firstly, the organization-wide deployment sustainability measurement and evaluation was found to be a technical enabler. Correspondingly, a lack thereof was shown to be a technical barrier. In particular, the lack of involvement of departments in the measurement of certain dimensions of sustainability in cases A and D resulted in this technical barrier. Secondly, having adequate systems in place was found to enhance technical integration. Findings show that in order to perform the FCA analysis, it will be smoother to perform the analysis if there is high data availability in the information system. Case A and C demonstrate that the lack of this availability can lead to a technical barrier. Lastly, the FCA initiatives signalled commitment to sustainability to internal and external stakeholders in all cases. This confirms that these positive signals provide a technical enabler.

Separate planning and evaluation of sustainability impacts in different departments presented a technical barrier. However, having a systematic process was only partly supported to affect technical integration. Unlike Garcia et al.'s (2016) results, Case D illustrates having had experience with the evaluation of social impacts did *not* promote smoother integration of environmental impacts as the estimation of these impacts was experienced to require different expertise.

Two out of three factors for organizational integration were supported being collaboration and communication. Firstly, the sustainability champions play an important role in improving inter-departmental collaboration. Establishing workgroups at the top and bottom of the organisation in which sustainability issues are discussed is confirmed to be an organisational enabler. The lack of a sustainability champion in middle management to foster this collaboration from the bottom of the organisation resulted in weak collaboration across work roles. So similarly, the lack of a sustainability champion resulted in an organisational barrier for collaboration. Secondly, communication between middle managers and operational personnel was found to be an organisational barrier in all cases. Attempts to improve communication were made in cases A and B and showed overcoming this barrier supports greater organizational integration.

Top management support was partly supported. It was found that this intra-organizational factor is a necessary, but not a sufficient condition. This is because top management can inhibit change by limiting the dual (diagnostic and interactive) use of FCA. Firstly, the findings of dynamic tensions will be discussed below in order to explain why top management support was not a sufficient condition.

It is surprising the interactive use of FCA was not perceived by the cases as the ultimate goal of FCA. Dual use of diagnostic and interactive control systems was regarded as the optimal way to use FCA by the cases who wanted to use it to work towards a sustainability case for business. Dynamic tensions can be beneficial because they focus organizational attention, trigger creativity and encourage mutual understanding. Gond et al.'s (2012) conceptualization of the modes of integration was limited as interactive use of FCA was portrayed as ideal. However, Gond et al. (2012) overlooked the ideal outcome of sustainability is a paradox. Sustainability involves reaching both long-term and short-term goals, meeting end goals without compromising the means such as environmental or human assets (UNWCED, 1987). Lewis & Smith (2014) mention these ideal outcomes demonstrate the processual nature of paradox. Routines to achieve short-term goals emphasize stability and efficiency, whereas attaining the long-term goals is enabled by change and innovation (Lewis & Smith, 2014). Similarly, in control systems enabling both flexibility and control is paradoxical, but as the cases showed it could overcome organizational and cognitive boundaries. The cases showed that during the implementation of FCA, the sustainability champions want to achieve the integration of

SCS and MCSs by using FCA to generate dynamic tensions. Thus, the sustainability champions want to apply a paradoxical way of using FCA for the paradoxical goal of sustainability. Alongside the argumentation of Lewis (2000), the dynamic tension was found to be a double-edged sword. The tension triggered defensive routines in top management which inhibited change. Therefore, the case findings indicate top management support is necessary, but not sufficient. Top management support was perceived to be an organisational enabler if they recognize the importance of sustainability issues (Battaglia, Passeti, Bianchi, & Frey, 2016). However, this is not a *sufficient* condition for integration of FCA within MCSs as sustainability champions were inhibited to fully use it both interactively and diagnostically. Thus, the intent of dual use of FCA was hindered by top management which resulted in the continuation of the profit-seeking institution. Financial impacts were currently still considered to be the most important.

