Materiality in sustainability accounting: a critical realist perspective

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Materiality in Sustainability Accounting: 
A Critical Realist Perspective

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Thesis Declaration

I certify that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

I acknowledge that I have read and understood the University’s rules, requirements, procedures and policy relating to my higher degree research award and to my thesis. I certify that I have complied with the rules, requirements, procedures and policy of the University (as they may be from time to time).

周宇

Yining Zhou

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Publications

Research Award
The 11th Elmer B. Staats Award (2013), *The International Organization of Supreme Audit Institutions (INTOSAI)*, for the best article published in the INTOSAI journal from 2010 to 2012.

Journal articles

Papers in Edited Conference Proceedings.
Communications / Opinions related to research


Abstract

This thesis extends the existing understanding of materiality in sustainability accounting by interrogating it from a critical realism perspective. Materiality, long emphasized as one of the cornerstones of accountancy, refers to the significance of an issue for decision-making purposes. It rests on a basic logic that holds that a person or institution should take action on what really matters. Drawing on insights from four parent disciplines, including financial accounting, sustainability accounting, accountability, and stakeholder theory, this research articulates a consolidated, objective reality of the materiality phenomenon that underlies the context-specific and sometimes contradictory empirical observations of materiality practices.

This consolidated conceptualization of materiality in sustainability accounting is constructed by applying Bhaskar’s (1975, 2008) model for the logic of scientific discovery, in order to build a model of heterogeneous stakeholder materiality (HSM), which is postulated as a mechanism that can be tested empirically. This mechanism of heterogeneous stakeholder materiality begins with a knowledge claim stating the variation in materiality between two issues, and then reveals a process and structure through which materiality practices enable a firm to discharge its accountability to many heterogeneous stakeholders.

Although the mechanism itself is not directly observable, the critical realism paradigm stratifies reality into the real, actual and empirical domains, and then enables an understanding of the mechanism and structure ascribed to the real domain and that which underlies the observable phenomena. The empirical confirmation of the mechanism was conducted in two significantly different contexts. The first setting is a slowly developing but complex system involving Exxon, a multinational corporation with many diverse stakeholders. Actions taken by Exxon and its major stakeholders are analysed across four issues: the Valdez oil spill, an oil pipeline leak in Montana, funding of weapon purchases in Angola, and the funding of climate change sceptic organizations.

The second setting involves a longitudinal field study in a small, isolated rural village comprising a family-owned farm and three stakeholders. This second setting is used in this research to approximate the critical realist condition of closure. The results from both settings confirm the fundamental process and structure postulated in the mechanism. The empirical
confirmations are followed by an exploration of the transfactual operation of the mechanism and its practical implications in managing sustainability issues.

This thesis also explores the theme ‘empirical falsification’ and its implications for sustainability management practice, using two particular sustainability issues by which the mechanism appears to be falsified. Both issues echo the deliberations of Bhaskar (2008) and Sayer (1992) concerning two possible conditions where empirical phenomena seemingly contradict the mechanism: one is where the mechanism is not activated, and the other is where other mechanisms intervene in the empirical results.

The main contributions of this research are trifold. First, it contributes to accounting theory by addressing theoretical deficiencies in the current conceptualizations of materiality, and integrating interdisciplinary insights into materiality knowledge. Second, this study sheds light on sustainability management practices by illustrating the practical value of the mechanism in predicating the firm’s behaviour with respect to issues, evaluating possible sustainability management solutions, and informing innovation management. Third, this study enriches accounting research methodology by applying the critical realism research paradigm to solve a fundamental accounting problem, thereby demonstrating both the relevance and method of application of this paradigm in accounting research.
# Contents at a Glance

Chapter 1 Introduction ..................................................1  
Chapter 2 Literature Review ...........................................26  
Chapter 3 Research Method ............................................98  
Chapter 4 Models of Heterogeneous Stakeholder Materiality ..........132  
Chapter 5 Empirical study I: ...........................................156  
Chapter 6 Empirical Study II: ..........................................176  
Chapter 7 Empirical Study III: .........................................231  
Chapter 8 Empirical Study IV: .........................................246  
Chapter 9 Discussion ....................................................265  
Chapter 10 Conclusion ..................................................286  

Reference list ............................................................296
# Table of Contents

## Chapter 1 Introduction

1.1 The concept of materiality

1.1.1 Materiality in financial accounting

1.1.2 Transfer of traditional accounting concepts to sustainability accounting

1.1.3 Transfer of the materiality concept to sustainability accounting

1.2 Interdisciplinary perspectives of materiality

1.2.1 Financial accounting and materiality

1.2.2 Sustainability accounting and materiality

1.2.3 Stakeholder theory and materiality

1.2.4 Accountability and materiality

1.3 Research Method

1.3.1 Research questions and method

1.3.2 Critical realism

1.3.3 Abduction

1.4 Overview of the thesis

1.5 Definitions of key terms

## Chapter 2 Literature Review

2.1 Topic 1: Materiality in financial accounting

2.1.1 Background of the materiality concept

2.1.2 Materiality defined in financial accounting

2.1.3 Rules of thumb and other quantitative models

2.1.4 Qualitative considerations

2.1.5 The likelihood continuum approach

2.1.6 A summary of Topic 1

2.2 Topic 2: Materiality in sustainability accounting

2.2.1 Theme 1: Call for materiality of sustainability issues

2.2.2 Theme 2: Critique of definitional streams of materiality in sustainability accounting contexts

2.2.3 Theme 3: Materiality assessment of sustainability issues

2.2.4 Theme 4: A managerial focus of sustainability accounting materiality
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.5 Theme 5: Context-specific materiality practices</td>
<td>62</td>
</tr>
<tr>
<td>2.2.6 Theme 6: The demise of the ‘rules of thumb’ materiality model</td>
<td>63</td>
</tr>
<tr>
<td>2.2.7 A summary of Topic 2</td>
<td>65</td>
</tr>
<tr>
<td>2.3 Topic 3: Accountability and Materiality</td>
<td>66</td>
</tr>
<tr>
<td>2.3.1 The concept of accountability</td>
<td>67</td>
</tr>
<tr>
<td>2.3.2 An analytic framework of accountability</td>
<td>69</td>
</tr>
<tr>
<td>2.3.3 The accountability reference to materiality in financial accounting</td>
<td>74</td>
</tr>
<tr>
<td>2.3.4 The accountability reference to sustainability accounting materiality</td>
<td>76</td>
</tr>
<tr>
<td>2.3.5 Implications of the accountability references to materiality</td>
<td>81</td>
</tr>
<tr>
<td>2.3.6 The school of critical accountability and its implications to this research</td>
<td>83</td>
</tr>
<tr>
<td>2.4 Topic 4: Stakeholder theory and materiality</td>
<td>86</td>
</tr>
<tr>
<td>2.4.1 Insight 1: The stakeholder heterogeneity paradigm and materiality</td>
<td>86</td>
</tr>
<tr>
<td>2.4.2 Insight 2: The stakeholder inclusivity principle and materiality</td>
<td>90</td>
</tr>
<tr>
<td>2.5 Research Questions</td>
<td>95</td>
</tr>
<tr>
<td>2.6 Concluding remarks</td>
<td>97</td>
</tr>
</tbody>
</table>

**Chapter 3 Research Method**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 The four research paradigms</td>
<td>99</td>
</tr>
<tr>
<td>3.1.1 Positivism</td>
<td>99</td>
</tr>
<tr>
<td>3.1.2 Constructivism</td>
<td>100</td>
</tr>
<tr>
<td>3.1.3 Critical theory</td>
<td>100</td>
</tr>
<tr>
<td>3.1.4 Critical realism</td>
<td>101</td>
</tr>
<tr>
<td>3.2 Justification of critical realism for this study</td>
<td>102</td>
</tr>
<tr>
<td>3.3 Critical realist terminology and its relevance to this thesis</td>
<td>101</td>
</tr>
<tr>
<td>3.3.1 Subjects and objects</td>
<td>101</td>
</tr>
<tr>
<td>3.3.2 Causal powers of objects</td>
<td>101</td>
</tr>
<tr>
<td>3.3.3 Structures</td>
<td>102</td>
</tr>
<tr>
<td>3.3.4 Events</td>
<td>103</td>
</tr>
<tr>
<td>3.3.5 Mechanisms</td>
<td>103</td>
</tr>
<tr>
<td>3.3.6 Condition and context</td>
<td>103</td>
</tr>
<tr>
<td>3.3.7 Stratification of reality</td>
<td>105</td>
</tr>
<tr>
<td>3.3.8 Epistemic fallacy, empirical falsification and critique of empiricism</td>
<td>105</td>
</tr>
<tr>
<td>3.4 Bhaskar’s logic of scientific discovery</td>
<td>106</td>
</tr>
<tr>
<td>3.4.1 The logic of scientific discovery</td>
<td>110</td>
</tr>
</tbody>
</table>
Chapter 5: Empirical study I: Confirming the HSM mechanism in a complex closed system (the Exxon Case)

5.1 Closure, transparency and particular issues
5.1.1 An assumed closed system
5.1.2 The particular issues for the mechanism test
5.1.3 The transparency condition
5.2 The accounts of issues and quantification of provoked actions
5.2.1 Quantification of stakeholder actions
5.2.2 The firm’s managerial and reporting action levels
5.3 The four issues
5.3.1 Issue one: Valdez Oil Spill
5.3.2 Issue two: Montana Pipeline Oil leak
5.3.3 Issue three: Angola-gate Scandal
5.3.4 Issue four: Funding of Global Warming Sceptic Organizations
5.4 The HSM structure of the Exxon case
5.5 Empirical verification of the lemma of consistent change
5.6 Concluding remarks

Chapter 6: Empirical Study II: Confirming the HSM Mechanism in a Simple Closed System (the Fu farm Case)

6.1 Overview
6.2 Field experiment in natural settings
6.2.1 Closure condition
6.2.2 Field experiment in real-life or natural settings
6.3 The case setting
6.3.1 The Fu farm
6.3.2 Stakeholders
6.3.3 Closure, stability and simplicity
6.3.4 Transparency
6.3.5 Issues
6.4 Data collection and analysis
6.4.1 Data collection
6.4.2 Quantification of the issue-provoked actions of stakeholders .......................... 185
6.4.3 Quantification of the firm’s managerial actions .................................................. 186
6.4.4 Informational levels of informal reporting practices in this setting ...................... 188
6.5 The sustainability issues identified from the field study ........................................ 192
6.5.1 Sustainability theme one: Pig waste management .............................................. 193
6.5.2 Sustainability theme two: Fish pond waste management .................................. 197
6.5.3 Sustainability theme three: Safety management ................................................ 201
6.5.4 Sustainability theme four: Water management .................................................. 205
6.5.5 Sustainability theme five: Pond ecosystem management ................................... 209
6.5.6 Sustainability theme six: Livestock health management ................................... 214
6.6 The empirical illustration of the HSM structure ..................................................... 217
6.6.1 The transparency condition .............................................................................. 221
6.6.2 Heterogeneous stakeholder actions .................................................................. 219
6.6.3 Firm’s response to stakeholder action ................................................................ 221
6.6.4 Informal accounts ............................................................................................ 221
6.6.5 Correlation between material and information action levels ............................. 222
6.7 Empirical testing of the HSM mechanism ............................................................... 224
6.7.1 Testing the mechanism within one sustainability theme: an example .................. 225
6.7.2 A full account of action levels for all 18 issues ................................................ 225
6.7.3 An empirical reflection on the critical accountability perspectives ..................... 227
6.8 Concluding remarks .............................................................................................. 229

Chapter 7 Empirical Study III: Transfactual operation and practical implications of the HSM mechanism (the Fu farm case continued) .................................................. 231
7.1 Transfactuality....................................................................................................... 231
7.2 The complete materiality index ............................................................................. 232
7.2.1 The materiality account of observable issues ..................................................... 232
7.2.2 The unidentified stakeholder action sets .......................................................... 233
7.2.3 The complete materiality index ......................................................................... 236
7.3 Transfactuality and predicative tests ..................................................................... 237
7.3.1 Transfactual operation of the mechanism in the Fu farm .................................. 237
7.3.2 Hypothetical issue 1: pig waste discharged to a nearby stream ....................... 238
7.3.3 Hypothetical issue 2: the muscle-building agent .............................................. 239
7.4 Evaluating solutions to sustainability problems .................................................... 240
7.4.1 Four alternative solutions ............................................ 240
7.4.2 Evaluation of solutions .................................................. 243
7.4.3 Comparison with Fu’s solution preferences......................... 243
7.5 Concluding remarks....................................................... 245

Chapter 8 Empirical Study IV: the HSM Mechanism Survives Empirical Falsifications
(the Zhong and Hui farms cases) .............................................. 246
8.1 Introduction ................................................................. 246
8.2 The Zhong farm case ....................................................... 247
8.3 The Hui farm case ......................................................... 253
  8.3.1 Background of the Hui farm ....................................... 253
  8.3.2 Issue Hui (1): Large investment to resolve a seemingly insignificant issue----254
  8.3.3 Involvement of other issues in managerial action .................. 255
  8.3.4 Analysis of apparent empirical falsification ...................... 258
8.4 Implications of empirical falsifications in practice .................. 260
  8.4.1 Context-specificity: a critical realism justification ................ 260
  8.4.2 Transparency results from stakeholders’ effort to overcome the firm’s preference for non-transparency ........................................... 261
  8.4.3 Plurality of mechanisms and innovation potential............... 261
8.5 Concluding remarks....................................................... 263

Chapter 9 Discussion ................................................................ 265
9.1 The critical realism account of materiality .............................. 265
  9.1.1 An overview of the critical realism account of materiality .......... 266
  9.1.2 The conceptual component ......................................... 267
  9.1.3 Empirical manifestations of the HSM mechanism .................. 269
  9.1.4 Empirical falsifications and context-specific materiality practice .................. 271
  9.1.5 The critical realism explanation of materiality phenomenon ....... 272
9.2 The critical realism ontology of this research .......................... 274
9.3 The critical realism epistemology of this research .................... 277
  9.3.1 Abductive logic in this materiality research ...................... 277
  9.3.2 Limitations of deduction and induction in researching the nature of materiality ----278
  9.3.3 Abduction in the thesis: an overview ............................. 279
  9.3.4 Three forms of knowledge ......................................... 282
9.4 Concluding remarks .................................................................284

Chapter 10 Conclusion ..................................................................286
10.1 Responses to the research questions ........................................286
10.2 Contributions to sustainability practices .................................288
10.3 Contributions to accounting research methodology ..................289
10.4 Reflections on the critical accountability school ......................291
10.5 Limitations and future research ..............................................292
10.6 Summary of the chapter .......................................................294

Reference list .............................................................................296

Appendix 1: The data sources of the Exxon case study ..................313
List of Figures

Figure 1.1 .................................................................................................................. 21
Figure 2.1 .................................................................................................................. 51
Figure 2.2 .................................................................................................................. 54
Figure 2.3 .................................................................................................................. 55
Figure 2.4 .................................................................................................................. 61
Figure 2.5 .................................................................................................................. 68
Figure 2.6 .................................................................................................................. 68
Figure 3.1 .................................................................................................................. 107
Figure 3.2 .................................................................................................................. 108
Figure 3.3 .................................................................................................................. 111
Figure 3.4 .................................................................................................................. 129
Figure 4.1 .................................................................................................................. 136
Figure 4.2 .................................................................................................................. 141
Figure 4.3 .................................................................................................................. 144
Figure 4.4 .................................................................................................................. 147
Figure 4.5 .................................................................................................................. 151
Figure 5.1 .................................................................................................................. 169
Figure 5.2 .................................................................................................................. 174
Figure 6.1 .................................................................................................................. 180
Figure 6.2 .................................................................................................................. 218
Figure 6.3 .................................................................................................................. 222
Figure 6.4 .................................................................................................................. 224
Figure 8.1 .................................................................................................................. 253
Figure 8.2 .................................................................................................................. 259
Figure 9.1 .................................................................................................................. 266
Figure 9.2 .................................................................................................................. 267
Figure 9.3 .................................................................................................................. 273
Figure 9.4 .................................................................................................................. 274
Figure 9.5 .................................................................................................................. 278
Figure 9.6 .................................................................................................................. 279
Figure 9.7 .................................................................................................................. 281
List of Tables

Table 1.1 ........................................................................................................................... 15
Table 2.1 ........................................................................................................................... 73
Table 2.2 ........................................................................................................................... 75
Table 2.3 ........................................................................................................................... 79
Table 2.4 ........................................................................................................................... 95
Table 3.1 ........................................................................................................................... 108
Table 3.2 ........................................................................................................................... 118
Table 3.3 ........................................................................................................................... 130
Table 5.1 ........................................................................................................................... 159
Table 5.2 ........................................................................................................................... 160
Table 5.3 ........................................................................................................................... 161
Table 5.4 ........................................................................................................................... 161
Table 5.5 ........................................................................................................................... 170
Table 5.6 ........................................................................................................................... 171
Table 5.7 ........................................................................................................................... 172
Table 6.1 ........................................................................................................................... 185
Table 6.2 ........................................................................................................................... 186
Table 6.3 ........................................................................................................................... 189
Table 6.4 ........................................................................................................................... 190
Table 6.5 ........................................................................................................................... 192
Table 6.6 ........................................................................................................................... 224
Table 6.7 ........................................................................................................................... 226
Table 6.8 ........................................................................................................................... 226
Table 7.1 ........................................................................................................................... 232
Table 7.2 ........................................................................................................................... 234
Table 7.3 ........................................................................................................................... 235
Table 7.4 ........................................................................................................................... 235
Table 7.5 ........................................................................................................................... 235
Table 7.6 ........................................................................................................................... 236
Table 7.7 ........................................................................................................................... 243
Table 7.8 ........................................................................................................................... 244
Table 9.1 ........................................................................................................................... 269
List of Images

Image 6.1 .................................................................................................................. 195
Image 6.2 .................................................................................................................. 197
Image 6.3 .................................................................................................................. 199
Image 6.4 .................................................................................................................. 201
Image 6.5 .................................................................................................................. 204
Image 6.6 .................................................................................................................. 205
Image 6.7 .................................................................................................................. 212
Image 6.8 .................................................................................................................. 215
Image 8.1 .................................................................................................................. 250
Image 8.2 .................................................................................................................. 250
Image 8.3 .................................................................................................................. 250
Image 8.4 .................................................................................................................. 250
Image 8.5 .................................................................................................................. 252
Image 8.6 .................................................................................................................. 255
Image 8.7 .................................................................................................................. 255
Image 8.8 .................................................................................................................. 257
**List of Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA1000APS</td>
<td>AA1000 AccountAbility Principles Standard</td>
</tr>
<tr>
<td>AASB</td>
<td>Canada Auditing and Assurance Standards Board</td>
</tr>
<tr>
<td>ACCA</td>
<td>Association of Chartered Certified Accountants</td>
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<tr>
<td>AICPA</td>
<td>American Institute of CPAs</td>
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<td>APB</td>
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<td>ASRB</td>
<td>Accounting Standards Review Board</td>
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<td>CGA-Canada</td>
<td>Certified General Accountants Association of Canada</td>
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<td>Canadian Institute of Chartered Accountants</td>
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<td>CSR Europe</td>
<td>European Business Network for Corporate Social Responsibility</td>
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<td>FASB</td>
<td>Financial Accounting Standards Board</td>
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<tr>
<td>GAGAS</td>
<td>General Accepted Government Auditing Standards</td>
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<tr>
<td>GRI</td>
<td>Global Reporting Initiatives</td>
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<td>International Accounting Standards Board</td>
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<td>International Accounting Standards Committee</td>
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<td>IIRC</td>
<td>International Integrated Reporting Council</td>
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<tr>
<td>IMA</td>
<td>Institute of Management Accountants</td>
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<tr>
<td>ISEA</td>
<td>Institute of Social and Ethical AccountAbility</td>
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<tr>
<td>NRTEE</td>
<td>National Round Table on the Environment and the Economy</td>
</tr>
<tr>
<td>NZSA</td>
<td>New Zealand Society of Accountants</td>
</tr>
<tr>
<td>PSASB</td>
<td>Public Sector Accounting Standards Board</td>
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<td>SASB</td>
<td>Sustainability Accounting Standards Board</td>
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<tr>
<td>SEC</td>
<td>Securities and Exchange Commission</td>
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<td>TSX</td>
<td>Toronto Stock Exchange</td>
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</tbody>
</table>
Chapter 1

Introduction

The aim of this thesis is to advance our understanding of the concept of materiality within a sustainability accounting context. The journey of exploration that this thesis embodies starts by examining a trend within accountancy knowledge development that sustainability accounting knowledge can be traced back to traditional financial accounting knowledge (Lamberton, 2005). This trend is being embraced by the sustainability accounting community in its effort to generalize a number of financial accounting concepts to the territory of sustainability associated with corporate environmental and social performance, thereby leading to the construction of a list of concepts such as environmental cost, natural capital, natural inventory, and environmental liabilities (Hearth, 2005; Nyquist, 2000).

One hotspot in this trend is the sustainability accounting conception and the application of materiality. Materiality is regarded as one cornerstone concept in accountancy, for, as Hicks (1964, p.171) states, “in no aspect of accounting is judgement more important than in applying the concept of materiality”. In essence, the rationale within the materiality concept refers to it being reasonable to allocate resource, time and effort to what matters, instead of what is deemed to be trivial (Hicks, 1964; APB, 1995; Jeffries, 1981). In the financial context, materiality is defined in a focus of reporting practices, thereby signifying a requirement for the organization to include all information significant to shareholders into its financial reports. In sustainability accounting, *materiality* is regarded as a foundation concept in sustainability reporting and management (GRI G3, 2000-2011; GRI G4, 2013). In contrast, *materiality practices* refer to a process of determining what issues are material, and taking responsive actions to address these material issues (AccountAbility, 2006; 2008; Eccles & Serafeim, 2013; GRI G3, 2000-2011; GRI G4, 2013; GRI G4 Implementation Manual, 2013; Khan, Serafeim & Yoon, 2015; Murninghan, 2013).

Nevertheless, sustainability accounting standards such as GRI G3 (2000-2011), GRI G4 (2013) and AA1000APS (AccountAbility, 2008) reflect the current understanding of materiality, which has been strongly influenced by the long-established meaning of
materiality within financial accounting (Zadek & Merme, 2003). This reliance on the financial accounting conceptualization of materiality fails to address the complexity of the stakeholder environment context, where firms need to take account of not only economic but also social and environmental issues. The current state of materiality understanding has not achieved answers for questions resulting from stakeholder complexity, such as the view that ‘all stakeholders’ or ‘only primary stakeholders’ should be taken into the scope of materiality, all of which relates to the issue of how to address heterogeneous interests and expectations among stakeholders within a materiality framework. Failure to address the complexity of stakeholder environment confines the ability of researchers and practitioners to understand the materiality phenomenon emerging from the growing practice of sustainability accounting. Moreover, it militates against maximizing the potential of this critically important concept in the context of managing and reporting on sustainability issues.

Another critical limitation to understand materiality results from its inherent context-specificity. The sustainability accounting literature has emphasized that materiality practices vary across different organizational and time settings (SASB, 2011; AccountAbility, 2006; Eccles & Serafeim, 2013). To illustrate, the same sustainability issue may be more material to an organization, but less material to another; and for the same organization, the issue may be more material at one time, but less material at another time. Unfortunately, in previous research on this matter, the phenomenon of context-specific materiality practices presents more as an undisputed fact than an investigation opportunity that has the potential to deepen materiality knowledge. Indeed, no effective explanation has been found in the literature dealing with this context-specific phenomenon, all of which has led to inconsistent or even contradictory observations of current materiality practices. An acknowledgement of the limitations of our current understanding of materiality practices informs an engagement with the critical realism paradigm, which has rarely been adopted in accounting research (Bisman, 2010). This paradigm has the potential to help us to explore the nature of such a complex phenomenon within contextual observations in different conditions and settings (Bhaskar, 2008; Sayer, 1992; Modell, 2009; Danermark, Elstrom, Jakobsen & Karlsson, 2002).

In summary, this thesis endeavours to generate two important insights on accountancy literature. First, it advances the existing materiality understanding with a new perspective of conceptualizing and applying materiality in sustainability accounting practices. Second, this thesis provides a concrete research case to inform accounting researchers with regard to how
the critical realism paradigm can be adopted in the context of accountancy research, thereby enriching the accounting methodology knowledge.

This chapter continues with a discussion of materiality as a social phenomenon, followed by the background to the research problem, where the materiality concept has been generalized from the financial accounting to the sustainability accounting context. A discussion of the four parent disciplines which this research draws on and their connections to materiality in sustainability accounting is provided. The primary and secondary research questions are presented together with a discussion of the knowledge gaps which this research addresses. The chapter concludes with a discussion of the interdisciplinary nature of the research and the chosen research methodology which is based on the critical realism paradigm, followed by an overview of the thesis, and a list of definitions of key terms used in this thesis.

1.1 The Concept of Materiality

Accountancy is regarded as a social phenomenon in which the practice of accounting exists as a reflection of human behaviours (Bisman, 2010; Burchell, Clubb, Hopwood, Hughes & Nahapiet, 1980; Henderson, Peirson & Brown, 1992). Accounting practices have also been described as life experiences in social and organizational settings (Hopwood, 1983; Parker, 2012). As a form of accounting practice, materiality is a social phenomenon pertaining to judging the significance of issues, taking appropriate actions and allocating resources to resolving material issues. The materiality phenomenon is observed in normal daily life, regardless of whether the social actors have been educated in the accounting concept of materiality. Bernstein (1973, p.68) states that:

The concept of materiality is part of the wisdom of life. Its basic meaning is that there is no need to be concerned with what is not important or with what does not matter. Man’s work is burdensome enough without his having to pay attention to trivia.

The concept of materiality, long emphasized as one of the cornerstones of accountancy (Edgley, 2014; Frishkoff, 1970; Lee, 1984), is generally used in reference to the significance of an issue for decision-making purposes (FASB, 1980; SEC, 1999). Hicks (1964, p.158) simply explains materiality by saying “if it doesn’t matter, don’t bother with it”, and he refers
to this as “the elementary proposition of materiality”. Similar to Hicks, the APB (1995, para.3) defines materiality as “an expression of the relative significance or importance of a particular matter”. Jeffries (1981, p.13) similarly defines materiality as “an index of time and trouble in relation to the amount in question”.

The following example presented by FASB (2008a) explains materiality as a social phenomenon, as well as an accounting concept. It does so by using a job application case. The agency provides the job applicant with items of information about the job. Certainly, the applicant should be informed of some items, including the duties and location of the job, payment and workload, all of which affect the applicant’s decision whether to take the job. These items are therefore all material. But some items, such as whether the office floor is carpeted, are immaterial. This is because they make no difference to the applicant in forming a decision to accept the job or not; that is, immaterial items “are not important enough to matter” (FASB, 2008a, note 126).

This example shows the wider application of materiality as it assists the applicant to identify the relevance of both economic and social aspects of the job. Hicks (1964, p.159) argues that materiality is a social phenomenon beyond financial accounting consideration:

… [M]ateriality is not solely an accounting consideration, as some of the literature on the subject would seem to suggest. In fact, the concept is widely and frequently used. For example, when a business executive, applying the technique of “management by exception”, cuts through to the matters of significance, he is recognizing materiality. When the president of a corporation, presenting non-financial data in reports to stockholders, prunes away details, he is recognizing materiality.

This quote from Hicks firmly locates the application of materiality beyond solely accounting matters, and underscores its relevance to management, a theme explored later in this thesis. The next section examines the application of materiality in financial accounting, as this practice has determined how materiality is defined in sustainability accounting.

1.1.1 Materiality in Financial Accounting

Materiality in financial accounting is operationalized with a specific focus on reporting issues
that matter to shareholders and other users of external financial reports. A typical definition of materiality in financial accounting is provided by FASB (2008b, CoN 2-6):

The magnitude of an omission or misstatement of accounting information that, in light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would have been changed or influenced by the omission or misstatement.

Similar definitions of materiality have been established by international and national financial accounting standards, including Australian AASB (2013), IASB (2006), and SEC (1999).

In practice, financial accountants often apply the materiality concept by using a numeric model or ‘rule of thumb’, where a pre-set percentage of an accounting subject is selected as the threshold to determine whether an item is material or not (Messier, Martinov-Bennie & Eilifsen, 2005). For example, 5 percent of pre-tax income may be selected as the threshold or materiality level, where a misstatement of a financial item larger than this amount is considered material, and a misstatement of less than this amount is regarded as immaterial (Chewning, Weeler & Chan, 1998; Leslie, 1985). Over-reliance on quantitative rules of thumb may lead to the omission of some issues, which, although of small financial value, may still be significant to shareholders (del Corte, Garcia & Laviada, 2010; Levitt, 1998; SEC, 1999). SEC (1999, SAB 99) proposes a series of qualitative considerations for financial materiality such as “whether the misstatement changes a loss into income or vice versa” and “whether the misstatement involves concealment of an unlawful transaction”.

In short, the logic of Hicks and others with respect to materiality being the things that matter remains as the financial accounting conceptualization of materiality. The next section provides a discussion of how this conceptualization of materiality has been transferred to sustainability accounting.

1.1.2 Transfer of Traditional Accounting Concepts to Sustainability Accounting

A new, but rapidly growing, domain of accountancy knowledge is sustainability accounting, also known as ‘social accounting’, ‘environmental and social accounting’, or ‘corporate responsibility accounting’ (Gray et al., 1997; Mathews, 1997). Sustainability accounting
requires the disclosure of both financial and non-financial issues concerning the organization and its stakeholders, with the aim of enabling the organization to achieve a more sustainable level of performance. This performance is recognized as including economic, ecological, and social aspects (Gray et al., 1997; Mathews, 1997).

John Elkington (1987) put forward the Triple Bottom Line (TBL) concept and proposes a rationale for viewing sustainable development as a plurality of economic, social and environmental aspects (Major, 2005; Wilson, 2003). Sustainability accounting is viewed by several authors as a subset of accounting in recording, analyzing and reporting the environmental, social and economic issues, namely, sustainability issues (Bebbington, Brown & Frame, 2007; Crowther, 2000; Schaltegger & Burritt, 2010), all of which aligns with the Triple Bottom Line view.

Lamberton (2005, p.14) describes the phenomenon of generalizing accounting concepts and techniques from the traditional (financial) accounting to sustainability accounting as being one where

… most of the various approaches to sustainability accounting draw on traditional accounting principles and practice … providing familiar principles to navigate through the unfamiliar territory of ecology and sustainability.

The accounting concepts that have been extrapolated to the sustainability context include ‘environmental cost’ (Macve, 2000), ‘natural capital’ (Costanza & Daly, 1992; Costanza et al., 1997), ‘natural inventory’ (Gray, 1993; Jones & Matthews, 2000), ‘environmental assets’ and ‘environmental liabilities’ (Heal & Kunreuther, 2008), all corresponding to the respective financial archetypes of cost, capital, inventory, asset and liability.

Some researchers (Hearth, 2005; Nyquist, 2000) regard this transfer from the financial to the sustainability accounting context as problematic, more so given the strong focus on non-financial issues in sustainability accounting. Nyquist (2000) investigates whether environmental reports should be based on existing accounting theory by examining eight traditional accounting principles, including cost, realization, matching, objectivity, materiality, full disclosure, consistency and conservatism. Nyquist concludes that some of these accounting principles are difficult to apply in an accounting context that focuses on non-
financial issues. The author therefore argues that further development in traditional accounting theory is required to enable application to sustainability accounting (p.185). In a study on “natural resource accounting”, Herath (2005, p.1047) asserts that “Traditional accounting procedures did not include the depletion of natural resources since they were considered to be available in plentiful supply and hence their values were low”. Herath (2005) emphasizes that a major problem constraining progress in sustainability accounting is that it is difficult to measure the value of natural resources. As a result, Herath has called for multi-disciplinary support to develop sustainability accounting.

1.1.3 Transfer of the Materiality Concept to Sustainability Accounting

The materiality concept is a hotspot for members of the sustainability accounting community who continuously seek its appropriate generalization from the financial to the sustainability domain, highlighting the core role of materiality in sustainability reporting and management (AccountAbility, 2006, 2008; Deegan & Rankin, 1997; GRI G3, 2000-2011; GRI G4, 2013; Murninghan, 2013; Zadek & Merme, 2003).

A problem confronting organizations is that they have to deal with complex sustainability issues, many of which involve not only financial, but also ecological and social aspects concerning a wide range of stakeholders (AccountAbility, 2006; Birkin, 2000; Lamberton, 2003; Gray, 1997). In reporting these complex issues to stakeholders, the ‘take-the-lot’ or ‘broadband’ approach, used in an effort to cover as many as possible data to meet the full information demands, is costly, time-consuming and information overloaded for both stakeholders and the organizations themselves. This possibly comes with risking a reduction of trust from stakeholders, who may suspect that the reporting organizations are deliberately disguising the important issues (Accountability CSR Europe, 2002; Zadek & Merme, 2003). To address this problem, sustainability accounting researchers advocate a materiality concept, considering it an effective instrument enabling the management to identify, select and prioritize significant issues from the enormous array of issues relevant to the corporate sustainability performance (AccountAbility, 2006; Deloitte, 2012; KPMG, 2014; Zadek & Merme, 2003).

Institutional efforts on redefining materiality have been evidenced in sustainability accounting standards (GRI, AA1000APS, IIRC and SASB), and in standard-related studies

The information in a report should cover topics and indicators that reflect the organization’s significant economic, environmental, and social impacts or that would substantively influence the assessments and decisions of stakeholders (G3, 2000-2011, p.8).

In addition to the role of materiality in reporting practice, sustainability accounting literature highlights the role of materiality in managerial practices, where the firm should not only include material issues in sustainability reporting, but also manage them with an input of resources and efforts (AccountAbility, 2006; 2008; KPMG, 2014; Murninghan, 2013).

1.2 Interdisciplinary Perspectives of Materiality

This research is based on the view that the conception of materiality in a sustainability context is informed by each of the disciplines involving financial accounting, sustainability accounting, stakeholder theory and accountability. Interdisciplinary study is neither multidisciplinary, merely bridging relevant disciplinary insights, nor transdisciplinary, synthesizing theories and concepts from different disciplines (Repko, 2008, pp.13-15). An interdisciplinary approach involves reconciling conflicting insights from different disciplines and creating a new integrative body of knowledge (Repko, 2008). In the following sections, the knowledge from each of the four disciplines that is relevant to materiality conception is identified and critiqued.

1.2.1 Financial Accounting and Materiality

The practices of financial accounting are governed by financial accounting standards, where the materiality concept, along with four other concepts (relevance, reliability, understandability and comparability), is regarded as the basic framework underpinning accounting (Chew & Parkinson, 2013; FASB, 2008b). The essential role of materiality to
financial accounting is governed by financial accounting standards (Edgley, 2013; Frishkoff, 1970; Messier et al., 2005). These reflect the basic logic of materiality as prioritizing issues that matter (APB, 1995; Bernstein, 1973; Hicks, 1964; Jeffries, 1981).

Myers (2001) identifies that financial accounting standards are underpinned by the assumption that external financial users form a homogeneous group with identical information needs, behaviour and judgement. Homogeneity means that shareholders are assumed to share the same interests, and take the same economic decision and action using the same information about financial performance (Myers, 2001). Although the accounting literature does not focus on conceptualizing financial materiality under the shareholder homogeneity assumption, this assumption is inherent to financial accounting standards.

‘Homogeneity’ is a critical point for this thesis in reconstructing the materiality concept in the context of sustainability accounting. In Chapter 2, the homogeneity assumption is critiqued, thereby leading to the reconstruction of the materiality concept based on the heterogeneity paradigm in Chapter 4. The next section provides an overview of the current understanding of the materiality concept in sustainability accounting.

1.2.2 Sustainability Accounting and Materiality

Sustainability accounting draws many of its principles and concepts from financial accounting (Gray, 2001; Lamberton, 2003). Therefore, the logic underpinning the conceptualization of materiality in sustainability accounting follows that of financial accounting; that is, the system of accounting established to measure and report on financial issues has been transferred to the system of sustainability accounting, which is designed primarily to report on environmental and social issues.

There are three variations in how materiality is understood within sustainability accounting literature, where the variations depend on to whom the issue is material:

- Some researchers define materiality in general non-accounting terms as meaning “insignificance”, “importance” or “relevance”, all without identifying to whom a sustainability issue is material (Alison & Sean, 2004; Casey, 2006; Deegan & Rankin, 1997).

• The mainstream view within the sustainability accounting discipline and especially within standard setting institutions (AccountAbility, 2006; 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2013; KPMG, 2014; Zadek & Merme, 2003) is to consider the materiality of an issue to a wide range of stakeholders rather than the narrower shareholder-only focus.

The central role of materiality in sustainability accounting is reinforced in prior research (Accountability, 2006; Muriningham, 2013; Zadek & Merme, 2003), in the GRI sustainability accounting framework, and in the AccountAbility Assurance standards. GRI (G3) and (G4) classify materiality as the core principle in sustainability accounting. The AccountAbility’s AA1000APS 2008 framework specifies materiality, inclusivity and responsiveness as the three foundation principles.

This research addresses the underdevelopment of the conceptualization of materiality in sustainability accounting thus far by identifying five specific aspects within current literature that provide the potential for further conceptual development as proposed in this thesis. First, sustainability accounting extends its scope from financial issues to cover environmental and social issues. This extended scope implies that materiality practices should cover a wide range of stakeholders rather than merely a group of shareholders (KPMG, 2014; Muriningham, 2013; Zadek & Merme, 2003). Differences between economic versus environmental and social issues, particularly in terms of measurement, and differences between accountability obligations to shareholders versus stakeholders, specifically as these differences impact on materiality in sustainability accounting, are further investigated in this research.

Second, in financial accounting, materiality is often presented in binary terms, where the material is differentiated from the immaterial (Chewning et al., 1998; Messier et al., 2005). Alternatively, a continuum is applied to measure materiality in sustainability accounting as recommended in the GRI (G3) and GRI (G4). This research addresses the call from Zadek and Merme (2003) to further explore the calibration of the instruments used to measure materiality in sustainability accounting, by considering the significance of an issue to
stakeholders, rather than the size and quality of a sustainability issue, as the base for measuring materiality. This is discussed in detail in Chapter 2.

Third, current knowledge of materiality in sustainability accounting identifies both the reporting function of sustainability accountants, and managerial function of managing sustainability issues (AccountAbility, 2006; 2008; KMPG, 2014; Murninghan, 2013). The new understanding of materiality provided in this thesis informs both the reporting and managerial functions.

Fourth, the current conflict within the literature (AccountAbility, 2006; CGA-Canada, 2006; GRI G3, 2000-2011; GRI G4, 2013) as to whether materiality in sustainability accounting concerns significance to the firm, or to stakeholders or to both, is resolved in the new model of materiality developed in this research. Presented in Chapter 4, this new model is enabled by the recognition that what matters to stakeholders must therefore matter to the firm.

Fifth, context-specificity, according to Zadek and Merme (2003, p.27), means that “what is material for one company will be less so for others, or less so for the same company at a different time or place”. Similarly, the relevance of context to materiality is identified in the AccountAbility Assurance Standard (AA 1000 APS, 2008, p.13), which states that “the changing sustainability context and maturity of issues and concerns” must be taken into account to determine materiality. This importance of context (time, place and entity) to materiality is observed in sustainability accounting practice (AccountAbility, 2006; Hardy & Ballis, 2013; Mashaw, 2006). A concern in current materiality research is to deepen understanding of the context-specificity including the cause of this phenomenon and its practical implications (AccountAbility, 2006; 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2011; Eccles & Serafeim, 2013; Zadek & Merme, 2003).

The interdisciplinary aspect of this research is introduced in the next sections, where explanations of ‘accountability’ and ‘stakeholder theory’ and their relevance to materiality in sustainability accounting will be found.

1.2.3 Accountability and Materiality

Accountability has been defined in terms of the relationship between two social actors, ‘A’
and ‘B’, where ‘A’ is obliged to give an account justifying her action to ‘B’, otherwise suffers sanction by ‘B’ (Goetz & Jenkins, 2002; Schedler, 1999). The two actors in the accountability relationship are called ‘accountor and accountee’, or ‘account giver and account receiver’, or ‘accountability seeker and accountability target’ (Bovens, 2006; Goetz & Jenkins, 2005; Hardy & Ballis, 2013). Some accountability scholars posit that ‘A’ and ‘B’ are by nature an agent and a principal in an agency structure (Bovens, 2006; Dubnick, 2003; Gray et al., 2014; Lindberg, 2009; Mulgan, 2000; Power, 1991). This view is supported in both financial and sustainability accounting literature, where: (1) shareholder agency (Eisenhardt, 1989; Fontrodona & Sison, 2006; Jensen & Meckling, 1976; Perry & Nölke, 2006; Watts & Zimmerman, 1978; Whittington, 2008); and (2) stakeholder agency (Fontrodona & Sison, 2006; Hill & Jones, 1992; Langtry, 1994; Shankman, 1999; Sharplin & Phelps, 1989) are used to justify accountability discharged to shareholders and stakeholders respectively. This thesis consistently uses ‘principal’ and ‘agent’ to denote the two actors involved in the accountability relationship, but it is noted that alternative terms such as ‘accountee and accountor’, and ‘account receiver and account giver’ can be also used to denote these two social actors.

Accountability constructs a foundation for financial accounting practice, and as Shearer (2002, p.569) notes, “accounting practices enact accountability”. The connection between materiality and accountability is addressed in AASB (1995), which defines materiality from its function of enabling the governing body or management of the entity to discharge accountability. While financial accounting concerns the discharging of accountability to capital providers, the objective of sustainability accounting is to “discharge accountability to stakeholders” (Gray 2001, p.11). Gray’s ‘extension of accountability’ objective is also reflected in Lamberton’s (2005, p.19) argument that sustainability accounting “would aim to discharge the accountability of business organizations for their environmental and social impacts to a broad set of external stakeholders”. However, a substantive reference to accountability as it relates to the concept of materiality has not been found in current sustainability accounting literature.