All cases are grounded in the business case for sustainability. This instrumental approach includes both a TBL perspective as well as the integrated approach which recognises there are trade-offs between the dimensions of sustainability: the economic stability of the organisation remains most important. However, the Special Advisor for the True Value cases remarks:

"In the future there should be combinations of the instrumental and the stewardship approach … there have to be market transformations in which external parties monetize sustainability impacts of companies in order to break the glass ceiling and work towards sustainability." Special Advisor

Firstly, an institutional perspective is offered that FCA should be used as a tool to surpass the 'glass ceiling' and move from a business case orientation to a sustainability case for business. Secondly, it is indicated external stakeholder pressures are needed to stimulate organisations to monetize impacts. This leads to the findings related to monetization which is discussed below.

FCA was found to be a mechanism of change used to build awareness. In the True Value cases the monetization of sustainability impacts was found to *further* overcome cognitive barriers. Hence, monetization was found to be a moderating variable for using FCA to lower cognitive barriers (myopia) and enhance cognitive enablers (vision). Even though institutions towards sustainability were slowly changing, it was fully supported myopia posed a cognitive barrier in the cases. Subsequent to the introduction of FCA, awareness was built and myopia was slowly mitigated. However, findings show that vision was partly supported to be a cognitive enabler. It was found that the vision of the president and top management was a necessary condition to design FCA, but it was not the major catalyst of change. The moderating effect of FCA in building awareness and enhancing cognitive integration was the major catalyst of change. Monetization further increased cognitive

integration as it facilitated a quicker comprehension by the organisation members' existing knowledge structures. Cases B and C showed individuals could better understand the monetary unit of analysis. Furthermore, the cross-case analysis revealed involving sustainability champions who have finance expertise helps in the calculations of monetization, but also in signalling that there are no organizational silos. Signalling this collaboration is an organizational enabler when the FCA analysis is provided in the 'same language' which every department will understand. Thus, using FCA as a mechanism of change can foster greater cognitive integration. Monetization is a moderating variable of cognitive integration, enhancing it further. Sustainability champions are required for the monetization process because of their expertise in the design phase, but also for signalling collaboration in the implementation phase. Thus, in the True Value cases the sustainability champions can encourage greater organisational integration if they come from a finance background.

The cases found strong environmental jolts by community stakeholders. These external stakeholder pressures resulted in the subscription of FCA. Thus, the extra-organizational factors were relevant in triggering the design phase of FCA. However, the pressure of public opinion did not provide strong environmental disturbances during the implementation phase. Hence, empirical evidence for Perego's (2005) expectation of the relative influence of extra-organizational factors was found. Intra-organizational factors are more influential than extra-organizational factors during later stages of integration (Perego, 2005). During the implementation phase of FCA intra-organizational factors were more found to be more influential than extra-organizational factors.

4.5 Chapter Conclusion

The findings of this study were discussed in this chapter. The conceptual model described in Chapter 2 was analysed based on cross-case analysis of two True Value cases and two TBL FCA cases. Two additional themes were discussed. The first relating to the control being used as a mechanism to build awareness about sustainability concerns in the organisation. The second theme relates to dynamic tensions which arise from the dual use of FCA. Three cases illustrated attempts to use FCA both diagnostically and interactively. The cases suggests a paradoxical use of FCA fits the paradox inherent in sustainability goals. However, top management's acknowledgement of the importance of sustainability issues is not a sufficient condition for it to be an organizational enabler. The lack of adoption of top management to use FCA diagnostically and interactively limited the ability of sustainability champions to deal with organisational conflicts and experience the benefits of dynamic tensions. Furthermore, FCA is used as an object of change as well as a mechanism of change. Sustainability champions can use FCA to build awareness and promote cognitive integration. In particular, the True Value cases experienced a moderating effect of monetization in enhancing cognitive integration. Monetary units of analysis translate sustainability impacts to a language which is understood organization-wide. Collaboration can be stimulated by sustainability champions with a finance background if they promote the results of the monetary analysis of FCA. In turn, organizational barriers of collaboration are overcome fostering greater organizational integration. Chapter 5 concludes this study in which limitations and implications of this research for academia and practice are provided.

Chapter 5 Conclusion

5.1 Conclusion about the Research Question

This paper examined the processual aspects of management accounting change surrounding the integration of FCA within MCSs. Justification of this study was provided by highlighting the need to study how sustainability issues are managed internally (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016; Maas, Schaltegger, & Crutzen, 2016; Abdalla, Nibiha, & Shahbudin, 2014). Case study research could provide in-depth insights into how processual aspects during the implementation phase of FCA affect its integration within MCSs.