Another connection between accountability and materiality in sustainability accounting is the principle of ‘inclusivity’. Inclusivity concerns determining which are the stakeholders to whom an issue is (or should be) significant. Some materiality researchers, such as Hsu, Lee and Chao (2013), focus on ‘key stakeholders’, which is similar to the classical stakeholder
approach, which classifies primary and secondary stakeholders according to the strength of their influence on the organization (Agle & Wood, 1997; Clarkson, 1995; Freeman, 1984; Harrison & John, 1996; Mitchell, Agle & Wood 1997; Neville et al., 2011).

This stakeholder prioritization view is critiqued by other stakeholder theorists, who regard focusing merely on key stakeholders as unreasonable. The accountability discipline presents a more radical stance of ‘stakeholder inclusivity’. Bellal (2002) and Rasche and Esser (2006) contend that it is problematic for accountability practice to select primary stakeholders, as suggested within the stakeholder management literature, because the principle of ‘inclusivity’ is a precondition of accountability according to ISEA (1999), GRI G3 (2000-2011) and GRI G4 (2013). Inclusivity means that all stakeholders, rather than some, should be included in accountability discharge by the firm, as is clearly expressed in ISEA (1999), GRI G3 (2000-2011) and GRI G4 (2013). Stakeholder inclusivity, although theoretically justified, does not receive further analysis or empirical investigation in prior materiality research.

An association between accountability and stakeholder heterogeneity in a sustainability context suggests that the two issues might be addressed together. Prior accountability literature has acknowledged that stakeholders are in different accountability domains where accountability processes and practices vary in response to the same issue (Hardy & Ballis, 2013; Mashaw, 2006; O’Dwyer, 2005). Therefore, investigation from an accountability perspective allows the opportunity to address the stakeholder heterogeneity problem encountered in the current materiality conception within sustainability accounting.

1.2.4 Stakeholder Theory and Materiality

In this section, the relationship between stakeholder theory and materiality is established by identifying two key stakeholder issues for conceptualizing materiality within sustainability accounting. These two issues are: a failure to capture the stakeholder heterogeneity paradigm within stakeholder theory; and the unclear parameters for deciding which stakeholders should be included within the scope of a materiality assessment, in other words, how to address the basic stakeholder theory question of ‘who really matters’ to the organization (Freeman, 1992).

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1 GRI (G3) and (G4) use the term ‘inclusiveness’, which is interchangeable with ‘inclusivity’.
The original definition of ‘stakeholder’ comes from a 1963 internal memorandum at the Stanford Research Institute, with the term referring to “those groups without whose support the organization would cease to exist” (Freeman & Reed, 1983, p.89). The popularization of stakeholder theory in business and society literature was initiated by Freeman’s (1984) seminal book, Strategic Management: A Stakeholder Approach, where a stakeholder refers to any group that affects or is affected by the organization’s performance. Stakeholder theory advocates that organizations that ignore the needs of the multitude of stakeholders would be incurring significant risk (Clarkson, 1995; Freeman, 1984; Frooman, 1999).

A number of stakeholder theorists adhere to the stakeholder agency view that ascribes to an accountability relationship, whereby the firm is the agent and its stakeholders are the principal (Agle et al., 1999; Fontrodona & Sison, 2006; Frooman 1999; Hill & Jones, 1992; Langtry, 1994; Shankma, 1999). In this relationship, the stakeholders (principal) manipulate critical resources so as to demand an account given by the firm (agent). From here, the firm is required to justify its actions to stakeholders, who assess whether the firm’s action was in their best interests.

The connection between stakeholders and materiality in sustainability accounting lies in the fact that sustainability issues that concern an organization cover a broad range of economic, social and environmental aspects, and thus concern a broad range of stakeholders (Gray et al., 1997). Hence materiality in sustainability accounting needs to be defined from the perspective of what matters to stakeholders, in contrast to the materiality definition in financial accounting, which considers what matters to shareholders. However, a simple substitute of stakeholder for shareholder, with other elements of the financial accounting materiality conception remaining the same, cannot address the complexity of the stakeholder environment.

This complexity is evidenced by the stakeholder heterogeneity paradigm that underpins stakeholder theory. It has been long established in stakeholder literature that stakeholders are heterogeneous not only in their expectations, interests and social identities (Clarkson, 1995; Freeman, 1984; Frooman, 1999; Rowley & Moldoveanu, 2003), but also in the actions that they take to protect their interests and identities (Frooman, 1999; Peloza & Papania, 2008; Rowley & Moldoveanu, 2003; Wood & Jones, 1995). This heterogeneity is opposite to the homogeneity assumption inherent in the financial accounting materiality concept. The current
state of conceptualizing materiality in sustainability accounting fails to address the heterogeneity paradigm; instead, it considers stakeholders as one homogenous group, and it is this false assumption that this research aims to address.

Another concern with regard to the stakeholders is the scope of materiality. It remains unclear which stakeholders should be included into the materiality assessment: all stakeholders, or only some of them? The classical stakeholder approach distinguishes primary or salient stakeholders from secondary stakeholders, according to the extent of their influence over an organization (Clarkson, 1995; Freeman, 1984; Harrison & John, 1996; Mitchell et al., 1997). The application of stakeholder salience theory may suggest that the scope of materiality should be limited to primary stakeholders whilst excluding secondary ones. But this view is critiqued from the perspective that secondary stakeholders can exert significant influence over the organization, either by strengthening their actions as stakeholders (Eesley & Lenox, 2006), or through networking interactions that mobilize other strong stakeholders (Hart & Sharma, 2004; Maak, 2007; Neville & Menguc, 2006; Rowley, 1997).

This research develops materiality knowledge within sustainability accounting by drawing on these insights from the stakeholder theory discipline that recognize complexity of the stakeholder environment. This research involves reconciling these incompatible disciplinary insights: the homogeneity assumption in financial accounting conflicting with the heterogeneity paradigm underpinning stakeholder theory; and the stakeholder inclusivity assumption from the accountability discipline which contradicts classical stakeholder theory which focuses the firm’s attention on primary stakeholders. Table 1.1 outlines how this thesis reconciles and integrates these incompatible insights.

<table>
<thead>
<tr>
<th>Incompatible disciplinary insights</th>
<th>Financial accounting</th>
<th>Stakeholder theory</th>
<th>Accountability</th>
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<tbody>
<tr>
<td>Characteristic of those to whom it matters</td>
<td>Homogeneity (refused)</td>
<td>Stakeholder heterogeneity (adopted)</td>
<td></td>
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<tr>
<td>Stakeholder scope for materiality</td>
<td>key stakeholders / classic approach (refused)</td>
<td>All stakeholders / inclusivity (adopted)</td>
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The new materiality conception reconciles the different insights from three disciplines in the following ways: it rejects the notion of homogeneity (financial accounting) and adopts the notion of heterogeneity (stakeholder theory); and it rejects the classic stakeholder approach focusing on key stakeholders, and espouses the notion of inclusivity, an accountability principle, so as to cover all stakeholders.

The interdisciplinarity of this research is reflected in the use of accountability disciplinary insights to advance knowledge of sustainability accounting as regards the conception of materiality. The new materiality model put forward in Chapter 4 has been developed to reveal the underlying relationship between accountability and materiality, thereby addressing an existing knowledge gap regarding the current materiality conception in sustainability accounting. Hence this research integrates insights, either conflicting or complementary, from four disciplines, financial accounting, sustainability accounting, stakeholder theory and accountability, into a new body of knowledge which explores the phenomenon of materiality in a sustainability context, which would not be possible if explored within any of the single disciplines.

In the following section, primary and secondary research questions are designed and matched to gaps in the current understanding of materiality in sustainability accounting.

### 1.3 Research Questions and Method

#### 1.3.1 Research Questions

How the four disciplines mentioned above relate to materiality is further addressed in the literature review (Chapter 2), from which the primary question of this research is inferred:

*How can the existing understanding of materiality be developed to show how materiality practices contribute to the discharge of a firm’s accountability to stakeholders for issues that matter?*

Addressing this research question required construction of the materiality concept within
sustainability accounting, and was performed within an accountability framework. This stance recognizes that business organizations operate within a complex environment populated with many diverse stakeholders mobilized by varying needs. This primary question recognizes the dual role of the materiality concept in informing both reporting practice in accounting and informing management action required in response to material issues.

In order to address this primary question, there are four secondary research questions that needed to be addressed. These are as follows:

1. How is the concept of materiality applied by the firm to discharge accountability to stakeholders?
2. How can the concept of materiality be developed to address a complex environment where stakeholders hold heterogeneous interests and expectations?
3. How can it be empirically confirmed that different firms have different sustainability materiality practices?
4. How is the concept of materiality applied to both the reporting and management of sustainability?

1.3.2 Critical Realism

The chosen philosophical approach underpinning this research is critical realism. A crucial reason for selecting this approach is that it makes an ontological distinction between the enduring nature of materiality that may not be directly observable, and materiality practices, which can be empirically observed but which vary across observational contexts. The nature of materiality, in critical realism terminology, is understood in terms of structure, process and mechanisms, all of which are independent of actual observable materiality practices, such as prioritization of sustainability issues, and the forms of corporate reporting and managerial actions taken in response to those issues.

This investigation of the structure, process and mechanism of materiality provides an increased understanding of both the materiality phenomenon and the context-specificity of
materiality, both of which remain unexplained in prior research. The major result of applying the critical realism paradigm not only contributes to accounting theory and practice with an advanced materiality knowledge, but also provides insight and direction for accountancy research from a methodological perspective.

Since the publication in 1975 of the first edition of Roy Bhaskar’s (2008) *A Realist Philosophy of Science*, which laid the groundwork for critical realism, this approach been used only sparingly in accounting research (Bisman, 2010; Modell, 2009; 2015). The manifesto of critical realism is to understand the reality of the events that occur in the social world (Bryman & Bell, 2003). Critical realism researchers hold that:

> We will only be able to understand – and so change – the social world if we identify the structure at work that generate those events … these structures are not spontaneously apparent in the observable pattern of events; they can only be identified through the practical and theoretical work of the social sciences (Bhaskar, 2011, p.2)

Structure, in the context of critical realism philosophy, refers to the way in which things are constituted. For example, Bhaskar (1979) makes the point that, in natural science, a water molecule is constituted of two hydrogen atoms and one oxygen atom; in the social world, a social system is based on interactions between social actors, including individual humans or humanistic institutions (Ackroyd & Fleetwood, 2000; Lawson, 1997).

Critical realism guides investigation into complex social phenomena by differentiating between our empirical observations of events, and the underlying structures which generate the events, albeit that they may not be observable (Bhaskar, 2008; Danermark, Elstrom, Jakobsen & Karlsson, 2002; Sayer, 1992). Whereas positivism contends that empirical knowledge of reality directly reflects the reality itself, a critical realist view acknowledges the complexity of reality, and the limitations of empirical observation to know this reality (Bhaskar, 2008; Bryman & Bell, 2003; Sayer, 1992; Sobh & Perry, 2006; Thompson & Perry, 2004). This view also differs from a constructivist view, which maintains that subjective reality is dependent on the researcher’s own perception, whereas critical realism contends an objective reality, where structures and mechanisms exist independently from the researcher’s observation and knowledge (Guba & Lincoln, 1994; Sobh & Perry, 2006; Thompson & Perry, 2004).
In this study, materiality is held to be a context-specific social phenomenon operating in complex circumstances of heterogeneous stakeholders (Frooman, 1999; Peloza & Papania, 2008; Rowley & Moldoveanu, 2003; Wood & Jones, 1995). Materiality practices involve the discharge of accountability (AASB, 1995; Shearer, 2002) within a power structure comprising (1) a principal (accountee), who demands an account, and (2) an agent (accountor), who is held accountable by the principal (Bovens, 2006; Dubnick, 2003; Lindberg, 2009; Mulgan, 2000; Power, 1991). This current disciplinary understanding of materiality as the discharge of accountability accords with the ontological foundations of critical realism. The empirical domain of materiality is contextual; that is, the practice of materiality is observed to be entity-specific and changeable over time, while the real domain of materiality comprises the structures and mechanisms that are enduring and underlying the empirical observation. The critical realism paradigm provides an explanation of the intrinsic nature of materiality relevant to accountability discharge process, thus advancing knowledge of materiality from an accountability-based perspective and providing further examples of the application of this methodology to explore accounting phenomenon.

1.3.3 Abduction

Critical realism is associated with the logic of abduction (Bhaskar, 2008; Danermark et al., 2002; Modell, 2009). Founded by Charles Sanders Peirce (1834-1914), ‘abduction’ (also called ‘abductive logic’, ‘abductive inference’, or ‘hypothetic inference’), with induction and deduction, are three forms of logical process used in constructing an argument (Peirce, 1931). Peirce (1931) uses the ‘rule-case-result’ view to differentiate between the three kind of logic: deduction is to predict the result from the rule operated in a case; induction is to conclude a rule from the observed result in a case; and hypothetic reasoning (interchangeable with abduction) is to hypothesize a case, which is unobserved, from the observed result and a preset rule. Peirce (1931) explains the inferential process of abduction thus:

\(1\) The surprising fact \(C\) is observed;

\(2\) If \(A\) were true, \(C\) would follow as a matter of course;

\(3\) It is reasonable to suspect \(A\) is true.

A critical realism knowledge must be developed in light of abduction (Bhaskar, 2008; Modell, 2009). In the context of critical realism, the structure or mechanism refers to ‘\(A\)’, while the
phenomenon refers to ‘C’. If the unobserved mechanism ‘A’ accounts for the observed fact ‘C’, the mechanism is suspected to be real.

The critical realism approach designed in this thesis is based on Bhaskar’s (2008) model, developed by him in 1975, of the logic of scientific discovery. This model involves two steps: first, it is necessary to postulate the hypothesized inner structure and mechanism through a creative model building process (as addressed in Chapter 4); second, testing the structure and mechanism in empirical settings is required (Chapters 5 to 8). This method is justified in the abductive logic’s inferential process: the structure and mechanism refer to the hypothetic explanation ‘A’; and the empirical observations refer to the surprising fact ‘C’. In this thesis, as the empirical observations from different settings are justified as a matter of the materiality structure and mechanism, the existence of the materiality structure and mechanism is confirmed logically. The application of critical realism and abductive logic highlights the methodological contributions of this thesis to the accounting literature. This application draws on the arguments of Modell (2009) and Bisman (2010) concerning the rigour of critical realism with respect to informing accountancy research, which has been dominated by the application of the traditional paradigms of constructivism and positivism.

1.4 Overview of the Thesis

This thesis is constructed in two parts: development of the conceptual framework for the research; and empirical testing of the conceptual framework over four case studies. The conceptual development component is contained within Chapters 2 to 4, which present a literature review, an explanation of the methodological design, and presentation of the underlying structure and mechanism postulated to explain materiality practices in sustainability accounting contexts. The empirical testing component is contained in Chapters 5 to 8, which consist of four case studies of organizations that demonstrate the application of the materiality model within significantly different contexts, but which are rationally explained by the postulated mechanism. In Chapter 9, the conceptual and empirical outcomes of the research are integrated into a critical realism account that strengthens our understanding of the concept of materiality in sustainability accounting within the complex and diverse stakeholder environment. Figure 1.1 outlines the structure of this thesis, and is
Chapter 2 provides an extensive literature review, associating the materiality concept to four disciplines, these being: financial accounting, sustainability accounting, accountability and stakeholder insights. The list of primary and secondary questions developed from the literature review to guide the materiality research are provided.

Chapter 3 discusses methodological matters and presents the research design. It commences with an introduction to the four major research paradigms of positivism, constructivism/interpretivism, critical theory and critical realism (Guba & Lincoln 1994; Thompson & Perry 2004; Sobh & Perry 2006), and then justifies critical realism as the research paradigm for this research.

Chapter 4 encompasses the first step in conducting research within a critical realism framework. A materiality structure is postulated to reveal how materiality practice contributes
to accountability discharged by the firm to heterogeneous stakeholders. Inferred from the materiality structure, the mechanism states a law that the firm prioritizes the more material issue over the less material one in both managerial and reporting practices. Epistemic issues of confirming the mechanism in a complex social system are discussed. To address these epistemic concerns, a lemma (or middle-range theory) is deduced from the mechanism, thereby providing a practical protocol that enables indirect tests of the mechanism in complex closures. The chapter ends by discussing how the structure and mechanism respond to all the primary and secondary research questions from a theoretical perspective.

Chapter 5 is a case study of the multinational corporation, Exxon, using secondary data sources over a relatively long time period to identify four particular sustainability issues which constitute a materiality phenomenon. Analysis of results shows that this phenomenon is reasonably explained by the lemma deduced from the mechanism; therefore, the mechanism is critically (not directly) confirmed in this complex stakeholder environment.

Chapter 6 reports the second case study, which is a natural social setting. This case is conducted in an isolated village involving a tiny farm (the Fu farm) and three stakeholders representing a simple quasi-closed system, which Pawson and Tilley (1997) define as the ‘best case’ for critical realism research. In this chapter, the mechanism is empirically confirmed in a direct way by 18 sustainability issues identified from a field study over a time period of three years.

Chapter 7 continues the empirical study in the Fu farm setting. This chapter explores a crucial aspect of critical realism referred to ‘transfactuality’, and presents the application of the mechanism in sustainability management practices by its transfactual nature.

Chapter 8 concerns how the mechanism appears to be falsified from empirical observations in two cases of the Zhong farm and Hui farm, and the implications of empirical falsification for sustainability management practice. Both cases echo Sayer’s (1992) deliberations on two possible conditions, thereby leading to the mechanism being falsified: one is where the mechanism is not activated; and the other is where other mechanisms intervene in events.

Chapter 9 presents a discussion of previous chapters. It applies a critical realism account of materiality to integrate the conceptual and empirical findings. This account therefore offers a
novel and distinctive resolution of the research questions from an interdisciplinary perspective within the critical realism paradigm. It suggests that the structure and mechanisms operating in different settings lead to generation of different forms of materiality practices. Furthermore, it discusses the critical realism ontology and epistemology of this materiality research, including how the new materiality knowledge is achieved via abductive logic.

Chapter 10 is the conclusion of the thesis and indicates how the research questions are answered, how this thesis contributes to sustainability management practices and accounting research methodology, the limitations of this research, and future research areas that are required to extend our understanding of the concepts dealt with herein.

1.5 Definitions of Key Terms

1.5.1 Theme of Sustainability

Sustainability
The term ‘sustainability’ is often used interchangeably with ‘sustainable development’, referring to performance in terms of environmental, social and economic impacts (Elkington, 1987).

1.5.2 Theme of Materiality

Materiality
Regarded as a wisdom of life, materiality refers to the basic logic of prioritizing issues, of distinguishing those that really matter from those that are trivial, as a means of optimizing resource allocation (Bernstein, 1973; Hicks, 1964).

Materiality of financial issues
In a financial accounting context, materiality is defined as the magnitude of a financial item, fact or statement that significantly influences the judgment of shareholders (Kohler, 1953; FASB, 1998; IASB, 1980; SEC, 1999).

Materiality of sustainability issues
Materiality in sustainability accounting is defined as the magnitude of influence of a sustainability issue on the stakeholders and the organization, where the more material an issue is, the higher priority this issue should be allocated in the reporting and managerial agenda (AccountAbility, 2006; 2008; GRI G3, 2000-2011; IIRC, 2011).

**Materiality practices**

Materiality practices in sustainability accounting include a course of actions to: identify material issues; manage these issues; and report these issues and relevant managerial actions to stakeholders (Eccles & Serafeim, 2013; Khan et al., 2015).

**Context-specificity of materiality**

Materiality practices of sustainability issues vary across different social and organizational settings, or across different times for the same organization (AccountAbility, 2006; 2008; Eccles & Serafeim, 2013; GRI G3, 2000-2011; Zadek & Merme, 2003).

1.5.3 Theme of Stakeholder

**Stakeholder**

“A stakeholder is any group or individual that can affect or is affected by the organization” (Freeman, 1984, p.46).

**Stakeholder heterogeneity**

Stakeholders are different in their values, interests and social identities (Freeman, 1984; Hill & Jones, 1992; Clarkson, 1995), and take different actions and exert different extents of influence on the organization (Frooman, 1999; Peloza & Papania, 2008; Rowley & Moldoveanu, 2003; Wood & Jones, 1995).

**Stakeholder inclusivity**

The organization should be accountable to all stakeholders rather than the key stakeholders (Bellal, 2002; GRI G3, 2000-2011; ISEA,1999).

1.5.4 Theme of Accountability

**Accountability**

Accountability is defined within a principal-agent relationship, where the agent, under the sanction effects of the principal, is requested to give an account to the principal to justify the
agent’s action (Bovens, 2006; Dubnick, 2003; Power, 1991; Lindberg, 2009; Mulgan, 2000).

**Sanction**
In an accountability relationship, sanction power is possessed by principal (accountee), referring to “punishing bad behaviour” (Shedler, 1999, p.15), and to “promising inducements and make threats, offering carrots and threatening sticks” (Mansbridge, 2010, p.1).

**Answerability**
Answerability is the ability and obligation of the agent (accountor) to give an account about her action in response to the principal (accountor) who demand the account (de Wit & Akinyoade, 2008; Dubnick, 2003; Mulgan, 2000; Schedler, 1999).

**Transparency**
Transparency refers to a situation where “people [are able] to see into systems and to understand the reasons for decisions taken” (Osborne, 2004, p.292).

1.5.5 Theme of Critical Realism

**Structure in critical realism**
In the context of critical realism philosophy, structure refers to the way in which things are constituted.

**Process in critical realism**
Process refer to the how the structured objects interrelate with each other leading to generation of events that can be observed.

**Mechanism in critical realism**
Mechanisms, or generative mechanisms, are “the ways of acting of things” (Bhaskar, 2008, p.3).
Chapter 2
Literature Review

This research commences with a review of literature relevant to the accounting concept of materiality, from which the research questions are developed, in order to guide the next stage of materiality research in sustainability accounting contexts. The literature review is organized around four topics, which address the relevance of the materiality concept to the four parent disciplines: financial accounting, sustainability accounting, accountability, and stakeholder theory.

**Topic 1: Materiality in financial accounting**
In this topic, the basic logic of materiality (efforts and resources are allocated to what matters, whilst little or no action is allocated to trivial things) is refined from materiality literature. This topic then addresses how this logic underpins financial materiality definitions and assessment approaches of the quantitative, the qualitative, and the likelihood continuum.

**Topic 2: Materiality in sustainability accounting**
This topic includes six themes of materiality knowledge in sustainability accounting: (1) the concept of materiality evolves to assess sustainability issues; (2) the three definitional streams of sustainability accounting materiality; (3) sustainability accounting modifications of the materiality application (4) a managerial focus of materiality conception; (5) context-specific materiality practices; and (6) the demise of *rules of thumb* materiality model in sustainability accounting contexts.

**Topic 3: Accountability and materiality**
Materiality is referred to accountability in this topic. An analytic framework of accountability is concluded from prior literature and used to examine the materiality concept in both financial and sustainability accounting contexts. This study endorses the viability of accountability in conceptualizing materiality.
**Topic 4: Stakeholder theory and materiality**

In this topic, two insights from stakeholder theory relate to the materiality concept. First, the insight of ‘stakeholder heterogeneity’ refers stakeholders to heterogeneous groups whose interests and social identities vary, and who use different actions to influence the firm. Second, the insight of ‘stakeholder inclusivity’ requires the firm to respond to the claims of all stakeholders, rather than of key stakeholders. It is argued that both insights should be integrated into the concept of materiality.

Based on the literature review of the above four topics, expanded below, the list of primary and secondary research questions provided in Section 1.3.1 was developed, as discussed below in Section 2.5. These questions guided the next stage of the exploration of materiality in this thesis.

### 2.1 Topic 1: Materiality in Financial Accounting

This topic includes: (1) the background of the materiality concept, (2) the basic materiality logic refined from prior literature, and (3) how materiality is defined and operationalized in financial accounting contexts.

#### 2.1.1 Background of the Materiality Concept

Materiality is regarded as “one of the cornerstones of accountancy” (Frishkoff, 1970, p.166). Hicks (1964, p.171) emphasizes the vitality of the materiality concept in accountancy by stating that: “in no aspect of accounting is judgment more important than in applying the concept of materiality”. In the introductory chapter, materiality was explained as a social phenomenon associated with both accounting and non-accounting spheres (Bernstein, 1973; FASB, 2008; Hicks, 1964; Jeffries, 1981), which rests on the basic logic of taking action concerning what really matters (Bernstein, 1973; Edgley, 2014; FASB, 2008; Hicks, 1964; Jeffries, 1981; SEC, 1999). As Hicks (1964) explains, without the principle and practices of materiality, unwarranted amounts of time and effort would be invested in matters that are not significant. However, the necessary and important facts and relationships would be obscured.
The formal definition of materiality is traced back to a United States Federal Reserve Board booklet published in 1917 for edification of accountants. This booklet indicates that

Where the market values of securities are less than the book values, save where the variation is so small as to be trifling, a reserve for loss in value on the balance sheet date must be set up (Reininga, 1968, p.31).

The phrase ‘where the variation is so small as to be trifling’ appears to be the first reference to material items.

Holmes (1972) provides a historical perspective for the introduction and establishment of the materiality concept in relation to financial accounting standards. The author has traced its origin back to British common law in the 1860s, which establishes what issues must be correctly and fully disclosed, as follows:

Those who issue a prospectus … are bound to state everything with truth and scrupulous accuracy, and not only abstain from stating as a fact that which is not so, but to omit no one fact within their knowledge, the existence of which might in any degree affect the nature or intent, or quality, of the privileges and advantages which the prospectus holds out as inducements to take shares (as cited in Holmes, 1972, p.45).

In a case in 1867 cited by Holmes (1972, p.46), the ruling judge established that “…in a prospectus no misstatements or concealment of any material fact ought to be permitted”. Furthermore, according to Holmes (1972, p.46), in updating the British Companies Act 1895, Lord Davey’s committee stated that “Every contract or fact is material which would influence the judgment of a prudent investor in determining whether he would subscribe for the shares or debentures offered by the prospectus”. Holmes regards these two legal cases as the first time the terms ‘material’ or ‘materiality’ appeared in official documents.

2.1.2 Materiality Defined in Financial Accounting Standards

The mentioned English legalistic pronouncements equate material issues to what matters to investors, which stands as a prototype for subsequent materiality definitions within various financial accounting standards (AASB, 2013; APB, 1995; AUS, 2001; DGS, 2016; FASB,
No academic literature has been found to address how the concept of materiality transferred from the legalistic contexts to the accounting contexts, and how it eventually achieved its popularity in international accounting standards. However, a hypothesis proposed by Edgley (2014) is that the immigrant accountants from England made a significant contribution to the establishment of formal accounting standards in the United States, including introduction of the term ‘materiality’. This may therefore have been a key step towards formalizing the materiality principle since the early 20th century. For example, *Kohler’s Dictionary for Accountants* provides an early version of a formal definition of accounting materiality:

The characteristic attaching to a statement, fact, or item whereby its disclosure or the method of giving it expression would be likely to influence the judgment of a reasonable person (Kohler, 1953, p.317).

Accounting standards institutions have established materiality definitions with similar definitional contents. FASB (1980) define materiality as:

The magnitude of an omission or misstatement of accounting information that, in the light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would have been changed or influenced by the omission or misstatement.

Another influential institutional definition is given by IASC (1999):

Information is material if its omission or misstatement could influence the economic decisions of users taken on the basis of financial statement. Materiality depends on the size of the item or error judged in the particular circumstances of its omission or misstatement.

Although the materiality concept or principle is widely defined in accounting standards, those standards do not provide explicit guidance in judging materiality. The materiality concept “continues to be elusive” and is generally regarded as “a matter of professional judgment” (Chewning & Higgs, 2000, p.66). Price and Wallace (2001, p.22) state that materiality is not to be used as a substitute for the accountant or auditor’s professional judgment, explaining that:
[Materiality is determined] ... by reference to what he or she believes will probably change or influence the decision of a person who is relying on the financial statements and who has a reasonable knowledge of business and economic activities. Ultimately, therefore, materiality decisions are based on professional judgment.

In practice, financial accountants adopt different approaches and models to assess the materiality of financial issues. The following three sections provide outlines of three major streams of financial materiality assessment: rules of thumb and other quantitative models, the qualitative considerations, and the likelihood continuum.

2.1.3 Rules of Thumb and Other Quantitative Models

A traditional and influential approach to operationalizing this concept is to use quantitative models. Holstrum and Messier (1982) concluded that financial items become material at some point between approximately five percent and ten percent of income. Leslie (1985) later proposed a level of 5 percent for larger incomes and 10 percent for smaller incomes, and some fixed percentages related to gross profit, total assets, equity and revenues:

- 5% for pre-tax income
- 0.5% of total assets
- 1% of total equity
- 0.5% of total revenues

This series of quantitative thresholds with fixed percentages is also widely known as rules of thumb model, in a popular use amongst professional accountants (Chewning et al., 1998; Messier et al., 2005).

Different from the popular rules of thumb or fixed percentage models, changing percentages of gross profit as materiality judgment basis is advised by CICA (1965):

- 2% - 5% of gross profit if between 0 and $ 20,000
- 1% - 2% if between % 20,000 and $ 1,000,000
- 1/2% - 1% if between $1,000,000 and $100,000,000
- 1/2% if over $100,000,000

This model is known as sliding scale model, which is based on the idea of control of the
increase of materiality level. A sliding down percentage imposed on the increasing gross profit can mitigate the effect of a sudden increase of materiality level.

Some non-percentage or non-linear quantitative models using exponential functions are developed in prior literature. For example, Leslie (1985, pp.14-15) introduced a formula for materiality threshold called ‘Audit Gauge’, which considers the minor changes being made over the years to reflect factors such as inflation:

\[ 1.6 \left( \text{greater of assets or revenues} \right)^{2/3} \]

Warren and Elliott (1986), based on a survey on 60 CPA firms in the United States, proposed the following non-linear quantitative model:

\[
0.038657 \times \text{revenues}^{0.667203} \\
0.146924 \times \text{pre-tax income}^{0.942554} \\
0.271762 \times \text{net income}^{0.994640}
\]

*Sliding scale effect* is achieved in these exponential function models, where given the index number is less than 1, the rate of increase of the materiality level slows down on account of the increase of the base number.

**2.1.4 Qualitative Considerations**

Criticism of the traditional and dominantly quantitative approaches to assessing materiality arises in accounting literature. A core critique focuses on ‘*what is legal*’ and ‘*what constitutes fraud*’. There are *grey areas*, where the presentation of earnings is allowed to be at the whim of the company’s own interests, without needing to reflect the obtained results more truly (Levitt, 1998; del Corte, Garcia & Laviada, 2010; Messier et al., 2005). Accountants and auditors may use tricks to modify accounting figures under the name of materiality, for there is room for quantitative materiality in these flexible grey areas. Del Corte et al. (2010, p.459) point out that:

Regulation on materiality allows companies to, with the auditors’ consent, intentionally hide misstatements within a previously defined percentage without needing to reformulate more exact and precise financial statements in order to better fulfil the standards, thus projecting a less faithful image and representing their interests more favourably.
In the *Staff Accounting Bulletin* (SAB), the SEC (1999) contends that materiality judgments should not be based on quantitative measures, for sometimes misstatements may not be simply immaterial even if being below a numerical threshold (del Corte et al., 2010). The SEC emphasizes the danger of simple reliance on quantitative measures, and stresses the need for serious considerations of qualitative factors that can make even very small misstatements material (DeZoort, Harrison & Taylor, 2006). Sometimes the companies may deliberately mis-state the known errors, which are quantitatively trivial but are significant with respect to qualitative factors (Chewning & Higgs, 2002).

Consistent with this view, Ng and Tan (2007) assert that overreliance on quantitative materiality thresholds may cause auditors to waive quantitatively immaterial but qualitatively material audit differences, thus the audit quality may be undermined. Ng and Tan (2007) conducted an experiment to measure auditors’ judgments about materiality thresholds related to the qualitative factors. In their view, existing mechanisms that draw attention to qualitative materiality factors may not necessarily achieve consistent and intended effects because of differential materiality thresholds that auditors use to assess qualitative materiality. These researchers point out that, while SAB provides qualitative factors, they are vague, and they conclude by highlighting the importance of more explicit guidance on the determination of qualitative materiality (Ng & Tan, 2007).

The notion of qualitative materiality was introduced by SEC in the 1970s. The idea is that, if a certain type of conduct was illegal, the illegality itself would be material, even if the conduct itself were not financially significant to the company (Fedders, 1998). Fedders goes on to explain that economic or quantitative materiality is characterized by facts that significantly affect a company’s financial performance and, consequently, its stock price. Furthermore, while judgments of quantitative materiality may be reached objectively without surmise, the means to reaching qualitative determinations of materiality encompasses subjective components and judgments, and has almost no relationship to the financial condition of a company. Fedders (1998) concludes that determinations as to whether an issue is qualitatively material can be measured by quality, kind, and essential character or conduct, and cannot be made simply by employing arithmetic. However, since reasonable people will differ in their views as to whether qualitative information is material, an establishment of qualitative standard is necessary.
By 1975, the SEC began focusing on bribes provided by corporations and their agents to foreign officials to obtain or retain business, and other questionable practices (McLucas, Lewis & Angotti, 1996). The inquiries revealed that many companies, including large enterprises, falsified records to conceal corrupt practices and often employed schemes to hide the payments from auditors. As a result of the initiatives, an undefined theory of ‘ethical materiality’ developed concerning the quality and integrity of management and accounting controls, earnings, and assets. This theory became the bedrock for the qualitative materiality standard.

Fedders (1998, p.75) cites a speech delivered in 1982 by Evans, the Commissioner of the SEC, where the requirement of a qualitative standard of materiality is expressed:

Information may be qualitatively material if it is relevant to the competency or the integrity of management. This could include such things as … questionable or illegal activities of management …. It must be obvious that because qualitative materiality deals with factors that are harder to measure, such as competence and integrity, it is much more difficult to determine. Despite the fact that the law with respect to qualitative materiality is unsettled, many investors consider the quality of management to be the most important factor in their decision making.

Eventually, the SEC developed nine qualitative materiality considerations on the ‘quantitatively small misstatement’ (SEC, 1999, SAB 99):

1. Whether the misstatement arises from an item capable of precise measurement or whether it arises from an estimate and, if so, the degree of impression inherent in the estimate.
2. Whether the misstatement masks a change in earnings or other trends.
3. Whether the misstatement hides a failure to meet analysts’ consensus expectations for the enterprise.
4. Whether the misstatement change a loss into income or vice versa.
5. Whether the misstatement concerns a segment or other portion of the registrant’s business that has been identified as playing a significant role in the registrant’s operations or profitability.
6. Whether the misstatement affects the registrant’s compliance with regulatory requirements.
7. Whether the misstatement affects the registrant’s compliance with loan covenants or...
other contractual requirements.

(8) Whether the misstatement has the effect of increasing management’s compensation – for example, by satisfying requirements for the award of bonuses or other forms of incentive compensation.

(9) Whether the misstatement involves concealment of an unlawful transaction.

Iskandar and Iselin (1999) classify five qualitative materiality categories: the percentage effect of a factor on net income; the effect of other financial or nonfinancial variables; the effect of personal characteristics, the effect of audit firm structure; and other items related to processed samples (judgment of auditors compared with other groups, the consensus of the group of auditors). Emil, Ancuta and Timea (2010, p.275) comment on this classification as ensuring “a high degree of visibility for interested specialists”.

Some researchers observe that industry context can be a qualitative factor effecting materiality assessment. Based on a discovery that audit materiality level applied in the financial industry is lower than in the retail industry, Iskandar and Iselin (2000) argue that higher risk industries likely adopt a more conservative position to lower materiality level. Emil et al. (2010) added that lower materiality level is used in financial sector companies, while a higher level is commonplace in the service sector.

### 2.1.5 Likelihood Continuum Approach

The third approach to financial materiality assessment is likelihood continuum. Price and Wallace (2001, p.19) apply an example, SFAS 5, *Accounting for Contingencies*, in which a possibility continuum is set forth for recognizing liabilities in such cases: probable and estimable liabilities are to appear on the face of, or notes to, the financial statements; and remote and estimable liabilities are neither reported nor disclosed. In the likelihood continuum, the *probable* implies that an issue is material, while *remote* implies that it is immaterial for the report preparers.

FASB (1999), in its *SFAS 109 Accounting for Income Tax*, provides another example, this being the *more likely than not* criterion to define deferred tax assets. SFAS 109 indicates no substantive difference between the accounting results of the two judgment approaches: (1) recognition of a deferred tax asset if the likelihood of realizing the future tax benefit is more
than 50 percent (the affirmative judgment approach); (2) recognition of a deferred tax asset unless the likelihood of not realizing the future tax benefit is more than 50 percent (the impairment approach).

In studying the seven major financial accounting standards regarding the materiality concept, Price and Wallace (2001) found that likelihood references are generally employed in defining materiality. These likelihood references appear in these terms: ‘would be likely to influence users’ (ICAEW and AS 306); ‘would reasonably influence users’ (SAS 220); ‘could influence the economic decisions of users’ (ISA 8320); ‘should such a misstatement become material in the future’ (AuG 7); ‘which may impact’ (ISA 8320; AS 306); ‘may/might be material’ (AS 306; SAS 47); ‘potential to adversely affect’ (AUS, 2001); ‘possibility of misstatement’ (AUS, 2001; AuG 7; SAS 220; ISA 8320; AS 306); ‘reasonable possibility it could lead to a material contingent liability or material loss of revenue’ (SAS 47); ‘maximum (largest) possible misstatement’ (AuG 7; SAS 47); as well as ‘probable’, ‘likely’ and ‘extremely unlikely’.

Given the difficulty of corresponding ‘likelihood’ to quantitative measurement, the GAO (US General Accounting Office, now known as Government Accountability Office) clarifies the likelihood continuum in SFA5, by indicating that ‘probable’ is higher than 95 percent in practice (Price & Wallace, 2001). Similar to this, Wallace (1995) interprets that ‘probable’ approximates 78 percent. A normal and seemingly effective way is to use ‘dimensions’ and ‘ranges’ to signify the degree of likelihood, instead of the specific percentage. In the view of Price and Wallace (2001, p.24), “many numerical estimates, particularly for softer accounts, will involve expected value computations, a likelihood dimension should be explicitly built into the materiality guidance”.

Price and Wallace (2001) provide an ‘apparent continuum of likelihood’ to reflect the implication of materiality guidance. This ‘apparent continuum’ places eight points from remote to probable: remote, extremely unlikely; may/might/could/potential; possible; reasonably possible; would reasonably influence; would be likely to influence; and probable. Causey and Causey (1999, p.40) present an analytical scale for assessing material effects on a reasonable investor ranging from remote effect as range 1 to probable loss of investment as range 5 (also cited in Price & Wallace, 2001). The probability scale is then linked to a legal-based materiality description:

- Range 1 on the scale, is ‘minor importance’, a remote effect on a reasonable investor;
• Range 2 is ‘a substantial decision factor’, a possible effect on value;
• Range 3 is ‘a decisive factor’, a major effect of information on value;
• Range 4 is ‘no warning of disaster’, a possible loss of investment; and
• Range 5 is ‘probable loss of investment’ referring to information calculated to deceive.

2.1.6 Summary of Topic 1

The preceding discussions show that the basic logic of materiality as action taken as to what really matters (Bernstein, 1973; Hicks, 1964; Jeffries, 1981; SEC, 1999; FASB, 2008; Edgley, 2014) is inherent to the definitions of financial accounting materiality as focusing on what really matters to shareholders. This basic materiality logic underlies all the three approaches of assessing materiality in the financial context. Rules of thumb and other quantitative models relate magnitude of the amount of money associated with the financial issues, as to whether they matter to shareholders. The qualitative materiality standards and factors endorse that what matters to shareholders can be determined by the quality of an issue, even if the quantity of money is small, but may involves serious consequences due to a breath of the law, policy, or social norm. And the likelihood continuum approach rests on the extent of loss that shareholders bear on account of issues, which represent a direct reference to what really matter to shareholders.

The subsequent topic concerns the evolution of the materiality concept into the sustainability accounting contexts, where the basic logic of materiality sustains and refers to what matters to stakeholders.

2.2 Topic 2: Materiality in Sustainability Accounting

This topic pertains to current state of conceptualizing and applying materiality in sustainability accounting. This topic involves six themes:

(1) the necessary evolution of the materiality concept in sustainability accounting
(2) three definitional streams of materiality in sustainability contexts
(3) sustainability accounting modifications of materiality assessment
(4) a managerial focus in sustainability accounting materiality
(5) the context-specific materiality practices
(6) the demise of rules of thumb materiality models in sustainability contexts

2.2.1 Theme 1: Call for Materiality of Sustainability Issues

In this theme, the evolution of materiality into sustainability accounting is articulated, where stakeholder accountability as the primary aim of sustainability accounting must be inherent to the materiality conception.

Sustainability
The concept of sustainable development was introduced in the Brundtland Report of the World Commission on Environment and Development in 1987, and is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission, 1987, p.47).

The operationalization of sustainable development into three aspects, economy, society and environment is central to the rationale of Triple Bottom Line (TBL) proposed by John Elkington (1997), who founded the concept of sustainability (IMA, 2008). In light of the TBL view, sustainability refers to an attempt to achieve an ideal conciliation of forces such as economic development, social justice and environmental protection (Dyllick & Hockerts, 2002; Wilson, 2003); a synthesis of ecological, social and economic goals (Bond & Morrison-Saunders, 2009; Lamberton, 2005); or the ability for people to live better in, and form the richness of, the economic and social system and ecosystem (Pearce, Barbier & Markandya, 1990).

The concept of sustainability applied at corporate level is viewed as posing an alternative to the traditional models of short-term wealth maximization (Signitzer & Prexl, 2008; Wilson, 2003). Its aim is to shift the focus of organizations from a perspective that is exclusively financially oriented, and make a response to the challenge posed by those who privilege the term of sustainable development (Lamberton, 2000). Dunphy, Griffiths and Benn (2003) conceptualize corporate sustainability as a course of enduring improvement towards a balance of economic, social and environmental value, through planned and strategic management processes of working. The concept of sustainability at corporate or organizational level is regarded as an overarching term for various concepts referring to the
role of the organization in society, which includes corporate social responsibility (CSR), corporate citizenship, corporate social performance, people-planet-profit, social accountability, stakeholder management and corporate governance (Signitzer & Prexl, 2008; Wilson, 2003).