Research has focused on the intra-organizational aspects of management accounting change in the integration of sustainability issues into a broader performance management system (George, Siti-Nabiha, Jalaludin, & Abdalla, 2016). However, no attempts have been made to focus on the role of FCA as a specific and promising application of SCSs (Spangenberg, 2011; Bebbington & Larrinaga, 2014). Gond et al.'s (2012) conceptualization of integration as a socio-technical process is used to categorize the intra-organizational aspects in technical, organisation and cognitive dimensions. In order to fully comprehend intra-organizational processes, Gond et al.'s (2012) framework is combined with Burns & Scapens' (2000) framework which addresses the duality of action and institutions. Burns & Scapens' (2000) lacks the explanation how the continual reproduction and enacting of routines can lead to institutions. Gond et al's (2012) approach bridges this gap, for it uses Simons' (1995) LOC framework which proves key in understanding this process. Management accounting change does not happen in an extra-organizational void (Perego, 2005). Thus, extra-organizational factors are studied using Laughlin's (1991) framework of environmental disturbances which is commonly used in SEAR literature (Contrafatto & Burns, 2013; Bouten & Hoozee, 2013). Hence, using a sustainability science approach (Vries & Petersen, 2009) to management accounting change these theoretical perspectives are combined into the conceptual model described in Chapter 2. The sub-categories of the intra- and extra-organizational factors are based on findings from empirical literature.

A multiple-case study of FCA was provided to test the theoretical ideal processual context to integrate FCA within MCS and hence, embed sustainability into the organisation. The cross-case comparison was contrasted to this ideal situation and provided several insights for theory and practice. A theoretical answer to the research question was provided in the second chapter. The research question will be answered using the insights of the multiple-case study:

How do processual aspects of management accounting change affect the integration of FCA in traditional Management Control Systems?

A theoretically ideal situation was constructed in which intra-organizational factors and extra-organizational factors can influence the realignment process of new rules and routines. The coinfluence of high integration and interactive use of control systems was theorized to lead to a sustainability institution. The cross-case analysis depicts intra-organizational factors to be more important than extra-organizational factors during the implementation of FCA. Corresponding with theory and empirical research, the sub-categories of technical integration positively affect the integration process. The cases show organisational and cognitive integration are also necessary for integration of FCA within MCSs. However, additional themes were discovered which provide a more nuanced view of the dynamics involved in FCA's integration.

To elaborate, the main findings of the study relate to top management support and the intended use of FCA. The results reveal sustainability champions intended to use FCA both diagnostically and interactively to create dynamic tensions. The creation of dynamic tensions can be beneficial in the integration of FCA within MCSs for two reasons. Firstly, dynamic tensions are beneficial to stimulating creativity, focusing organizational attention and encourage mutual understanding within the organisation (Henri, 2006). Secondly, diagnostic use of FCA can assign accountability and introduce it as an organization-wide rule which in turn can become routinized and institutionalized. The creation of dynamic tensions was limited by top management as the sustainability champion was inhibited to use FCA in a dual fashion. Hence, empirical evidence for dynamic tension as a double-edged sword (Lewis, 2000) was found. Top management activated defensive routines that inhibit the full adoption of FCA and perpetuated the business case for sustainability rather than work towards a sustainability institution. The insufficient adoption of FCA by top management posed the main organisational barrier to the integration of FCA within MCSs.

The introduction of FCA as a new rule positions FCA as an object of change. However, cross-case analysis found that all cases, True Value and TBL FCA, used FCA as a *mechanism* to increase awareness of the coherence of environmental, social and economic impacts and the importance of these impacts to the organisation and society. It was used as a tool by sustainability champions to enhance cognitive integration as the president's and top management's vision was not the major catalyst of change. FCA facilitated change by reinforcing the vision and overcoming cognitive biases. The True Value cases which monetized sustainability impacts experienced an enhanced effect on cognitive integration. Monetization was a moderating variable in fostering greater cognitive integration as it provided a 'language' commonly understood by everyone in the organisation.