**Corporate sustainability and stakeholders**

Since the publication of Freeman (1984)’s classic, *Stakeholder Management: A Stakeholder Approach*, stakeholder theory has been popularized in academic literature. ‘Stakeholder’ is defined as “any group or individual who can affect or is affected by the achievement of the organization’s objectives” (Freeman, 1984, p.46). The basic assumption in stakeholder theory is that the organization depends on the critical resources that different stakeholders own or hold to survive and develop in the business world (Gray et al., 1997). Therefore, the organization needs to build, maintain and enhance relationship with stakeholders by meeting their expectations in order to develop a competitive advantage.

Wilson (2003, p.4) claims that “the contribution of stakeholder theory to the corporate sustainability” lies in it being in the organization’s own interest to work in the sustainable development direction, for this direction leads to a strengthening firm-stakeholder relationship, which in turn, helps the firm meets its business objectives. This sustainability development direction, according to Dyllick and Hockerts (2002, p.132), is to “maintain and grow their economic, social and environmental capital base”. Dyllick and Hockerts (2002, p.132) explain further:

> Corporate sustainability can accordingly be defined as meeting the needs of a firm’s direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities, etc.), without compromising its ability to meet the needs of future stakeholder as well.

Consistent with the above, Wilson (2003, p.4) argues that, given a diversity of the goals and demands in stakeholders, it is generally accepted that the “goals of economic stability, environmental protection and social justice are common across these stakeholders”, and that few stakeholders would argue against these goals, although the level of their priority is debated. Thus, sustainability at a corporate level is achieved by satisfying the demands of its stakeholders (Garvare & Johansson, 2010). Stakeholder satisfaction is viewed as “a quotient
between delivery and demands”, which refers to an increase in an organization’s delivery on quality of output to stakeholders, and a decrease in stakeholder demands on the organization, resulting in a reduction of constraints that stakeholders impose on the organization (Garvare & Johansson, 2010, p.742).

**Extended (stakeholder) accountability and sustainability accounting**

The imperative of sustainability informs an extension of accountability, where the corporations are required to establish the communication of a social account to stakeholders, other than the financially oriented account to shareholders only. It argues that the essence of this extended accountability is to place society at the heart of analysis, and to question legitimacy of an organization’s action, or even its right of existence (Gray, 2001). Gray, Owen and Maunders (1987, p.ix) explain:

> Communicating the social and environmental effects of organizations’ economic actions to particular interest groups within society and to society at large. As such it involves extending the accountability of organizations (particular companies), beyond the traditional role of providing a financial account to the owners of capital, in particular, shareholders.

According to Tilt (2006), this extended accountability indicates a broadening scope to encompass issues found in the complex business environment involving diverse stakeholders, thereby approximating what Pava and Krausz (2007, p.148) called “a more expansive and justifiable interpretation of our basic and long-held view of corporate accountability”. Consistent with this is Schaltegger and Burritt’s (2010) contention that, in the social world, where organizations are expected to indicate their performance in terms of contributions to sustainability, accountability is the precondition that enables the cooperative and constructive contributions of a wide range of stakeholders. The extension of accountability can therefore be associated with an extension of duty in account giving and performance. As the ISEA (1999, p.8) states:

> To discharge its accountability, an organization will account for its acts, omissions, risks and dependencies. However, in addition to this accounting requirement of transparency, accountability also entails a broader obligation of responsiveness and compliance.

To realize the accountability to stakeholders or establishment of a social account (Gray, 2001;
Gray et al., 1987), it is necessary to develop a sustainability accounting system within a reliable and credible basis for accountability (Schaltegger & Burritt, 2010, p.383).

Sustainability accounting is referred to by an array of terms such as ‘social accounting’, ‘environmental accounting’, ‘ethical accounting’, ‘corporate social responsibility accounting and reporting’ (Gray, 1994; Lamberton, 2005; Tilt, 2008). Crowther (2000, p.20) defines it as an approach

…the which stresses the need for the identification of socially relevant behavior, the determination of those to whom the company is accountable for its social performance and the development of appropriate measures and reporting techniques.

Likewise, Schaltegger and Burritt (2010, p.377) define sustainability accounting as

…a subset of accounting that deals with activities, methods and systems to record, analyze and report… social, environmental and economic issues constituting the three dimensions of sustainability.

The primary purpose of a sustainability accounting process, as Gray (2001) and Schaltegger and Burritt (2010) maintain, is to discharge accountability to stakeholders, thereby contributing to sustainability performance on which these interests of these stakeholders are grounded. O’Dwyer (2006, p.233) describes the sustainability accounting community as a group of individuals with “commitment to stakeholder accountability”. The same author views sustainability accounting as

…a mechanism aimed at enhancing corporate accountability to a wide range of external stakeholders, addressing the social, environmental and ethical concerns and values of individuals upon whom a business has a non-economic impact (p.220).

**Call for materiality of sustainability issues**

The previous discussion refines an extended accountability view, on which sustainability accounting is grounded. Based on this view, it is the duty of a firm to account for those on whom the sustainability issues impacts. Nevertheless, sustainability practices have been challenged by the requirement to provide report users with clear, concise and comprehensive
reports that cover a wide range of economic, social and environmental aspects (Business & Environment, 2007; Murninghan, 2013; Zadek & Merme, 2003). Zadek and Merme (2003, p.5) suggest that, in rebuilding the “all-important social contract between business and society”, the organization must meet the requirement of “more and better information”, which is needed by those responsible for improving financial performance, and those interested in the business’s environmental and social impacts.

One such consequential phenomenon is the trend of the ‘take-the-lot’ approach, whereby huge amounts of time, cost and effort have been spent on dealing with the burgeoning amounts of data regarding sustainability aspects, all in order to meet the extensive information demands. But management and reporting effectiveness appears to be unsatisfactory, with “sustainability reports becoming bloated data-dumps” (AccountAbility, 2006, p.11). This situation is reflected in a manager’s statement quoted in AccountAbility (2006, p.25): “Our stakeholders were telling us on one hand that the report is far too long. But if we ask them what we are missing, they are also demanding more and more information to be included”.

AccountAbility CSR Europe (2002) warn that it is dangerous for the sustainability reporting practices to become a costly tick-box exercise failing to impact on the social, environmental or economic outcomes of corporate performance. Consistent with this view, Zadek and Merme (2003, p.5) caution that “a move towards a take-the-lot approach to disclosure is neither feasible nor desirable”. This is because it can lead to information overload, and it is unlikely to create effective communication between the company and its stakeholders. One negative effect of the take-the-lot approach is a reduction of trust among report users, who believe that such reports “are deliberately disguising what is important”; in other words, report users “can’t see the wood for the trees” (Zadek & Merme, 2003, p.5). Given the unfeasibility and ineffectiveness of take-the-lot approach, the concept of accounting materiality emerges to be the focus of sustainability accounting literature, as an effective way of proceeding to explore the enormous array of environmental, social and economic issues relevant to the corporate performance on aspects (AccountAbility, 2006; Deegan & Rankin, 1997; Murninghan, 2013; Zadek & Merme, 2003).

The primary purpose of materiality in the financial contexts is to identify the information concerning financial matters that are useful, relevant and important to financial providers in
their decision-making, while ruling out the trivial, irrelevant and unimportant information, thereby facilitating optimal financial resource allocation. This function enables the concept of materiality to be used in sustainability accounting system to assess the significance and relevance of the sustainability issues to report users, and to determine what sustainability issues should be included and emphasized within the corporate sustainability reports. In other words, materiality is used as a filter for a *sea of data*, so that material data can be retained, and immaterial data excluded. By means of materiality, not all issues relevant to the corporate sustainability performance need to be taken into account, while only those issues truly significant to the organization and report users are included in the scope of the corporate reports; that is, the businesses “need to be able to differentiate what is material from what is ‘noise’” (AccountAbility, 2006, p.9). Deloitte (2012) maintains applying the materiality concept to assess environmental and social issues helps to achieve effective sustainability management and reporting practices by narrowing down the voluminous amount of information concerning these issues. But a critical question rises here. Given an understanding of the usefulness of the materiality concept in identifying, selecting and prioritizing the report sustainability issues, it is doubtful whether a direct copy of the financial accounting materiality is available to sustainability accounting practices.

Sustainability reports broaden the scope of information content to cover social and environmental as well as financial performance. The audiences range from financial capital owners to a wide range of stakeholders with diverse interests and with different resources critical to the development of the reporting organization. The basic requirements of broader reporting scope and the extension of audiences in sustainability reporting cannot be realized by reference to the traditional financial materiality concept, which rests on information relevant to short-term performance and risks from financial aspects, but fails to capture the non-financial information relating to the environmental and social aspects of the enterprise (AccountAbility, 2006).

In the view of Zadek and Merme (2003, p.11), sustainability accounting practices of materiality must exceed the traditional (financial) track of defining materiality, which represents “an overly narrow approach”, with its problematic emphasis on only financial performance regardless of other non-financially important aspects pertaining to its business operations. This narrowly defined materiality concept, which focuses on short-term performance in exclusive financial terms, does not serve the interests of even the capital
owners themselves. It is evident that businesses potentially sacrifice long-term development opportunities in their efforts to meet the short-term financial expectations (Graham, Harvey & Rajgopal, 2005). Apart from the investment community, other interested parties seeking to scrutinize the operations of businesses and penalize poor performers base their judgment and actions on the evidence of compliance with laws, norms, codes and commitments (AccountAbility, 2006). This indicates the potential substantial influence of non-financial issues on the businesses, even though those issues do not fall into the scope of financial materiality. From this point of view, a redefinition of materiality is of interest to both parties concerned with corporate sustainable development outcomes, and to the investment community concerned with effective risk management on the environmental and social impacts, and the delivery of long-term returns (Zadek & Merme, 2003). Thus, the necessity to reassess and redefine the materiality concept so as to extend the dimension of issues into environmental and social aspects is justified in sustainability accounting contexts.

The next section concerns three definitional streams of materiality in sustainability accounting contexts.

2.2.2 Theme 2: Critique of Definitional Streams of Materiality in Sustainability Contexts

Underpinning the reason for organizations to report their sustainability performance is the assumption that those parties using the reports take sustainability issues into account (Deegan & Rankin, 1997; Flynn, 2009). Therefore, in sustainability reporting practices, what is material includes not only financial issues, but also non-financial issues concerning different report users, with Deegan and Rankin (1997) asserting the possibility of environmental issues being material to external report users. From this perspective, coverage of the material topics and indicators would normally be sufficient to reflect economic, environmental and social impacts, hereby enabling report users to ascertain the reporting organization’s overall performance in reported period.

Since the pioneering work of Deegan and Rankin (1997) exploring the materiality of environmental information, continuous efforts and experimentations have been made by researchers, institutions and companies seeking an effective redefinition of materiality in sustainability contexts. This section categorizes the prior definitions of materiality in sustainability contexts into three approaches:
- A simple synonym stream that refers *materiality* to simple and direct synonymous terms. The basic materiality logic in this stream concerns action taken regarding what matters to ‘someone’ who is unspecified.

- A shareholder-based stream resting on financial value of non-financial information to investors. The basic materiality logic in this stream concerns action taken regarding what matters to ‘shareholders’.

- A stakeholder-based stream identifying informational needs of stakeholders, which is the mainstream of defining materiality in sustainability accounting standards and studies. The basic materiality logic in this stream concerns action taken regarding what matters to ‘stakeholders’.

This theme focuses on critiquing the first two streams, both of which are argued as being unable to capture the stakeholder accountability on which the primary purpose of sustainability accounting discipline rests on. It thus endorses justifying the adoption of the third stream as the mainstream of conceptualizing materiality among the sustainability accounting community, and therefore reflects the standards of GRI G3 (2000-2011), GRI G4 (2013), AA1000APS (2008), and IIRC (2013). The stakeholder-based stream is examined and critiqued in later sections.

**The simple synonym stream- definition and critique**

In explaining what is the *materiality* of a sustainability issue, some researchers do not clarify *to whom the issue is material*, but simply relate or even equate the concept of materiality to the terms including *importance* (Deegan & Rankin, 1997), *usefulness* (Deegan & Rankin, 1997), or *relevance* (Casey, 2006). One example of this stream is the pioneering study on non-financial issue materiality authored by Deegan and Rankin (1997). Their study avoids a formal definitional work of *materiality*, but simply interprets it as *importance* and *usefulness*, where report users participating in the survey are asked whether environmental information is important to their decision-making, and whether such information is useful. Furthermore, the report users participating in the survey include only financial providers and academics, without clearly indicating whether a wide range of non-financial stakeholders should be included into the scope of materiality of environmental issues.

Casey (2006) attributes *materiality* as one criterion for assessing sustainability report content,
referring it to *relevance*, and explains material things as those items that *matter most* with respect to sustainability impacts and major risks. However, if only these simple terms are employed, precisely which groups of persons should be included in the scope of materiality assessment remains uncertain. Moreover, these terms do not specify ‘to whom’ an issue is material. Although in this definitional stream a direct and simple statement to interpret the meaning of *materiality of non-financial issues* is provided, the oversimplification of the interpretation leads to incompleteness and vagueness of materiality redefinition in sustainability accounting contexts.

The simple synonym stream is problematic, for, in this stream, not only the scope of ‘for whom an issue is significant’ is unclear, but also oversimplified connotations of materiality are limited with respect to interpreting a complex meaning of materiality in the sustainability territory. For example, although the term *importance* implies being able to generate a high level of influence, the terms *importance* and *materiality* cannot be conflated in some cases: the position of the report preparer is important, but this position may not be material to stakeholders/shareholders, who would not care about whether the company has this position, nor whoever takes this position. Similarly, *usefulness* is not equal to *materiality*, because not all useful data are material. Some data are used to enhance or furnish the description of a material issue. But these data may not be material. From this point of view, these synonyms are arbitrary and therefore require further explanation.

*The shareholder-based stream – definitions and critique*

The shareholder-based stream of thinking concerning materiality focuses on assessing the financial impacts of non-financial issues on shareholders or investors. In this definitional stream, the assessment criterion of materiality is based on the financial perspective, although the reporting scope is extended into non-financial perspectives. The National Round Table on Environment and Economy (NRTEE) (2007) conducted research into the term *materiality* by studying how environmental and social disclosure data impact on investors’ decisions. In this work, financial impacts are the index to assessing the materiality of a non-financial issue. Simply put, some environmental and social issues should be financially material. In the shareholder-based stream, the materiality assessment of environmental and social issues is operationalized in terms of *environment cost, legislation fine, environmental liabilities*, and so on. Reports disclose these environmental and social issues and allocate their financial impacts into appropriate accounts and journals in accordance with relevant financial
Some security authorities from different countries follow a finance-oriented approach to define materiality of social and environmental information. In the United States, SEC defines materiality as a fundamental criterion for determining specific reporting requirements. SEC requires the listed companies to use the section of *Management’s Discussion and Analysis* of the annual corporate report to detail current conditions, which may generate material impacts on a company’s financial performance. This specific section should interpret material events, which may not be defined as financial information, but would cause significant impacts on the future financial performance or future financial conditions.

In Canada, security authorities require disclosure of non-financial information deemed to be financially material. In Ontario, the Securities Act requires the timely reporting of information on any ‘material change’ for a company. The Toronto Stock Exchange (TSX) has established disclosure guidelines in line with the Securities Act (Ontario), with a definition of ‘material information’ broader than ‘material change’. In particular, the TSX definition includes information concerning rumours and speculation that may have a financial impact on the company.

Material sustainability impacts are assessed under financial reporting guidelines of the Association of Chartered Certified Accountants (ACCA). ACCA uses three cases to exemplify how to use financial guidelines to assess and disclose environmental issues. One case is that an oil company purchased its major competitor, and found that it needed to deal with the environmental impact of the laying of pipeline established by the competitor before the purchase. There was no legal obligation to carry out the work, but the company felt that restoring the impacted farmland would cost it around US$150 million.

In the view of ACCA, IAS ‘Provisions, contingent liabilities and contingent assets’ were relevant to this environmental issue. Provisions for environmental liabilities should be recognized where there is a legal or constructive obligation to rectify environmental damage or perform restorative work. The mere existence of the restorative work does not give rise to an obligation and there is no legal obligation. However, it could be argued that there is a constructive obligation arising from the company’s approach in previous years, which may have given rise to an expectation that the work would be carried out. If this is the case, a
provision of US$150 million would be required in the financial statement. In addition, this provision and specific examples of restoration of land could be included in the environmental report (ACCA, 2007, p.34, p.104). The major consideration here focuses on whether to disclose or not and how to disclose the possible environmental liability in the light of relevant financial reporting guidelines, which is IAS 37 in this case.

Shareholder-based thinking that focuses on valuing financial impacts of sustainability issues, is rooted in the economic-core view, which Birkin (2000) calls environmental economics in accountancy, or which Hayward (1994) defines as reformist environmentalism. In the economic-core view, environmental impacts are considered as part of the whole economic development (Kneese & Russell, 1987; Pearce, 2002; Stavins, 2008). The foundation of this accountancy view has been built in works such as Pearce’s (2002) Environmental Economics, Ditz, Ranganathan and Banks’s (1995) Green Ledger, Owen’s (1992) Green Reporting, and inherent to such sustainability accounting tools as Life Cycle Assessment (ISO, 14040), Total Cost Assessment (Gray, 1993), Eco-Cost-benefit Analysis (Gray, 1993; 2001), Eco-Efficiency (Schaltergger, 1992), and so on. These works are confined to an economic scope for evaluating environmental and social issues in monetary terms.

Gray (1993, p.232) comments that, if the strict confinement of traditional accounting is imposed on accountants when entering the environmental reporting and accounting field, the environment is expected to be similarly constrained, thereby yielding “a very narrow, tamed, safe and controllable conception of environment (is expected to be) created by the accountants of the environment”. With this economic-core view, shareholder-based definitions of materiality produce opportunities of processing sustainability issues that accountants are familiar. However, this pathway is narrow and limited with respect to where social and environmental impacts are taken as part of financial impact, valued in monetary terms, and are confined into existing financial accounting and reporting frameworks. However, the economic-core view is problematic and has therefore been criticized by sustainability academics. In pursuance of economic goals, the economic-core view may override the sensitivity of ecological relationships of business. It leads to a situation whereby human society cannot sustain the development given that the ecosystem imposes operative limits to resource consumption for the growth or expansion of human activities (Birkin, 2000).

From this point of view, the existence and development of a business depends not only on its
financial relationships with investors, but also on the relationships to a wide range of stakeholders concerning the environmental and social aspects. Issues with significant social and environmental impacts on stakeholders are directly substantively influencing the organization, and are thus material to it. But the shareholder-based way of defining materiality, operating with an economic-core view, fails to capture such directness of non-financial impacts. Instead, it underestimates the materiality of some sustainability issues whose financial value may be insignificant, even though they generate strong impacts on the environment and society. Therefore, neither the synonym nor the shareholder-based definitional stream commits to the primary purpose of sustainability accounting as to discharging accountability to a wide range of stakeholders (Gray, 1993; Growther, 2000; Schaltegger & Burritt, 2010; Tilt, 2000). This critique of the first two definitional streams mentioned leads to an emphasis on the third stream, based on stakeholders like the second stream critiques above, but which has been adopted as the mainstream of defining materiality in sustainability accounting community (AccountAbility, 2006; 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2013; Murninghan, 2013; Zadek & Merme, 2003).

**Stakeholder-based stream – materiality in sustainability accounting**
The stakeholder-based materiality definitional stream is the mainstream in sustainability accounting literature and practice, adopted by influential sustainability accounting standards including GRI G3 (2000-2011), GRI G4 (2013), AA1000APS (2008) and IIRC (2013). In contrast with the shareholder-based stream whereby the capital providers remain the dominant concerns for materiality assessment, sustainability accounting materiality identifies the needs of a wide range of stakeholder for the conception of materiality.

The stakeholder-based conception of materiality is associated with the belief established in stakeholder theory that stakeholders are holding different resources on which the organizations rely to achieve survival and development in the business world, and hence the business must give due regard to the interests of these stakeholders (Freeman, 1984). In this regard, organizations have long managed the information flow to the customers, employees and the communities in which they operate, and to the public at large, all with the purpose of trying to establish a positive connection between a favourable business image and enhanced business performance (Schmidt & Pan, 1994). Materiality is highlighted as a useful tool to enhance the quality and function of sustainability reports and management in achieving supports from stakeholders. The Context survey (2006, p.9) justifies the necessity for
corporate report to include “a wide range of corporate responsibility issues where financial materiality is not immediately obvious”. This is because these issues could in undermine the business reputation, operations and ultimately determine the long-term financial success. Therefore, all stakeholder concerns deserve attentions of the business, even they are not currently impact the business (Context, 2006). From this perspective, stakeholder-based stream tends to provide a more holistic and longer-term view in reporting and managing sustainability issues, and in maintaining the support from stakeholders.

The remaining part of this theme concerns the how the sustainability accounting standards including GRI G3 (2000-2011), GRI G4 (2013), AA1000APS (2008) and IIRC (2013) define the concept of materiality and operationalize it into the assessment practices.

**GRI (G3) and (G4)**

The Global Reporting Initiative (GRI) is an influential standards-setting insituation issuing standardized guidelines for sustainability reporting. The recent GRI guidelines include (G3) (2000-2011) and (G4) (2013).

GRI (G3) defines materiality in the reporting context:

> Material topics for a reporting organization should include those topics that have a direct or indirect impact on an organization’s ability to create, preserve or erode economic, environmental and social value for itself, its stakeholders and society at large (2000-2011, TP, p.3).

And it refers to *material topics* as those that

> inform assessments or decision-making by stakeholders, or support engagement with stakeholders that can result in actions that would significantly influence performance or address key topics of stakeholder concern (G3 2000-2011, p.9).

GRI G4 (2013, p.17) defines the principle of materiality as follows:

> The report should cover aspects that reflect the organization’s significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders.
And it (2013, p.17) further explains that

Organizations are faced with a wide range of topics on which they could report. Relevant topics are those that may reasonably be considered important for reflecting the organization’s economic, environmental and social impacts, or influencing the decisions of stakeholders. And therefore, potentially merit inclusion in the report.

The GRI framework outlines three process steps for defining report content: identification, prioritization and validation. Materiality is regarded one of the four ‘reporting principles for defining content’. The other principles are stakeholder inclusiveness, sustainability context and completeness. Figure 2.1 indicates the roles of these principles in the different reporting process steps.

The prioritization step follows the identification step where the reporting organization identifies relevant topics and issues by learning about expectations and interests of stakeholders. This step involves examining and assessing materiality of these identified relevant topics and deciding their relative reporting priority. In the next step, namely the validation step, these material aspects or issues need to be assessed against the principle of completeness. Materiality of some issues may be reconsidered according to the organization’s report boundary and scope.
AccountAbility (AA 1000 APS 2008)

The AA 1000 Accountability Principles Standard (2008), which was developed from AA 1000 Accountability Framework Standard (1999), is to provide organizations with a set of principles to “frame and structure the way in which they understand, govern, administer, implement, evaluate and communicate their accountability” (AccountAbility, 2008, p.8). Materiality, inclusivity and responsiveness are here regarded as “the three foundation principles to support the realization of accountability” (p.8). AA1000APS (2008, p.8) states that, after the materiality assessment process has taken place, by which “the most relevant and significant issues for an organization and its stakeholders” are determined, the principle of responsiveness requires that the organization’s “decisions, actions and performance related to those material issues” should be made known to stakeholders.

AA 1000 APS defines materiality based on influence on stakeholders and influence on the organization:

Materiality is determining the relevance and significance of an issue to an organization and its stakeholders [and] a material issue is an issue that will influence the decisions, actions, and performance of an organization or its stakeholders (AA1000APS, 2008, p.12).
The International Integrated Reporting Council (IIRC) (2013)

The International Integrated Reporting Council (IIRC) (2013) releases an integrated reporting framework, in which materiality is defined from the perspective of value creation, expressed in the following excerpts:

An integrated report should disclose information about matters that substantively affect the organization’s ability to create value over the short, medium and long term (IIRC, 2013, p.5, p.18).

IIRC further associates material matters (issues) with the stakeholders in the course of value creation, indicated in the statements:

A matter is material if it could substantively affect the organization’s ability to create value in the short, medium or long term (IIRC, 2013, p.33).

And

[Material matters are] those that have, or may have, an effect on the organizations ability to create value. This is determined by considering their effect on the organization’s strategy, governance, performance or prospects…[and the so-called values are] not created by or within an organization alone, [but] created through relationships with stakeholders (IIRC, 2013, p.18).

AccountAbility (2006)

AccountAbility (2006, p.31) provides the following definition:

Material issues are those things that could make a major difference to an organization’s performance, [and] material information provides the basis for stakeholders and management to make sound judgments about the thing that matter to them, and take actions that influence the organization’s performance.

This definition considers materiality as the extent to which an organization’s performance could be changed by the sustainability issues, with an explication that such change is from stakeholders’ judgment based on these issues.
KPMG (2014) defines materiality from two indicators, ‘influence on stakeholders’ and ‘influence on the business itself’:

The principle of defining the social and environmental topics that matter most to your business and your stakeholders.

KPMG (2014) suggests that the definition of materiality should go beyond CSR and sustainability reporting practice to include the strategic level. The following definition of materiality assessment is given:

Materiality assessment is the process of identifying, refining, and assessing numerous potential environmental, social and governance issues that could affect your business, and/or your stakeholders, and condensing them into a short-list of topics that inform company strategy, targets, and reporting (KMPG, 2014, p.4)

2.2.3 Theme 3: Sustainability Accounting Modifications of Materiality Assessment

The definitions of materiality for sustainability issues are based on its influence on stakeholders and the organization (AccountAbility, 2006; 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2013). The influence is operationalized into “accounts for the needs, concerns and expectations of the organization and its stakeholders” (AccountAbility, 2008, p.12). This section addresses how the materiality assessment model is modified in sustainability accounting; that is, it looks at the degree to which aspects of materiality assessment developed in the sustainability accounting community differ from the financial materiality assessment.

GRI assessment model

GRI G3 (2000-2011) and GRI G4 Implementation Manual (2013) encourage the use of a combination of internal and external factors to test materiality of sustainability issues. External factors addressing influence on stakeholders include the stakeholder interests, topics for the sector reported by peers, laws and regulations by the government and industrial association, impacts identified by expert bodies, and so on. Influence on the organization is explicated in internal factors, including an organization’s strategies, management system, and
expectation from the stakeholders on the success of organizations, risks to the organization, critical success factors, and core competencies.

Figure 2.2 provides an illustration of GRI’s materiality assessment method, the 2-axis model, where the horizontal axis indicates influence on stakeholder assessment and decision corresponding to external factors, and the vertical axis indicates significance of economic, environmental, social impacts referring to internal factors or influence on the organization. The GRI (G3) and (G4) framework provides an example of three materiality levels in response to three reporting priority levels. In this model, the least material (immaterial) issues that correspond to low reporting priority should not be included in the report. In addition, the moderate material issues assigned medium-level of reporting priority could be taken into consideration for inclusion in the report, but are accorded less attention and content. The more material the issue is, the greater emphasis should be placed on it in the report.

Figure 2.2: GRI’s 2-axis Model in Testing Materiality


AccountAbility’s (2006) assessment model
AccountAbility (2006) provides a similar 2-axis model to the framework of GRI, as shown in Figure 2.2. But AccountAbility’s model addresses both reporting and managerial levels associated with materiality assessment. In this model, the two axes, external significance and internal significance, represent the level of influence of the issue to the stakeholders and the organization itself respectively. The position of an issue in the coordinate system represents
its level of significance to the organization and its stakeholders.

In practice, AccountAbility (2006) suggests that the extent of influence that an issue generates on stakeholders is measured by the level of stakeholder action provoked, while the extent of an issue’s influence on the organization is measured by the level of the corporate action that should be taken in response to this issue. Issues are plotted within zones, each of which corresponds to a commitment to deal with the issues in an appropriate way. In other words, different zones represent different levels of materiality corresponding to different grades of actions and reporting practices. The materiality levels are broadly divided into three. Material issues need to be emphasized in the report and linked to the business strategic performance. Less material issues (relevant but not strategically material) are often interpreted on the website and relevant to operational performance. ‘Not material’ issues “do not warrant significant action or reporting on at this stage” (AccountAbility, 2006).

Figure 2.3: AccountAbility’s Materiality Model


In Figure 2.3, the darkest zone contains high or strategically material issues included in formal report and linked to strategic performance. The moderate zone contains less material or relevant issues disclosed in online report and linked to operational performance. The light zone contains immaterial issues not reported and that do not warrant significant action.
The materiality assessment models presented in the frameworks of GRI (G3) and (G4) and AccountAbility (2006) involve modifications from traditional *rules of thumb* materiality approach, as discussed in the following.

**Modification 1: significance to stakeholders (and the organization)**

Traditional financial materiality assessment focuses on significance of financial items to shareholders. In contrast, both AccountAbility (2006) and GRI models recommend materiality assessment from a combined consideration of the two indexes, these being *significance to stakeholders* and *significance to the organization*. This modification also concerns a debate in literature that materiality of an issue should be indexed as its significance to both stakeholders and organization, or merely stakeholders.

CGA-Canada criticizes the double-index assessment method of materiality, arguing that the two indexes (significance to the firm and significance to stakeholders) should not be put on an equal status; instead, material issues “should be defined in the context of what is of importance to stakeholders and not the organization” (CGA-Canada, 2006, p.4). It is argued that the material influence of an issue can be identified from its significance to stakeholders in reference to actions taken by stakeholders, while other factors relevant to significance to the organization are secondary factors that can be used to assist with this identification (CGA-Canada, 2006, p.5).

Consistent with CGA-Canada’s argument is a note from GRI G3 stating that the two assessment indexes overlap to some extent and can be unified in terms of *stakeholder interest and expectation*. This is because the interests and expectations of stakeholders (workers, shareholders, and suppliers) are invested specifically in the success of the organization, and hence are significant for not only stakeholders, but also the organization (GRI G3, 2000-2011). Therefore, it is reasonable to use only ‘significance to stakeholders’ to reflect ‘significance to the organization’.

AccountAbility (2006, p.13) identifies a problematic gap between the viewpoints of the organization and stakeholders: “Businesses that deem issues to be immaterial that stakeholders consider important are revealed as not having an embedded response”. This gap is a reflection of “a business will and capacity to truly respond to what stakeholder think should count” (AccountAbility, 2006, p.51). That is, the lesser the gap between significance
to stakeholders and that to the business, the more will opportunities exist for the business to identify, manage and report the issues that are really material.

The following question may suggest the necessity to unify the two viewpoints: Can one issue significant to stakeholders but insignificant to the organization be identified? It seems that it cannot. The primary reason for sustainability report and management is that stakeholders hold critical resources for the survival and development of the organization, and pressure the organization to act in a way that meets their expectations on the improvement of corporate sustainability performance. From this point of view, an issue significant to stakeholders must be significant to the organization. Yet it is unimaginable that an issue is significant to the organization itself, but is not significant to any stakeholders including shareholders. From this point of view, the argument of GRI and CGA-Canada on unification of the two materiality viewpoints into a single gauge, stakeholder expectations or actions, is justified and should be incorporated in the materiality conception.

Modification 2: Quantification of the issue influence

The sustainability materiality assessment models (AccountAbility, 2006; GRI G3, 2000-2011; G4 Implementation Manual, 2013) based on quantification of influence of an issue being measured by a mixed array of quantitative, qualitative, descriptive, and narrative evidence (AccountAbility, 2006; Zadek & Merme, 2003), is significantly different from the rules of thumb financial materiality approach using direct monetary indictors.

Sustainability accounting materiality assessment is to “quantify economic, environmental and social impact” involving complex multifaceted data (KPMG, 2014, p.5). Murninghan (2013, p.20) comments that a normal materiality assessment should involve a qualitative analysis and discussion with a scoring system in which the complex and multi-faceted data are quantified. GRI G3 (2000-2011), GRI G4 Implementation Manual (2013) and AccountAbility (2006) suggests that, to measure influence of sustainability issues, organizations often need to conduct stakeholder research by surveying or interviewing them in order to collect sufficient data from different perspectives relating to the prevailing issues associated with the business.

Modification 3: Materiality continuum

The axis models (AccountAbility, 2006; GRI G3, 2000-2011; GRI G4 Implementation Manual, 2013) use a continuum to indicate less materiality to more materiality, rather than a
**Modification 4: Methods of collecting evidence for materiality assessment**

When assessing financial materiality, the data concerning the financial items are recorded in the bookkeeping system, with entries for the daily financial transactions (ACCA, 2007). In sustainability accounting, data concerning significance to stakeholders involves not only descriptive records on the background of the sustainability issues themselves, but also an extensive research on stakeholders (GRI G3, 2000-2011). GRI G3 (2000-2011), GRI G4 Implementation Manual (2013), AccountAbility (2006) and IIRC (2013) regard stakeholder engagement as the major approach to data collection for materiality assessment. In doing so, the organization is required to establish effective dialogues and communications with different stakeholders through multiple methods including surveys, regular visits, the complaints channels, online discussion forums, and so on.

In summary, the rules-of-thumb materiality approach using fixed percentages on monetary-term financial indictors or items is not adopted in current sustainability accounting materiality assessment. In contrast, the sustainability accounting community has developed its materiality assessment techniques by applying substantial modifications of the rules-of-thumb approach. This includes: (1) quantifying a mixed set of quantitative and qualitative data concerning sustainability items; (2) using a continuum indicating the less material and the more material rather than a binary financial materiality threshold differentiating the material and the immaterial; and (3) employing multiple communicative methods to obtain stakeholder opinions on significance of the sustainability issues, rather than simply refers to...
2.2.4 Theme 4: Managerial Focus on Sustainability Accounting Materiality

Sustainability accounting involves both reporting and management functions, although its reporting role is often emphasized in literature. Gray, Owen and Maunders (1987) highlight sustainability accounting as a process of external reporting of corporate performance to communicate qualitative and quantitative information about the environmental impact on particular interest groups in society. However, sustainability accounting should not be conflated with sustainability reporting, but should be directly associated with operational decision-making and performance management. As Burritt and Lehman (1995, pp.169-70) maintain, sustainability accounting is “the generic name given to the field of study highlighting the interrelationships between accounting, accountants and the ecological”. This interrelationship involves not only communicating stakeholders about the sustainability performance, but also capturing and assessing the useful information to support strategies of the organization in sustainability management (Clarke & O’Neill, 2005).

Sustainability accounting materiality as a sustainability accounting concept contributes to both dimensions of sustainability reporting and management, which enables the organization to “seek to manage their performance, and look to communicate effectively with their stakeholders” (AccountAbility, 2006, p.18). Although the GRI materiality model focuses the application of materiality on the dimension of sustainability reporting practices, materiality plays a critical role in performance management. As GRI G3 (2000-2011, p.9) states, material issues generating “impacts that are considered important enough to require active management or engagement by the organization”. In addition, AA1000APS (2008, p.12) associates materiality with managerial actions of the organization and stakeholders by pointing out that, “to make good decisions and actions an organization and its stakeholders need to know what issues are material to the sustainability performance of the organization”. The capability of addressing stakeholders’ requirement is the aim of establishing the judgment of materiality of sustainability issues (AccountAbility, 2006). Through materiality practice, “an organization focuses on what is really matter, thereby identifying and acting on opportunities as well as managing non-financial risk and compliance” (AccountAbility, 2008, p.21).
A rigorous approach to sustainability accounting materiality is needed to “direct, rather than reflect performance” (AccountAbility, 2006, p.51). In the sustainability accounting context, the materiality of social and environmental issues with extensive and long-term influence is understood as a board level responsibility, with a linkage into corporate governance, core decision making and performance management (AccountAbility, 2006; Eccles & Serafeim, 2013; Murninghan, 2013). Murninghan (2013) points out that management, especially senior executives, need to understand and manage material sustainability issues and effectively wire them into a firm’s operating system. AA1000APS (2008, p.13) states that focusing the materiality lens on sustainability issues is “the most effective way both to drive and to test businesses’ real commitment to the sustainability imperative”. According to Eccles and Serafeim (2013, p.5), the aim of identifying the material environmental, social and governance (ESG) issues is to assist the organization to “undertake major innovation in products, process, and business models to achieve the improvement” (2013, p.5) by resolving these material issues. In this way, materiality practices lead to “both to solve and manage crucial problems and assure accurate disclosure to different stakeholders” (Murninghan, 2013, p.13).

AA1000APS (2008) emphasizes the importance of materiality assessment to its management strategy. The process of materiality assessment “is aligned with the processes for organizational decision making and strategy development” (AccountAbility, 2008, p.12). A rigorous and usable materiality lens enables management to clarify its long-term objectives with respect to decision-making, instead of being confined to the short-term financial compliance or technical goals (AccountAbility, 2006, p.51). In addition, sustainability materiality “offers the opportunity to close the loop between reporting and stakeholder engagement on one side and strategy development and performance management on the other” (AccountAbility, 2006, p.12). Figure 2.4 depicts a pioneering materiality framework, proposed by AccountAbility (2006), to illustrate the dual-function of materiality assessment, which is stretched beyond sustainability reporting to performance management.

This model indicates that materiality determination or assessment process (central) connects both reporting (the right side) and managerial practices (the left side). This connection leads to a consistency between report priority and management priority. For example, the organization should report highly material issues with details in the formal report, and resolve these issues at the strategic level of management; moderately material issues may be
presented in the online report and tackled at the operational level; while immaterial issues should not be reported and therefore no significant action is warranted for them.

Figure 2.4: Materiality Framework

![Materiality Framework Diagram]


The relevance to performance management of sustainability issues echoes the basic logic of materiality, thus flagging the significance of an issue and the extent of efforts in dealing with it (Hicks, 1964; Jeffries, 1981; Bernstein, 1973). It also reinforces the argument that materiality application involves not only accounting considerations, but also the field of managerial practices, where issues are managed by cutting through to the matters of significance (AccountAbility, 2006; Bernstein, 1973; Eccles & Serafeim, 2013; Hicks, 1964; Jeffries, 1981; Murninghan, 2013). Khan et al.’s (2015) research findings focus on the managerial aspect of materiality logic. They argue that investment and effort should concentrate on material environment, social and governance (ESG) issues. This is because investing ESG factors, which are immaterial but owing an opportunity cost, does not generate significantly different value to the firm.

As discussed above, current sustainability accounting literature has addressed the managerial focus of sustainability accounting materiality, compared to the mere reporting function of financial accounting materiality. That is, sustainability accounting materiality assessment assists both managing the sustainability issues and communicating with stakeholders concerning the managerial actions on these issues (AccountAbility, 2006; 2008; Clarke & O’Neill, 2005; Eccles & Serafeim, 2013; KPMG, 2014; Murninghan, 2013). The dual functions of materiality in both reporting and managerial systems is addressed in
AccountAbility’s (2006) materiality model (Figure 2.4) and is involved in the discussion of Murnaghan (2013), KPMG (2014) and Eccles and Serafeim (2013), who argue that significantly material issues should be included into the strategic level of management and specified with more detailed contents and details reports.

2.2.5 Theme 5: Context-Specific Materiality Practices

The context-specific materiality phenomenon has been emphasized in sustainability accounting literature (AA1000APS, 2008; AccountAbility, 2006; Eccles & Serafeim, 2013; GRI G3, 2000-2011; GRI G4, 2013; GRI G4 Implementation Manual, 2013; Zadek & Merme, 2003), especially with reference to practices of materiality determination that are influenced by the contexts of the entities in making decisions in response to the issues. Zadek and Merme (2003, p.27) point out that materiality tests of sustainability issues, however robustly defined, must be interpreted contextually. This is because “what is material for one company will be less so for others, or less so for the same company at a different time or place”. Eccles and Serafeim (2013, p.57) observe that “the materiality of any issue varies from one industry to the next”. According to Eccles and Serafeim (2013, p.55), the issue of carbon emissions is more material to a coal-fired utility than a bank, and issues relevant to human rights for a firm employing low-cost workers in developing countries are more material than a company using skilled workers in developed countries.

AA 1000 APS (2008, p.13) states that, in determining materiality of sustainability issues, the organization needs to “take into account the changing sustainability context and maturity of issues and concerns”. AccountAbility (2006, p.20) contends that “material social and environmental issues occupy the contested are where neither legal nor financial guidance thresholds are sufficient”, and that this is why businesses have to develop prioritization criteria on their own visions to “assess materiality in the context of managing for long-term sustainability”.

Given that prior research serves as a cautionary note for sustainability managers formulating materiality practices of issues without consideration of the operative circumstance where issues occur, context-specificity of materiality remains as a phenomenon observed and described in previous literature. Indeed, this existing literature lacks theoretical and empirical investigation of why this phenomenon occurs and how it should be incorporated into the
materiality conception. This thesis, in its later chapters, aims to deepen our understanding of materiality context-specificity via a new conceptual model for materiality, which reveals the enduring process, structure and mechanism underlying the context-specific materiality practices.

2.2.6 Theme 6: The Demise of ‘Rules of Thumb’ Materiality Model

This theme explicates the assertion that a direct copy or simulation of financial accounting techniques cannot be applied to sustainability accounting. According to Birkin (2000), when engaged in improving sustainability performance, organizations encounter problems in dealing with the sustainability-related issues with long-term multi-aspectual influences on a diverse range of stakeholders. The complex and contentious nature of environmental and social issues results in these issues being difficult to quantify reliably, in contrast with the financial accounting items, which are directly quantified in precise monetary terms (Birkin, 2000; Clarke & O’Neill, 2005). This inherent complexity relating to sustainability issues leads to the incompatibility of uniform quantitative units (such as financial issues are presented and measured in terms of ‘money’ in financial accounting), especially when sustainability accounting practice is required to perform analysis, assessment and comparison of the non-financial issues (Birkin, 2000). It is thus suggested that current financial accounting system and practice may be limited in accounting for non-financial issues (Benston, 1982; Clarke & O’Neill, 2005; Wildavsky, 1994). As Clarke and O’Neill (2005, p.233) note, “ideal systems for measuring environmental performance attributes cannot be attained”.

Sustainability accounting materiality assessment or determination developed in the GRI G3 (2000-2011), G4 (2013), and AccountAbility (2006) differ significantly from conventional financial accounting materiality approach. However, prior literature lacks any concrete justification as to why the conventional 5 percent rules of thumb test is not suitable in assessing materiality of non-financial issues. In this theme, this knowledge gap is addressed by attributing the inapplicability of the rules of thumb materiality approach on account of three complexity aspects inherent to sustainability issues: the qualitative characteristics of issue influence; the time frame; and entity context-specificity.
The qualitative interpretation of sustainability issues

First, some sustainability issues may not be described straightforwardly in terms of quantitative value, but only in qualitative terms. Schaltegger and Burritt (2000; 2010) and Yongvanich and Guthrie (2006) argue that environmental and social impacts and extended performance should be expressed qualitatively. For example, Yongvanich and Guthrie (2006) propose a reporting framework covering a range of aspects such as customer satisfaction, brand, distribution channel, compliance, and human rights, which must rest on qualitative descriptions. The authors suggest that accounting for corporate sustainability performance according to a stakeholder view should be based on a flexible structure incorporating both quantitative and qualitative information. In fact, in using the GRI reporting framework, it is difficult to measure indicators of social issues in quantitative units (Lamberton, 2005). Therefore, the rules of thumb approach, which uses a fixed percentage such as 5 percent, cannot be applied straightforwardly in assessing materiality of many sustainability issues that are described and understood in qualitative terms. A warning is given by Deegan (2002, p.307), who states that a sustainability issue should be material, even though it “cannot be quantified (reliably) [and is] generally not considered to be material and therefore do[es] not warrant separate disclosure”. Instead of the simple and straightforward rules of thumb test, the sustainability materiality assessment or determination must “handle the range and complexity of non-financial as well as financial, and quantitative and qualitative information” (Zadek & Merme, 2003, p.29).

The long-term time frame of sustainability issues

The second complexity aspect of sustainability issues is the time frame of influence. The rules of thumb tests, which are based on a short report period (quarterly or annually), cannot apply to some sustainability issues associated with long-term or even intergenerational outcomes and effects. In light of this, AccountAbility (2006, p.48) states that

Sustainability materiality processes aim to pick up not on issues that would impact on less than 5% of earnings in the next year, but on issues that could impact on 5%, 10%, 50% or more, or indeed on business survival, within the next 5, 10, or 20 years.

The same authority also argues that long-term matters must not be overlooked in the materiality assessment. As IIRC (2013, p.4) adds,
matters that might be relatively easy to address in the short term but which if left unchecked could be increasingly damaging and progressively more difficult to address over time need to be included in the population of relevant matters (for materiality assessment).

Zadek and Merme (2003, p.15) argue that timeframes should be handled in sustainability materiality assessment “with typically more social and environmental issues being included where longer time periods are taken into account”. Since the long-term environmental and social performance assessment is more than a simple accumulation of a number of short-term issues (Zadek & Merme, 2003), the short-termism inherent in the application of rules of thumb fail to provide a time horizon as the basis for assessing the complex and potentially long-lasting effects of environmental and social issues.

**The entity-specific materiality of issues**

The third complexity aspect is the entity-specific materiality of sustainability issues, as addressed in Theme 4. Materiality of sustainability issues varies over different entities or different time for the same entity, thereby leading to contested prioritization assessment result for the issues. Therefore, the *rules of thumb* model, generally accepted in different contexts, are improper for assessing the context-specific sustainability issues.

Overall, it is inapplicable for sustainability accounting community to directly copy or simulate the rules of thumb materiality model that has been widely applied in financial accounting contexts. This argument justifies the calls for innovative models to assess materiality of sustainability matters.

**2.2.7 Summary of Topic 2**

In this literature review, the evolution of materiality from financial to sustainability accounting contexts is attributed to the growing requirement of accountability being extended to stakeholders rather than merely shareholders. Among the three streams of redefining materiality, the stakeholder-based stream, which is grounded on stakeholder values and interests, is justified as the mainstream adopted in sustainability accounting community. Based on the materiality frameworks proposed by GRI G3 and AccountAbility, this study identifies four modifications due to application of materiality in assessing sustainability issues in comparison to the financial application of materiality. These modifications include
‘significance to stakeholders’, ‘quantification of complex data relevant to the issues’, ‘materiality continuum’ and ‘data collection methods focusing on stakeholder research’.

Furthermore, compared to financial materiality in a focus of only reporting practices, materiality in sustainability accounting is defined and operated from either managerial or reporting perspectives; however, consistency between managerial and reporting practices has been little studied in prior literature. This topic addresses context-specific materiality phenomenon, where materiality practices of sustainability issues vary across organizational settings, or across different times for the same organization. But a deep form of knowledge on context-specificity has not been seen in previous materiality literature. The final theme in this topic is that the demise of the rules of thumb materiality model in sustainability contexts is due to qualitative interpretations and long-term effects of sustainability issues, together with the context-specificity of materiality practices.

2.3 Topic 3: Accountability and Materiality

This topic links materiality to accountability and aims to construct an accountability framework by which the materiality practices can be analysed. The accountability foundation for accounting is reflected on Shearer’s (2002) assertion that accountability is enabled by accounting practices. This view associates accountability and accounting practices including application of the accounting concept of materiality. This connection is reinforced in AASB (1995, p.8), which defines material issues as issues having “the potential to adversely affect the discharge of accountability by the management or governing body of the entity”. Whereas financial accounting aims at discharging accountability to shareholders, sustainability accounting is grounded on “extension of accountability” (Gray, 2001, p.11); that is, discharging accountability of the firm to a wide range of stakeholders (Gray, 2001; Lamberton, 2005; Schaltegger & Burritt, 2010; Tilt, 2000). However, the current state of materiality conception has not established a substantive reference to accountability.

In this topic, an analytic framework of accountability is developed and applied to construct accountability references to materiality in financial accounting and sustainability accounting. This accountability framework comprises four defining elements and one condition including ‘an agent being answerable’, ‘a principal possessing sanction power’, ‘managerial action’,
‘account’ and ‘transparency (condition)’. The same accountability framework applies to study materiality practices in financial and sustainability accounting contexts, which pertain to accountability discharged to shareholders and stakeholders respectively.

2.3.1 The Concept of Accountability

Accountability, as “one of the golden concepts” (Bovens, 2007, p.447), has been widely used in business, politics, non-profit and public administration, sociology, education, and psychological studies (Frink & Ferris, 1998; Lehman, 2007; Lerner & Tetlock, 1999; Sinclair, 1995). Accountability is simply referred to as a situation where one actor should be called on to justify its actions or possible actions to another actor, for a failure to do so would result in negative consequences for the first actor (Lerner & Tetlock, 1999; Roberts & Scapens, 1985). A frequently cited definition of accountability is given by Schedler (1999, p.17):

A is accountable to B when A is obliged to inform B about A’s (past or future) actions and decisions, to justify them, and to suffer punishment in the case of eventual misconduct.

Similarly, Goetz and Jenkins (2002, p.5) define accountability as:

The relationship where A is accountable to B if A is obliged to explain and justify his actions to B, or if A may suffer sanctions if his conduct, or explanation for it, is found wanting by B.

In most cases, the two actors involved in the accountability relationship are alternatively termed by accountability theorists to be ‘accountor and accountee’, ‘account giver and account receiver’, ‘accountability target and accountability seeker’, or ‘agent and principal’ (Bovens, 2007; Dubnick, 2003; Goez & Jenkins, 2005; Gray et al., 2014; Hardy & Ballis, 2013; Lindberg, 2009; Mansbridge, 2010; Mulgan, 2000; Power, 1991). This study consistently uses the terms ‘principal’ and ‘agent’ to denote the two social actors in an accountability relationship.

Lindberg (2013) translates a course of practices as presented in accountability definitions into a stylized time-line continuum, as is depicted in Figure 2.5.
This time-line model indicates that, within the accountability relationship, the agent is legitimated to take action on behalf of the principal, and then report to the principal about this action. If the agent fails to do this, it suffers the principal’s sanctions. Yet Gray et al. (2014, p.50) propose another model (Figure 2.6), which defines accountability as “the duty to provide an account or reckoning of those actions for which one is held responsible”.


Source: Gray et al., 2014, p.52.
Identical to Lindberg’s (2013) time-line model, Gray et al.’s model presents the process of accountability discharge as follows: the accountability relationship empowers the principal to sanction (reward or punish) the agent, who must take appropriate action on behalf of the principal, and then provides the principal information about the action. Gray et al. (2014) contend that this accountability model applies to sustainability accounting. It informs the accountability relationship involving stakeholders acting as the principal, and the organization as the agent. This application is discussed further in a later section (2.3.4) of this chapter.

The preceding discussion concerns defining accountability according to two aspects: first, one actor is able to give an account justifying her behaviour; second, the other actor is able to impose a penalty for unsatisfactory performance (Goetz & Jenkins, 2002, p.5). McKernan (2012) argues that what is generally acknowledged as central to the accountability conception and process is “the power to require that information be made public, the capacity to breach silences and seccreces and to demand and to get data and answers” (McKernan, 2012, p.264). Similarly, de Wit and Akinyoade (2008) indicate that accountability has two dimensions: the first dimension is the answerability of the agent with respect to a requirement to provide information about one’s actions; and the second is that the agent has to be penalized by those who are dissatisfied either with the agent’s actions, or with the agent’s justification of these actions. That is, an accountability relationship cannot emerge if the ‘agent’ (accountor) does not hold the ability of being answerable, or the ‘principal’ (accountee) does not possess the sanction power.

2.3.2 An Analytic Framework of Accountability

The definitions and defining models of accountability mentioned above outline four defining elements:

1. A principal or accountee necessarily possessing sanction power towards an agent;
2. An agent or accountor necessarily being answerable to the principal;
3. The agent’s action; and
4. The account given by the agent to justify her action.

These elements, together with the fifth element ‘transparency’, identified in later part of this section as the necessary condition of maintaining an accountability relationship, constitute the
analytic framework of accountability to inform the conceptual link established in this thesis between accountability and materiality in both financial and sustainability accounting contexts.

**Elements: ‘principal’ and ‘agent’**

Prior literature refines answerability as to the major requirement of the agent in defining accountability (Dubnick, 2003; Harwood, 1996, Mulgan, 2000; Schedler, 1999). Schedler (1999, p.14) claims that answerability is the “closest synonym” of accountability:

> The notion of accountability indicates that being accountable to somebody implies the obligation to respond to nasty questions and vice versa, that holding somebody accountable implies the opportunity to ask uncomfortable questions.

Both Schedler (1999) and Mulgan (2000) indicate two aspects of answerability contained in accountability. One is an informational aspect to release information about the agent’s behaviour, while the other is the explanatory aspect to justify what was done by the agent.

Shedler (1999, p.15) argues that, apart from accountability’s informational and explanatory aspects, accountability contains “elements of enforcement (sanction)”, which refer to “rewarding good and punishing bad behavior” (Mansbridge, 2009, p.1). As Lindberg (2013, p.216) states, a sanction is a kind of after-effect whose purpose is to make agents responsive to the wishes and interests of principals:

> If dissatisfied, the principals can sanction the agents by way of throwing the rascals out or simply expose the agents’ actions and failures.

For Mansbridge (2009; 2010), the principal’s power for imposing sanctions to exercise accountability is based on an assumption of conflict between the agent’s interest and that of the principal:

> The principal holds the agent to account through either positive or negative sanctions – promising inducements and making threats, offering carrots and threatening sticks. (Mansbridge, 2010, p.1)
Elements: ‘action’ and ‘account’

The definition of accountability reflects an association of ‘action’ and ‘account’ as to where the agent is required to give an account to the principal. This action-account association is addressed in accountability studies as the integration of the internal management system (which refers to action taking) and the external communication system (which refers to account giving) (Dubnick & Romzek, 1991; Christensen & Lægreid, 2013; Demirag & Khadaroo, 2011; Dubnick, 2003). According to Dubnick (2003) and Mitchell (2011), the agent takes managerial action in order to realize the goal of achieving the principal’s expectation, and hence the agent must maintain communication with the principal to clarify expectations of the principal and to inform the principal. A similar view is taken by Demirag and Khadaroo (2011); that is, to improve management, it is necessary for the agent to establish effective communications with the principal. By this means, the agent can consider its managerial performance against the principal’s expectations. This will allow the agent to appease the principal by addressing these expectations, thereby forestalling negative outcomes for the agent.

Lægreid, Roness and Rubecksen (2008) propose a model that justifies the logical linkage between reporting practice and managerial action. This model includes four phases.

- The first phase is a formulation of goals demanding discretion for the members of the organization to achieve those goals.
- The second phase is formulation of indicators and steering parameters to judge goal attainment.
- Reporting on activities and results is the third phase.
- The final phase is to use the reported results for learning and further performance steering.

This procedural model reveals a reciprocal relationship between account-giving activity and managerial action, which connects an organization’s informational system and managerial system (Lægreid et al., 2008).

In summary, the managerial action taken by the agent underpins the practice of accountability, which is defined as an agent giving an account to justify such an action (Bovens, 2006; Dubnick, 2003; Lindberg, 2009; Mansbridge, 2010; Mulgan, 2000; Power, 1991; Strom,
Only when the managerial action achieves the expectation of the principal will the account be able to justify what the agent did. This will allow the agent to avoid a potentially negative consequence resulting from the principal’s sanction. In addition, the accounts given by the accountor (agent) to the accountee (principal) can be either formal or informal (Dubnick, 2003; Hardy & Ballis, 2013; Mashaw, 2006). Formal accounts include annual or periodic official reports to the governmental bodies or the public. Complementary to formal accounts, informal accounts include advertisement, verbal reports, ad-hoc informal reports, and ad-hoc media reports, or even face-to-face encounters (Hardy & Ballis, 2013; Roberts, 2009). Hardy and Ballis (2013) conducted a study of how a religious charity used informal reports to discharge accountability to different stakeholders, including the communities and the charity members.

**Condition: Transparency**

The accountability literature highlights the condition of transparency, under which it is possible to maintain an accountability relationship. Transparency can be understood as that which “requires allowing people to see into systems and to understand the reasons for decisions taken” (Osborne, 2004, p.292). As Gray (1992, p.415) states

> The development of accountability… increases the transparency of organizations. That is, it increases the number of things that are made visible, increases the number of ways in which things are made visible, and in doing so encourages a greater openness. The inside of the organization becomes more visible, that is transparency.

Roberts (2009, p.958) regards “the operation of transparency as a form of accountability”. The author argues that a complete or perfect transparency is impossible. But “transparency can at best signal the need for intelligent accountability” (p.969), which refers to “well placed trust” facilitated by “active enquiry – listening, asking questions, and talking”, rather than blind acceptance (p.966). Accountability in its intelligent form “is typically a face-to-face encounter, rich with information, in which communication is less easily stage-managed and rhetoric can be constantly compared to actual practice” (p.966). In contrast, accountability cannot operate in an opaque situation, because the principal would be unable to acknowledge what the agent does, nor to verify what the agent informs. Roberts (2009) and Strathern (2000) argue that transparency typically occurs in situations of before and after the action taken by the actors. Therefore, transparency enables the principal to observe the change resulting from
the action and contributes to measurement and evaluation of the agent’s performance.

Mitchell (2011) implies two logics associating transparency to the agent’s accountability behaviour. Where the agent’s performance is transparent to the principal, the principal is able to assess the benefits or loss resulting from the agent’s behaviour (the consequence logic), and judge whether the agent behaves in accordance to the norms and values that the principal maintains (the appropriateness logic). Accordingly, the agent must be accountable to the principal, by justifying the consequence and appropriateness of her actions to the principle. One means to achieving transparency, that is, for the organization to know the agent’s actual performance, is monitoring controls that police the principal-agent relationship. Bebchuk and Fried (2004) argue that the agent has more information than the principal, who is unable to truthfully guarantee that the agent’s behaviour is always on behalf of the interests of the principal. According to Hart and Holmstrom (1987), the agent may act in a way that sacrifices the principal’s interest to achieve the agent’s self-interest, using ‘hidden action’ which is unobservable to the principal, and ‘hidden information’ by which the principal is misled or deceived. To prevent the opportunity for the agent to deceive the principal, monitoring controls effectively enables the principal to verify actions taken by the agent (Eisenhardt, 1989; Hill & Jones, 1992; Watts & Zimmerman, 1983).

**Outline of the analytic framework of accountability**

The analytic framework of accountability concluded from the above discussion is presented in Table 2.1.

<table>
<thead>
<tr>
<th>Defining elements and condition</th>
<th>Significations to establish and maintain an accountability relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A principal possessing sanction power</strong></td>
<td>An accountability relationship must involve two social actors, one is principal (accountee) who possesses power of sanctioning the other one, agent, to request an account. And the agent (accountor) holding answerable to the principal’s request by giving an account.</td>
</tr>
<tr>
<td><strong>An agent holding answerability</strong></td>
<td>The account, which is given to the principal, must justify agent’s action.</td>
</tr>
<tr>
<td><strong>Agent’s action Account</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Transparency (monitoring controls)</strong></td>
<td>Without transparency, the principal may be unable to verify the account and may not exert the sanction power that she possesses. Then the agent</td>
</tr>
</tbody>
</table>
would have a chance of being unaccountable without any sanction effects. Transparency can be achieved by monitoring controls.

In Sections 2.3.3 and 2.3.4, this framework will be applied to the analysis of materiality in both financial and sustainability accounting contexts.

2.3.3 The Accountability Reference to Materiality in Financial Accounting

A conventional view is to take the firms’ managers or governing bodies as agencies of shareholders (Eisenhardt, 1989; Jensen & Meckling, 1976). Fontrodona and Sison (2006) and Quinn and Jones (1995) hold that the firm is the agent of shareholders, who as principals, are in search of investment returns. This view is justified by Dejilic’s (2013, p.596) argument that, with its own right granted by corporate law, a firm can be treated as a fictional individual or a legal person in relationship with its investors. Regarding the coexistence of both views, ‘a firm as agent’ and ‘a firm’s governing body as agent’ in literature, this study accommodates the view that either the firm or its governing body can be referred as the agent in the accountability relationship with shareholder.

Financial accounting standards are policing instruments in the relationship between shareholders as principal and the firm (or its management) as agent, and merge the interests of the management and shareholder (Perry & Nölke, 2006; Watts & Zimmerman, 1978; Whittington 2008), thereby enabling the accountability relationship where the firm (as an agent) is required to give an account to shareholders (as principals). Perry and Nölke (2006, p.560) contend that the principal-agent relationship is portrayed in financial accounting standards that act as “a mirror of shareholder value”, and are assessed “in terms of their efficiency and whether they reduce the principal-agent conflict and information asymmetries” (p.568). Whittington (2008, p.145) argues that, in the context of financial accounting and reporting, the relationship between the management and shareholders presents “a classical example of a principal/agent problem”, where the firm holds ‘the scope for free action, and the shareholder needs to monitor that freedom, using the information in financial report’.

It is inferred that the financial reporting practice is a form of account-giving action through which the firm discharges accountability to its shareholders. Watts and Zimmerman (1978, p.113) state that “financial reporting is to act in the shareholders’ interest”, and that financial
accounting standards are designed “to constrain management to act in the shareholders’ interests”. The shareholder agency view is inherent to the Conceptual Framework of IFRS/IASB (2010), where the objective of financial reporting is “to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity”. In this statement, the provision of resources refers to the sanction power possessed by shareholders in buying, holding, selling securities of the company, and utilizing the shareholder votes, to demand that the firm report material issues. Therefore, financial accounting is associated with shareholder accountability in the ‘accountability regime of the capital market’ (Marshaw, 2006), where the shareholders act as the principal, and the firm (or its governing body) is the agent.

This perspective informs application of the analytic framework of accountability for establishing an accountability reference to materiality, conceptualized in financial accounting as discharging accountability to shareholders, as shown in Table 2.2. Under the obligation to shareholders who possess the power of investment, divestment and voting for sanctioning the organization, the organization is required to improve financial performance by managing financial issues and including all material financial issues in the formal financial reports presented to shareholders.

Table 2.2: The Accountability Reference to Materiality in Financial Accounting

<table>
<thead>
<tr>
<th>Defining Elements and condition</th>
<th>Application in financial accounting</th>
</tr>
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| **Principal** (accountee) possessing sanction power | Shareholders (principal, accountee) possess the power of investment, divestment and share voting to demand the business organization to meet their expected financial performance.  
*Implication to financial materiality practices:* failing to identify material issues, or intentionally misstating the material issues that are identified, the organization will suffer sanction by shareholders. |
| **Agent** (accountor) being answerable | The organization or its governing body (the agent, the accountor) is answerable to the shareholders’ requests by improving financial performance and reporting the financial performance to shareholders. |
| **Action** | The managerial aspect is not a focus in financial materiality definitions, but, as IFRS/IASB (2010) and Whittington (2008) mention, it is |
informed by the formal financial report or internal report prepared by accountants, with management taking action to improve financial performance.

*Implication to financial materiality practices:* the management is required to resolve material financial issues so as to improve financial performance to address shareholders’ interests.

**Account**

The organization must provide fair and objective financial reports to shareholders.

*Implication to materiality practices:* certainly, the organization needs to prepare formal reports to include all financial items that are material.

**Transparency (monitoring controls)**

Transparency condition is achieved via *external audits* by which shareholders are able to scrutinize the organization’s performance.

*Implication to materiality practice:* the external audit enables verification of whether any material issues are misstated or omitted; therefore, the organization cannot be unaccountable free from sanction imposed by shareholders.

Table 2.2 demonstrates the implications of the analytic elements of accountability for materiality practices. The determination of materiality is based on whether this issue is significant enough to provoke shareholders to exert their sanctioning power in terms of their investment options. Reporting material issues refers to account-giving activity. The managerial aspect of materiality is implicit in financial accounting standards which focus on the role of accountants in reporting material issues. But the managerial action is mentioned in IFRS/IASB (2010) and Whittington (2008); the accountability of the organization is realized by both the managers in improving financial performance, and the accountants in preparing financial statements. From this point of view, managerial practices of material issues fall into the role of managers, but not into the role of accountants, on which financial accounting standards focus in defining materiality. The transparency condition is realized by the external audit, which ensures that the organization’s performance is fairly and objectively reported to shareholders. The external audit verifies any misstatement or omission of material issues.

2.3.4 The Accountability Reference to Sustainability Accounting Materiality

In this section, the defining elements and condition of accountability are applied to construct an accountability reference to materiality practices in sustainability accounting.
The ‘shareholder as principal’ view has been criticized from a number of perspectives. These are as follows:

- **Capital non-preferential perspective** that capital owners are not superior to other parties related to the firm (Fama, 1980; Fontrodona & Sison, 2006);

- **Market efficiency perspective** that the efficient market hypothesis is regarded as insufficient to interpret the reality of the power differentials (i.e., unequal resource dependencies) between management and stakeholders (Hill & Jones, 1992);

- **Deontological ethics perspective** that each stakeholder should be treated as an end in itself, rather than a means to an end (i.e., the wealth end of shareholder) (Shankman, 1999).

These critiques have led to academic efforts to reform the classical view, which focuses on only shareholders as the principal to cover the scope of stakeholders as principals. The following are examples of such critiques:

- **Stakeholder-agency theory** (Hill & Jones, 1992) sets stakeholders as ‘principal’ and the organization’s managers as ‘agent’ in recognition of implicit and explicit contractual relationships between the organization and all of its stakeholders.

- **Tinged stockholder theory** (Langtry, 1994), which acknowledges that sometimes management acts as agent for people other than shareholders;

- **General stakeholder model subsuming agency theory** (Shankman, 1999), which includes the recognition of stakeholders and requires a moral minimum to be upheld, thereby elevating moral principles above the stakeholder interests;

- **Rehabilitated agency theory** (Fontrodona & Sison, 2006), which assumes the purpose of the firm is not to maximize shareholder wealth but to benefit stakeholders; and

- **Agency apologetic** (Sharplin & Phelps, 1989), where the strategic managers must see themselves as servants of a variety of constituencies (i.e., stakeholder groups) with a purpose of maximizing their wealth rather than merely the shareholder wealth.

The establishment of the view ‘stakeholder as the principal to the firm’ justifies the fundamental standpoint that stakeholders provide the firm with critical resources in exchange for protection of their interests (Agle et al., 1999; Frooman, 1999; Hill & Jones, 1992). This
exchange between the stakeholders and the firm renders that the firm is exposed to survival and development risks, and is influenced by stakeholders who can allocate, enhance, mitigate or terminate their provision of resources critical to the firm.

Using the principal-agent relationship to define the process of accountability discharge (see Figure 2.6), Gray et al. (2014) infer an application of the accountability perspective to sustainability accounting contexts, where the stakeholders as principals are able to manipulate critical resources to sanction the firm, and the agent is liable to answer stakeholders’ request. They explain that fulfilment of stakeholder accountability by the firm is through the sustainability reports that inform stakeholders of the firm’s actions; that is, the accountability relationship is established where the firm must give an account to the stakeholders, or otherwise suffers a sanction from stakeholders that are able to manipulate diverse critical resources to the firm.

Table 2.3 shows how the accountability reference to materiality is established using the analytic framework of accountability. The table demonstrates the allocation of each defining element and the condition of accountability to the application of materiality in sustainability practice including identifying, managing and reporting sustainability issues that are significant to stakeholders (AccountAbility, 2006; Eccles & Serafeim, 2013; GRI G3, 2000-2011; GRI G4, 2013; GRI G4 Implementation Manual, 2013; Khan et al., 2015; KPMG, 2014). The materiality of an issue is assessed in its significance to stakeholders, which is indexed to stakeholder (re)actions that this issue provokes (AccountAbility, 2006; 2008; GRI G3, 2000-2011; GRI G4 Implementation Manual, 2013).

As AccountAbility (2006, p.16) states that “stakeholders are not just passive observers of business practice, they are actively engaged in trying to change what is material”. Therefore, the stakeholders will manipulate their diverse resources to enforce the organization, if the account given to stakeholders is unsatisfactory owing to inappropriate or insufficient managerial and reporting actions to these issues. The managerial aspect of materiality is stressed in the sustainability accounting literature and refers to the organization resolving material issues on behalf of stakeholders. The reporting aspect of materiality refers to the organization communicating with stakeholders about material issues and relevant solutions. This reference of materiality based on accountability perspective reinforces the sustainability accounting literature’s emphasis on the dimensions of materiality practices in both
managerial and reporting systems (AccountAbility, 2006; 2008; Eccles & Serafeim, 2013; Khan et al., 2015; KPMG, 2014; Murninghan, 2013).

The transparency condition is endorsed by monitoring controls for stakeholders so as to allow them to perceive the material issues and the firm’s responsive performance, and avoid an overreliance on the account provided by the organization itself (Gray, 2001; AccountAbility, 2006). Monitoring controls include a social audit and assurance service provided by third parties (Gray, 2001) either employed by the firm or by the stakeholders, or stakeholder engagement such as media exposure (AccountAbility, 2006) and other monitoring instruments such as governmental supervisions, NGOs’ independent investigations, and community participation.

Table 2.3 The Accountability Reference to Materiality in Sustainability Accounting

<table>
<thead>
<tr>
<th>Defining Elements and condition</th>
<th>Application in Sustainability Accounting Materiality</th>
</tr>
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| **A principal with sanctioning power** | Stakeholders possess power of manipulating diverse resources critical to the development and survival of the firm.  
*Implication to materiality practice in sustainability accounting*: If the firm fails to identify material issues significant to stakeholders, or avoids taking managerial and reporting actions in response to these issues, stakeholders would sanction the firm by operating their resources relating to the firm. |
| **An agent with Answerability** | The firm (or its governing body) must be answerable to the requests of stakeholders.  
*Implication to materiality practice in sustainability accounting*: the firm is able to answer whether material sustainability issues are resolved and how. |
| **Managerial action** | The firm needs to take appropriate action to improve sustainability performance, so as to meet the stakeholders’ expectations.  
*Implication to materiality practice in sustainability accounting*: the firm needs to take appropriate managerial actions to resolve the material issues concerned with stakeholders. |
| **Account** | The firm needs to provide stakeholders with formal sustainability reports and/or informal account concerning its sustainability performance.  
*Implication to materiality practice*: the firm needs to report its managerial action to the material issues to stakeholders. |
| **Transparency** | The transparency condition is achieved via social auditing, assurance and... |
other monitoring instruments, by which stakeholders are able to scrutinize the firm’s actual sustainability.

*Implication to materiality practice:* If the firm is not transparent as a result of insufficient monitoring controls, the firm may intentionally provide a falsified account of its actions relating to material issues.

These monitoring controls enable stakeholders to acknowledge the actual performance of the firm, including how it deals with material issues relevant to the corporate sustainability. It also allows them to avoiding over relying on the firm’s own reports. Where transparency is absent on account of insufficient monitoring controls on the firm, the organization has the opportunity to be unaccountable to stakeholders by providing false information on the material issues. In this case, stakeholders cannot rationally manipulate their resources to sanction the unaccountable firm, as the account given by the firm cannot be verified.

It should be noted that, when referring materiality practices to stakeholder accountability, accountability discharge includes, but is not limited to, managing and reporting material issues. As Gray et al. (2014, p.50) note, “to offer accounts means explaining oneself and one’s actions”. As part of accountability requirement, explaining the organization itself includes presenting its policies, principles, decision-making procedure, and the operative system to stakeholders (AccountAbility, 2008; Gray et al., 2014; GRI G3, 2000-2011; GRI G4, 2013). These accountability practices, which are designed to explain the organization’s basic value or overall operating system, differ from materiality practices on managing and reporting material environmental and social issues. Simply put, material practices represent one aspect of requirements for the organization to discharge accountability to stakeholders, but accountability practices cover aspects other than materiality practices.

In summary, to be accountable to its stakeholders, an organization should identify material issues, and take appropriation actions to manage these issues, and then report its action and performance to stakeholders. Otherwise, if it fails to identify material issues, or avoids managing and reporting these material issues, the organization is unaccountable to stakeholders and would suffer the negative sanctions of stakeholders.
2.3.5 Implications of the Accountability Reference to Materiality

This study constructs two references of accountability to materiality in two accounting contexts pertaining to finance and sustainability respectively, thus inferring four implications for materiality knowledge.

(1) Understanding an accounting concept from an accountability perspective
This topic presents an accountability perspective to understand materiality practice, reinforcing the accountability-based definition of materiality (AASB, 1995). The accountability references of materiality reflect the stance that accounting practices enact accountability (Shearer, 1999), and strengthens the view that the primary purpose of sustainability accounting is to enable the organization to discharge accountability to stakeholders (Gray, 1993; 2001; Growther, 2000; Lamberton, 2005; Schaltegger & Burritt, 2010; Tilt, 2000). Although the literature has addressed the association of accounting practices and accountability, there is limited theoretical development of this accounting-accountability relationship. This study, in which the accounting concept of materiality is analysed through the lens of the defining elements and condition of accountability, attempts to address this gap.

(2) Understanding the extension of accountability in materiality evolution to sustainability accounting
The two comparative accountability references to materiality (Table 2.2 and Table 2.3) imply the way in which the materiality concept evolves from financial accounting to sustainability accounting. As informed by these two tables, materiality of an issue, either financial or sustainability, is determined by its significance to the principal in exerting sanction power which is legitimized by the accountability relationship. And in either accounting context, the organization is required to be accountable to its principal (either shareholders or stakeholders) by taking managerial and reporting practices on the material issues. That is, given significant differences between financial issues and sustainability issues (Birkin, 2000; Zadek & Merme, 2003), materiality practices in both accounting contexts are committed to the purpose of accountability discharge. But materiality practices in sustainability accounting concerns an extension of accountability discharged to stakeholders from shareholders.
A new perspective on duality of materiality in managerial and reporting practices

The accountability references of materiality justify the managerial-reporting duality of materiality with respect to an association of ‘account’ and ‘action’, which constitute a complete accountability definition (Gray et al., 2014). This action-account association is reified in the reciprocal relationship between the reporting and managerial systems, as has been argued in prior accountability literature (Christensen & Lægreid, 2012; Dubnick, 2003; Lægreid et al., 2008). The accountability reference to financial materiality reveals that: given that managerial role is beyond the scope of accounting standards that focus on guiding accountants to prepare financial reports, the managerial aspect of materiality is implicit, but still exists in the role of managers. And in the accountability reference to sustainability accounting materiality (Table 2.3), the managerial-reporting duality of materiality practices directly reflect the action-account association that the accountability definitions infer (AccountAbility, 2006; Eccles & Serafeim, 2013; IIRC, 2011; KPMG, 2014; Murninghan, 2013).

The necessary condition of transparency to materiality practices

This study argues that the accountability relationship cannot be sustained in the absence of transparency; insufficiency of monitoring controls limits the ability of principal (accountee) to verify the account given by the agent (accountor), and hence it lacks of a justifying ground for the principal to impose sanction on the agent. In either accounting context, the unmonitored firm has the opportunity to be free of the sanction effects even if it is unaccountable by misstating or omitting material issues. From this point of view, the two references identify ‘transparency’ as the condition for practicing the materiality concept in either accounting context, and justify this condition from an accountability perspective.

Furthermore, this understanding of the transparency condition contributes to exploring the context-specific materiality phenomenon with which prior materiality researchers have been concerned (AccountAbility, 2006; Eccles & Serafeim, 2013; GRI G3, 2000-2011; GRI G4, 2013; Zadek & Merme, 2003). The references indicate that the operation of materiality practices is not unconditional in any social and organizational settings, but is constrained in the condition of transparency achieved by monitoring controls. Where transparency is absent on account of insufficient or ineffective monitoring controls, the firm has opportunities for unaccountability by intentionally avoiding managerial and reporting actions on material issues. The operation of materiality practices is not context-free or unconditional; instead, it
relates to whether transparency is achieved in the empirical setting where materiality practices are observed.

(5) The informal report practices associating with materiality

Current definitions of materiality derived from sustainability accounting standards (AA1000APS, 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2013) focus on the settings of formal sustainability reports. However, in sustainability accounting, formal reports are not always available in the stakeholder communication (Hardy & Ballis, 2013; Mashaw, 2006). In some cases, informal reports reflect “the spirit of accountability”, thereby creating effective communicative access to stakeholders (Hardy & Ballis, 2013, p.539). AccountAbility (2006) mentions that, apart from formal public reports to all stakeholders, informal “targeted or responsive communications” are sometimes encouraged.

Materiality as a social phenomenon may occur in different social and organizational settings, such as small businesses and religious charities, where formal reports may be unnecessary and unavailable, and where provision of informal accounts is more convenient and underpin the discharge practices of accountability (AccountAbility, 2006; Hardy & Ballis, 2013; Mashaw, 2006). From this point of view, this study informs a novel aspect of materiality understanding, addressed in the question regarding how the materiality concept can be applied in the giving of informal accounts. This aspect has been rarely discussed, and it may even be viewed as ‘untrodden territory’ in the literature. It is therefore clear that an opportunity exists to advance materiality knowledge in the broader context of sustainability accounting.

2.3.6 The school of critical accountability and its implications to this research

An emerging school of accountability literature concerns interrogating the traditional conception and operationalization of accountability, and exploring new accountability possibilities from socio-political, ethical, psychological and theological perspectives (Roberts, 1991; 2003; 2009; Shearer, 2002; Messner, 2009; Joannides, 2012; McKernan, 2012; McKernan & Kosmala, 2007). This thesis focuses on two themes from this accountability school:

- The for-the-other accountability (Shearer, 2002; Messner, 2009; Roberts, 2003; McKernan & Maclullich, 2004) compared to traditional for-the-self conception of
accountability;

- Intelligent accountability, or the socializing form of accountability, which allies the agent and principal as interdependent partners, compared to the traditional approach which focuses on the agent’s individual efforts in giving an account to the principal (Roberts, 1991; 2009).

For-the-other accountability

Drawing on Butler (2005), Messner (2009) develops a philosophical stance of what he calls “exposed selves”, which holds that the agent “is exposed to an addressee to whom an account is provided” (p.933). This view is aligned with Shearer (2002)’s conception of accountability from for-the-self to for-the-other so that “the primary exposure to the other requires us to account to this person, instead of accounting simply for ourselves” (Messner, 2009, p.927). Similarly, McKernan and Maclullich (2004, p.356) refers to accountability as an ideal relating to an “absolute obligation to the other”. Roberts (1991; 2003) argues that accountability is not a mere means of realizing the self’s (agent’s) goodness, but sometimes involves an intention of fulfilling goodness of others (principals). This for-the-other obligation of accountability promotes the emergence of social and environmental accounting for a diverse set of stakeholders (Shearer, 2002; Roberts, 2003; McKernan & MacLullich, 2004; Messner, 2009). However, it is questionable whether an ideal of accountability to all others can ever be achieved. Indeed, Roberts (2009, p.923) asks: “how could such an idea (for the other), be enacted in the context of widely dispersed stakeholders (others)? Can one reasonably expect organizations to talk and listen to all the others out there?”

In this thesis, the materiality logic as to the action taken to that which matters is operationalized in the sustainability accounting context, whereby the firm is required to take managerial and reporting actions to material sustainability issues which matter to stakeholders. Support for this view is found in GRI G3 (2000-2011) and CGA-Canada (2006), which state that, in assessing materiality, the significance of an issue to the firm reflects its significance to stakeholders, thereby materiality indicators should focus on stakeholder actions and concerns. Furthermore, the ‘for all others’ question asked by Messner (2009) pertains to the ‘inclusivity’ assumption requiring the agent be accountable to all stakeholders instead of just a selection of the larger ones (ISEA, 1999; GRI G3, 2000-2011). The stakeholder inclusivity assumption is discussed in detail in the next section (2.4), and is integrated into the new model of materiality presented in Chapter 4.
A further connection of the ‘exposed self’ to this thesis is the view that “not accounting for something is also a form of accounting” (Messner, 2009, p.928). That is, no account given by the self (agent) to the other (principal) does not necessarily point to a failure of exposing the self to the other or a collapse of the accountability relationship. Rather, the agent’s non-accounting may be rationally justified by the accountability relationship to which the agent is subjected. This thesis provides support for the notion of non-accounting as a form of accountability, whereby no accounting by the firm to stakeholders with regard to immaterial issues reflects a rational approach that avoids overinvesting in trivial issues, rather than inaccountability.

**Intelligent accountability**

Roberts (2009) critiques the view that traditional accountability practices have been grounded on a transparency-seeking assumption, where the imperative of accountability is for the agent to be fully exposed to the principal according to a pre-determined expectation and standard process. Transparency as a condition of accountability is not denied, for Roberts (2009, p.968) states that “I do not think that we can manage without transparency”. Nevertheless, a transparent self (an agent who has given an account) is an insufficient ideal of accountability. To exemplify the problems that transparency cannot resolve, Roberts refers to Hood’s (2007) “blame avoidance”, which refers to different account-giving strategies implemented by the agent to persuade or even intentionally mislead the principal to approve of the agent’s actions, regardless of whether these actions reflect good performance. Roberts’ (2009, p.965) criticism of the traditional conception of accountability lies in its “individualizing practice”, which refers to the agent’s efforts in account-giving for the self for the purpose of the agent’s own improvement or success. However, this traditional conception of accountability leads to agents neglecting their interdependence with the principal, and it is this interdependence that enables the realization of the agent’s interest (Roberts, 2009, p.967).

To overcome this inadequacy inherent to traditional accountability practices, Roberts (2009) promotes “intelligent accountability”, which symbolizes a sustaining and socializing process leading to interdependencies, cooperation, and co-existence of the self (agent) and the other (principal). In particular, Roberts (2009, p.966) states:

(‘Intelligent accountability’) is not a mere showing or making visible of the self against a pre-determined set of categories, but rather involves active enquiry – listening, asking
Accountability, in its intelligent form, is “reconstituted as a vital social practice”, as “an exercise of care” and “a caution to compassion” in relation to the agent and the principal (Roberts 2009, p.969). This social practice enables both the agent and principal to discover the nature of their interdependencies, and commit themselves to an ongoing necessity of collective work to resolve problems and build a better social system.

This thesis relates intelligent accountability and materiality in the case study of the Fu farm (Chapter 6). In this case, the accountability discharging process includes the collective efforts of both the firm and its stakeholders in materiality practices where the firm actively consults different stakeholders to seek better understanding of material issues, as well as possible solutions to these issues. In the Fu farm case, the account-giving actions focus on informal reporting practices including casual conversations, direct vision and frequent visits, which are “rich with information, … (and) less easily stage-managed and rhetoric can be constantly compared to actual practice” (Roberts 2009, p.966). The Fu Farm case illustrates empirically how the application of materiality can integrate characteristics of intelligent accountability, and how this accounting process of materiality contributes to the growth of an ecological community in which sustainability problems are resolved effectively by cooperation of the firm with its stakeholders, all of which leads to improved sustainability outcomes for this community.

2.4 Topic 4: Stakeholder Theory and Materiality

This topic addresses relevance of stakeholder theory to the concept of materiality, arguing a necessary integration of two stakeholder insights, ‘stakeholder heterogeneity’ and ‘stakeholder inclusivity’, into the materiality concept.

2.4.1 Insight 1: The Stakeholder Heterogeneity Paradigm and Materiality

This section applies the insight from stakeholder theory, ‘heterogeneity’, to the materiality concept, reconciling it with the assumption of ‘homogeneity’ from financial accounting
Homogeneity assumption in financial accounting and materiality

The assumption of shareholder homogeneity is the cornerstone of financial accounting standards. Examining the Statement of Accounting Concepts (SAC) of Public Sector Accounting Standards Board & Accounting Standards Review Board, Myers (2001) identifies how the homogeneity assumption is inherent within financial accounting standards, by distinguishing four elements of shareholder homogeneity:

- Homogeneous information needs. All financial reports share a general purpose to meet the common information needs of all users.
- Homogenous information manner. All users will make an economic decision, evaluating and allocating resources by using the same information about performance, financial position, financing and investing, and compliance.
- Homogeneous shareholder behaviour. All users rely on accounting reports to evaluate managerial performance (SAC2, para.27) and use a range of sources to satisfy their information needs (SAC2, para.10).
- Homogeneous shareholder character. Financial reports ought to be constructed having regard to the interests of users who possess the proficiency necessary to comprehend the significance of contemporary accounting practices (SAC3, para.27).