The sustainability champions play a significant role in the integration process. Firstly, the individuals stimulate technical integration as a systematic evaluation of sustainability impacts requires finance

and sustainability expertise from the sustainability champion. Secondly, they encourage organizational integration by improving organization-wide collaboration and communication. Lastly, FCA analysis is used by sustainability champions to overcome cognitive biases by building awareness. The majority of intra-organizational factors were supported to facilitate integration. Organization-wide deployment of evaluating sustainability impacts, signalling commitment to stakeholders and having adequate information systems in place were found to be technical enablers to the integration process. Similarly, organisational integration was supported by improving inter-departmental collaboration and communication. Myopia was regarded a cognitive barrier to integration. As discussed above, vision and top management support were necessary but not sufficient conditions for integration of FCA within MCSs. Using FCA as a mechanism of change was the major catalyst of change as cognitive barriers were overcome and the effect of vision was enhanced. The findings of top management support provide nuanced insights into its role in the integration process. It was necessary for management to openly commit to the importance of sustainability issues. However, it was also found top management inhibited sustainability champions in balancing dynamic tensions from the dual use of FCA. Thus, lack of top management adoption was found to be the main organisational barrier to change.

The intra-organizational factors played an important role during the implementation phase, whereas extra-organizational factors triggered the design of FCA. The interactive use of FCA as being the ideal use of the SCS was rejected. A paradoxical way of using (both diagnostic and interactive) FCA was intended by organisations which wanted to introduce the sustainability case for business. Thus, sustainability champions sought to use a paradoxical way to use FCA for a paradoxical goal of sustainability. Once there will be adequate top management adoption in these cases, the potential benefits of dynamic tensions can be studied in these cases.

The construct validity of the concepts was secured by complementing the interviews with other sources of data. The key participants of the cases were provided the transcript of their interview to review and give feedback. Yin (2014)proposed these measures to further enhance construct validity. Reliability was secured through using the case study protocol and documenting the cases in *Atlas.ti*. The questions used in this case study can be used to study FCA cases repeatedly. External validity is obtained through using replication logic in this multiple-case study and internal validity by using cross-case analysis (Yin, 2014). However, there are limitations to this study which will be discussed in the following section.

5.2 Limitations

The methodology used in this research resulted in limitations. The cross-sectional design is a limitation, similar to the study of Bouten & Hoozee (2016) which also investigated management accounting change mainly using cross-sectional data. This limited the institutional insights surrounding the integration of FCA within MCSs. Based on the prediction of Sustainability Manager B, a longitudinal study covering a period of 10 years could capture the change of profit-seeking institution to sustainability institution. However, due to time constraints in the scope of this paper a multiple-case study was able to provide cross-case insights into the main barriers and catalysts of the early stages of management accounting change.

The sensitive nature of FCA initiatives limited views of other parties besides those involved in the implementation of FCA. An attempt was made to interview managers from the Finance departments of the cases. However, these managers were not open to participation. So, the contact information was not made available for this study. This number of interview participants limits the analytical power of the findings. Fortunately, it was made sure the key people involved in the implementation of the FCA initiative were interviewed. Thus, the study provides a reasonable view of the integration of FCA within MCSs, because the participants of the study stood at the centre of the initiative.

The last limitation is that statistical generalization is not possible, because this study attempts to generalize to theory (Yin, 2014). Thus, because of analytical generalization the results cannot be generalized to a larger population and this may raise doubts about the objectivity of the research. Despite the rigor used in this case study some researchers remain sceptical of case study research (Hodkinson & Hodkinson, 2001). Some degree of judgments about the significance of the data cannot be avoided in case study research.

5.3 Implications and Future Research

The results of this study have policy implications as a new ISO-standard for the monetary valuation of environmental impacts is being developed (Hubendick & Walakira, 2015). ISO 14008 will respond to the trend of FCA and is expected to be finished late 2018. This study provides insights into how FCA can be embedded within the organization. Hubendick & Walakira (2015) do not expect this standard to "*sell in large numbers*" (Hubendick & Walakira, 2015). However, this study shows FCA can help build awareness to enhance cognitive integration. Especially for companies in which top management wants to fully adopt FCA, the ISO 14008 standard can help during the design phase of FCA in order to overcome cognitive barriers in the implementation phase. Thus, because of these insights, implication ISO 14008 may be adopted by more organizations than Hubendick & Walakira (2015) expect.