The assumption of shareholder homogeneity is central to how materiality is formulated and defined in financial accounting. Financial materiality definitions often refer to a reasonable or informed person or investor, a general reference to all shareholders, without identifying potential differences in their attributes and abilities. Below is a list of some materiality definitions addressing homogeneity with respect to shareholders:

- Kohler’s dictionary of accounting defines materiality refers to disclose of a fact or item influences “the judgment of a reasonable person” (Kohler, 1953, p.317, my emphasis). Here, a reasonable person is a general reference relating to those who are influenced by the material item.
- The American Accounting Association (AAA) produces a similar definition: “an item should be regarded as material if there is reason to believe that knowledge of it would influence the decisions of an informed investor” (AAA, 1957, p.8, my emphasis).
- The Financial Accounting Standards Board (FASB) (1980) defines materiality from
the perspective of “judgment of a reasonable person” (my emphasis) being influenced by the omission or misstatement of accounting information. Securities and Exchange Commission (SEC) refer to “a prudent investor” (my emphasis) to whom an issue is regarded as material.

Within financial accounting, shareholders are assumed to belong to a homogeneous group to which Myer’s (2001) schema of homogenous information needs, manner, behaviour and character can be applied. From an accountability point of view, the implication of the assumption of homogeneity is that all shareholders demand the same account from the firm, and take the same actions toward the firm that fails to give such an account. Therefore, if an issue is material to a shareholder, it is unvaryingly material to any shareholder, and thus to all shareholders as a homogeneous group.

Stakeholder heterogeneity
The assumption that stakeholders are homogeneous is rejected within the stakeholder literature, where it is well established that stakeholders are heterogeneous in their expectations, interests and identities, and that the homogeneity assumption is both unrealistic and simplistic (Clarkson, 1995; Freeman, 1984; Frooman, 1999; Rowley & Moldoveanu, 2003). According to stakeholder mobilization theory, a stake is regarded as “a particular end state” that stakeholders will protect, where necessary, by taking action to influence the firm (Rowley & Moldoveanu, 2003, p.207, my emphasis). The distinction of specificity in stakes empowers the categorization of groups of persons as separate stakeholder groups with their own particular expectations, interests, values, and particular resources that can be mobilized to achieve the desired end state. Hence, stakeholders are differentiated into many diverse constituencies or groups. To illustrate, shareholders are a group of persons who invest in the financial capital of the firm and expect a financial return from the firm. Employees are a group of persons who provide labour input and expect reasonable salaries and good working conditions from the firm. The variance in stake justifies the classical taxonomy of stakeholders covering shareholders, employees, customers, suppliers, governments, trade associations, activist groups, communities, the general public, media, and so on (Clarkson, 1995; Freeman, 1984; Hill & Jones, 1992).

Given their divergent interests and differing identities, stakeholders evaluate the firm’s performance, all the while making judgments and exerting influence on the firm to ensure
that it meets their own specific interests and expectations (Frooman, 1999; Peloza & Papania, 2008; Rowley & Moldoveanu, 2003; Wood & Jones, 1995). The inherent heterogeneity of stakeholders is emphasized as they mobilize differently (evaluate performance, make judgment, exert influence on the firm) in response to the same issue to protect their various interests and identities. Davenport and Leitch (2006) contend that, as different stakeholders hold different interests, the likelihood of taking action varies across stakeholders; where the impact of an issue on the interests or social identity of a stakeholder group is high, it is more likely that the group will mobilize and take action against the firm. Mobilization therefore is a consequence of an issue being material to a stakeholder. However, owing to stakeholders’ many diverse interests and identities and varied levels of mobilization, action and influence on the firm, the universal set of stakeholders cannot be assumed to comprise a homogeneous group, in which each member perceives the same impact emanating from one issue.

From an accountability perspective, stakeholders operate in different accountability regimes, where the accountability processes and practices vary significantly. The diverse interests of stakeholders suggest that the accounts given to various stakeholders should not be the same, while the account-giving methods should also not be uniform. This phenomenon is exemplified in O’Dwyer’s (2006) study, where it is reported that it is difficult for different stakeholder groups to achieve consensus with regard to certain issues.

A problematic simplistic substitute of stakeholders to shareholders in sustainability materiality

Although it may be assumed that shareholders hold a primary interest in common, that of maximizing wealth, stakeholder heterogeneity suggests that this issue may matter to some stakeholders more than it does to others. This highlights the need to develop a conception of sustainability materiality that recognizes stakeholder heterogeneity. However, within sustainability accounting standards (e.g., AccountAbility, 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2011) and standard-related studies (e.g., AccountAbility, 2006; 2007; KMPG, 2014; Murninghan, 2013; Zadek & Merme, 2003), there is no evidence of an attempt to address stakeholder diversity or heterogeneity. In this body of sustainability accounting literature, substituting stakeholders for shareholders (as conceptualized in financial materiality) in core terms such as ‘influence on stakeholders’ or ‘significance to stakeholders’ is simplistic, because the homogeneity of shareholders is assumed to apply likewise to stakeholders. Thus, the incorporation of stakeholder heterogeneity, upon which stakeholder
theory rests, is lost. Stakeholder heterogeneity informs the consideration of what matters to some stakeholders but perhaps not others, rather than what matters to all stakeholders.

2.4.2 Insight 2: The Stakeholder Inclusivity Principle and Materiality

This section resolves the accountability insight ‘stakeholder inclusivity’, which refers to the idea that all stakeholders, rather than only the key stakeholders, should be taken into account in materiality assessment.

A question then presents itself: who are (or should be) stakeholders in the scope of materiality of sustainability issues? This question is associated with Bellal’s (2002) argument of ‘stakeholder management or stakeholder accountability’ comparing two strands of stakeholder view. The first strand is a normative stakeholder accountability model claiming the accountability of the organization towards all stakeholders; and the second strand is the stakeholder management model that maintains that the organization selects the key stakeholders and focuses on effective management of them. Bellal (2002) argues that the ideal state of accountability is not promoted through the practices focusing on key stakeholders, but must include all stakeholders in the account. This section advances Bellal’s (2002) argument and brings together elements of stakeholder literature to establish a critique of the key-stakeholder approach and substantiates stakeholder inclusivity as precondition of accountability.

The classical key-stakeholder approach

The first definition of stakeholder came from a 1963 internal memorandum at the Stanford Research Institute, “those groups without whose support the organization would cease to exist” (cited in Freeman & Reed, 1983, p.89). Clarkson (1995, p.106) adopts a similar definitional work of stakeholders as those “without whose continuing participation the corporation cannot survive as a going concern”. In the business world, an organization is involved and operates in the environment of a vast range of stakeholders. Owen, Swift and Hunt (2001) point out that the term ‘stakeholder’ itself is too broadly defined. A basic question of stakeholder theory for an organization, as Freeman (1994, p.411) notes, is “the principles of who and what really counts”.

Classical stakeholder theory differentiates stakeholders according to the strength of their
influence on the firm, distinguishing primary from secondary stakeholders (Clarkson, 1995; Freeman, 1984; Harrison & John, 1996). The classical approach to answering the basic stakeholder question is riveted on a utilitarian orientation: it is those primary or important stakeholders, to whom and whose claims the firm should pay much attention (Clarkson, 1995; Harrison & John, 1996; Savage, Nix, Whitehead & Blair, 1991). The justification for the classical approach is reflected in the argument that the firm should develop intangible but valuable assets that are potentially sources of competitive advantage through building and maintaining better relationships with primary stakeholders (Freeman, 1984; Hillman & Keim, 2001). Therefore, in light of the classic approach, the firm should respond to the claims made by the firm’s primary stakeholders. This rationale has been developed into the concept of stakeholder salience (Mitchell et al., 1997, p.854), which has been operationalized into the three most widely recognized stakeholder attributes:

1. the stakeholder’s power to influence the firm,
2. the legitimacy of the stakeholder’s relationship with the firm, and
3. the urgency of the stakeholder’s claim on the firm.

The salience of a stakeholder is determined by the firms’ perception of these attributes, and the firm responds to claims from salient stakeholders.

Based on the accumulative arrangement of the three attributes, Mitchell et al. (1997) postulate a salience-based typology of stakeholders, thereby corroborating the argument that, the more salient a stakeholder is, the more likely that their claims will be addressed by the firm. This salience argument is reinforced by Neville, Bell and Whitwell’s (2011) discussion of managerial decisional thresholds as the cut-off point for a firm to decide to take action in response to a stakeholder claim. Here, the decisional thresholds are determined by stakeholder salience, or whether the stakeholder is “satisfactorily legitimate, powerful, or urgent, relative to the resources available for satisfying stakeholder demands” (Neville et al., 2011, p.372).

**Critiques of key-stakeholder approach within stakeholder literature**

The classical salience argument entailing that the firm prioritizes or selects salient stakeholders and responds to their claims only has been critiqued in existing stakeholder literature from three perspectives.
The first critique of the key-stakeholder focus is that secondary or less salient stakeholders may still demand the firm’s attention given their potential to exert sufficient influence. Eesley and Lenox (2006) identify two methods through which less-salient stakeholders are able to motivate a firm to achieve their demands:

1. Imposition of direct operational costs in response to the strengthening of actions taken by secondary stakeholders. These costs include public relations expenses, legal fees, and managerial attention.
2. Significant consequences of stakeholder actions. These actions taken by stakeholders may damage the firm’s reputation, reduce its capacity to attract employees and customers, and constrain its ability to appease shareholders and governmental regulators.

Furthermore, less-salient stakeholders can exert significant influence through networking. Hart and Sharma (2004, p.7) believe that “fringe stakeholders”, identified as the “poor, weak, isolated, non-legitimate, and even non-human”, can influence core stakeholders through complex interactions within stakeholder networks. Accordingly, they hold that the firm must “systematically identify, explore and integrate the views of stakeholders on the fringe” (p.7) to avoid or curb possible negative consequences or non-response. The first critique entails the potential of secondary stakeholders massively affecting the organization with respect to significant issues, all of which underlines the impracticality of underestimating or ignoring secondary stakeholders within the broader materiality conception advanced herein.

The second critique rests on the problematics of asserting that the firm is willing to address any claim from salient stakeholders. Eesley and Lenox (2006) recognize that the firm’s action is determined by both the attributes of stakeholders, as well as the extent of stakeholder action. They therefore posit a positive relationship between the strength of stakeholder action and the firm’s likelihood of response. Hence, a small or trivial claim from a salient stakeholder may not be sufficient to elicit a response from the firm. The second critique discourages the problematic view that all issues relating to salient stakeholders must be material; that is, that the salience of stakeholders and the materiality of an issue are inextricably associated.

Third, the classical stakeholder approach, where the particular stakeholders are central to
firm’s attention and response, is rejected by stakeholder network theorists (Maak, 2007; Neville & Menguc, 2006; Rowley, 1997). With regard to the stakeholder network, classifying or prioritizing key stakeholders not only limits but also misleads the understanding of how the firm responds to stakeholder influence. This is because it is the entire set of different stakeholders, rather than merely the key stakeholders, that aggregate into unique patterns of influences on the firm. As Rowley (1997, p.907) explains, “firms do not respond to each stakeholder individually, but instead must answer the simultaneous demands of multiple stakeholders”. Consistent with this view, Maak (2007, p.329) states that the task of leaders is “to build and sustain a business that is of benefit to multiple stakeholders” and “to make sure that the stakeholder network consists of balanced social capital and that overembeddedness in particular relationships is avoided” (p.339). Maak explicates the term ‘overembeddedness’ as a focus on the relationships with influential stakeholders like shareholders. Inferred from this critique is an integrality of primary and secondary stakeholders through network interactions that enable all networking stakeholders to contribute significantly to some issues relating to the organization. That is, an exclusion of non-key stakeholders from the materiality conception is both unreasonable and impractical from the network perspective.

**Inclusivity and materiality**

The preceding three critiques illustrate the limitation of the key-stakeholder approach in conceptualizing materiality, and justify a normative conceptual foundation based on stakeholder inclusivity. ISEA (1999), GRI G3 (2000-2011), GRI G4 (2013) and Owen et al. (2001) indicate that the purpose of accountability practice is to address the needs and concerns of all relevant stakeholders; that is to say, “inclusivity defines an organization’s accountability as accountability to all stakeholders” (ISEA, 1999, p.10), while the organization is under “broader expectations of accountability to all stakeholders” (GRI G3, 2000-2011, p.10). But both Bellal (2002) and Rasche and Esser (2006) point out that, in many cases, accountability practices tend to follow the path of stakeholder management with its focus on primary stakeholders, rather than achieving the principle of inclusivity.

The stakeholder accountability structure is established through the ‘exchange’ of critical resources held by stakeholders, generally at the cost of the organization meeting their expectations (Gray, 2001). The critical resource exchange elicits contractual relations between the firm and stakeholders, where the firm acts on behalf of the interests of stakeholders in order to obtain their support. In addition, as with all constituencies with
legitimate interests participating in a firm, there should be no prima facie priority of interest of one stakeholder over that of another (Collier, 2008; Donaldson & Preston, 1995), more so given that stakeholders vary in their salience attributes to achieve their own demands (Mitchell et al., 1997). Hill and Jones (1992) conclude that the firm is by nature a nexus of contracts between all stakeholders, whose power to influence the firm will be dissimilar.

Consistent with the non prima facie priority of stakeholder interests is recognizing the firm as a community of all stakeholders, regardless of the roles that they play in the firm. Llano (1998, p.54) defines a firm as “a community of persons, in which the condition of being a person prevails over any other condition, including the condition that derives from their belonging to the community that we call a firm”. Shankman (1999, p.332) challenges the traditional economic view of the firm, and establishes a new paradigm, in which “the interests of business are seen as an extension of interests of a larger community”, and the social contribution of the firm is emphasized as significant as its economic power. The business-as-community view reallocates the focus of what a stakeholder group does for the organization, thereby highlighting the stakeholder group’s intrinsic worth, value and goodness in their own right (Fontrodona & Sison, 2006). The community is thus a means of achieving a common good shared by all community members; therefore, neither a good of the whole community disregarding the good of its members, nor a good for particular members merely, is possible with the community approach (Alford & Naughton, 2001). The view of firm as common-good-purpose community rehabilitates the accountability relationship in the stakeholder environment (Fontrodona & Sison, 2006), thereby informing the stakeholder-agency perspective for the common good of all stakeholders. According to this view, each stakeholder is treated uniquely and fairly, given that some stakeholders are able to hold stronger claims. Stakeholder accountability is thus naturally embodied in the principle of stakeholder inclusivity, which requires the organization to be accountable to all stakeholders, instead of simply to some of them. Therefore, inclusivity is justified as the foundation of accountability legitimated within the principal-agent relationship.

From this point of view, the firm should take into account of all relevant stakeholders in materiality considerations, rather than merely primary stakeholder. Despite this, how to realize the principle of inclusivity remains unexplored in the current body of materiality knowledge. In the following section, based on the review of the four topics presented above, primary and secondary research questions will be developed to guide further research on the
materiality issues of interest to this study.

2.5 Research Questions

The literature review leads towards a primary research question underpinned by a range of secondary questions, by which the materiality exploration is guided.

Table 2.4 concludes the topics of the literature review and their implications for the exploration of the materiality concept.

<table>
<thead>
<tr>
<th>Topic 1: Materiality in financial accounting</th>
<th>Summary and Implications</th>
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<tbody>
<tr>
<td>The basic materiality logic, which refers to efforts and resources taken to what matter, sustains the materiality concept defined in financial accounting, and all the three financial materiality assessment approaches of the quantitative, the qualitative, and the possibility continuum.</td>
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<tr>
<th>Topic 2: Materiality in sustainability accounting</th>
<th>Summary and Implications</th>
</tr>
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<tbody>
<tr>
<td>Materiality as an accounting concept is useful in sustainability practices to prioritize the significant issues relevant to sustainability, thereby enabling accountability to be discharged to stakeholders. But materiality applied in assessing sustainability issues differs from its financial application. The materiality conception in sustainability accounting informs the dual relevance of materiality to managerial and reporting practices, and highlights context-specific materiality practices. But this duality and context-specificity remain little studied in previous literature. The complex nature of sustainability issues concerned with a wide range of stakeholders means that it is impossible to simply simulate financial materiality model in sustainability accounting contexts.</td>
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<tr>
<th>Topic 3: Accountability and materiality</th>
<th>Summary and Implications</th>
</tr>
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<tbody>
<tr>
<td>An analytic framework of accounting is proposed and applied to construct references of accountability to materiality in both financial and sustainability accounting contexts. This review shows the viability of accountability as the base to understanding materiality. The duality of materiality in both managerial and reporting system is justified from an accountability perspective. It informs application of sustainability accounting materiality may involve informal reporting practices.</td>
<td></td>
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</table>
The transparency condition constraining operation of materiality practices implies a relevance to context-specificity of materiality.

| Topic 4: Stakeholder theory and materiality | Stakeholder heterogeneity paradigm underpinning stakeholder theory should be inherent to the materiality concept. Financial materiality conception’s assumption of shareholder homogeneity is not applicable to sustainability accounting contexts. The materiality concept should embody the inclusivity principle, which refers to accountability discharged to all stakeholders. The materiality consideration process should include all stakeholders, instead of simply following the classical stakeholder approach with its focus on only key stakeholders. |

As shown on Table 2.4, the literature review topics centred on ‘stakeholder accountability’. As a result, the ‘complex materiality phenomenon’ can be summarized as follows:

Stakeholder accountability, as the primary purpose of sustainability accounting, necessitates the evolution of the materiality concept for the firm given that it should be accountable to its stakeholders by prioritizing material social and environmental issues in managerial and reporting practices. However, the current state of materiality knowledge remains inadequate with respect to explaining and exploring the complex materiality phenomenon, particularly where the materiality practices of sustainability issues vary across organizational and time settings, and are associated with accountability discharged to all heterogeneous stakeholders.

Based on this summary, a primary research question could be inferred:

PQ: How can the current understanding of materiality be developed to show how materiality practices contribute to the discharge of a firm’s accountability to stakeholders for issues that matter?

The following secondary research questions could then be inferred:

(1) How is the concept of materiality applied by the firm to discharge accountability to stakeholders?
(2) How can the concept of materiality be developed to address a complex environment
where stakeholders hold heterogeneous interests and expectations?

(3) How can it be empirically confirmed that different firms have different sustainability materiality practices?

(4) How is the concept of materiality applied to both the reporting and management of sustainability?

2.6 Concluding Remarks

This chapter provided a review of the literature relevant to the materiality concept from four disciplines, financial accounting, sustainability accounting, accountability, and stakeholder theory. In doing so, the chapter addressed how the materiality concept is defined and applied in financial accounting, how the materiality concept has evolved in sustainability accounting in response to accountability discharged to stakeholders, how materiality is referred from an accountability perspective, and the necessary integration of the heterogeneity paradigm and the inclusivity principle into the concept of materiality. The chapter concluded by demonstrating how the literature review refined the primary research question and secondary questions, which guided the next stages of research. Chapter 3 presents and elucidates the research method through which these questions are answered.
Chapter 3

Research Method

This chapter presents the research method of this thesis. In particular, it justifies how critical realism was selected as the research paradigm to inform inquiry for research questions proposed from the literature review. According to Bhaskar’s (1975) critical realism philosophy, reality transcends empirical observation, and only through experimental design can our observations approach the reality examined. In Bhaskar’s (1979) later work, The Possibility of Naturalism, the concept of naturalism is reframed as critical naturalism, which refers to the equivalent application of the realism philosophy to both the natural world and to human society. As Bhaskar (1979, p. ix) states, the term critical realism is “an elision of the two phrases, transcendental realism and critical naturalism”.

Critical realism as a relatively new philosophical orientation has been used in many disciplinary and interdisciplinary studies (Easton, 2010) including organization and management (Ackroyd & Fleetwood, 2004; Blundel, 2007; Fleetwood, 2005; Ryan et al., 2012). In accounting, critical realism has been applied to the theorization of budgetary control; for example, Mutiganda (2013) sought to understand how institutionalized governance and budgetary policies affect actions of institutional actors within a critical realism framework, while Modell (2009) used critical realism to explore two research cases concerning budgetary control. Ashraf and Uddin (2013) employ a critical realist perspective to explain why management accounting control reformation is constrained by the political and social conditions. Both Modell (2009) and Bisman (2010) encourage the application of the critical realism paradigm to construct a strong philosophical foundation for accounting research, which must address the complex and multi-faceted lived experience and behaviour of social actors in many varied social settings where accountancy phenomena are investigated. But critical realism studies in accounting are scarce. For example, Modell (2014, 2017) identifies a small number of ten critical realism articles published in accounting literature since 2004, among which only three empirical studies used this paradigm.

This chapter is organized as follows:
(1) The ontological and epistemological foundations of the four research paradigms (positivism, constructivism, critical theory and critical realism) are differentiated.

(2) The inherent compatibility of the research questions with the critical realist ontology and incompatibility with the other research paradigms is explained.

(3) With reference to Sayer’s (1992) work, a system of terminology is presented and applied to materiality practices.

(4) An introduction of Bhaskar’s (2008) idea of the *logic of scientific discovery* and its implication to critical realism inquiry.

(5) The logic of abduction used in this research is contrasted with deduction and induction.

(6) The critical realism methodology is applied in this research in three phases: (1) development of the materiality mechanism which describes how a firm discharges its accountability to stakeholders (Chapter 4); study of the mechanism in different empirical settings (Chapters 5 to 8); and establishment of a critical realism account of materiality in sustainability accounting (Chapter 9).

### 3.1 The Four Research Paradigms

A paradigm is defined as a comprehensive set of beliefs that define the nature of the world, thereby providing a logical framework for any research (Charles & Tashakkori, 2009; Guba & Lincoln, 1994; Willis, 2007). Thompson and Perry (2004, p.403) argue that, “[i]n essence, a paradigm reflects a researcher’s understanding of the nature of existence that is beyond “logical” debate because each paradigm is “rational” within its own constructed logic”. A research paradigm subsumes three elements (Bryman & Bell, 2003; Guba and Lincoln, 1994; Perry, Rieg & Brown, 1999; Sobh & Perry, 2006; Thompson & Perry, 2004; Willis, 2007): *ontology* refers to the nature of reality (being or existence); *epistemology* refers to the relationship between reality and the researcher; that is, what the researcher can know about reality; and *methodology* addresses how (what research techniques) the researcher discovers what is knowable. Guba and Lincoln (1994) classify the four main research paradigms as *positivism, constructivism, critical theory* and *postpositivism*, which differ from each other with respect to their ontological, epistemological and methodological attributes. Guba and
Lincoln’s paradigm classification is corroborated in the works of Thompson and Perry (2004) and Sobh and Perry (2006), where the paradigm of postpositivism is regarded as realism or critical realism. These main paradigms are discussed below.

3.1.1 Positivism

The positivist view assumes that reality is objective and independent from the researcher, but comprehensible within the researchers’ realm of experience. That is, positivist researchers explore reality without influencing it or being influenced by it. Positivism is a reflection of “a deterministic philosophy in which causes probably determine effects or outcomes” (Creswell 2003, p.7). However, there is scepticism within positivism about the idea of unobservable or non-discoverable reality (Paley, 2008). The ontology of positivism is also called naïve realism. Willis (2007, p.42) explains that positivism is “… [n]aïve because it ignores a whole host of problems that make it difficult to say that the results of an experiment are perfect reflections of an out-there reality”. Positivist research tends to use predominantly quantitative method involving survey, experiments, data collection and analysis (Bryman & Bell 2003; Perry et al 1999). It aims to test a theory or hypothesis concerning causes and effects through observation and measurement (Mackernzie & Knipe, 2006).

3.1.2 Constructivism

Constructivism, which is synonymous with interpretivism or constructivist-interpretivist (Bhattacharya, 2008; Gage, 1989), requires the researcher to examine the perspectives of individual people and their beliefs and values, which form this paradigm’s subjectively constructed realities. From a constructivist view, there is no external objective reality independent of the researcher; rather, knowledge and experience are constructed through social interaction (Costantino, 2008, p.116). The constructivism paradigm locates the researcher as a participant within the research environment, working closely with other participants, and contributing directly to research outcomes (Guba & Lincoln, 1994; Thompson & Perry, 2004).

With regard to methodology, the way of generating data for constructivist studies typically includes participant observation and interviews. This is because the researchers aim to understand a phenomenon from the perspective of those who experienced it. The knowledge
developed by constructivist researchers is therefore co-constructed with the participants’ knowledge, all of which occurs through mutual interactions between the researchers and participants within the research setting (Costantino, 2008).

3.1.3 Critical Theory

Like constructivism, assumptions made within the critical theory paradigm are essentially subjective, but considered grounded in social and historical routines. Similar to constructivism, critical theory is more concerned with meaning rather than measurement; this paradigm holds that “perception is reality” (Perry et al., 1999, p.4).

Critical theory studies usually critique the status quo, and seek to identify the requirements to reach a desired state. This is done by drawing on the application of reason, dialectic and ethics to achieve an in-depth understanding of the conditions under which people live (Budd, 2008). Guba and Lincoln (1994, p.110) state:

[Critical theory aims to] … uncover and excavate those forms of historical and subjugated knowledges that point to experiences of suffering, conflict, and collective struggle, … to link the notion of historical understanding to elements of critique and hope.

The essence of critical theory research is to critique social, political, cultural, economic, and ethical values, and to ultimately transform these values (Guba & Lincoln, 1994; Thompson & Perry, 2004).

3.1.4 Critical Realism

Different from the constructivism and critical theory paradigms, which assume a subjective reality, critical realism privileges an ontological stance that reality exists independent of human experience; that is, reality is external, objective and pre-interpreted (Bhaskar, 1979; Madill, 2008; Sayer, 1992). This external reality can only be observed imperfectly (Guba & Lincoln, 1994; Merriam, 1988; Sobh & Perry, 2006; Tsoukas, 1989), therefore differences between true reality and the researcher’s view of reality must be acknowledged.

Sobh and Perry (2006, p.1199) describe this imperfect observation of reality as “a window on
that blurry external reality”. This imperfect observation differentiates critical realism from positivism, which favors a direct apprehensible reality. According to Bhaskar (2008) and Sayer (1992), because the world consists of mechanisms through which objects interact, where different mechanisms may interplay in different ways resulting in different observations, what we observe differs from reality, which consists of mechanisms which are stable and enduring.

Critical realism research is often associated with quantification, but with a significant compatibility with qualitative methods (Madill, 2008). Sobh and Perry (2006) and Modell (2009) advocate a triangulation of different theories, data sources, and research methods in critical realism research. According to these authors, triangulation is appropriate within the realism paradigm. Here, a single reality is assumed that can provide a collection of possible answers to explain different aspects of this reality, rather than being suppressed by patterns of meanings seen as predominant, as those produced within a constructivist paradigm. Modell (2015) advances a critical realist conception of triangulation, which adjudicates between knowledge claims from diverse theoretical perspectives towards ‘realistic’ accounts of the enduring mechanisms that operate in particular empirical contexts. He emphasizes the significance of this kind of triangulation for interdisciplinary accounting research.

Triangulation informs this research in two ways. First, this research is interdisciplinary, drawing on the four disciplines of financial accounting, sustainability accounting, accountability and stakeholder theory to develop the concept of heterogeneous stakeholder materiality. Second, the context-specificity of materiality practice is explored in this research by comparing the meaning of materiality in different social and organizational contexts utilising different data sources and analysis methods.

3.2 Justification of Critical Realism for this Study

The selection of a paradigm depends on a researcher’s own ultimate presumptions, which cannot be tested on any empirical or logical grounds (Sobh & Perry, 2006; Thompson & Perry, 2004). As Sobh and Perry (2006, p.1196) state, “there is no ‘objective’ ground for choosing a paradigm”, for each paradigm reflects a researcher’s view on existence and is
rational within its own structured logic so that it is beyond logical debate (Sohb & Perry, 2006; Thompson & Perry, 2004). However, it is claimed in this study that insights from the literature review from which the research questions were developed provide justification for selecting the critical realism paradigm to conduct this research.

First, the literature review confirms that materiality practice is not a completely subjective behaviour of organizational management, but rather is constrained by the basic logic of materiality that a person or institution should take action on the issues that really matter (Bernstein, 1973; Edgley, 2014; FASB, 2008; Hicks, 1964; Jeffries, 1981; SEC, 1999). The interaction of the firm’s management and its stakeholders is “not merely the creation of someone’s imagination ... for the manager cannot do whatever they feel” (Sohb & Perry, 2006, p.1194). It is illogical for the firm to allocate major resources to a trivial issue, or to ignore a significant issue with substantive influence on stakeholders, and potentially provoke their strong reactions. This logic implies the existence of an objective rule for managerial decision makers for prioritizing issues, and taking appropriate action in response to these issues. Therefore, materiality practices repose on an objective reality, for these practices are not random but rational, and are underpinned by the materiality logic that is neither reliant on managers’ subjective perception nor dependent on the researchers’ own observations. This objective logic emancipates the materiality exploration in this thesis from both the constructivism paradigm and the critical theory paradigm, both of which assume a subjective reality, where the phenomenological perspective of human behaviours is “not as evidence of underlying, essential uniformity among entities, but as an illusion – a social construction” (Erickson, 1986, p.126).

Second, the objective reality informed from the research questions is not simple, but complex, which blurs direct observations, owing to the heterogeneity of stakeholder interests. That is, materiality is a complex social phenomenon where the firm interacts with many diverse stakeholders with heterogeneous expectations and actions in response to issues that arise. Researchers have to refine the essence of this complex phenomenon in order to approach the reality of materiality practice. This course of refinement is incompatible with the positivism paradigm, which assumes a simple reality that is easily apprehensible by observers, but fails to acknowledge the influence of unobservable factors underlying the phenomenon (Clark, 2008).
Another aspect in choosing the most appropriate paradigm for this research, as highlighted in Topic 2 of the literature review (Chapter 2), is context-specificity of the materiality of sustainability issues. Edgley et al. (2015, p.14) states that “Judgements about materiality are localized, varying from firm to firm, and context to context”. Since these dynamic and localized observations present contextual meanings, it is problematic to accept positivism’s claim of a simple reality reflected by these complex observations. Furthermore, these context-specific materiality practices are not embraced within constructivism, which “cannot adequately resolve competing claims to knowledge” (Clark, 2008, p.167). In contrast, in the view of critical realists, these context-bound observations are available for discovery as inner entities that underlie complex phenomenon (Modell, 2009; Tsoukas, 1989).

In summary, a review of the literature supported the assumption of an objective, complex and contextually manifested reality, on which the research questions could be developed. This view aligns with the ontological stance of critical realism, but would be incompatible with constructivism, critical theory or positivism paradigms, which assume either a subjective reality or a simple objective reality that is available to be directly observed. Hence, this thesis is located within the critical realism paradigm.

### 3.3 Critical Realist Terminology and its Relevance to this Thesis

The following sections draw on the work of Sayer (1992) in presenting the specific terminological system of critical realism that is then applied to this study of materiality.

#### 3.3.1 Subjects and Objects

Sayer (1992) defines *subject* as the observer or investigator who is considering or performing the research, and the *object* as the thing being studied or investigated. Objects could be organizations, persons, a specific gender, manufactured products or opinions. Given that objects are not impervious to whatever meaning or meanings are ascribed to them, they are contextually and socially-derived phenomena. In addition, what these objects are “depends on what they mean in society to its members” (Sayer, 1992, p.30). In this thesis, the objects refer to the firm and its stakeholders.
3.3.2 Causal Powers of Objects

According to Sayer (1992), and as is supported by Bhaskar (2008), objects, on account of their essential nature, have the power to cause change or movement on status quo; that is, from a state in which nothing occurs to the state in which something emerges. Bhaskar (2008) asserts that the nature of an object is determined by its causal powers. Similarly, as Sayer (1992, p.88) states, “powers appear to be necessary features of what objects are, while others appear to be incidental”. It is this nature of the object (thing), that is, the causal powers that constitute the identity of the object (thing) that enable us to identify “the same thing persisting through change” (Bhaskar, 2008, p.78).

With reference to the materiality phenomenon, the stakeholders as objects possess the power to manage the resource that they control, which is critical for ensuring that the firm meets their expectations (Gray, 2001). The organization as an object therefore has the ability to resolve issues and report information that is significant to stakeholders.

3.3.3 Structures

Sayer (1992, p.92) defines structures as “sets of internally related objects or practices”. In social science, social structure “is ontologically irreducible to people and their practices” (Lewis, 2000, p.249). Sayer (1992) suggests that there are particular ‘positions’ that can be associated with certain roles within social structures. It is necessary to distinguish the position’s occupant from the position itself. Occupants of a position in the structure may vary, but they are invariably constrained within the role defined in this position.

An example of social structure given by Sayer (1992) is the landlord-tenant structure involving two positions, a landlord and a tenant. The role of landlord is to provide a property and collect the rent; and the role of tenant is to pay the rent for using the property. But people occupying the two positions may be different. For example, according to Sayer, a landlord or a tenant may be an institution or an individual, Catholic or Protestant, male or female, married or single, and so forth. Therefore, there are unlimited forms of landlords and tenants to occupy the two positions. But the landlord-tenant structure including the positions themselves is “invariant under certain transformations” (Sayer, 1992, p.94).
The structure of materiality practice constitutes two positions, an organization and the organization’s stakeholders. Given there are many different organizations, there are many possible stakeholder sets that could occupy the other position. From a critical realist perspective, the underlying structure of materiality should endure across different empirical settings.

3.3.4 Events

Neither Bhaskar (2008) nor Sayer (1992) provides a formal definition of ‘event’, although the term is used frequently in their works. In general, an event is the occurrence of something because of the practices of objects. Sayer (1992) provides an example of an event, a seminar, which concerns teaching and learning practices of a group of people, but involves far more than a discussion of topics between the participants. This seminar event includes economic elements such as the teacher earning a living; educational elements such as the students trying to complete a degree; psychological elements as the participants engage and compete with each other; and communicative elements concerning the way in which people talk, interrupt and interact with each other. This multidimensionality, which is typical of social objects, offers many opportunities for investigation of the event (a seminar). In this research, events are materiality practices concerning sustainability issues, where these practices concern how a firm reports and manages sustainability issues.

3.3.5 Mechanisms

Mechanisms are “nothing other than the ways of acting of things” (Bhaskar, 2008, p.3). Mechanisms present “deep processes” (Easton, 2010, p.122) between the structured objects that generate events; that is, the way in which these objects/things act and interact. In this research, the mechanism is the materiality practice that contributes to the discharge of an organization’s accountability to its stakeholders, thereby revealing the process of interaction by which the firm and its stakeholders are structured in response to sustainability issues that matter.
3.3.6 Condition and Context

During the research process, particular events are observed to occur under specific conditions, and these events can be used to identify mechanisms (Bhaskar, 1979, p.3). These mechanisms will not operate universally or unconditionally, but rather only under the specific conditions will the mechanism be activated causing the observed events (Bhaskar, 2008; Sayer, 1992). Bhaskar (2008, p.78) explains: “To say that a thing has a power to do something is, by contrast, to say that it possesses a structure or is of such a kind that it would do it, if the appropriate conditions obtained”. Similarly, Sayer (1992, p.108) asserts that “[s]ome of these conditions may include objects which activate the mechanisms”. In other words, some conditions constrain the operation of the mechanism.

**Figure 3.1: Critical Realist View of Causation**

![Diagram of Critical Realist View of Causation]

**Source**: Sayer, 1992, p.15.

Figure 3.2 illustrates how Sayer’s causation model is applied in this study:
According to Figure 3.2, the materiality mechanism has a stable structure about the objects (the firm and stakeholders). Under some conditions, the mechanism is activated to contribute to the discharge of accountability to stakeholders. But some conditions constrain the mechanism from contributing to accountability discharge.

### 3.3.7 Stratification of Reality and Transfactuality

The stratification of reality is regarded as a fundamental claim of critical realism. This view originated from Bhaskar (1975; 2008). It suggests that reality should be understand as being stratified into the domains of the real, the actual and the empirical, as presented in Table 3.1.

**Table 3.1: Stratification of Reality**

<table>
<thead>
<tr>
<th></th>
<th>Domain of real</th>
<th>Domain of actual</th>
<th>Domain of empirical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanisms</strong></td>
<td>✓</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td><strong>Events</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Experiences</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Source: Bhaskar, 2008, p.2.*

The empirical domain is comprised of that which the researcher can experience or observe. In the actual domain, there are events that actually occur, but which are not observed by researchers. In the real domain, there are mechanisms that operate in order to generate events, some of which may not be empirically observed, nor actually occur (but the possibility of their occurrence exists). Transfactuality is associated with the stratified reality, referring that
the mechanism *transfactually* operates in all the three domains (Bhaskar, 2008); that is, the mechanism exists beyond our empirical observation.

From this view of stratified reality, sustainability issues should be differentiated into three forms: ‘observable issues’ in the empirical domain; ‘unobserved actual issues’ in the actual domain; and ‘non-actual or possible issues’ in the real domain. The materiality mechanism *transfactually* operates across all possible sustainability issues, whether they are observable, unobservable but actually have occurred, or have not occurred.

### 3.3.8 Epistemic Fallacy, Empirical Falsification and Critique of Empiricism

This stratification of reality endorses Bhaskar’s (2008) critique of empiricism, which leads to the conception of *epistemic fallacy*, which underpins the epistemological ground of critical realism. Bhaskar (2008, p.5) defines epistemic fallacy as “metaphysical dogma” that fortifies empiricism through the false belief that “being can always be transposed into statement about our knowledge of being”. A similar definition is given (or paraphrased) by Danermark et al. (2002, p.205), where epistemic fallacy means “reducing reality to empirical observation, that is, apprehending and defining reality as identical with empirically grounded conceptions”. Bhaskar (2008) critiques empiricism for focusing only on the empirical domain, thus failing to recognize events that cannot be observed in the real and actual domains. In addition, Bhaskar (2008) believes that empirical researchers observe only the tip of the iceberg, rather than the whole iceberg, which comprises many other invisible (to the empiricist) parts closely connected to the observable tip.

Epistemic fallacy informs the concept of ‘empirical falsification’, which refers to cases where the mechanism appears to be falsified by empirical results. Both Bhaskar (2008) and Sayer (1992) illustrate that, in an open system, the empirical results may contradict the causal claim of the targeted mechanism, where the phenomenon in open systems is exposed to intervention from other mechanisms. For example, a causal claim is the law of gravity, which states that objects that are heavier than air must fall down due to the force of gravity. In an open system, we observe that a heavy airplane can fly. This observation may encourage some observers to believe the epistemic fallacy, and refute the law of gravity, without consideration of other mechanisms. In addition to intervention of other mechanisms, Bhaskar (2008) and Sayer (1992) suggest the mechanism may be inactivated in particular conditions (Section 2.3), so
that observation appears to falsify the mechanism.

The impact of empirical falsification is diminished by observing the condition of closure, where external influences on the social system that could disable the mechanism or cause interference from other mechanisms, are eliminated or at least minimized. In the next section, Bhaskar’s (2008) logic of scientific discovery model is applied to this study.

### 3.4 Bhaskar’s Logic of Scientific Discovery

This section presents an approach of critical realism based on Bhaskar’s (1975; 1998c; 2008) formulation of the logic of scientific discovery.

#### 3.4.1 The Logic of Scientific Discovery

Bhaskar (2008, p.56) argues that the purpose of realism research is to understand “the things that produce the mechanisms that generate the flux of phenomena of the world”; hence, knowledge is “typically expressed in laws” to discover the way things act (pp.4-5). He proposes the logic of scientific discovery, thereby indicating the method of achieving realism knowledge across three ‘stages’, each of which signifies an ontological perspective for understanding a phenomenon: (1) classic empiricism; (2) transcendental idealism; and (3) transcendental (critical) realism. According to Bhaskar, the three stages are not separated; instead, there are two ‘steps’, by which the knowledge claim starts from classical empiricism in Stage (1) towards the depth of critical realism in Stage (3).

The first step is between (1) to (2) and involves creative model building, while the second step is a move from (2) to (3) involving empirical exploration, as shown in the following figure.
For Stage 1, according to a classic empiricist view, knowledge is derived from observations in normal open systems which focus on the regular conjunction of events. If an empiricist frequently observes that an event ‘Y’ usually follows another event ‘X’, the empiricist’s claim is that ‘if X, then Y’. However, the empiricist is limited from discovering a deeper form of reality beyond the regularity of events (Bhaskar, 2008).

For Stage 2, the transcendental idealist stance involves constructing conceptual knowledge from empirical knowledge developed in the first stage. This movement from Stage 1 to Stage 2 is achieved through a creative model-building process (Step 1). From a transcendental idealist point of view, objects of scientific knowledge exist in terms of models, ideals of the natural order, or as artificial constructs, but do not exist independently of humans or human activity (Bhaskar, 2008, p.15). The transcendental idealist’s claims include the hypothetical mechanism explaining the phenomena in question. However, Bhaskar explains that the idealist conception of knowledge may be logical, but incapable of empirical proof; hence, the transcendental idealist mechanism is only imaginary.

With regard to Stage 3, Bhaskar suggests that the ‘imaginary versus real distinction’ marks the ontological watershed of transcendental idealism and transcendental realism. That is, transcendental idealism presents things that may be imaginary but that do not necessarily exist in the world; however, in transcendental realism, things must exist in the world. This is because, although we may be unable to perceive them empirically, our empirics reflect the
distorted forms of these things (Bhaskar, 2008). Hence, empirical testing is required to confirm the reality of the mechanism free from the confinement of idealism, thereby enabling the transition to the third stage of Bhaskar’s inquiry process. This movement “involves experimental production and control, in which the reality of the mechanisms postulated in the model are subjected to empirical scrutiny” and finalizes the task of science, which is to “discover what the real mechanisms are, i.e., to produce an adequate account of them” (Bhaskar, 2008, p.137).

The research method of this thesis is informed by Bhaskar’s logic of scientific discovery, as explained above. In Chapter 4, the materiality mechanism is hypothesized through a course of model building (Step 1). In addition, this mechanism is tested from different empirical settings in Chapters 5 to 8 (Step 2).

3.4.2 Step 1: The Creative Model-Building Process

The creative model-building process in Bhaskar’s model realizes a move from Stage 1 to Stage 2. As Bhaskar (2008, p.154) states, the realism researcher first asks whether there is “an empirical regularity which constitutes a prima facie candidate for a law”, the answer to which leads to a ‘protolaw’. From there, the question is asked whether there is “some reason, other than the regularity, why the predicates instantiated in the law-like statement should be conjoined”. The objects posited and mechanism described are postulated as a constructive explanation to the phenomena in question. As Bhaskar explains (p.15),

Typically, then, the construction of an explanation for … some identified phenomenon will involve the building of a model, utilizing such cognitive materials and operating under the control of something like a logic of analogy and metaphor, or a mechanism, which if it were to exist and act in the postulated way would account for the phenomenon in question.

This quote indicates that critical realism researchers start from hypothesizing mechanisms in models to explain what they observe from the phenomenon, regardless of whether these mechanisms have been verified empirically.

Abstraction

For Bhaskar, central to this model building is the cognitive process of abstraction. He
suggests that the hypothesized or postulated model should be interpreted as a law-like statement in which the objects and processes are abstracted from the tangible, complex phenomena. As Bhaskar (2008, p.228) argues, “[t]he objects of scientific thought… are ‘ideal’ or ‘abstract’ with respect to such things and events… (and) it is the world itself, not our thought of it, that is abstract and ideal”. Sayer (1992) provides an extended explanation for how to achieve abstraction in realist modeling. Defined as “the activity of identifying particular constituents and their effects” (p.3), abstraction illuminates “social relations and structures” (p.9). In doing so, Sayer suggests a way to individuate objects and characterize their attributes and relationships; that is, to “abstract from particular conditions, excluding those which have no significant effect in order to focus on those which do” (p.9).

In this research, a materiality mechanism is postulated using this creative model-building process, which starts with establishing the basic logic of materiality (that is to take action in response to what really matters), thereby leading to the elementary materiality structure. This elementary structure abstracts materiality practices into an interactive process involving four objects: an accountor (agent), an accountee (principal), an account and an issue. This elementary structure is then applied to the heterogeneous stakeholder environment, whereby the mechanism states how the firm’s management and reporting of sustainability issues should proceed given the diverse needs of many heterogeneous stakeholders.

3.4.3 Step 2: The Empirical Procedure

Step 2 of Bhaskar’s model for scientific exploration is the empirical test of the hypothesized mechanism. Bhaskar (2008, p.137) states that “it is the task of the philosophy of science to capture science’s essential movement, not to guess its eventual destination”. He maintains that this step involves “experimental production and control, in which the reality of the mechanisms postulated in the model are subjected to empirical scrutiny” (p.136). In natural science, the experimental circumstance, from which the mechanism is identified and tested, is often achieved in a closed lab-like system where the conditions are manipulated and controlled by researchers. However, achieving an artificial closure is difficult in social systems (Bhaskar, 1979; Sayer, 1992). Quasi-closed systems (e.g., an isolated village) or assumed-closures (e.g., a slowly developing social system) are suggested as approximations of closed social systems (Sayer, 1992).
Critical realism philosophers (Bhaskar, 1979; 1998b; 2008; 2011; Sayer, 1992) argue that a mechanism identified from experimental quasi-closed systems operates similarly in open systems, thus the mechanism functions logically to explain the phenomena in an open system. Bhaskar (2008, p.2) therefore makes the following observation:

> It is only if we make the assumption of the real independence of such mechanisms from the events they generate that we are justified in assuming that they endure and go on acting in their normal way outside the experimentally closed conditions that enable us to empirically identify them.

The purpose of the experiment is to isolate a single mechanism and record its effects the experimental objects. However, outside the quasi-closed system, where the objects of the experiment are potentially impacted by other mechanisms, the precise description of the mechanism’s mode of operation is impossible to determine (Bhaskar, 2008, p.43).

Bhaskar (2008, p.43) further emphasizes closure as a necessity for successful empirical testing in the following comments:

> Only if the mechanism is active and the system in which it operates is closed can scientists in general record a unique relationship between the antecedent and consequent of a law-like statement.

And

> If experimental activity is to be rendered intelligible, that natural mechanisms endure and act outside the conditions that enable us to identify them that the applicability of known laws in open systems.

However, it must be conceded that perfect closure is impossible in social science research. Sayer (1992, p.123) points out that “The social sciences deal with open systems but lack the advantage of their equivalents in natural science of having relevant closed system sciences on which to draw”. Apart from quasi-closure in social science, Sayer (1992, p.124) suggests the possibility of “assumed closure” or “partial account of closure conditions”, although the perfect closure conditions are not achievable in social systems. An approach suggested by
Sayer (1992) is to assume a slowly developing system as a closure where the relationships among the experimental objects remain relatively stable. Sayer (1992, p.125) maintains that “one common response to the ubiquity of open system is simply to assume them to be closed”.

Although social science research focuses on open systems, there are examples of experiments in a closed (or quasi-closed) system. As Sayer (1992, p.122) states, “Within local regions of open systems, closed or quasi-closed systems may occur, perhaps where one mechanism completely dominates or overrides the effects of others. He adds (p.124) that “At most, social systems can only be quasi-closed, producing regularities that are only approximate and spatially and temporally restricted”. One example of social experiment is a case study authored by Laycock (1985) on the effectiveness of property marking to achieve crime prevention. Conducted in two isolated villages in Wales, Laycock’s study was appraised as the ‘best case’ study for it is analogous to natural science experiments where realism researchers have demonstrated that the scientists create conditions for the triggering of the mechanism (Pawson & Tilley, 1997).

Similar to Laycock’s research context, the empirical study of this thesis involves a field study (see Chapter 6) in a stable isolated remote village that is a quasi-closed social system. In this field study 18 issues are identified, through which the hypothetic mechanism is empirically tested.

**Triangulation**

Triangulation allows for integration of different but complementary theoretical views and empirical results to capture a unified reality (Modell, 2009, p.209). Critical realism researchers regard a mechanism as a tendency that is reinforced, modified or suppressed by different conditions in an open social system (Danermark et al., 2002). These differing conditions result in variable manifestations of the same mechanism in different empirical settings, and thus knowledge of this mechanism may be conveyed by different empirical methods and from varying observational angles (Danermark et al., 2002).

As Modell (2009; 2015) and Sobh and Perry (2006) argue, when assuming a single reality, triangulation is appropriate to critical realism research. According to their view, triangulation delivers a set of observational and theoretical answers that cover different contexts of the single reality. Different perceptions from the different theoretical and empirical sources
would not lead to confusion of the same reality, rather they are integrated to foster a deeper form of understanding of this complex reality (Modell, 2009; 2015; Sobh & Perry, 2006). Eastwood, Jalaludin and Kemp (2014) specify that triangulation can occur throughout the entire study including formation of research questions, unit of analysis, data collection, and data analysis. Triangulation enables critical realism researchers to integrate different perspectives on the investigated phenomenon, and upholds their sensitivity to the context-specific meanings of this phenomenon, from which the critical realism knowledge claim is derived (Eastwood, et al. 2014). Modell (2015, p.1146) contends that researchers subscribing to critical realist thought “need to be equipped with an acute sense of context”, and only having a deep understanding of how the mechanism works in “diverse contexts” can critical realist researchers advance knowledge claims. This triangulation of contextual understandings “informed by critical realism would thus seem well positioned to further interdisciplinary accounting project” and “maintains its openness of novel ways of theorizing and engaging with accounting practices” (Modell, 2015, p.1147). Triangulation is applied in this thesis as the study involves four empirical settings where materiality practices, data collection and analysis methods vary significantly. A focused explanation of how the cases are selected and conducted is included in the following section.

### 3.5 Multiple Case study

Critical realism accommodates diverse research methods (Sayer, 1992; Danermark et al., 2002; Easton, 2010). As Sayer (2000, p.19) states, “critical realism endorses or is compatible with a relatively wide range of research methods” including case study method. Yin (1994) and Danermark et al. (2002) regard case study as being suitable for exploring complex phenomena given that it facilitates the construction of deeper and comprehensive knowledge to explain the phenomena under investigation. From this point of view, case study conjoins the purpose of critical realist researchers for revealing the mechanism underlying the phenomenon. This section addresses the application of multiple case study in critical realist research and how critical realist cases were selected in this thesis.

#### 3.5.1 An introduction of multiple case study
Stake (2005, p.445) defines multiple case study as: “a number of cases may be studied jointly in order to investigate a phenomenon… I call this a multiple case study or collective case study”. Yin (2009, p.141) comments on Stake’s definition and adds that the “comparison each (individual case) offers with others” generates richer implications than the separated study of each single case. Hence, a multiple case study approach is able to “drill deeper” towards the “gut” of these cases, which are then seen from a perspective of wholeness other than separateness (Yin, 2009, p.141). Yin’s point of view echoes the critical realist claim that the mechanism is the enduring core inherent in the empirical observations that are varied across different settings.

Critical realist scholars highlight the application of multiple case study in the research design. Sayer (1992, p.242) states that the causal process or mechanism can reflect from “[a] limited number of cases”. Furthermore, Sobh and Perry (2006) note that using different cases to test the same mechanism is suitable for research situated within the critical realism paradigm.

3.5.2 Selection of cases

Associated with multiple case study is the concept of replication, which refers to testing a hypothesis or theory in different cases (Tsang & Kwan, 1999; Yin, 1994). Replication promotes development of critical realism theory, as the knowledge claims are strengthened when a same mechanism is tested in different contexts (Tsang & Kwan, 1999; Sobh & Perry, 2005). Yin’s (1994) categorizes two forms of replications pertaining to case selection:

1. literal replication where cases generate similar results for predictable reasons;
2. theoretical replication where contrary results are produced.

A similar thought appears in Thomas’s (2011, p.77) book, where a case that is selected can be either a “key case” that refers to “a good example of something, a classic or exemplary case”, or “an outlier case showing something interesting because of its difference from the norm”. The key case is identical to the one used in literal replication from which a theory or hypothesis is verified, while the outlier case is used in theoretical replication, which invokes improvement of the theory to address the conflicts to the empirics.

Different from positivistic research, where the same empirical results are expected in replicating a study in different cases (Hubbard & Armstrong, 1994), both forms of replication
are applicable to case selection in critical realism research (Sohb & Perry, 2005). This is because either the sameness or difference between the results are the reflections of the phenomenon in different contexts, and thereby enable a better understanding of how the mechanism enduring the context-dependent empirical observations (Bhaskar, 2008; Sayer, 1992; Sohb & Perry, 2005). In view of this purpose, replication logic other than sampling logic should be used for multiple case study in critical realism, while relevance but not representativeness is the criterion for case selection in realism research (Sohb & Perry, 2005). That is, a critical realism case is selected due to its particularity with respect to relating to the mechanism in research, rather than because the case can represent a general population of empirical observations.

3.5.3 Case selection in this thesis

From the perspective of critical realist philosophy, the mechanism can be manifested, distorted, or even falsified by empirical observations from different contexts (Bhaskar, 1998c; 2008; Sayer, 1992). Therefore, both ‘key cases’ confirming the mechanism, and ‘outlier cases’ that are contradictory to the mechanism, are useful in a critical realist study. In this thesis, four cases were selected, with the overall research design involving both key cases in literal replication and outlier cases in theoretical replication. To illustrate, these empirical cases are compared to four different contexts dealing with phenomenon of gravity, as shown in the following table, with these contexts being directly compared to the four cases used in the empirical part of this research.

Table 3.2 An analogy between the contextual gravity phenomenon and the four empirical cases of materiality in this thesis

<table>
<thead>
<tr>
<th>Case</th>
<th>Phenomenon of gravity</th>
<th>Phenomenon of materiality</th>
<th>Analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Key case</td>
<td>Objects drop on the ground from air. But light objects like leaves drop at a slow speed, while an apple drops down more quickly. These events imperfectly reflect the law of gravity.</td>
<td>The Exxon case is conducted in a complex assumed closed system, involving a collection of four particular issues (mini cases) confirms indirectly the materiality mechanism.</td>
<td>The empirics critically (indirectly) verify the mechanism in an approximate closed system.</td>
</tr>
</tbody>
</table>
In a laboratory where a vacuum is created, any objects, whether a light leaf or a heavy steel ball, dropping from the same height must reach the ground at the same time. Events observed from this lab directly manifest the law of gravity, which associates with a constant speed acceleration ‘g’.

The Fu farm case concerns a simple closed system, from which a number of 18 issues (mini cases) are identified to confirm directly the materiality mechanism.

In a lab-like closed system, the empirics directly confirm the mechanism.

The objects, including astronauts, hover in a space station, where there is no effect of gravity.

In the Zhong farm case, a significant issue provoked no response of the farm. This contradicts the materiality logic, on which the mechanism is grounded. This falsification is due to an absence of the condition by which the mechanism is activated.

The mechanism seems to be falsified by empirics, where the mechanism is not activated in some particular conditions.

The birds and airplanes fly in the sky instead of dropping down. This is because these flying objects are influenced by not only gravity, but also other impulse forces.

In the Hui farm case, it was observed that great resource was invested to an insignificant issue. This observation appears to contradict the materiality logic, on which the mechanism is grounded. This is because the farm’s action is influenced by other mechanisms ascribed to other issues.

The mechanism seems to be falsified by empirics, where the empiric results are intervened by other mechanisms.

Table 3.2 outlines the rationale employed in the selection of the four cases in this thesis. How these cases relate to the materiality mechanism’s knowledge claim is further discussed as the following. Of these cases, the Exxon case and the Fu farm case are used as the ‘key cases’ to confirm the mechanism empirically, while the cases of the Zhong and Hui farms work as
‘outlier cases’, in which the mechanism appears to be falsified, thus leading to a deliberation regarding the causes and implications.

- **The Exxon case (Chapter 5)**
  This case setting is a complex social system involving the multinational company Exxon and numerous stakeholders. As the manner of operation of Exxon and the behavioural modes of its stakeholders have remained consistent for a long time, this social system is relatively stable and slowly developed, and “appear[s] to approximate the condition for closure” (Sayer, 1992, p.125). The Exxon case comprises four particular issues,\(^2\) by which the lemma (identical to a middle-range theory) deduced from the mechanism is verified, so that the mechanism is indirectly confirmed. The Exxon case, being conducted in an (assumed) closed system, is therefore analogous to the phenomenon of gravity; that is, objects released in the air eventually drop to the earth, but their dropping speeds vary. For example, a light leaf drops slowly, but an apple drops more quickly. This gravity phenomenon concerns an imperfect closure, where the movement of these objects is dominated by the law of gravity, but also suffers the influence of air upthrust. In both this gravity phenomenon and the Exxon case, the materiality mechanism and the law of gravity are reflected, but not perfectly manifested, in the observations.

- **The Fu farm case\(^3\) (Chapters 6 and 7)**
  This case setting is a simple closed social system as it is an isolated village comprising the farm and only three stakeholders. This setting is similar to that of Laycock’s (1985; 1992) studies conducted in two remote rural villages in Wales, which Pawson and Tilley (1992) appraise as the best case of a closed system, identical to laboratory experiments. A critical consideration of selecting this farm is availability of longitudinal field study, from which a number of issues could be identified for substantive tests of the mechanism. The farm owner, Fu, permitted unlimited visits in the field and was available for interviews after the completion of the field study. In the Fu farm case, 18 issues were identified and used for

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\(^2\) Identification of the Exxon issues started from reading a few reports critiquing Exxon’s performance. These reports revealed some issues relevant to the misconduct of Exxon. Among a range of issues mentioned in these reports, the four issues eventually selected had to meet two conditions. First, data on these issues should be rich and accessible to the public. Second, these issues should meet the special condition under which the mechanism (or lemma) is testable. The test condition will be inferred and explicated in Chapter 5.

\(^3\) The Fu farm was one of the five farms introduced by an elder relative of the researcher. Among these owners, only Fu allowed prolonged interviews and long-stay field study. The list of the five farms also includes other two farms (Zhong and Hui) used in a study of empirical falsification in this thesis.
direct confirmation of the materiality mechanism (Chapter 6). Furthermore, this thesis explores how this mechanism applies to predict the firm’s response to possible issues and evaluate the solutions to sustainability problem (Chapter 7). The Fu farm case is analogous to the gravity phenomenon seen in the vacuum condition created in a lab. In this lab, for any objects of any size and weight, whether a leaf or a steel ball, if they are released from the same height, the time is the same for these objects to reach the ground. In this lab, the constant acceleration ‘g’, which denotes the law of gravity, can be identified as the relationship between the height from which objects are released and the time take to drop to the ground. Both the Fu farm case and this gravity phenomenon are conducted in relatively perfect closed systems, where the mechanism can be directly manifested from the empirics.

- The Zhong farm case (Chapter 8)
This case was selected because of its relevance to empirical falsification of the materiality mechanism. But the farm owner, Zhong, allowed only a single one-day visit and five hours of interviewing for data collection purposes. The value of this short visit lies in observation of an exceptional phenomenon. In this case, an issue was significant to stakeholders, yet it provoked no responsive action from the farm. This contradicts the materiality logic (Sections 1.1 and 2.1.1), which refers to action taken to what matters, on which the materiality mechanism is grounded. This falsification of the mechanism results from inactivation of the mechanism. An analogy to this case is the phenomenon that objects hover in side a space station, where gravity does not influence non-tethered items within the space station.

- The Hui farm case (Chapter 8)
This represents the second case relating to the empirical falsification of the mechanism. Similar to the Zhong farm, the owner, Hui, allowed a short half-day visit to the field and three hours of interviews. In the Hui farm case, an issue was seemingly insignificant, yet it triggered great investment on the part of this farm with respect to seeking solution. This empirical falsification results from the intervention of other mechanisms ascribing to other issues. This case is analogous to the phenomenon that birds and airplanes are able to fly in the sky instead of dropping down, as one might otherwise expect according to the law of gravity. This is because other mechanisms relating to other impulse forces have an effect on the movements of these flying objects.

The selection of the four cases echoes the argument that a mechanism is identified from
particular events other than what is manifested ubiquitously (Bhaskar, 2008). The particularity of the Exxon case and the Fu farm case rests on both social systems achieving approximate closure or quasi-closure conditions. The selection of both cases reflects an intention of the researcher to locate observations on social systems, which are slowly developed or isolated, and which are suitable for identification of the mechanism. By way of contrast, the particularity of the Zhong and Hui farms lies in observations of the unusual empirics that seem to contradict the basic logic of materiality. But collection of these outlier cases was not foreseeable in the anticipation of the empirical study; that is, the researcher was unsure whether any unusual phenomenon would be observed during the data collection period, and was uncertain whether these materiality-contradictory events could be found. The two outlier cases emerged when the researcher visited some farms so as to gain a better background understanding for the Zhong farm case. But eventually the observations of these unusual issues prompted the deliberation of the researcher regarding the causes and implications of the empirical falsifications of the materiality mechanism.

In summary, the four cases presented in this thesis are selective rather than based on random sampling. Furthermore, these cases were selected in accordance with their strong relevance to operation of the materiality mechanism in different contexts. The case selection method in this thesis reinforces Sobh and Perry’s (2006, p.1203) view that, in critical realism research, “no[t] sampling logic should be used for multiple-case studies … (and) relevance rather than representativeness is the criterion for case selection”.

3.5.4 Data collection and analysis

This section outlines the data collection and analysis in each case. Thomas (2011, p.105) argues that “the various [data] sources are highly complementary, and a good case study will want to rely on as many sources as possible.” In this thesis, multiple sources of data were involved in constructing the aforementioned cases.

The data for the Exxon case study constituted publicly accessable documentation sourced from internet. These secondary data include news clippings appearing in the mass and local media, governmental reports, and articles in NGO websites. In this thesis, the search engine Google was used for collecting the data.
The Fu farm case was developed with primary data secured from multiple sources, including field observation, prolonged in-depth interviews with the farm owner, casual interviews with stakeholders, and business documentation such as the farm’s business journal and transaction invoices. These data were recorded by the researcher as field notes, photographs, videos, interview notes, and drawings. Primary data such as these supported a longitudinal study of this farm, from which a number of issues were identified and used to test the mechanism in a substantive fashion. In the Zhong and Hui farm cases, only a short visit for each farm was permitted by the farm owners. The primary data were collected through in-depth interviews with the farm owners and direct observations at the two sites in question.

The analysis of data aimed to address the claim of the mechanism, which was expected to reveal how the firm prioritizes issues in managerial and reporting practices. This knowledge claim is abstracted in terms of the relationship between ‘the firm’s action’ and ‘significance to stakeholders’ indexed as stakeholder action (see Chapter 4). The evidence was quantified into levels of stakeholder actions, the firm’s managerial levels, and its reporting levels. The quantification criteria are detailed in Chapters 5 and 6 concerning the Exxon case and the Fu farm case. A similar quantification method to the Fu farm case was adopted in the Zhong and Hui farm cases. Detailed analyses of the data will be addressed in the empirical studies presented in Chapters 5 to 8.

3.5.5 Ethical considerations

The ethical approval of this thesis was granted by Southern Cross University’s Human Research Ethics Committee. The ethics approval code is ECN-12-318. Among the four cases, the Exxon case data were retrieved from Internet, and so are publicly accessible. The other cases concerning the three farms are based on the field research. The farm owner Fu consented to the use and reporting of all data collected, including photographs, information derived from the prolonged in-depth interviews, and business journal records. The other two farm owners, Zhong and Hui, consented to the use of data derived from the short semi-structured interviews and photographs.

Another consideration is protecting the personal identities of the farm owners mentioned in this research report. Instead of stating their family names, this report uses only one part of their given names, which are unspecified as the three names (Fu, Zhong and Hui) are
extremely common in the local area in which the farm cases were situated.

The subsequent section addresses how the critical realism inquiry was established within the logic inference of abduction.

3.6 Abduction

In this section, abductive logic is explained and distinguished from deductive and inductive logic, thereby reinforcing the relevance of abduction to critical realism (Bhaskar, 1978; 2008; Danermark et al., 2002; Easton, 2010; Modell, 2009). Charles Sander Peirce (1839-1914) was the founder of the term ‘abductive logic’. The edited collection of his papers, The Collected Papers of Charles Sanders Peirce (Deeley, 1994), first published in 1931, comprises eight volumes and 3,000 pages. For convenience, this work is referred to here as CP, and the system used here and elsewhere to refer to particular numbered texts in the collection is (CP vol. text); for example, (CP 6.726) refers to the 726th text in Volume 6 of CP.

Peirce referred to logic as ‘the method of methods’ (CP 7.59) used to build basic knowledge and construct an argument. The three logics according to Peirce are abduction, deduction, and induction (CP 2.98). In Peirce’s work, the terms ‘hypothesis (hypothetic inference)’, ‘abduction (abductive logic)’ and ‘retroduction (retroductive logic)’ are interchangeable. As Peirce states, “retroductive is an alternative expression for abductive” (CP 6.66, fn.). John Deely, the editor of CP, comments that “Peirce also uses ‘abduction’ and ‘hypothesis’ for what he here calls ‘retroduction’” (editor’s comment for CP 7.97 fn. 21).

3.6.1 Hypothetic Reasoning

Peirce first uses the terms ‘guessing’, and later ‘hypothesis’, ‘hypothetic reasoning’, and then ‘retroduction’, when referring to abductive logic. Peirce defines hypothetic reasoning as follows:

Hypothesis (hypothetic reasoning) is where we find some very curious circumstance, which would be explained by the supposition that it was a case of a certain general rule, and thereupon adopt that supposition (CP 2.624).
Peirce (1931) uses three themes, ‘rule’, ‘case’ and ‘result’ to analyse an inference and differentiate between the three logics: deduction is to infer result from rule and case; induction is to infer rule from result and case; hypothetic reasoning is to infer case from rule and result. Peirce emphasizes the difference between hypothesis and induction thus:

The great difference between induction and hypothesis is, that the former infers the existence of phenomena such as we have observed in cases which are similar, while hypothesis supposes something of a different kind from what we have directly observed, and frequently something which it would be impossible for us to observe directly (CP 2.640).

An inductive inquirer aims at identifying the common element among a serious of events observed; that is, this common element is observed directly; and then infers the rule that this common element must be shared by all events including those that have not been observed.

Peirce proposes the following example to illustrate hypothesis reasoning:

Fossils are found, say, remains like those of fishes, but far in the interior of the country. To explain the phenomenon, we suppose the sea once washed over this land. This is another hypothesis (CP 2.625).

In this example, the rule is ‘fish live in the sea’, and the result observed is ‘fossils of fish are found inland’; what is inferred is the case ‘the land was part of the sea in the distant past’, which has never been observed by the inquirer.

In this example, the researcher cannot observe directly the conclusion (case), nor assert their reality and actuality, but can believe the reasonableness of the conclusions reached to explain what is observed (result). As Peirce comments:

It (hypothesis / hypothetic reasoning) often inclines our judgment so slightly toward its conclusion that we cannot say that we believe the latter to be true; we only surmise that it may be so (CP 2.625).
3.6.2 From Hypothetic Reasoning to Abduction

There may be a number of hypotheses that emerge as candidate explanations to account for the perceived facts or phenomena. Peirce (CP. 7.220) discusses the principles of selecting one hypothesis as the account. The first principle is the capability of subjecting the hypothesis to experimental testing. The second principle is that this hypothesis “must be such that it will explain the surprising facts we have before us” (CP. 7.220). The third principle is that cost factors need to be considered when selecting the hypothesis, including money, time, and energy, for “the true hypothesis is only one out of innumerable possible false ones” (CP. 7.220).

Peirce regards abduction as “the process of forming an explanatory hypothesis” (CP 5.171), and “the process of choosing a hypothesis” (CP 7.219) from a set of hypotheses developed. Fann (1970, p.41) summarizes the purpose of abduction as “hypothesis construction and selection”. Abduction starts from the facts even without any particular theory, but is motivated to seek a theory to explain the surprising facts (CP 7.218). The theory is achieved by rationalization of surprising facts through adoption of an explanatory hypothesis. Peirce (CP 5.189) later develops the formal definition of abduction as follows:

Long before I first classed abduction as an inference it was recognized by logicians that the operation of adopting an explanatory hypothesis – which is just what abduction is – was subject to certain conditions. Namely, the hypothesis cannot be admitted, even as a hypothesis, unless it be supposed that it would account for the facts or some of them.

Peirce (CP 5.189) then proposes the 3-step inferential process of abduction, introduced in Section 1.3.3, and discussed further below, and in Section 3.5.3:

1. The surprising fact, C, is observed;
2. But if A were true, C would be a matter of course,
3. Hence, there is reason to suspect that A is true.

Peirce explains that A cannot be abductively inferred by itself, until the entire content is presented in the premise; “if A were true, C would be matter of course” (CP. 5.189). That is, A cannot be a new knowledge that we generate from our own mind without some surprising
fact observed. Yet, if C is a fact, there must exist an A to explain C. Given possible explanations of the fact may be innumerable, there is a finite number of guesses of the true explanation of the facts (CP 7.219). Therefore, there must be one A for C; that is, a hypothesis which accounts for the phenomenon.

Peirce merits abduction as the “only logical operation which introduces any new idea” (CP 5.171), and that “all the ideas of science come to it by the way of abduction” (CP 5.145). In contrast, induction draws uniformity from past events with the hope that this repeats in the future (CP 2.270).

### 3.6.3 Abduction and Identification of the Mechanism

Consistent with Bhaskar’s (2008) formulation of the logic of scientific discovery, the purpose of a critical realism research is to discover the mechanism(s) in a closed system to explain phenomena. The 3-step inferential process of abduction applies in critical realism as follows:

1. **The surprising fact C is observed;**
   A particular sequence of events generated in a closed system is observed; these events are so surprising that they may not be experienced in open systems where our observation is normally located.

2. **But if A were true, C would be a matter of course;**
   If the mechanism were real, the particular observations would result as a matter of course from the mechanism.

3. **Hence, there is reason to suspect that A is true.**
   The existence of the mechanism is confirmed by abductive logic given the impossibility of direct verification in an open system.

This three-step process connects abduction with critical realism, and is consistent with Modell’s (2009, p.213) suggestion that A denotes some real mechanisms, and C denotes a particular event. Furthermore, it provides a supportive note to Lawson’s (1997, p.236) argument relating abduction to realism:

Retroduction (abduction) involves moving from a conception of some phenomenon of interest to a conception of a different kind of thing (power, mechanism) that could have generated the given phenomenon.
Peirce also states that new ideas are generated only through abduction but not through induction or deduction (CP 5.171). This is because critical realists seek to discover mechanisms underlying the observed phenomenon. Therefore, abduction engages the process of discovery. Yet the guesswork required to postulate a mechanism signifies novelty in knowledge rather than a fixed result derived from pre-set theory, thereby refuting deduction. Bhaskar (2008, p.136) comments on the two steps of the logic of scientific discovery in the following way:

It should be noted that the move from (1) (i.e, classical empiricism on regularity observed from phenomenon) to (2) (i.e., transcendental idealism with mechanisms imagined) just because it involves the postulation of novel entities and processes cannot be given a deductive interpretation.

In the next section, the critical realist process framed by abductive logic followed in this thesis is summarized.

3.6.4 Abduction and Critical Realism in this Research

This research applies the logic of scientific discovery (Figure 3.3) as formulated by Bhaskar, and abductive logic as formulated by Peirce. Figure 3.4 applies the logic of scientific discovery to the context of this research. It indicates that the research method involves three phases through two steps to achieve an in-depth comprehensive critical realist account of materiality in sustainability accounting. Phase 1 concerns Step 1, the ‘creative model building course’ of the logic of scientific discovery. This leads to the structure and mechanism as a hypothetic explanation to the complex materiality phenomenon (A). Phase 2 applies Step two of the logic of scientific discovery, where the mechanism is empirically studied resulting in ‘surprising fact C’. This leads to an inference that A is true, that is, the mechanism is real.
Phase 1: Postulate the structure and mechanism *Chapter 4 (Step 1 of the logic of scientific discovery)*

Hypothetic explanation ‘A’

Phase 2: Empirical study of the mechanism *Chapters 5 to 8 (Step 2 of the logic of scientific discovery)*

Confirming the mechanism in two closure settings (the Exxon case and the Fu farm case);
Transfactuality and practical implication of the mechanism (the Fu farm case);
The mechanism survives empirical falsifications, which occur under specific conditions (the Zhong farm case and the Hui farm case).

Surprising fact ‘C’
- C1: Empirics on issues observed in two closed systems;
- C2: Empirics on issues that are possible but have not occurred;
- C3: Empirics on issues seemingly falsifying mechanism

Phase 3: A critical realist account of materiality in sustainability accounting *(Chapter 9)*

‘A’ is inferred to be true where ‘C’ would be a matter of course of ‘A’.

Phase 1 of this realism research concerns the first step of Bhaskar’s (2008) *logic of scientific discovery*, first formulated in 1975, in which the materiality structure and mechanism are postulated through a creative model building process, so as to explain the materiality practices of sustainability issues. The mechanism and structure refer to the hypothetical explanation of A, as stated in the inferential process of abduction.

Phase 2, presented in Chapters 5 through 8, addresses the second step of Bhaskar’s *logic of scientific discovery*, where the hypothesized structure and mechanism are tested empirically from the data gleaned from the four cases. These empirics signify ‘the surprising fact C’ defined in the abductive inference process.

Phase 3, the critical realist account of materiality in sustainability accounting, is presented in Chapter 9. Drawing on Sayer’s (1992) *causal explanation model*, Phase 3 integrates the conceptual work (Phase 1) and empirical results (Phase 2) into a critical realism account of materiality in sustainability accounting. This account addresses the stable structure and mechanism which underlie materiality practices across different empirical settings. From the perspective of abductive logic, this realism account reveals that given ‘the hypothetic
explanation A’ is true (that is the materiality structure and mechanism), ‘the surprising fact C’ would be a matter of course. Therefore, the knowledge claims of the structure and mechanism by which the complex materiality phenomenon is explained are endorsed.

3.7 Concluding Remarks

This chapter focused on the relevance and application of the critical realist paradigm to develop materiality knowledge. It began with a brief introduction of the four major research paradigms and justified selection of critical realism for this research. The literature review, from which research questions were refined, generated an objective, external and complex reality appropriate for examination using a critical realism approach, but inappropriate relative to other paradigms. This is because positivism assumes a naïve objective reality, and both constructivism and critical theory assume a subjective reality, neither of which are aligned ontologically with the reality assumed for this study.

This chapter summarizes Sayer’s (1992) philosophy of critical realism into a terminological system, and relates it to this materiality research. The design of the study is based on Bhaskar’s ‘logic of scientific discovery’ and constitutes a multiple case study located within the abductive logic framework proposed by Peirce. In addition, it outlines three research phases for producing a critical realist account of materiality in sustainability accounting.

The following table concludes ontological, epistemological and methodological signposts of critical realism to materiality in view of this research.

TABLE 3.3 Association of Critical Realism and Materiality

<table>
<thead>
<tr>
<th>Critical realism signposts</th>
<th>Materiality from the view of this thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontology</td>
<td></td>
</tr>
<tr>
<td>The world is stratified into domains of the empirical, the actual, and the real.</td>
<td>Sustainability issues provoking materiality practices include those which we can observe (empirical domain), which actually occur but are unobserved (actual domain), and which are possible but have not occurred (real domain).</td>
</tr>
<tr>
<td>The reality is objective and independent of our observations.</td>
<td></td>
</tr>
<tr>
<td>Epistemology</td>
<td>The mechanism works on all these issues to generate materiality practices, and its operation is independent of what we can observe.</td>
</tr>
<tr>
<td>Epistemology</td>
<td>The enduring mechanism, in the real domain transcends the phenomenon, which is complex, dynamic, and with contextual or even contradictory empirical results from our observations. Knowledge of the mechanism is not directly derived from our observations. Our observations often present distorted forms of the mechanism.</td>
</tr>
<tr>
<td>Methodology</td>
<td>The materiality mechanism is enduring and it underlies the complex materiality phenomenon in which we observe context-specific or even contradictory materiality practices.</td>
</tr>
<tr>
<td>Methodology</td>
<td>We cannot know the mechanism from empirical observations. Knowledge of the mechanism involves a critical and intelligent process of dealing with the empirical results.</td>
</tr>
<tr>
<td>Methodology</td>
<td>The materiality mechanism is confirmed in two different closure settings of Exxon (Chapter 5) and the Fu farm (Chapter 6). The mechanism is distorted in two cases of the Zhong farm and the Hui farm (Chapter 7), where the closure conditions are breached.</td>
</tr>
</tbody>
</table>

Chapter 4 focuses on the first research phase pertaining to the creative model building process through which the structure and mechanism are conceived to explain the complex materiality practices of stakeholders.
Chapter 4
Models of Heterogeneous Stakeholder Materiality

As explained in Chapter 3, this research was constructed in accordance with a critical realism paradigm, as expressed in Baskar’s (2008) model for the logic of scientific discovery, first formulated in 1975. This involved two steps: first, a process of creative model-building to postulate the structure and mechanism; and second, empirical testing of the mechanism by reference to particular events under specific conditions.

The first step achieved in this chapter involves an examination of the nature of the structure and the mechanism the materiality phenomenon, which in turn leads to development of the model for Heterogeneous Stakeholder Materiality (HSM). Specifically, this model building process involves the following:

- Two perspectives from the literature review, the basic materiality logic (presented in Topic 1) and the accountability reference to materiality (Topic 2), are recalled to offer a foundation for the development of the materiality model;
- The elementary materiality structure is modelled by applying the basic materiality logic to the accountability reference of materiality;
- The HSM structure model integrates the elementary materiality structure into the complex heterogeneous stakeholder environment.
- Conceived from the HSM structure, the HSM mechanism gives rise to a law pertaining to the way in which the firm prioritizes more material issues in the managerial and reporting practices in response to the stakeholder actions provoked by sustainability issues.
- A lemma, which refers to an intermediate theorem inferred from a general proposition or argument, is deduced from the mechanism and represents a practical protocol for critically confirming the existence of the mechanism in the complex system, which involves a number of stakeholders.

This chapter concludes with a discussion of how the HSM model forms a conceptual response to the research questions proposed in Chapter 2.
4.1 The Basic Materiality Logic and the Accountability Reference to Materiality

This section recalls the basic materiality logic and the accountability reference to materiality, which constitute the foundation for the materiality model development.

4.1.1 Recalling the Basic Materiality Logic

Chapter 1 and Section 2.1 presented the logical underpinnings of the materiality concept, namely, that a person should be concerned with something that matters to him/her, but not waste resources on what does not matter. This logic can be expressed as “a cost/benefit idea” (Edgley, 2013, p.262), and as “a solution to inefficiency, reducing time wasting in relation to unimportant details” (p.263). Jeffries (1981) describes this materiality logic as an index of efforts including time, resource usage and effort relevant to the amount in question. As Hicks (1964, p.158) points out, “without such a rule (of materiality), unwarranted amounts of time would almost certainly be spent on insignificant matters.”

Materiality logic can be extended to include a comparative dimension as follows:

*If Issue A matters more to a person than Issue B, this person should take stronger action (allocate more resources and efforts) in response to Issue A than to Issue B.*

The literature review (Chapter 2) presents how this basic materiality logic underpins the conceptions of materiality in accounting contexts. In financial accounting, the materiality logic is enacted as the firm reports financial issues that matter to shareholders. Similarly, the materiality logic embedded in sustainability accounting refers to the managerial and reporting actions taken by the firm in response to issues that matter to stakeholders.

4.1.2 Recalling the Accountability Reference to Materiality in Sustainability Accounting

The accountability reference to materiality constructed in Topic 3 (Chapter 2) is recalled here. In essence, accountability means that, to avoid a sanction from a principal (or accountee), an
agent (or accountor) gives an account justifying his/her action to the principal (Goez & Jenkins, 2005; Mansbridge, 2009; Mulgan, 2000; Schedler, 1999). Based on this definition, and drawing on prior accountability models (Dubnick, 2003; Gray et al. 2014; Lindberg, 2013), the study proposes an analytic framework of accountability involving four defining elements, together with one condition:

1. A **principal** (accountee) who possesses power to sanction an agent;
2. An **agent** (accountor) who holds ability of being answerable to the principal;
3. **Action** that is taken by the agent on behalf of the principal;
4. An **account** concerning action for the agent to inform the principal;
5. The **transparency** condition, which requires monitoring, controls the action of the agent and removes the possibility of the agent using a falsified account to deceive the principal.

In sustainability accounting contexts, the stakeholders (accountees) act as the principal, holding sanctioning power by manipulating resources critical to the firm or its governing body. The latter party acts as the agent (accountor) liable to answer stakeholders’ request by reporting on sustainability performance that stakeholders need, thereby fulfilling its requirement of stakeholder accountability (Gray et al., 2014).

The stakeholder accountability view informs an accountability reference to materiality practice of sustainability issues: to be accountable, the firm should report to stakeholders about its appropriate action in response to issues that matter to stakeholders; or otherwise, if the firm fails to include these issues and responsive actions into the reports, it is unaccountable to stakeholders and suffers the negative consequences of stakeholders’ sanctions. This accountability reference is centred on two aspects of the firm’s treatment of material issues. It can: take action to resolve the material issues; and communicate with stakeholders about the action.

Integration of this accountability reference and the basic materiality logic results in the elementary materiality structure presented in the next section.
4.2 The Elementary Materiality Structure

In this section, based on an integration of the basic materiality logic and the accountability reference of materiality, the elementary materiality structure is established to reveal the process of materiality practices contributing to the discharge of accountability.

4.2.1 The Materiality Process and Structure

A ‘process’ involving five steps might well be inferred to present the interactions between the four objects: an agent; a principal; an issue that matters to the principal; and an account that the agent gives to the principal. The steps in this process are as follows:

1. The issue matters to the principal so the principal should make an effort to deal with it according to the basic logic of materiality.

2. The principal is prevented by circumstance from dealing with the issue directly, therefore he/she engages the agent to do so. Otherwise, if the principal is able to resolve this issue, he/she does not need an agent, and the accountability relationship cannot be established. Accordingly, the principal requests that the agent provides an account about performance on the issue as a legitimate action stemming from the accountability relationship between the principal (accountee) and the agent (accountor).

3. If an account justifying the action on the issue is not forthcoming, or the account does not satisfy the principal, the agent would suffer sanctions from the principal; therefore, this issue matters to the agent.

4. According to the materiality logic, as the issue matters to the agent, the agent should take responsive action on the issue. Under the accountability relationship, the responsive action includes an account to justify his/her performance on the issue.

5. The principal judges whether the agent’s managerial action on the issue coheres with what he/she expects. If the agent does not provide an account, or the account’s content is unsatisfactory, because the issue is not resolved owing to insufficient or ineffective action, this issue will still matter to the principal and the principal would therefore continue to proceed with sanctions against the agent until an appropriate account is given.
Through this five-step process (called the *materiality process* hereafter), the four objects (principal, agent, issue and account) are structured to realize accountability discharge. This structure is illustrated in Figure 4.1.

**Figure 4.1: The Elementary Materiality Structure**

![Diagram of the Elementary Materiality Structure]

*Source: Developed for this thesis.*

The dual dimensions of materiality argued in prior literature (AccountAbility, 2006; Christensen & Lægreid, 2012; Dubnick, 2003; Lægreid et al., 2008; Murninghan, 2013) is reinforced in this model, where the materiality process differentiates two systems relevant to the agent’s action: the management and the informational systems. The managerial action aims to resolve, control or mitigate the negative impacts of the material issue, and could also include the decision to take no action if the issue is not significant enough. An informational system including principal, agent and account, allows for giving an account in which the issue is described and the agent action on the issue is justified.