The managerial implications of this research revolve around the main barrier of integration found in this study. A lack of adoption of top management to use FCA both diagnostically and interactively present a major barrier to embedding sustainability in the organization. Even though organization-wide awareness of the importance of sustainability could be present, it is not fully applied. Thus, in order to reach a state of sustainability, top management should *both* set divisional targets *and* allow the insights of FCA to improve decision-making and inform strategy. Reaching sustainability is a complex task which involves conflict, so balancing SCSs will also involve tension. However, tension can be beneficial to the organization as it improves creativity and mutual understanding.

Directions for future research include the investigation of the dynamics involved in top management adoption. The intended dual use of FCA by sustainability champions showed the negative effects of dynamic tensions in the lack of adoption of top management. A promising direction for future research is to study how top management *support* evolves into top management *adoption* of FCA. The processual, intra- and extra-organizational, factors of this change should be studied. This may uncover more insights surrounding the dynamics of working towards a sustainability institution and the potential benefits of dynamic tensions in FCA.

Another fruitful avenue for future research is to conduct a longitudinal study of cases which attempt to integrate FCA within MCSs in order to further test this paper's conceptual model. More nuanced insights into the complexity of this integration process can be found if the whole life cycle of an initiative is studied. Furthermore, critical success factors may be studied by comparing failed and successful FCA initiatives. Lastly, the moderating effect of monetization on using FCA to enhance cognitive integration could be studied in more detail.

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Appendix A

Interview Questions

Onderzoeksvraag: *How do processual aspects of management accounting change affect the integration of FCA in traditional Management Control Systems?*

Achtergrond interviewee

- Wat zijn de primaire verantwoordelijkheden als manager?
- Wat is het primaire doel van organisatie X?
- Sinds wanneer bij de organisatie?
- Grootste verschillen met duurzaamheid toen en nu, bij de werknemers?
- Hoe ziet u uw rol in de organisatie?
- Hoe zag de focus op duurzaamheid eruit toen vanaf het moment dat u bij de organisatie kwam?
- Op het operationele niveau, hoe merkt u de ambitie om klimaat-neutraal te zijn voor 2030 terugkomen?
- Hoe heeft u uw rol mbt duurzaamheid zien evolueren in de organisatie?
- Wat is in uw optiek de overkoepelende visie van de organisatie?

Context

- Hoe bent u als manager betrokken bij strategie?
- Met wat voor een soort regulations hebben jullie te maken gehad?
- Welke spelen er nu op dit moment?
    - Sector-niveau
    - Internationaal niveau
- Zet Organisatie X naast haar normale targets ook duurzaamheids targets?
- Wat is de rol van stakeholders (medewerkers, overheidsinstanties, media, klanten) geweest in de weg naar duurzaamheid?
    - Met welke stakeholders heeft Organisatie X het meest te maken?
    - Welke van deze stakeholders heeft het meeste invloed op de duurzaamheidstrategie: nationale politiek, gemeente, Europese politiek, de media, de lokale gemeenschap, wetenschap, werknemers, klanten
- Wanneer werd duurzaamheid een speerpunt in jullie organisatie?
- Zijn er in het verleden herstructureringen geweest?
- Wie in de organisatie zouden jullie omschrijven als ‘top management’?
- Staan zij ook achter deze duurzaamheids initiatieven?
- Zijn er ook werkgroepen waarin werknemers opgeleid worden op het gebied van duurzaamheid?
- Hoe is het FCA-programma onstaan?
- Hoe verloopt de execution van FCA?
- Wat is de voornaamste reden dat FCA metingen worden verricht, wat wordt ermee gedaan?
- Hoe beinvloed dit programma uw dagelijkse bezigheden?
- Hoe zie je duurzaamheid?