The *elementary materiality structure* transfers ‘*what matters to the principal*’ towards ‘*what matters to the agent*’. In summary, the chain of actions accomplishing this transfer is: principal exerts power to enforce the agent; therefore, the agent being enforced provides an account justifying his/her performance on the issue so as to meet the expectation of the principal.
4.2.2 The Transparency Condition Necessary to the Materiality Process

The transparency condition necessarily requires the two steps of the materiality process, these being Steps 1 and 5, to progress. In other words, the elementary materiality structure is unable to be maintained without transparency.

In Step 1, only when the principal is able to really acknowledge the occurrence and influence of the issue, can he/she make an appropriate response to this issue. Where transparency is absent, given that the issue actually impacts on the principal, the principal may not acknowledge the occurrence and influence of the issue. If so, he/she would not adopt an appropriate response to it. Another step, Step 5, is also completed under the condition of transparency. Without transparency, the principal is unable to verify the agent’s performance as reported by the agent, and no sanction is imposed on the agent if the agent provides an unauthentic account on the issue.

The transparency condition can be achieved by monitoring controls or instruments. As Eisenhardt (1989) notes, the opportunity for the agent to deceive the principal and benefit personally from the issue is controlled by the monitoring mechanisms, which enable the principal to verify actions taken by the agent.

4.2.3 The Proposition of Materiality

The structure of HSM is informed by the following:

Where the transparency condition is met, if an issue matters to the principal, the principal should compel the agent to provide an account regarding agent’s action on behalf of the principal. Accordingly, this issue matters (i.e., is material) to the agent, and the agent should manage the issue and report his/her action on this issue to the principal.

The materiality logic that ‘a person needs to concern more to something that matters more to him/her’ (Section 4.1.1) is adopted in the HSM structure. This infers the proposition P(M), which states a law, in light of which two issues are compared with respect to their levels of materiality, which reflect their priority levels in managerial and reporting practices. Such a
proposition can be expressed as follows:

\[ P(M): \text{Under the transparency condition, suppose two issues, 'A' and 'B', occur. If 'A' provokes stronger action by the principal to the agent relative to issue 'B', 'A' would be more material than 'B' to the agent, and the agent should prioritize issue 'A' over 'B' in managerial and reporting practice.} \]

It is noted that the P(M) is grounded on a relative aspect, where the more material is compared to the less material, instead of referring materiality to a binary point differentiating between the material to the immaterial (AccountAbility, 2008; GRI G3, 2000-2011; GRI G4 Implementation Manual, 2013).

### 4.3 The Structure of Heterogeneous Stakeholder Materiality (HSM)

In this section, the elementary materiality structure evolves to a model of materiality practices of sustainability issues concerned with heterogeneous stakeholders.

#### 4.3.1 Stakeholder Mobilization

A stake is defined as “a particular end state” that a stakeholder holds and protects, where necessary, by taking action towards the firm (Rowley & Moldoveanu, 2003, p.207). This stake definition renders a stakeholder as a group of persons characterized by a particular stake in terms of sharing a common interest, value, and social identity, defined as “a set of elemental propositions about the individual’s social embeddedness or image (role, position, prestige, and relationships)” (p.211). A stakeholder (group) rather than an individual person is used in modelling the stakeholder materiality structure.

The core argument of social movement theory is: when a group of people feels discontent, they collectively mobilize to address the cause of the dissatisfaction. That is, when a stakeholder’s interest or identity is impacted negatively, the stakeholder should mobilize in order to take appropriate action so as to influence the firm to protect their stake (Rowley & Moldoveanu, 2003; Eesley & Lenox, 2006). Both stakeholder mobilization perspectives
(Rowley & Moldoveanu, 2003) and action-based stakeholder salience (Eesley & Lenox, 2006) pivot on this same social movement argument operationalized in the stakeholder context.

The term ‘mobilization’ refers to the group’s commitment of resources to the cause. Mobilization commonly involves the shift from inaction to action where discontent leads to continued and heightened action until the accountability is discharged about the issue. Action strength is a continuous rather than binary variable. Eesley and Lenox (2006) emphasize that stronger stakeholder action directed at the firm is more likely to achieve the intended outcome. For example, NGOs tend to take confrontational actions such as boycotts, protests and lawsuits more seriously, as these actions are more likely to affect the firm than letter-writing campaigns or proxy votes (Eesley & Lenox, 2006). This suggests that stakeholder action should be measured on a continuum of increasing levels of action to address discontent.

4.3.2 The Heterogeneity Paradigm

This section recalls the stakeholder heterogeneity paradigm, which was discussed in detail in Topic 4 of Chapter 2. It is worth mentioning that the heterogeneity paradigm within stakeholder theory militates against a simple generalization of one stakeholder to all stakeholders, given a generalization of one shareholder to all shareholders occurs when homogeneity is assumed in financial accounting standards (see Chapter 2, Topic 4). With divergent interests and social identities, stakeholders evaluate the issue, make judgments, and exert actions on the firm to meet their own specific interests and expectations (Frooman, 1999; Peloza & Papania, 2008; Rowley & Moldoveanu, 2003; Wood & Jones, 1995).

The heterogeneity inherent to a stakeholder environment is emphasized as they mobilize differently (evaluate performance, make judgment, exert influence on the firm) in response to the same issue in order to protect their various interests and identities. Davenport and Leitch (2006) contend that, as different stakeholders hold different interests, the likelihood of taking action varies across stakeholders. Indeed, the higher the impact of an issue on the interests or social identity of a stakeholder group, the more likely that the group will mobilize and take action against the firm. The mobilization of one stakeholder can therefore lead to sanction effects on the firm and can be seen as the consequence of an issue substantively mattering to a stakeholder. However, owing to stakeholders’ many diverse interests and identities and varied levels of action mobilized, the entire set of stakeholders cannot be assumed to
represent a homogeneous group for assessing materiality.

The current state of sustainability accounting materiality definitions fails to address the heterogeneity paradigm, which limits its ability to generalize the materiality concept in assessing sustainability issues concerned with different stakeholders. From this perspective, which incorporates both stakeholder inclusivity and stakeholder heterogeneity, the HSM structure extends knowledge from the traditional materiality conception, which is indexed to *significance to stakeholders as a whole* (ACCA, 2007; AccountAbility, 2002, 2006, 2008; GRI G3, 2000-2011; GRI G4, 2013; IIRC, 2013; KPMG, 2014; Murninghan, 2013; Zadek & Merme, 2003).

**4.3.3 The Structure of Heterogeneity Stakeholder Materiality (HSM)**

In this section, we develop the structure of heterogeneous stakeholder materiality (HSM) by adapting the elementary materiality structure in the heterogeneous stakeholder environment. Suppose there are N stakeholders, who are mobilized to exert different actions to request the firm to give an account of its performance on a sustainability issue. As Rowley (1997, p.907) states: “[f]irms do not respond to each stakeholder individually, but instead must answer the simultaneous demands of multiple stakeholders”. In addition,

> Each firm faces a different set of stakeholders, which aggregate into unique patterns of influence .... Firms do not simply respond to each stakeholder individually; they respond, rather, to the interaction of multiple influences from the entire stakeholder set (p.890).

Figure 4.2 integrates the elementary materiality structure within a heterogeneous stakeholder environment, to generate the *structure of Heterogeneous Stakeholder Materiality* (HSM), where the set of all N stakeholders identified as S1, S2, …, Sn, hold heterogeneous expectations of the firm. Route ① depicts the issue impacting differently on N stakeholders owing to their heterogeneous interests and identities. In route ②, stakeholders’ action strengths differ, but collectively influence the firm to be accountable with respect to the issue (Rowley, 1997).
① a sustainability issue concerns stakeholders with heterogeneous interests and social identities. Stakeholders cannot resolve the issue directly.

② stakeholders collectively exercise differential enforcement actions demanding the firm to give an account justifying relevant performance on the issue.

③ the firm takes managerial action in response to the issue (sustainability management).

④ the firm gives stakeholders the accounts in which the issue is described and relevant performance is justified. The accounts can be either formal reports or less-formal communications.

⑤ The stakeholders assess whether the managerial action is justified in the account. If the issue was not resolved, the managerial action cannot be justified in the view of stakeholders, so the sanction pressures exerted by stakeholders are retained against the firm. Otherwise, if the issue was resolved, the managerial action would be justified and the sanction pressure would be lifted.

Of course, the transparency condition is necessary to the operation of the HSM structure. If transparency were absent in Step 1, the stakeholders would be unable to acknowledge the
occurrence and impact of the issue and take steps to remedy the situation. And in Step 5, opportunities for the firm to deceive the stakeholders with misleading information on its actual action would emerge on account of the insufficiency of external monitoring systems. In general, social audits and assurances are used by stakeholders to achieve transparency and ensure the firm’s sustainability (Gray, 2001).

Both the inclusivity principle and the heterogeneity paradigm are incorporated into the HSM structure. Here, differences of interests, social identities and sanction effects among stakeholders are recognized, but there is no discrimination between powerful or weak stakeholders. This is because all stakeholders are taken into consideration so as to recognize the intrinsic worth, value and goodness of each stakeholder in its own right (Alford & Naughton, 2001; Fontrodona & Sison, 2006; Llano, 1998; Shankman, 1999).

Steps 4 and 5 in the HSM structure correspond to previous models of sustainability accounting materiality provided by AccountAbility (2006), Eccles and Serafeim (2013), and KPMG (2014). These suggest that materiality be included in both the firm’s solutions to material issues and reports to stakeholders about the issues and how they were resolved. As Eccles and Serafeim (2013, p.55) suggest, the procedure of dealing with environmental, social and governance (ESG) issues is to:

identify material environmental, social and governance issues; … [then] undertake major innovation in products, processes and business models to achieve the improvements; … [and then] communicate with stakeholders about those innovations.

Accounts in the heterogeneous stakeholder environment can be either formal or informal (Hardy & Ballis, 2013; Mashaw, 2006). The firm may prepare formal printed sustainability reports or online reports to all stakeholders, or use informal communicative methods (advertisement, oral communication, newsletters, emails, etc.) to notify different stakeholders about the same issue and the relevant performance.

4.3.4 Symbolic and Graphic Presentations of HSM Structure

The extent of influence of an issue on a singular stakeholder refers to the action of this stakeholder towards the firm. The action position of an issue to stakeholder S is denoted as
the S(issue). For example, the action of stakeholder S1 mobilized by issue α is denoted by $S1(\alpha)$, which indicates that S1 mobilizes to action position $S1(\alpha)$ in order to request the firm to give an account, expressed as follows:

If stakeholder S’s action strength on the firm for issue α is higher than it is for issue β, we record this as $S(\alpha) > S(\beta)$; which implies that issue α is more significant to the stakeholder S than issue β.

Set notation is used in this thesis to describe stakeholder actions on the firm. A set is “a group or collection of things that belong together or resemble one another or are usually found together”⁴. The key attribute of a set is that elements are distinct when considered separately, but form a set when considered collectively.

The heterogeneous stakeholder environment is presented as a set of stakeholders (or groups), where each stakeholder (group) is a distinct element. To illustrate, a firm is influenced by N stakeholders (groups) S1, S2…Sn. The set S {S1, S2…Sn} designates the stakeholder environment consisting of N stakeholders (groups) that manipulate different resources critical to the development of the firm. Any one firm would have a particular stakeholder set covering all stakeholders relevant to this firm, with different firms being associated with different stakeholder sets.

When an issue occurs, stakeholders mobilize to take various sanctioning actions against the firm in order to achieve their specific ends. Each action taken by a stakeholder in response to the issue represents one element of the set of stakeholder actions. For example, for issue θ, Stakeholders S1, S2…Sn are in action $S1(\theta)$, $S2(\theta)$…$Sn(\theta)$, respectively. Stakeholder influence over the firm is in the terms of the set of stakeholder actions designated as ‘stakeholder action set θ’ {S1(θ), S2(θ)…. Sn(θ)}, where Si(θ) is an action of the stakeholder Si mobilized by issue θ.

Function F represents the materiality determined by the set of stakeholder actions; that is, the stakeholder action set θ {S1(θ), S2(θ)…. Sn(θ)}. Therefore, for issue θ, F(θ) denotes the materiality of issue θ to the firm reified by its priority in managerial and reporting practices.

That is, \( F(\theta) \) refers to the particular set \( \{S_1(\theta), S_2(\theta) \ldots S_n(\theta)\} \) and \( \text{Managerial}_\theta \) and \( \text{Informational}_\theta \) refer to the managerial action level and informational content level (reporting priority level) of the firm in response to the issue, so that

\[
\{S_1(\theta), S_2(\theta) \ldots S_n(\theta)\} \sim F(\theta) \sim \text{Managerial}_\theta \sim \text{Informational}_\theta
\]

As implied in the above symbolic presentation, the materiality level of an issue associates with the stakeholder action set provoked by this issue, and can be defined from either the firm’s managerial action level or informational content level.

Figure 4.3 illustrates heterogeneous stakeholder materiality in the form of a ‘materiality web’. The firm is represented at the intersection of all branches, each of which symbolizes a range of influence exerted by each stakeholder, \( S_1, S_2 \ldots S_n \). The influence of a stakeholder on the firm corresponds to the strength level of its action against the firm.

**Figure 4.3: The Materiality Web of an Issue**

![Materiality Web](image)

The significance of a particular issue to any one stakeholder is designated at one point along the stakeholder action branch (continuum). This point symbolizes the action of the stakeholder in response to the issue. Therefore, in the figure above, positions \( S_1(\theta), S_2(\theta), \ldots, S_n(\theta) \) symbolize the actions taken by \( S_1, S_2 \ldots S_n \) respectively. These positions on each
continuum are connected so as to form a web, which denotes the overall materiality of the issue to the firm, in the term of the stakeholder action set \( \Theta \) \{S1(\Theta), S2(\Theta)…Sn(\Theta)\}. In short, the ‘web’ model presents the ‘stakeholder heterogeneity’ paradigm inherent to materiality of sustainability issues.

**4.4 The Mechanism of Heterogeneous Stakeholder Materiality (HSM)**

In this section, a mechanism is inferred from the HSM structure to state a law pertaining to how issues are prioritized because of their materiality levels. The HSM structure indicates how the four things (the firm, stakeholders, account and issue) are structured into an integrated body that has the potential to reveal the process of how one material issue is dealt with in the accountability relationship. In addition, the HSM mechanism states the way on how the firm prioritizes the more material issue over the less material one in managerial and reporting practices.

Given that individual stakeholder actions are elements of the entire stakeholder action set, an elementary unit of change of this set rests on a change in any one of the elements – if it is assumed that other elements of the set remain unchanged. That is, if one stakeholder mobilizes to a new action position against the firm, while other stakeholders remain stable in their current positions, the firm would suffer more overall pressure from stakeholders and would need to make more of an effort to respond to stakeholders.

According to P(M), the materiality of an issue to the firm is reflected as the firm’s managerial and informational practices to this issue, and is associated with the set of stakeholder actions provoked by the issue. The elementary unit of change within the stakeholder action set is as follows: if an issue becomes more significant to any one stakeholder, but remains at the present levels of significance to other stakeholders, this issue leads to stronger action from this singular stakeholder to request an account of this issue, but other stakeholders’ action positions remain unchanged. Accordingly, this issue will become more material to the firm, and the firm will set a higher priority on this issue. This elementary unit change is called ‘singular stakeholder movement’ condition hereafter.
Based on the HSM structure, one can infer that the way in which the firm prioritizes one of two comparative issues under ‘singular stakeholder movement’ condition, in managerial and reporting practices. This way is denominated the mechanism of heterogeneous stakeholder materiality, as mechanisms are “nothing other than the ways of acting of things” (Bhaskar, 2008, p.14). In this study, this represents the way in which the firm and its heterogeneous stakeholders interact towards the process of materiality leading to accountability discharge. Hereafter, the mechanism of heterogeneous stakeholder materiality is referred to as the HSM mechanism, which is stated as follows:

Suppose two issues, α and β, occur. Issue α is more significant to one stakeholder than issue β, whilst significance of issue α is the same as β to all other stakeholders; therefore, issue α mobilizes one stakeholder to a higher action position against the firm than for issue β, whilst other stakeholders remain unchanged in their action positions with regards to both issues. Then issue α is more material than issue β to the firm. Therefore, the firm would prioritize α over the β in management and reporting practice.

It is noted that the HSM mechanism is activated under the transparency condition achieved by monitoring controls such as the social audit and assurance, which prevent the firm’s unaccountable behaviour being unnoticed by stakeholders, and allows it to escape stakeholder sanctions. The HSM mechanism is under a condition of ‘singular stakeholder movement’, where only one stakeholder changes its action, while other stakeholders remain unchanged in their actions regarding both issues. This ‘singular stakeholder’ is not specific, but could be any stakeholder, whether primary or otherwise.

The HSM mechanism can be expressed using set notation. Suppose that α and β are issues relevant to a firm and its stakeholders. If there exists only one stakeholder Si, where Si(α) > Si(β) (i.e., only Si takes different actions towards the two issues), and for any other stakeholder Sj, Sj(α) = Sj(β) (i.e., other stakeholders remain stable for both issues), F(α) > F(β) (i.e., Issue α is more material than Issue β to the firm). For F(α) ~ Managerial_α ~ Informational_α, and F(β) ~ Managerial_β ~ Informational_β (i.e., for materiality of an issue associates with the firm’s managerial action level and informational content level), Managerial_α > Managerial_β, and Informational_α > Informational_β (i.e., α provokes a

---

5 The phrase “stakeholders remain unchanged in their action positions with regards to both issues” does not mean that these stakeholders take no action to both issues; rather, it means that they may take action, but that their actions are identical in response to both issues.
higher managerial action level and informational content level for the firm than β).

Figure 4.4 illustrates the condition of ‘singular stakeholder movement’ where all stakeholder action positions remain unchanged, except for stakeholder Si who mobilizes from position Si(β) for issue β to position Si(α) for issue α. Therefore, the firm suffers stronger action from stakeholders on account of α compared to β. That is, issue α is more material to the firm than issue β, and thus the firm needs to prioritize α over β in managerial and reporting practices. The higher materiality of α is also indicated in the figure in that web α covers web β.

**Figure 4.4: Graphical Presentation of the HSM Mechanism**

![Graphical Presentation of the HSM Mechanism](source)

Source: Developed for this thesis

### 4.5 Problems of Confirming the Mechanism from Empirics

A question arises as to how to test empirically the mechanism; that is, how can we know the existence of such a reality presented in the HSM mechanism? Discussion follows as to why the mechanism must be tested or identified empirically in the situation of ‘simple closure’, and why an open and complex system limits the empirical test and identification of the mechanism (Bhaskar, 2008; Sayer, 1992).
4.5.1 Closure and Openness

A mechanism is confirmed in closed systems subject to both intrinsic and extrinsic closure conditions (Bhaskar, 2008; Sayer, 1992). Any change of social actors (the firm and stakeholders) will break the intrinsic closure conditions and then the mechanism is not testable. For example, consider a business that began as a small shop and now has become a large supermarket. The issue of a small delayed payment to the supplier may be highly material in the beginning stages of the enterprise, but is not so material now as the firm may have obtained sufficient credit on account of its larger size. Unchanged inner qualities of the social actors (such as the operation mode of the firm and behaviours of stakeholders) are the intrinsic closure condition for testing the mechanism.

A typical breach of the extrinsic closure condition is that new stakeholders enter the social system, or the old stakeholders exit the social system. But there is another situation that leads to the collapse of the extrinsic closure condition; that is, where different issues are interrelated. In such a situation, the firm’s action does not respond to a single issue but to a bundle of issues, thereby leading to failure in adequately testing the mechanism.

In an open and dynamic business world, either the intrinsic or extrinsic closure conditions are difficult to maintain. The changes of the conditions of the social systems or intervention of other mechanisms result in difficulty of identifying the target mechanism from empirical observations. To achieve the empirical test or confirmation of the mechanism, the satisfaction of intrinsic and extrinsic closure conditions must be ensured.

4.5.2 Simplicity and Complexity

To confirm the HSM mechanism, these conditions must be achieved in the target social system:

(1) All stakeholders need to be identified;
(2) The action positions of all stakeholders must be fully comprehended;
(3) The singular stakeholder movement condition should be met.

Some of these conditions might be met in a simple system, with only one firm and a limited range of stakeholders free from external influence. However, such idealistic situations cannot
be met in a complex business world, the preferred ground in which business and accounting researchers perform empirical observation. If a stakeholder is defined as someone who influences and is influenced by the firm, stakeholders can include virtually anyone (Mitchell et al., 1997, p.856). Thus, it is impossible for researchers to achieve the first condition; that is, to identify and observe all stakeholders in an open and complex system. Nor is it possible, owing to measurement resource and knowledge limitations, to comprehend fully the actions of all stakeholders (as the second condition requires).

Furthermore, in a dynamic and complex system, even one pair of issues leading to a singular stakeholder movement is rarely identified (as the third condition requires). In general, stakeholders change their actions simultaneously in response to different issues. But in a simple social system comprising of a firm and few stakeholders, it is possible to meet the singular stakeholder movement condition by which the mechanism is directly manifested. Yet it is suggested here that it is indeed possible to confirm the mechanism in a complex system through an indirect way, where what is verified is not the mechanism \( \textit{per se} \), but a middle-range theory deduced from the mechanism.

**4.6 Lemma Deduced from the HSM Mechanism**

Sourced from the discipline of sociology, middle-range theory (MRT) refers to an approach whereby a special social theory with a limited scope is developed that is applicable given a specific set of phenomena, and so contrasts with the grand theorizing or general concepts of social theory (Boudon, 1991; Laughlin, 1995). In particular, Danermark et al. (2002) emphasize the value of MRT in critical realism studies. Derived from the general theory or \( \textit{an abstract mechanism} \), a middle range theory aims at “bridging the gap between general theories and empirical observation” (Danermark et al., 2002, p.125). MRT therefore represents an attempt to create a middle course: a repudiation of over-empirical study that devotes itself solely to testable empirical propositions without concern with abstract mechanism; and a repudiation of the abstract general law that is untestable in an empirical domain (Danermark et al., 2002).
In this section, a middle-range theory (called the lemma hereafter\(^6\)) is derived from the law that the HSM mechanism states and aims at creating a more testable proposition for the mechanism. The lemma is tested in the circumstance where multiple stakeholder groups are in higher action positions mobilized by issue \(\alpha\) compared to issue \(\beta\), while other groups remain in the same action positions with respect to both issues. If the lemma can be tested in a particular situation, the existence of the mechanism is critically (not directly) confirmed.

To begin with, the concept of consistent change is defined thus:

All stakeholders mobilized by issue \(\alpha\) remain in equal or higher action positions relative to issue \(\beta\).

Then the lemma of consistent change is inferred:

If all stakeholders are consistently mobilized in equal or higher action positions for issue \(\alpha\) relative to issue \(\beta\), issue \(\alpha\) is more material than issue \(\beta\) to the firm, and the firm should prioritize issue \(\alpha\) relative to issue \(\beta\) in managerial and reporting practices.

The lemma is presented in Figure 4.5.

\(^6\) In this thesis, the mechanism refers to a general or grand theory, and the lemma, which is deduced from the mechanism, refers to the middle-range theory relating to the mechanism.
In Figure 4.5, no action positions on web α are lower than for web β. From a visual perspective, web α encompasses web β. The materiality web enables a visual assessment of materiality, where the issue depicted by the covering web is more material to the firm than the issue depicted by the web being covered. Hence the firm should prioritize issue α compared to issue β.

The lemma enables observation and analysis to progress within a complex system by simplifying some of its complex conditions. First, the lemma narrows the scope of vast numbers of stakeholders anticipated in the HSM mechanism to only a limited number of stakeholders consistently change their actions. Given that we are unable to comprehend the actions of all stakeholders, we should be able to observe stakeholder actions in response to one major issue involving a limited number of stakeholder groups. For those stakeholders where there is no evidence of actions in response to an issue, it is assumed that this issue is not significant enough to provoke their actions, rather than an inability to detect actions of these stakeholders.

Second, in some cases, we need not attempt to observe the extreme ‘singular stakeholder
movement’ condition where one stakeholder changes its action position while all other stakeholders remain stable. This is because the lemma generalizes this extreme condition as consistent change, which includes multiple stakeholders changing their actions. In summary, by means of this lemma, the scope of all stakeholders is narrowed to a limited number of observable stakeholders, and the extreme condition of singular stakeholder changing action is transferred to a more accessible condition where multiple stakeholders consistently change their actions.

In Chapter 5, the HSM mechanism is tested in a complex system involving a multinational corporation with numerous stakeholders across four comparative issues. In this case, an empirical confirmation of the lemma indicates the possibility of existence of the mechanism. For the sake of comparison, in Chapter 6, the mechanism will be directly tested in another case set within a stable isolative simple village where there is a tiny agricultural farm and 3 stakeholders dealing with a range of issues identified from a longitudinal field study.

### 4.7 The HSM Structure and Mechanism in Response to Research Questions

This section concludes how the HSM structure and mechanism form theoretical implications to the research questions developed from the literature review. A complete answer for these questions is presented in Chapter 10, which integrates both the theoretical work in this chapter, and the empirical findings from the next few chapters.

The primary research question is recalled as follows:

> How can the current understanding of materiality be developed to show how materiality practices contribute to the discharge of a firm’s accountability to stakeholders for issues that matter?

The implication of the hypothetical HSM structure and mechanism to the primary question is as follows:

> This study develops the models of HSM structure and mechanism, postulating the
way of materiality practices by which a firm discharges its accountability to the entire set of heterogeneous stakeholders.

Implications of the HSM structure and mechanism to secondary research questions and responses are as follows:

**Q1: How is the concept of materiality applied by the firm to discharge accountability to stakeholders?**

Grounding the basic materiality logic on the accountability relationship, the HSM structure integrates the four objects (a firm as the agent, stakeholders as the principal, an account and an issue) through the five-step materiality process, which transfers *what matters to stakeholders* into *what matters to the firm*. The HSM structure enables the firm to discharge accountability to stakeholders by taking appropriate managerial and reporting actions in response to issues that significant to stakeholders.

**Q2: How can the concept of materiality be developed to address a complex environment where stakeholders hold heterogeneous interests and expectations?**

As shown in the HSM structure, Step 2 of the materiality process addresses different stakeholders and their heterogeneous actions provoked by an issue on the firm. Furthermore, the heterogeneity paradigm is presented by symbolic ‘set’, where each stakeholder’s action is one distinct element of this set as a collection of the actions from different stakeholders in response to one issue. In the HSM structure, all stakeholders and their actions are included into the consideration in Step 2. And the firm’s reporting practice to all stakeholders is revealed in Step 4. Therefore, the stakeholder inclusivity principle is integrated.

**Q3: How can it be empirically confirmed that different firms have different sustainability materiality practices?**

The HSM structure assists our understanding of context-specificity of materiality. In response to different sets of stakeholders, different firms encounter different sets of stakeholder actions provoked by the same issue in Step 2. This leads to different managerial and reporting actions taken by different firms in Steps 3 and 4. That is, materiality practices vary across firms. However, the HSM structure endures, and the materiality process by which the firm conducts materiality practices remains in place. The context-specificity of materiality based on HSM structure and mechanism is explored empirically in Chapters 5 to 8.
Q4: How is the concept of materiality applied to both the reporting and management of sustainability?

The HSM structure encompasses two different but correlated systems. One is the sustainability management system, where the firm takes managerial action to resolve the issue. The other is the sustainability reporting system, where the firm communicates with stakeholders about the managerial action. The HSM structure indicates both the managerial and reporting actions taken by the firm in response to an issue that is significant to stakeholders. Empirical support for the managerial-informational consistency in materiality practices is provided in Chapters 5 and 6.

4.8 Concluding Remarks

This chapter completes the first step in applying Bhaskar’s (2008) framework for the logic of scientific discovery. This has led to the development of conceptual models of HSM structure, HSM mechanism and the lemma postulated, all of which correspond theoretically to the primary and secondary research questions proposed from the literature review.

The first output of this model building course is the elementary materiality structure, where four elementary objects (principal, agent, issue and account) are structured through the five-step materiality process that pivots on the basic materiality logic and the ‘accountability reference to materiality in sustainability accounting’ (refer to Table 2.3). The materiality process operates under the transparency condition achieved by monitoring controls. In the next stage of model building, the HSM structure was developed to represent the elementary materiality structure found in a complex stakeholder environment. This reveals the way in which materiality practices contribute to accountability discharged to the entire set of heterogeneous stakeholders. The transparency condition, under which the HSM structure works, can be achieved by monitoring controls, including social and environmental audits and assurances.

The HSM mechanism logically inferred from the HSM structure leads to the development of a law pertaining to how a firm prioritizes a more material issue compared with a less material
issue in managerial and reporting practices in response to the different sets of stakeholder actions provoked by the two issues. However, empirical confirmations of the HSM mechanism require the condition of singular stakeholder movement, which refers to the situation where, for the two comparative issues, only one stakeholder changes its action while others remain unchanged. However, this confirmation condition is difficult to achieve in the complex and dynamic world of business. This concern is addressed by the lemma of consistent change deduced from the HSM mechanism, a lemma which is verified under the condition of consistent change, where more than one stakeholder consistently upgrades its actions while others remain stable.

The models of HSM structure and mechanism form a conceptual response to the primary and secondary questions, thus revealing the way in which materiality practices contribute to accountability discharged to the entire set of heterogeneous stakeholders. The postulation of the HSM structure and mechanism in this chapter signals the completion of the first step of Bhaskar’s (2008) logic of scientific discovery. The second step concerns the empirical study of the HSM structure and mechanism, which is conducted subsequently in Chapters 5 to 9.
Chapter 5
Empirical Study I
Confirming the HSM Mechanism in a Complex
Closed System (The Exxon Case)

In Chapter 4, models for the HSM structure and mechanism were postulated. The second step in applying the logic of scientific discovery framework, the empirical study of the mechanism, is realized in the subsequent four chapters concerning four cases in different settings. The selection of these cases has been discussed in Section 3.6. This chapter (5) provides confirmation of the mechanism in a complex closed system.

This chapter reports the process and results of testing the HSM mechanism in the case of a complex system comprising of a multinational corporation and numerous stakeholders. It is a slowly developing system and thus accords with what Sayer (1992) defines as an ‘assumed closure’ and hence is regarded as suitable for testing the mechanism. This test is conducted by means of a collection of four comparative issues that satisfy the condition of consistent change, thereby resulting in verification of the Lemma of Consistent Change deduced from the HSM mechanism (Chapter 4). This case indicates that, even in the complex system where the extreme ‘singular stakeholder movement’ condition of directly testing the mechanism cannot be satisfied, the mechanism can still be critically (neither directly nor perfectly) apprehensible through the particular issues.

5.1 Closure, Transparency and Particular Issues

5.1.1 An Assumed Closed System

According to Bhaskar (2008) and Sayer (1992), an experimental circumstance that approximates closure (or a closed system) is the condition for empirical identification of the mechanism. It is well recognized in the critical realism research literature that a completely
closed system is impossible in a social world characterized by openness, complexity, ubiquity and dynamics (Bhaskar, 2008; Sayer, 1992). One solution to achieve closure in the social world is to take ‘partial account’ of the closure conditions (Sayer, 1992, p.124). Sayer (1992, p.125) suggests that social scientists may simply assume an open system to be closed given it appears “to approximate the conditions for closure”.

The setting for the case study presented in this chapter accords with the assumption of closure characteristic of what Sayer (1992, p.125) refers to as “a slowly developing system”. In this kind of system, there is no significant change in the social actors and their relationships. This system in this case comprises of a multinational oil corporation, Exxon, and its complex operative environment involving numerous stakeholders. This social system is ascribed as being relatively stable, where Exxon has long maintained its leading role in the oil industry, and no significant variation can be seen for the manner of operation of Exxon and the behaviour modes of its stakeholders. In this assumed closed system, four comparative environmental and social issues are collected in an investigation of whether and how the mechanism can be illustrated.

5.1.2 Particular Issues for Testing the Mechanism

In the closure condition, the particular sequence of events enables the researcher to identify the mechanism, which “need not, and in general will not, be reflected in an invariant pattern or regularly recurring sequence of events” (Bhaskar, 2008, p.3). In this case, the four issues selected are: the Valdez oil spillage; the Montana oil pipeline leakage; the funding of weapons purchased for the civil war in Angola; and the sponsorship of global warming sceptic groups. These issues satisfy two particular conditions for observation:

(1) As this study focuses on secondary data generated by the historical events. The relevant data of each of the four issues must be accessible online or from other sources containing sufficient evidence of the issue itself, the actions provoked by different stakeholders, and Exxon’s response.

(2) The four issues should meet the testable conditions of either ‘singular stakeholder movement’ or ‘stakeholder consistent change’, through which the mechanism or the lemma is illustrated. In this case, the consistent change condition is achieved within the testable ground involving the four sets of stakeholder actions corresponding to the
5.1.3 The Transparency Condition

The transparency condition necessary to activation of the HSM mechanism is achieved by the social audit and assurance on the four issues. As indicated from the evidence of the four issues (discussed in the following sections), Exxon was under the external and institutional monitoring controls involving the media exposure, governmental investigation, NGO watch and community engagement. These social auditing or monitoring controls position Exxon as relatively transparent with respect to these issues, and enable stakeholders to acknowledge the real situations pertaining to the issues and Exxon’s responsive actions.

5.2 Accounts of Issues and Quantification of Provoked Actions

This case study produces four accounts of issues to test the HSM mechanism. Each account includes two aspects: the stakeholder actions provoked by the issue; and the firm responsive actions pertaining to prioritizing the issue in management and reporting.

As discussed in Topic 2 of Chapter 2, the materiality assessment of the sustainability issues involves quantifying its significance to the stakeholders and the firm, which reflects on their actions provoked by the issue (Accountability, 2008; GRI G3, 2000-2011; GRI G4 Implementation Manual, 2013). The significance levels from ‘less significant’ to ‘more significant’ as indicated in the axis models given by AA1000APS (Accountability, 2008) and GRI G3 (2000-2011) are realized by quantifying qualitative or multi-sourced data; that is, by “quasi-quantification” (Bryman & Bell, 2003, p.476), or “ordinal scales or semi-quantification” (Bernard & Ryan, 2010, pp.152-154). Bernard and Ryan (2010, p.153) cite an example from the research of Weisner, Beizer and Stolze (1991), who transformed interview data gathered to assess families’ religious background into the ordinal variables: ‘nonreligious family’, ‘moderately nonreligious family’, ‘moderate to high religious family’ and ‘highly religious family’ (p.153). Bernard and Ryan (2010) explain that ordinal variables do not concern ‘how much’ something is more or less than another thing.
This case study involves quantification of the issue-provoked actions taken by Exxon and the stakeholders by means of some ordinal scales or levels, based on observation of the strength of their actions based on available secondary data.

### 5.2.1 Quantification of Stakeholder Actions

The stakeholder actions are quantified into four levels as shown in Table 5.1:

1. stakeholder indifference occurs in response to an issue that does not matter to this stakeholder;
2. stakeholder shows its concern in response to an issue that slightly matters;
3. moderate action is taken by stakeholders in response to an issue moderately matter; and
4. strong action by stakeholders responds to an issue that highly matters to this stakeholder.

<table>
<thead>
<tr>
<th>Table 5.1: Stakeholder Managerial Action Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action of stakeholder</strong></td>
</tr>
<tr>
<td><strong>Significance of the issue</strong></td>
</tr>
<tr>
<td><strong>Rating</strong></td>
</tr>
</tbody>
</table>

Table 5.1 shows the allocation of levels 1 to 4 to the four stakeholder action levels. For example, if stakeholder group S1 are indifferent to issue \( \alpha \), the corresponding action level is presented as \( S1(\alpha) = 1 \), and issue \( \alpha \) is assessed as not mattering to group S1. If stakeholder group S3 are concerned about issue \( \beta \), but not sufficiently concerned to take action, this action level is presented as \( S3(\beta) = 2 \), and issue \( \beta \) is assessed as marginally matters to group S3. Similarly, \( S2(\gamma) = 3 \) denotes action taken by the S2 group to address ‘moderately significant’ issue \( \gamma \). \( S1(\gamma) = 4 \) denotes high level of action taken by S1 due to the issue \( \gamma \) that matters greatly.

Four distinct issues concerning the large oil company Exxon and its stakeholders were examined. The four issues are denoted as \( \theta_1, \theta_2, \theta_3 \) and \( \theta_4 \). These issues were selected for their potential negative impact on stakeholders and the readily available reports from media and non-government organizations. It is assumed that observable stakeholder action was due
to the issue rather than from unidentified external influences and that, without such distinct evidence of external influence, the system is assumed to be exhibiting an approximate closure in the context of these issues.

The evidence provided for each issue is from secondary data sources listed in Appendix 1. This analysis is limited by our empirical observation, which captures fewer than the complete range of stakeholders. However, if a stakeholder group is significantly mobilized in response to any of the issues analyzed here, we assume the stakeholder actions were reported in the media sources that we examined. Hence the stakeholders that are not included in the following analysis are assumed to be in constant indifference towards the issue. From the available data, we observe five stakeholders: S1, the media; S2, the public; S3, the government; S4, NGOs (non-government organizations); S5, local community.

Other unrecognized stakeholders are denoted by the set U \{U1, U2…Ug\}, designating ‘g’ unrecognized stakeholders. All stakeholders are represented by set S \{S1, S2, S3, S4, S5, U1, U2…Ug\}. It is assumed that the unrecognized stakeholders for the four issues are in constant positions, c1, c2…cg respectively.

Table 5.2 provides exemplars of the actions of the five identified active stakeholders in the ordinal action levels:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Action level</th>
<th>The media</th>
<th>The public</th>
<th>Government</th>
<th>NGOs</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Indifference</td>
<td>No or slight report</td>
<td>No or little concern</td>
<td>Inaction</td>
<td>Inaction or slight action</td>
<td>Inaction or limited engagement</td>
</tr>
<tr>
<td>2</td>
<td>Concern</td>
<td>Neutral limited media report</td>
<td>Some concern; relatively neutral attitude</td>
<td>Warning; letters by officers</td>
<td>Open letters; Self web-site report</td>
<td>Complaint; continuous watch</td>
</tr>
<tr>
<td>3</td>
<td>Moderate action</td>
<td>Exposed and Moderate critics</td>
<td>Official governmental</td>
<td>Local-scale campaign;</td>
<td>Blame; demonstration</td>
<td></td>
</tr>
</tbody>
</table>

160
5.2.2 The firm’s Managerial and Reporting Action Levels

The HSM structure postulated in Chapter 4 addresses the correlative relationship between managing and reporting practices in response to one sustainability issue, by either of which practices materiality is defined. This case study assigns four priority levels to both managerial and reporting practices. Tables 5.3 and 5.4 provide criteria for these four levels assigned. The data used and reported in the Exxon case were retrieved from publicly accessible online sources, which are presented in Appendix 1.

**Table 5.3 Criteria for Quantifying the Firm’s Action**

<table>
<thead>
<tr>
<th>Managerial action level</th>
<th>Strength of managerial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decisive action (Level 4)</td>
<td>Long term efforts; huge investment on solutions</td>
</tr>
<tr>
<td>Moderate action (Level 3)</td>
<td>Efforts; moderate investment on solutions</td>
</tr>
<tr>
<td>Possible action (Level 2)</td>
<td>Evidence on some action or an intention of action</td>
</tr>
<tr>
<td>Inaction (Level 1)</td>
<td>No evidence on the action; indifference</td>
</tr>
</tbody>
</table>

**Table 5.4 Criteria for Quantifying the Firm’s Reporting Practice**

<table>
<thead>
<tr>
<th>Reporting level</th>
<th>Reporting practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive informational content (Level 4)</td>
<td>Specific theme report;</td>
</tr>
<tr>
<td>Moderate informational content (Level 3)</td>
<td>Normal topics in Official report;</td>
</tr>
<tr>
<td>Relative informational content (Level 2)</td>
<td>No formal report but high-ranking executive mentioned the issue in the public media;</td>
</tr>
<tr>
<td>Minimal informational content (Level 1)</td>
<td>No formal report; and little or no information is provided by Exxon.</td>
</tr>
</tbody>
</table>
The metaphors ‘M’ and ‘R’ are used to denote the levels of managerial actions and reporting practices respectively. For example, M(α) = 4 means Exxon takes strong action with long-term efforts or huge investment to seek the solutions to the issue α. And F (β) = 2 means that the issue β and its solution are included in the official report informing the stakeholders.

In the subsequent section, the actions taken by the stakeholders and Exxon in response to four issues are quantified according to the ordinal levels in light of the criteria mentioned.

5.3 The Four Issues

This section presents four issues satisfying the condition of consistent change. The sources and further details on each issue is included in Appendix 1 at the end of this thesis.

5.3.1 Issue 1: Valdez Oil Spill

The Exxon Valdez oil spill, regarded as one of the most devastating human-caused environmental disasters, occurred in Alaska on 24 March 1989. An oil tanker, Exxon Valdez, struck Bligh Reef in Alaska and spilled about 11 million gallons of crude oil into the ocean. The oil eventually covered 2,100 km of coastline and threatened the habitat of multiple species including salmon, sea otters, seals, seabirds and other wildlife.

Account 5.1 Issue 1 – the Valdez oil spill

<table>
<thead>
<tr>
<th>Stakeholder action set {4,4,4,4,4, c1,c2,…cg}</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Media: Strong action; S1(θ1) = 4. Frequent, extensive &amp; critical reporting over long period by major news networks directly blaming Exxon with strong criticism and black humor.</td>
</tr>
<tr>
<td>S2 General public: Strong action; S2(θ1) = 4. Extensive public concern unified negative public opinion.</td>
</tr>
<tr>
<td>S3 Government: Strong action; S3(θ1) = 4. Exxon Valdez Oil Spill Trustee Council was established to manage environmental damage &amp; restoration. The court ruled a punitive damage to an amount of US$ 507.5 million.</td>
</tr>
<tr>
<td>S4 NGOs: Strong action; S4(θ1) = 4. Exxon oil spill &amp; Alaskan grandeur used by environmental groups to promote their legitimacy. Sierra Club, the National Wildlife Federation, Defenders of</td>
</tr>
</tbody>
</table>
Wildlife & Greenpeace voiced extreme concern regarding the impacts of the oil spill, locating offices in Alaska and engaging media to criticize Exxon. NGOs such as Greenpeace campaigned internationally against Exxon whenever Exxon denied the ongoing environmental impacts.