Use of Control Systems

- Hoe houden jullie bij of de strategie wordt gerealiseerd?
- Kunt u een voorbeeld geven van hoe je dit bijhoudt?
    - Autonoom vs. Strak erop?
- Welke performance dimensions meten jullie? Bijvoorbeeld shareholder returns, customer satisfaction
- Welke KPI's meten jullie?
- Hoe meten jullie deze performance? (zit hier duurzaamheid in?)
- Denk je dat hier verbetering nodig is?
- In hoeverre kan u duurzaamheids strategie beinvloeden?
- Welke incentives en beloningen geeft u de medewerkers?
- Waar word u op beoordeeld?
- Zijn er targets die er gehaald moeten halen?
- Wat is het termijn van de huidige targets?
- Zijn er ook bepaalde targets waarmee jullie je performance kunnen vergelijken?
- Wat zijn voorbeelden van targets die door u vaak gebruikt worden?

Wat zijn de grootste overeenkomsten en verschillen tussen de systemen die jullie gebruiken voor duurzaamheid en de meer traditionele aspecten (klant tevredenheid, financiele)

a. Gebruik
b. Zelfde rekenmethodes

Wie bepaalt de strategie in de organisatie?

c. Hoe worden control systemen voornamelijk gebruikt?
    i. Strategie implementeren
    ii. Terugkoppelen van ontwikkelingen die medewerkers zien om zo telkens de strategie aan te passen

- Geven jullie de duurzaamheid impacts een monetaire waarde?

Systems in place

- Sinds wanneer meten jullie deze duurzaamheids impacts
- Op wat voor een manier gebeurt dit?

FCA

- Kunnen jullie een voorbeeld geven van impacts vaak gemeten worden?
- Hoe stond het met de beschikbaarheid van data voordat dit geimplementeerd werd?
    - Hebben de vorige projecten geholpen (information systems) om het makkelijker te maken?
- Hoeveel verschillende manieren hebben jullie om performance op milieu-niveau te meten binnen de organisatie zelf?
- Is dit relatief meer dan op sociaal of economisch niveau?

- Hoe vaak is de performance ivm de dimensies van duurzaamheid op dezelfde manier geevalueerd?
- Welke manier van impact meten is de belangrijkste in jullie organisatie?
- Was er voor de implementatie hiervan ervaring met duurzaamheid indicatoren?
- Hoe blijken in jullie optiek, dus in de praktijk, duurzaamheid en kostenefficiency samen te gaan?
- Hoe sterk zou duurzaamheid omarmd worden als er geen ruimte was voor kost-besparingen binnen de organisatie en gehele supply chain?

1. Waar zien jullie **uitdagingen** van de impactanalyse?
    a. Technisch of sociaal niveau?
2. Waar zien je de uitdaging op strategisch niveau?
3. Geef je input terug aan stakeholders/managers mbt duurzaamheid?

Deployment

- Waar in de organisatie worden duurzaamheid metingen verricht?
- Hoe geschied de evaluatie hiervan?

Signaling

- Wat voor een duurzaamheids vraagstukken worden behandeld tijdens deze gesprekken met stakeholders?
- Wat zijn de verwachtingen van deze stakeholders?
- Wat voor een effect heeft het naar buiten communiceren van de impactanalyse gehad?

Top Management

- Wie in de organisatie zouden jullie omschrijven als 'top management'?
- Staan zij ook achter deze duurzaamheids initiatieven?
- Kunnen jullie daar een concreet voorbeeld van geven?

Collaboration

- Zijn er ook werkgroepen waarin werknemers opgeleid worden op het gebied van duurzaamheid?
    - Welke afdelingen gaan hier heen?

Hiring for sustainability

- Wat is de rol van de werknemers mbt duurzaamheid?
- Met jullie nieuwe strategie op het gebied van duurzaamheid, hoe vertaalt zich dat in interviews met mogelijke nieuwe medewerkers?
- Hoe zien jullie duurzaamheid

Cognitive

- Zouden jullie zeggen dat er tussen de afdelingen in de organisatie een zelfde understanding is over duurzaamheid?
- Hoe verspreid awareness over sustainability

Duurzaamheid gaat over sociaal, economisch en milieu perspectieven

- Hoe zijn verschillende perspectieven tot nu toe samengekomen in de organisatie en waar zien jullie dat in de toekomst?

Algemeen

- Wat zijn de grootste uitdagingen op dit moment om jullie impact te vergroten?
- Wat zijn de grootste voordelen van de impactanalyse
- De grootste nadelen?

Appendix B

Description Case A

Organisation A is a large governmental organisation in the Netherlands of around 900 employees. It has a functional task which includes providing sufficient and clean water as well as maintaining several roads.

The organisation invests in eight different aspects being water safety, containing floods, prevent water shortage, healthy water, clean water, safe roads, crisis control and board & organisation. In 2013 the SER[36] agreement was signed by Organisation A implying a commitment to sustainable growth. The aim is to become a representative governmental organisation by adopting a modern approach which applies innovative and sustainable techniques. The report which describes the organisation's MVO-vision[37] from December 2014 states "People, Planet and Profit are the starting points for collaboration with our environment." Furthermore, it also states the organisation: "steers from the MVO-policy towards performance which leads to increased societal value … we seek to provide insights on the social benefit of our core responsibilities and operations from People, Planet and Profit."

Furthermore, innovation and sustainability is stimulated by using an idea contest in which every department has to submit ideas to solve sustainability concerns. For example, 3D printing was proposed as a circular economy solution in the purification facilities. A target for Manager A is to finish research surrounding 3D printing and execute this solution in 2017. There has been a commercialisation of governmental organisations. Manager A states: "*in the past 6 years you notice an immense commercialisation of the government. Laissez faire is gone. You notice is a lot in our operations and our technical tasks … it is all connected to efficiency.*"

This fits in well with the TBL and hence, this case is classified under TBL FCA. The key people involved in this initiative were two sustainability champions: Manager A and Strategic Advisor A. Controller A was interviewed to gain more insight into the use of FCA and the use of MCSs.

Description Case B

Inspired by the trend of FCA analyses in the governmental sector, organisation B decided to design a FCA model. Organisation B is a large telecommunications company which applied the True Value methodology for their FCA model. They consulted the special advisor (part of one of the Big 4 accountants) to help monetize sustainability impacts. After 3 months the design phase was

[36] Sociaal Economische Raad - Social Economic Council
[37] Maatschappelijk Verantwoordelijke Organisatie - Socially Responsible Organisation

completed which was attributed to the high degree of information availability in the organization. During the implementation phase the sustainability manager played a big role. He has worked at the organization for 7 years and is now the key person for sustainability in the Dutch branch of the company. He is currently the sustainability champion of the organization. The FCA analysis was published shortly after the design phase which was assured by another Big 4 accountant. It was published for the first time in 2015 and for the second time in 2016.

Description Case C

Case B is a large transportation company which monetized its socio-economic and environmental impacts using a True Value methodology. Stakeholders were involved since 2014 in the design phase of FCA. Material impacts were selected and the Special Advisor was consulted during this phase. During the implementation phase in 2015 the FCA Expert (sustainability champion) became involved and started playing a key role in its integration into the organization. The Finance department of organisation C approached to help integrate FCA in the organization. The project was placed with Finance rather than the separate Sustainability department (established in 2011) to signal the integrated approach of this analysis. The analysis covered all impacts, rather than a focus on environmental impacts.

The previous CFO wanted the insights from the FCA model to be incorporated into 1 comprehensive KPI. However, plans to incorporate this into the organisation seized in November 2016. During these plans to establish 1 KPI for the total impact of the organisation, the special advisor and his team consulted about the potential design and implementation of such a target. Therefore, the special advisor was a key person in the FCA initiative.

Furthermore, the methodology is published externally to improve transparency surrounding the monetization of FCA as well as inspire other organisations to adopt FCA.

Description Case D

Organisation D is a large electronics company, headquartered in Germany, who is active in the energy and health-care market. Since the 1990s they have been focused on measuring social impacts. However, only since 2012 they have started to measure environmental impacts and have recently introduced FCA. Their policy statement reads “sustainability is the ideal balance between people, planet and profit.” Thus, this type of FCA can be classified under TBL FCA. The managers involved with sustainability were interviewed. Manager D is mainly involved in the external communication of sustainability and governance. CS Manager D (customer service manager) is responsible health & safety officer of two large business divisions. Thus, social impact measurement is mainly performed in by this manager.