S5 Local community: Strong action; S5(θ1) = 4. 11,000 Alaskan residents worked throughout the region to restore the ecosystem. Local resident groups such as Homer Multi-Agency Task Force were formed to protect local fisheries; they constructed a 40,000-foot length log boom as a demonstration sign. Cordova District Fisherman’s United erected a blockade to stop a British Petroleum ship from coming in to Valdez port in 1993.

Other unrecognized stakeholders U1, U2 … Ug are assumed to take constant insignificant action c1, c2, ..., cg respectively. That is, this issue was not significant to mobilize other stakeholders to take action.

Exxon's managerial and reporting actions: M (θ1) ~ R(θ1)

Managerial action level to resolve the issue: M (θ1) = 4 (Decisive action).

Prompt action with continuous and strong efforts. Exxon paid large fines, cleanup fees and restoration costs; strong efforts also reflect on maintaining public relations and organizing workers to clean-up the oil spill and restore the contaminated area.

Level of informational content on the issue: R(θ1) = 4 (specific theme report).

Exxon promptly responded to the issue by releasing information including advertisements through media. Exxon maintains a specific section dedicated to the Exxon Valdez Oil Spill on its official website even though this issue occurred in 1989.

For the five stakeholders S1, S2, ..., S5 who perceived the seriousness of the issue, strength levels of their actions against the firm are valued as by 4, 4, 4, 4, 4. And it is assumed that other unrecognized stakeholders U1, U2...Ug were in the insignificant/constant action, c1, c2...cg. Then the stakeholder action set for issue one is θ1{4, 4, 4, 4, 4, c1, c2, ..., cg}, with each element of this set representing action taken by the five recognized stakeholders, together with other unrecognized stakeholders. The consistence between the firm’s managerial level and the level of informational content in response to one issue is evidenced as both are with Level 4 for this issue. And the number 4 is thus the materiality level that corresponds to the stakeholder action set.

Set θ1{4, 4, 4, 4, 4, c1, c2, ..., cg} ~ M (θ1) ~ R(θ1) = 4
5.3.2 Issue 2: Montana Pipeline Oil Leak

On 1 July 1 2011, Exxon’s Montana pipeline burst and leaked an estimated 42,000 gallons of oil into Yellowstone River, Montana. The US EPA advised that the danger of oil leaking ended in July 2011, when Exxon had removed oil contaminated water to a refinery in Billings for storage.

Account 5.2 Issue 2 – the Montana Pipeline Oil Leak

<table>
<thead>
<tr>
<th>Stakeholder action set {4,2,3,3,3, c1,c2,…cg}</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Media: Moderate action; S1(θ2) = 4. Extensive reports by major US media outlets including CNN, Fox, the New York Times, and the Wall Street Journal with strong critical stance on the public safety concerns.</td>
</tr>
<tr>
<td>S2 General public: Concerns; S2(θ2) = 2. There is no evidence of social campaigns or boycotts resulting from this issue. Public acknowledgement of the oil leak suggests that the issue was considered to be marginally material.</td>
</tr>
<tr>
<td>S3 Government: Moderate action; S3(θ2) = 3. Montana’s governor declared a state of emergency and criticized Exxon for failing to respond quickly and effectively. The US EPA requested immediate cleanup measures and safety improvement. In March 2013, Exxon was fined US$1.7 million.</td>
</tr>
<tr>
<td>S4 NGOs: Moderate action; S4(θ2) = 3. NGOs such as Greenpeace, Sierra Club and Friends of the Earth criticized Exxon’s slow and unsatisfactory response demanding accountability, full disclosure and improved environmental management practices. No evidence on large-sized campaigns, boycotts or litigations involving huge amount of compensation fees.</td>
</tr>
<tr>
<td>S5 Local community: Moderate action; S5(θ2) = 3. On July 2, 2011, 140 residents were evacuated for 4 hours from the town of Laurel as a precaution against possible explosion. Although the level of risk was uncertain, the oil leakage was believed to have contaminated Yellowstone River, which provides water for farm irrigation water and town drinking water. Exxon was blamed for the incident and the local communities requested an immediate cleanup.</td>
</tr>
<tr>
<td>Other unrecognized stakeholders U1, U2 … Ug are assumed to be in constant insignificant positions c1, c2, ..., cg, respectively.</td>
</tr>
</tbody>
</table>

Exxon’s managerial and reporting practices: M (θ1) ~ R(θ1)

**Managerial action level: M (θ2) = 3 (moderate action)**

Exxon agreed to pay $1.6 million settlement for the pollution and also claimed to clean up the contaminated area.

**Level of informational content R(θ2) = 3 (Official disclosure)**

164
Exxon disclosed relevant information to the public by its official statements.

Actions taken by the five recognized stakeholders S1, S2, ..., S5 are assessed as 3, 2, 3, 3, 3. It is assumed that other unrecognized stakeholders U1, U2...Ug were in the insignificant/constant action, c1, c2...cg. Thus Issue 2 provoked a stakeholder action set \( \theta_1 \{3, 2, 3, 3, 3, c_1, c_2, ..., c_g \} \). In this set, each element denotes action taken by each of all stakeholders including the five recognized stakeholders and other unrecognized stakeholders.

Account 5.2 demonstrates that the level of informational content (3) of this issue conforms with its managerial action level (3). So the number 3 is the materiality level as it corresponds to the stakeholder action set for this issue:

\[
\text{Set } \theta_2 \{3, 2, 3, 3, 3, c_1, c_2, ..., c_g \} \sim M(\theta_2) \sim R(\theta_2) = 3
\]

### 5.3.3 Issue 3: Angola-Gate Scandal

During the Angolan civil war from 1975 to 2002, Exxon, BP and Elf made signature bonus payments to obtain drilling licenses for offshore oil concessions. US$870 million from this fund was used by the Angolan government to purchase weapons. The Angolan foreign minister acknowledged that these oil funds were used to fund the war effort. The connection between the drilling license purchases and the funding of the Angolan war is not definitive, although the possibility of a link is acknowledged in media reports. Exxon’s action in Angola risked breaching the anti-bribery legislation, the Foreign Corrupt Practices Act (FCPA).

Account 5.3 depicts the general public and local communities’ lack of interest in this issue. The media showed some concern, but there was no extensive, critical or lasting exposure of the issue. Exxon’s involvement in Angola would have been in breach of anti-bribery legislation, although the US government applied an exemption, with no infringement or penalty recorded against Exxon. NGOs took action in the form of an investigation, critique and continued pressure.
Account 5.3: Issue 3 – Angola-Gate Scandal

<table>
<thead>
<tr>
<th>Stakeholder action set {3,1,2,3,1, c1,c2,\ldots cg}</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Media: Concerns; S1(θ3) = 3. Media exposure by a few influential media firms such as New York Times over a short time frame which although not directly blaming Exxon, were critical of the scandal.</td>
</tr>
<tr>
<td>S2 General public: Indifference; S2 (θ3) = 1. No evidence of public response to this issue.</td>
</tr>
<tr>
<td>S3 Government: Concerns; S3(θ3) = 2. FCPA contains a loophole exempting facilitating payments defined as payments to facilitate or expedite performance of routine governmental actions. A U.S. Department of Justice attorney ruled the exemption covers the signature bonus. The U. oil industry complained that the anti-bribery legislation may put the industry at a competitive disadvantage against competing countries. The issue relevant to FCPA was in the scope of the government intervention however no governmental action was taken against Exxon.</td>
</tr>
<tr>
<td>S4 NGOs: Moderate action; S4 (θ3) = 3. Human Rights Watch and Global Witness expressed dissatisfaction concerning lack of transparency of the payment. The International Consortium of Investigative Journalists’ investigation resulted in a strong and clear criticism of this bribe to gain commercial benefit.</td>
</tr>
<tr>
<td>S5 Local community: Indifference; S5 (θ3) = 1. No local communities, whether in the US or Angola, were reported to be in direct involvement in the Angolan scandal.</td>
</tr>
<tr>
<td>Other unrecognized stakeholders U1, U2, \ldots, Ug are assumed to be in constant insignificant positions c1, c2, …, cg, respectively.</td>
</tr>
</tbody>
</table>

Exxon’s managerial and reporting actions: M (θ1) ~ R(θ1)

Managerial action level: M (θ1) = 2 (Possible action)

Lee Raymond (then head of Exxon) also explained that, although he was ‘not sure’ whether the governance record of the Angolan leaders is satisfactory, Exxon had scrupulously observed its contract confidentiality with the government. This suggests that Exxon recognized the potential significance of the Angola scandal to some stakeholders but intended to hide Exxon’s performance on this issue rather than resolve it directly. No further evidence of direct action taken by Exxon is available.

Level of informational content: R(θ1) = 2 (no formal report but the issue was addressed by high ranking officer in public media)

Exxon’s competitor, BP, recognized its problematic involvement in Angola and, from 1997, commissioned an annual independent social impact assessment. However, Exxon refused to disclose this potential problem in Angola. Lee Raymond, then the head of Exxon, stated that it is not a proper role for a private company to disclose how government revenue is spent.

As shown in this account, Issue 3 provoked a stakeholder action set \{2, 1, 2, 3, 1, c1, c2, \ldots,\}.
which denotes actions taken by the five recognized stakeholders, together with those of another unrecognized one.

According to the account of the issues, Exxon took clear and intentional managerial actions in response to Issues 1 and 2. No significant managerial action was taken in response to Issue 3. However, Exxon’s managerial action in response Issue 3 requires further explanation. In particular, why is Exxon’s managerial action valued at 2, which indicates a possible action rather than no intention to take action (valued at 1)? Exxon’s response was a refusal to provide details on its involvement in the issue. This response does not necessarily mean that the issue exerted insignificant influence on Exxon. Exxon may perceive serious potential consequences of this issue; however, the intention of taking action cannot be observed directly. BP, when faced with similar stakeholder pressure concerning a similar issue, responded by releasing annual independent reports on its involvement in Angola. The pressure, which led to BP’s action, could therefore be expected to lead to a tendency for Exxon to act.

Managerial action level in response to issue 3 is therefore valued ‘2’. Given that there is no content in formal official reporting concerning this issue, the Head of Exxon provided explanation and justification in a public media interview. The reporting level is valued at 2.

Set $\theta_3 \{2,1,2,3,1,c_1,c_2, \ldots, c_g\} \sim M(\theta_3) \sim R(\theta_3) = 2$.

5.3.4 Issue 4: Funding of Global Warming Sceptic Organizations

The basic facts of this issue are that Exxon was accused of providing about US$23 million between 1998 and 2006, and continuing to fund organizations that were skeptical of the science linking global warming to the burning of fossil fuels.

Account 5.4 Issue 4 – Funding of Global Warming Sceptic Organizations

<table>
<thead>
<tr>
<th>Stakeholder action set {2,1,2,2,1, c1,c2,…c_g}</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Media: Concerns; S1(θ4)= 2. There was no extensive media exposure of this issue. Some influential media such as The Guardian and the Wall Street Journal reported this issue with mild criticism of Exxon.</td>
</tr>
<tr>
<td>S2 General public: Indifference; S2(θ4)= 1. There is no evidence to suggest the general public cared</td>
</tr>
</tbody>
</table>
about this issue.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Concern</th>
<th>Action</th>
<th>Reporting</th>
<th>Materiality</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3 Government: Concern; S3(θ4) = 2.</td>
<td>Senators Rockefeller and Snowe wrote a letter to Exxon indicating their concern as to the issue and its impact on perceptions of US moral leadership and the legitimate scientific community. There is no evidence that the government took action against Exxon to disclose details or cease this funding, nor was there evidence of government showing significant concern.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4 NGOs: Concerns; S4(θ4) = 2.</td>
<td>The UK Royal Society released an open letter in 2007 requesting Exxon stop sponsorship of climate change skeptics. The Union of Concerned Scientists argued that this was similar to tactics used by the tobacco industry and criticized Exxon for misrepresenting the science and denying scientific evidence in an attempt to delay action. No evidence of high-impact campaigns, boycotts or litigation was observed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5 Local community: Indifference; S5 (θ4)= 1.</td>
<td>There is no specific local community relevant to this issue.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exxon’s managerial and reporting practices: M (θ4) ~ R(θ4)

Managerial action level: M (θ4) = 1 (No action)

Exxon still sponsored a list of 41 climate skeptic groups. It indicates that Exxon took no action on this issue, and the issue remained unchanged.

Level of informational content R(θ4) = 1 (little information released)

Exxon’s manager for public affairs, Kenneth Cohen, stated in 2006 that funding of the Competitive Enterprise Institute and ‘a handful’ of similar groups had ceased, but he refused to reveal names of the denial groups. Rather, the evidence shows the continuity of sponsorship to many other denial groups, thereby indicating that the minimal information disclosed by Exxon was vague and misleading.

As shown in Account 5.4, only the media and NGOs showed concern, as is evidenced by limited media exposure of the issue. The other three stakeholders showed little interest. This issue was marginally material to media and NGOs, and immaterial to the general public, the government and local communities. The stakeholder action set is Set 04 {2, 1, 2, 2, 1, c1, c2...cg}. The reporting priority of this issue is consistent with the managing priority, and both refer to the lowest priority in practice. As a result, the materiality of this issue is valued as 1 so as to correspond with the stakeholder action set:

Set 04 {2,1,2,2,1,c1,c2, ..., cg} ~ M (04) ~ R(04) = 1.
5.4 The HSM structure of the Exxon case

The HSM structure (Chapter 4) applied to each of the four issues is shown in Figure 5.1.

Figure 5.1: The HSM Structure Applied to the Exxon Case

All the materiality practices of the four issues conform to the five-step *materiality process* presented in the HSM structure. Each Exxon issue impacted different stakeholders including the five identifiable stakeholders and all others (Step 1) who took different actions to influence Exxon (Step 2). The collective stakeholder influence provoked by this issue resulted in Exxon’s particular managerial action or no action (Step 3) and an account given to stakeholders, which justifies such managerial action regarding this issue (Step 4). After that, the stakeholders assess the account (Step 5).

Stakeholder heterogeneity and inclusivity

Stakeholder heterogeneity is evident in each of the four Exxon issues, where different

---

Step 2 includes a process of Exxon’s decision-making influenced by the stakeholder concerns. This cognitive process is not publicized and thus is not directly indicated from the case data. However, this limitation is resolved in a case study presented in Chapter 6, in which this process is illustrated from interviews with the firm operator.
stakeholders adopt different forms of actions, and these actions are in different levels, as presented in the accounts and symbolized in the stakeholder action sets.

The Exxon case study endorses the *stakeholder inclusivity principle* by discouraging the classical stakeholder approach where firms prioritize stakeholders and only respond to the mobilization actions of the primary or salient stakeholders (Clarkson, 1995; Freeman, 1994; Harrison & John, 1996; Mitchell et al., 1997). Exxon’s action validates the claim that organizational reporting practices do not prioritize individual stakeholders, as their publically accessible reports reach the broad stakeholder audience. Managerial actions comprise activities, some of which are general to all stakeholders, and others that are specific to individual stakeholders. However, managerial action *in toto* is directed towards all stakeholders. For example, for Issues 1 and 2, the cleanup of contamination and restoration of contaminated ecosystems are general activities that address broad stakeholder concerns (whether salient or not). Some activities tend to be specific to particular stakeholders, such as payment of fines to the government and compensation paid directly to victims. These general and specific activities are regarded as components of an action to mitigate the impacts of the issue to appease pressure within the stakeholder environment. That is, the purpose of a firm action is to resolve an issue or mitigate its impacts for all stakeholders so as to diminish the pressure from the stakeholder environment on the firm itself.

*The dual dimensions of materiality*

The Exxon case provides empirical evidence that endorses the view of dual dimensions of materiality, which refers to the definition of materiality of sustainability issues from either the perspective of managerial action level (AccountAbility, 2006; 2008; Eccles & Serafeim, 2013; Murninghan, 2013), or the level of informational content (AccountAbility, 2008; GRI G3, 2000-2011; GRI G4, 2013; Zadek & Merme, 2013).

Table 5.5 draws from the above observation to show the relationship between the responsive managerial and reporting actions of Exxon.

**Table 5.5: Consistency between Managerial Priority and Reporting Priority**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Managerial action level</th>
<th>Level of informational content</th>
<th>Materiality to Exxon</th>
</tr>
</thead>
</table>

170
<table>
<thead>
<tr>
<th>01</th>
<th>Decisive action (4)</th>
<th>Specific formal report (4)</th>
<th>Highly material (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>Moderate action (3)</td>
<td>Formal report (3)</td>
<td>Moderately material (3)</td>
</tr>
<tr>
<td>03</td>
<td>Possible action (2)</td>
<td>No formal report but with public explanation by the Head of Exxon (2)</td>
<td>Marginally material (2)</td>
</tr>
<tr>
<td>04</td>
<td>Inaction (1)</td>
<td>No formal report and little information provided by Exxon (1)</td>
<td>Immaterial (1)</td>
</tr>
</tbody>
</table>

The consistency between the managerial action level and the level of informational content is identified from Table 5.5, as both are assessed as having the same value. The materiality levels of the four issues are valued from 4 to 1, corresponding to either Exxon’s managerial action levels or its informational content levels in response to these issues. That is, the materiality levels of these issues are denoted from either managerial or informational perspectives:

\[
M(\theta_1) = 4; M(\theta_2) = 3; M(\theta_3) = 2; M(\theta_4) = 1; \\
R(\theta_1) = 4; R(\theta_2) = 3; R(\theta_3) = 2; R(\theta_4) = 1; \\
\]

### 5.5 Empirical Verification of the Lemma of Consistent Change

Table 5.6 shows a comparison of stakeholder action sets concerning the four issues. The universal set of stakeholders is divided into the five recognized stakeholders, S1, S2, S3, S4, and S5, and all other unrecognized stakeholders from U1 to Ug.

<table>
<thead>
<tr>
<th>Sustainability issue</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>U1</th>
<th>U2</th>
<th>...</th>
<th>Ug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set 01 - Issue 1</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>c1</td>
<td>c2</td>
<td>...</td>
<td>cg</td>
</tr>
<tr>
<td>Set 02 - Issue 2</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>c1</td>
<td>c2</td>
<td>...</td>
<td>cg</td>
</tr>
<tr>
<td>Set 03 - Issue 3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>c1</td>
<td>c2</td>
<td>...</td>
<td>cg</td>
</tr>
<tr>
<td>Set 04 - Issue 4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>c1</td>
<td>c2</td>
<td>...</td>
<td>cg</td>
</tr>
</tbody>
</table>

For each observed stakeholder, a diminishing trend in the stakeholder action from Issue 1 to Issue 4 is evident from Table 5.6. For example, for S1, the action levels for the four issues are
in this order: 4 (Issue 1) = 4 (Issue 2) > 3 (Issue 3) > 2 (Issue 4). For unrecognized stakeholders, the action levels are assumed to be constant for the four issues. For example, for U2, the action level is assigned c2 for all the four issues. Hence, the condition of the consistent change is met in this example case. According to the lemma, the ranking of firm’s managerial and informational response to the four issues is expected: 

\[ M(01) > M(02) > M(03) > M(04); \ R(01) > R(02) > R(03) > R(04); \]

Table 5.7 below provides a summary of the firm’s response for each issue.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Stakeholder action set</th>
<th>Materiality to Exxon</th>
<th>Exxon’s managerial priority</th>
<th>Exxon’s reporting priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set ( \theta_1 ) {4, 4, 4, 4, 4, c₁,c₂,…cg}</td>
<td>Highly material (4)</td>
<td>Decisive action (4)</td>
<td>Specific formal report (4)</td>
</tr>
<tr>
<td>2</td>
<td>Set ( \theta_2 ) {4, 2, 3, 3, 3, c₁,c₂,…cg}</td>
<td>Moderately material (3)</td>
<td>Moderate action (3)</td>
<td>Formal report (3)</td>
</tr>
<tr>
<td>3</td>
<td>Set ( \theta_3 ) {3, 1, 2, 3, 1, c₁,c₂,…cg}</td>
<td>Marginally material (2)</td>
<td>Possible action (2)</td>
<td>Justification statement by the Head of Exxon (2)</td>
</tr>
<tr>
<td>4</td>
<td>Set ( \theta_4 ) {2, 1, 2, 2, 1, c₁,c₂,…cg}</td>
<td>Immaterial (1)</td>
<td>Inaction (1)</td>
<td>Statement by top management (1)</td>
</tr>
</tbody>
</table>

Therefore, the lemma of consistent change reasonably explains the empirical observation of the four Exxon issues. The ranking of firm’s response levels is depicted in the materiality web model as shown in Figure 5.2, where web 01 covers web 02, which covers web 03, which covers web 04. However, this case study involves epistemic concerns that the direct manifestation of the HSM mechanism cannot be actualized empirically in a complex system involving numerous stakeholders. The condition of ‘singular stakeholder movement’ refers to an elementary change in stakeholder action set, where, in response to two issues, only one stakeholder takes different actions, while actions taken by each of other stakeholders remain unchanged. But this condition is extremely difficult to meet. In this system, numerous stakeholders are dynamic in their actions to different issues, at least if we discount the particular situation where all stakeholders except for one remain unchanged in response to two issues.
Three distinct limitations of observation in this case study needs to be identified. First, the limits of the stakeholder boundaries are incomprehensible owing to the size and influence of the organization. Therefore, it is necessary to narrow the observation to focus on five stakeholders that changed their actions in response to the four issues, while the actions of all the other stakeholders are assumed to be insignificant, or remain unchanged with respect to these issues.

The second limitation occurs because of the potential lack of precision in the measurement of the continuous mobilization variable, which is approximated in this research with a discrete variable consisting of four categories of stakeholder action and firm response levels. Thus, our empirical knowledge of the true existence of the HSM mechanism is derived from imperfect and limited observations, and by means of verifying the lemma of consistent change deduced from the mechanism, rather than the HSM mechanism itself.

Third, this case study is limited in manifesting the firm's decision-making process contained in Step 2 of the five-step materiality process. Exxon’s managerial and reporting actions in response to each issue were observed; however, this case has not presented empirically whether and how Exxon’s decision is formulated based on its perception of diverse stakeholder influences. This is because the cognitive decision-making process is not directly visible and thus is not confirmed from the case data. This limitation will be resolved in the next case study (the Fu farm) presented in Chapter 6 using primary data. In this case, the firm’s decisions on materiality practices and its intention to satisfy many heterogeneous stakeholders is explicated through in-depth interviews with the firm owner/operator.
Figure 5.2 Materiality Webs of the Four Exxon Issues

Web issue one

Web issue two

Web issue three

Web issue four

S1
S2
S3
S4
S5
U1
U2
Ug

Web issue 1
Web issue 2
Web issue 3
Web issue 4
5.6 Concluding Remarks

This research constructs an epistemological access to the enduring HSM structure, and confirms that the HSM mechanism enables the firm to discharge accountability to the entire set of diverse stakeholders. The HSM structure integrating the ‘stakeholder inclusivity’ and ‘stakeholder heterogeneity’ is validated with empirical support. In particular, the empirical evidence supports the consistency between managerial action levels and levels of informational content, thereby justifying the definition of materiality within existing sustainability accounting literature.

The Exxon case satisfies the closure condition necessary for observation, the transparency condition enabling the materiality process on which the HSM structure is grounded, and the ‘consistent change’ condition for the lemma tested through a particular collection of issues that are selected deliberately. The verification of the lemma, which is deduced from the HSM mechanism, informs an indirect confirmation of the mechanism.
Chapter 6
Empirical Study II
Confirming the HSM Mechanism in a Simple Closed System
(The Fu Farm Case)

6.1 Overview

This chapter presents the investigation of the phenomenon of closure as defined in the critical realism framework to further test the mechanism of heterogeneous stakeholder materiality (HSM). The second case setting, which consists of three small farms, differs significantly from the first case examined in Chapter 5, the large multinational Exxon case. The second case involves a small family-owned farm operating in a relatively isolated small rural village in Guangdong, South China. The major focus in this case is a longitudinal study of one of the three farms, which has three active stakeholders, in order to directly test the mechanism where all closure conditions are satisfied.

The case entity is a family farm owned by Fu. The study of Fu’s farm is part of step two of Bhaskar’s (2008) logic of scientific discovery and parallels the Exxon case, but with significantly different closure conditions. This chapter also provides the foundation for the exploration of the transfactual operation of the mechanism in Chapter 7.

The three main research outcomes of this chapter are as follows:

- This case provides an example of how to assess the materiality of sustainability issues in the setting of informal reporting practices.
- This case illustrates empirically the HSM structure in the closed setting of the Fu farm, in contrast to the complex system of the Exxon case where only the lemma was confirmed.
- This case provides empirical confirmation of the HSM mechanism from a range of sustainability issues identified from the field study.
This chapter is organized as follows. It begins with a review of the relationship between experimental activities and critical realism (Bhaskar, 2008), and then justifies how the setting of the Fu farm achieves the conditions of a natural experiment that enables the identification of the mechanism in this specific social system. The explanation of the method of data collection and analysis then follows. Here, 18 issues are categorized into six sustainability themes, where each theme is subjected to the test of the mechanism.

6.2 Field Experiments in Natural Settings

6.2.1 Closure Condition

Critical realism and experimentation are closely associated. Bhaskar (1979) holds that the value of experimentation in realism studies is to identify a law that cannot be observed directly or actualized in normal conditions. To identify the mechanism, the experimenter must ensure two essential conditions. First, the experimenter must trigger the mechanism being studied to ensure that it is activated; and second, the experimenter must prevent any interference by other mechanism(s) (Bhaskar, 1979, p.53).

Experiments require a closed system exempt from external inference. As Bhaskar (2008, p.59) suggests, “the idea of a closed system could be elucidated quite simply as a fragment or sector of the world effectively cut off for a period of time from non-constant external influences”. Similarly, Sayer (1992, p.122-123) states that the creation of a simple closed system that achieves the required conditions of activating the mechanism and preventing the influence of other mechanisms is the only purpose of experiments in critical realism investigations, which reveal more clearly the existence and operation of the mechanism(s).

A closed system equivalent to a scientific laboratory is difficult to achieve in the social domain. Sayer (1992, p.122) notes that “In the objects of study of the natural sciences, closed systems may exist naturally (e.g., the solar system) or may be artificially produced in experiments or machines”. However, social science normally works within open systems, rather than the closed system that is created artificially in the natural sciences. Thus, in most cases, a social system can only be quasi-closed, “producing regularities that are only
approximate and spatially and temporally restricted” (Sayer, 1992, p.122). However, Sayer (1992) suggests that a stable or slowly developing system can approximate a closed system. Pawson and Tilley (1997) suggest that isolated systems may be the best case of a closed system for a critical realism social study, such as in the Laycock (1985; 1992) studies set in two remote rural villages in Wales.

### 6.2.2 Field Experiment in Natural Settings

Bryman and Bell (2003, p.39) suggest that experimental studies, although popular in natural sciences, are rare in management and accounting literature, “mainly because of the problems of achieving the requisite level of control when dealing with organizational behavior”. They also cite the difficulty of manipulating the variables concerned with human experimental subjects.

It is necessary to differentiate between a laboratory experiment, which is performed in a contrived setting, and a field experiment which is performed in real-life or natural settings (Bryman & Bell, 2003; Singleton & Straits, 2010). Both of these studies emphasize that the field experiment is most likely to be of interest to management researchers, since the human subjects within the experiment should not be influenced by the researcher. The external validity of the study is increased by the realistic setting, as well as the opportunity to observe a heterogeneous sample of subjects (Singleton & Straits, 2010). Yet Singleton and Straits (2010, p.221) argue that, in field experiments, researchers often relinquish some control over the experiment by their dependence on other persons to carry out parts of the study, and as a consequence, validity is compromised. However, such natural experiment studies still present compelling research results, “because they are not artificial interventions in social life and because their ecological validity is therefore very strong” (Bryman & Bell, 2003, p.46).

In this study, the field experiment is conducted in a simple closed system comprising the Fu farm and its three stakeholders. Here, the experimental interventions are naturally occurring issues that mobilize the stakeholders to take different types and different levels of action against the firm so as to enable an understanding of how the mechanism underpins materiality practice.
6.3 The Case Setting

This study of three farms includes a longitudinal study of one farm (the Fu farm) that, in view of the closure conditions being met, is used to test the mechanism in this chapter (6), while the two other farms (the Zhong and Hui farms) are used to study the empirical falsification in Chapter 8. The longitudinal study takes place in a small isolated village in South China, comprising the Fu farm and three active stakeholders. This section introduces the background of the main case and justifies the suitability of its setting for conducting a field experiment.

6.3.1 The Fu Farm

The Fu farm is located in a small rural village, which is geographically isolated by a river and hills. This farm is owned and operated by Fu and is situated in a village to the south of Huazhou City, Guang Dong Province, China. The farm comprises two fish ponds and one pig house (see Figure 6.1). The sale of fish and pigs are the main source of income. Fu inherited the farmland from his parents, who inherited it from their parents, and the farm has stayed within the family for many generations. The farm was used to grow crops prior to 2010, but, in 2011, Fu constructed the fish ponds and the pig house and commenced an aquatic and livestock business. The smaller fish pond is used as a nursery to grow young fish (the locals call them ‘fish seeds’). When they mature, they are transferred to the larger fish pond.
Some basic information about this farm (2011 – 2014) is as follows:

- Area of ponds: 5,000 m²
- Annual productivity of ponds: about 7,200 kg fish
- Annual income from the aquatic business: about 60,000 RMB
- Area of the pig house: 200 m²
- Annual production: 30 pigs sold for meat and 4 sows (not for sale)
- Annual income from livestock: about 20,000 RMB
- Annual total net income: about 16,000 RMB
6.3.2 Stakeholders

In this setting, the farm, considered here as the firm, has three active stakeholders. These are as follows:

- **Stakeholder one (S1): neighbours.** The farm has two neighbours, whose rice fields are adjacent to the large fish pond. The neighbours suffer direct impacts from the farm, including waste water and pig waste discharges.
- **Stakeholder two (S2): The village council.** The village council acts on behalf of the villagers, and closely monitors any misconduct contrary to the public interest. These actions include oral warning, public blaming by the village board, or fines issued by the council committee.
- **Stakeholder three (S3): Traders.** The firm does not sell products (fish and pigs) directly to consumers, but rather to traders, who then sell the products to food factories and restaurants. The traders are able to reduce the purchase price or in some cases refuse to buy produce, if the quality is low. This stakeholder includes a team of employees who harvest and transport the product to factories, restaurants or wholesaler.

6.3.3 Closure, Stability and Simplicity

The isolation of the setting for this field study is analogous to that in Laycock’s (1985) realism study of two isolated villages. Such isolation, as Pawson and Tilley (1997, p.86) suggest, permits “the possibility of setting up an experiment creating the ideal contextual conditions” of identifying the mechanism.

This case setting displays the three significant traits of closure, stability and simplicity. Simplicity is due to the existence of only three active stakeholders within this system. Stability and closure of the system refer to the lack of evidence of change for the three years taken for this longitudinal field study.

Extrinsic closure is approximated, since during the period of the field study, no new stakeholders entered and no existing stakeholders exited this system. Hence, there was negligible external influence on this system. Intrinsic closure was achieved, as the four social actors maintain their interest in and ability to act or react to issues. That is, the neighbours
maintain their interest in the neighbouring rice fields, the village council continues to protect the public interest, and the traders constantly act to protect their interests in farm productivity. Similarly, the firm maintains its ability to act in response to stakeholder pressure.

As no social system is completely exempt from external influence (Sayer, 1992), this case setting is not a completely closed system, but suffers only negligible external influence owing to the unique attributes just described. Possible external influences include entities down the supply chain who consume the farm produce such as food factories, restaurants and the end consumers, who are external to the village, but may exert negligible indirect influence over the firm. Another possible external influence is from the suppliers who sell forage to the firm. The farm does buy forage but is not dependent on the suppliers, as the majority of forage is made by the farm from organic village waste and plants. The firm buys and stores packed forage in case of insufficient supply of homemade forage. The storeroom has a capacity of more than one year’s supply of packaged forage. In addition, the influence from local government is negligible. Chinese law exempts small agricultural businesses from all taxes. As there is no governmental institution in this village, public issues are resolved by the village council. However, if criminal acts occur, the village council or villagers will report this to the Tongqing town government, who will send police or other officials to resolve any legal problems.

As external influence to the system is extremely low, this case setting is regarded as a closed system suitable for a critical realism experimental study. The stability of this system enables the longitudinal study observing many issues relevant to materiality practice. The simplicity of this system provides an opportunity to test if the mechanism complies with the singular stakeholder movement condition. Such an opportunity would not be available in a complex system involving many stakeholders where singular movements are impossible to observe.

6.3.4 Transparency

Distinct from the Exxon case, the Fu farm setting does not involve specific formal social audit and monitoring procedures. But the transparency condition is achieved as the stakeholders can directly and promptly observe the performance of the farm in this small village, thereby initiating a ‘face to face encounter’ (Robert, 2009). This transparency also enables direct vision of the issue so that the account-giving formal reporting process is
unnecessary. A further discussion of transparency is provided in Section 6.6.

6.3.5 Issues

This case setting involves an analysis of 18 issues identified from the longitudinal study at the Fu farm. The reasons why 18 issues are required are:

- First, the purpose of the mechanism is to prioritize comparative issues and the necessary test condition is to observe the change in action level of any one stakeholder, while all other stakeholders remain unchanged. For example, if there are N stakeholders, the test of the mechanism must involve at least Nx2 issues, where the movement of any one stakeholder is observed across each pair of issues.
- Second, replication of this test condition across 18 issues strengthens the test results confirming the mechanism’s application to this full range of issues identified during the longitudinal study of this stable, closed system.
- Third, identification of many issues is essential to understanding the transfactuality of the mechanism and its practical implications, which are the focus of the next chapter.

The 18 issues observed are categorized into 6 sustainability themes, each of which involves three issues. The mechanism is tested across the three issues within each theme. The strength of the mechanism for explaining how issues are prioritized by the firm based on their materiality is validated by this extensive testing process.

6.4 Data Collection and Analysis

6.4.1 Data Collection

The direct observation component of the field study commenced on 27 October 2013 and concluded on 15 January 2014. This field study produced multiple types of data sourced from direct observation. These included: in-depth interviews with the firm owner during the three months in which the researcher was located on the farm as well as telephone conversations
that too place up to February 2016; the farm’s transactions recorded in a business journal for the three years from February 2011 to January 2014, as well as relevant invoices; and semi-structured interviews with the three stakeholders (the two neighbours, a village officer representing the council, and one trade dealer). The data collected includes: a written account of data from each interview recorded in Cantonese, and where used in this study, translated by the researcher into English; and photos, videos and drawings produced onsite by the researcher to record relevant aspects of the business operations.

The Fu farm study involves two protocols for data collection and analysis: the first used to study the HSM structure; the second to identify, interpret and analyse the sustainability issues and relevant actions taken by stakeholders and the farm.

The first protocol involves semi-structured interviews with Fu and the three stakeholders guided by the following questions:

• Questions asked of stakeholders:
  How does the operation of the Fu farm impact on you?
  How do you know when the Fu farm impacts your interest?
  How do you respond to the impacts from the Fu farm?

• Questions asked of Fu:
  What is the influence on your business from stakeholders?
  How did you respond to stakeholder claims?
  Did you inform stakeholders as to your response, and if so, how did you communicate your response?

The second protocol guides the researcher to identify each issue, and the stakeholder actions that it provoked, and the action taken by Fu in response to the issue:

(1) What is the issue?
(2) What action did each stakeholder take regarding this issue?
(3) How did Fu respond to this issue?
(4) What was the result of Fu’s action?

Answers to these questions from the two protocols were quantified into levels of stakeholder action provoked by the issues, levels of managerial action taken by Fu in response to the
issues, and the levels of informational content of issues that Fu provided to stakeholders. This quantification is described in the next section.

6.4.2 Quantification of the Issue-Provoked Actions of Stakeholders

Investigation of the Exxon case required the quantification of qualitative data into ordinal levels representing the significance of each issue to stakeholders, and the materiality of each issue to the firm. Similarly, the levels of significance and materiality of issues to stakeholders and the Fu farm are assigned by means of the same process of converting qualitative data into ordinal levels. Table 6.1 shows categories of possible actions of each stakeholder.

Table 6.1: Quantification of Stakeholder Action Levels

<table>
<thead>
<tr>
<th>Significance to stakeholders</th>
<th>Action level</th>
<th>Value</th>
<th>Neighbors (S1)</th>
<th>Village council (S2)</th>
<th>Traders (S3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insignificant</td>
<td>Weak</td>
<td>1</td>
<td>Indifference; inaction; tell Fu that they are aware of issue; tell Fu that the issue could be a potential problem.</td>
<td>Indifference; observe issue but take no action.</td>
<td>Inaction; discuss the issue with Fu.</td>
</tr>
<tr>
<td>Moderately significant</td>
<td>Moderate</td>
<td>2</td>
<td>Warn Fu that issue needs to be resolved; Criticize Fu for not resolving issue.</td>
<td>Council officer: gives oral warning to Fu to fix the problem; identifies potential risk; or criticizes inadequate response.</td>
<td>Identify potential for product quality problem; criticize production conditions.</td>
</tr>
<tr>
<td>Highly significant</td>
<td>Strong</td>
<td>3</td>
<td>Advise Fu that they will take action against his interest; claim significant compensation from Fu.</td>
<td>Official notice of damage of public interest announced in local media. Council imposes a fine or defines action required by Fu.</td>
<td>Boycott by traders of Fu’s produce; discontinue the trade partnership.</td>
</tr>
</tbody>
</table>
6.4.3 Quantification of the Firm’s Managerial Action

The materiality of an issue can be viewed from either a managerial or reporting (informational) perspective (AccountAbility, 2006; 2008; Murninghan, 2013). In this section, criteria are established for measuring the materiality of a sustainability issue in the Fu farm case from a managerial perspective. Materiality from an informational perspective is addressed in Section 6.4.4.

Table 6.2 shows four different levels of materiality for this case referring to the levels of action taken by Fu in response to stakeholder claims (AccountAbility, 2008; GRI G3, 2000-2011; GRI G4, 2013). The four different levels of action are distinguished using three criteria of cost, time taken by Fu to respond to the issue, and social engagement with stakeholders or social network members who can assist with the management of the issue. This approach to quantification is consistent with Jeffries’ (1981) reference to materiality as an index of time taken or trouble caused to the firm to resolve the issue.

Table 6.2: Fu’s Response to the Issue

<table>
<thead>
<tr>
<th>Ordinal value</th>
<th>Fu’s action to resolve issue</th>
<th>Description of managerial action by Fu in response to stakeholder claims</th>
<th>Level of expertise employed to solve issue (main indicator)</th>
<th>Cost by Fu</th>
<th>Time taken to fix issue by Fu</th>
<th>Materiality (managerial action)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>slight</td>
<td>No external advice required</td>
<td>Less than 16 RMB</td>
<td>Less than 1 hour of labour</td>
<td>Immaterial</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>small</td>
<td>Useful advice. Fu seeks useful opinion from stakeholders or his friends in the village.</td>
<td>From 16 to 160 RMB</td>
<td>From 1 to 10 hours of labour</td>
<td>Marginally material</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>medium</td>
<td>Consultation. Consulted stakeholders (especially traders, council officers and village elders) for advice on designing the solution.</td>
<td>From 160 to 800 RMB</td>
<td>From 10 to 50 hours of labour</td>
<td>Moderately material</td>
<td></td>
</tr>
</tbody>
</table>
The level of expertise employed by Fu to solve the issue is a key indicator of the materiality of issues. Fu claimed he was a ‘new hand’ who lacked sufficient experience in dealing with many issues in the aquatic and livestock businesses. Hence, discussions or consultation with stakeholders and experts were the major source of finding solutions to issues raised by stakeholders. Fu commented that, “In this village, money doesn’t mean anything. The social relationship is often far more important than money. If you possess a strong relationship network, nothing would be difficult for you”.

The resources consumed by employing external expertise are reflected in the hours taken and cost estimates provided in Table 6.2. In this village, Fu advises that one hour of labour is costed at 16 RMB. The cost of Fu’s own labour is calculated as the estimated number of labour hours expended by Fu multiplied by the notional labour cost per hour of 16 RMB:

- **No external advice required.** If an issue were trivial, Fu would fix it within a time of “preparing a cup of herb tea” (about one hour of Fu’s time).

- **Useful advice.** The second level of managerial action taken by Fu concerned seeking advice from stakeholders or friends regarding the solution. Fu said that the advice was sometimes useful but of limited value. This action level involved labour time of less than 10 hours of Fu’s time to solve the issue.

- **Consultation.** The third level of managerial action taken by Fu concerned the consultation of stakeholders, especially traders, senior council officers, or elder villagers with experience of similar issues. Fu, in some cases, invited them for dinner or gave them gifts. This level of action was estimated by Fu to involve less than 50 hours of personal labour in response to this issue.

- **Expertise.** The highest level of managerial action taken by Fu required expert help from outside the village. Fu drew on his social network or contacted experts

| 4 | high | **Expertise.** Use contacts within social network or city experts to manage issue. | More than 800 RMB | More than 50 hours of labour | Significant-ly material |

The level of expertise employed by Fu to solve the issue is a key indicator of the materiality of issues. Fu claimed he was a ‘new hand’ who lacked sufficient experience in dealing with many issues in the aquatic and livestock businesses. Hence, discussions or consultation with stakeholders and experts were the major source of finding solutions to issues raised by stakeholders. Fu commented that, “In this village, money doesn’t mean anything. The social relationship is often far more important than money. If you possess a strong relationship network, nothing would be difficult for you”.

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- **Expertise.** The highest level of managerial action taken by Fu required expert help from outside the village. Fu drew on his social network or contacted experts
from the town or city such as veterinarians, chemists, engineers or electrical technicians to come to the farm to manage the issue. Sometimes the action involved significant engagement from stakeholders. This level of action was estimated by Fu to involve more than 50 hours of personal labour.

Fu’s managerial action level was determined by whichever is the greater, the notional cost of Fu’s own labour, or the actual cost of employing the external consultant or expert.

6.4.4 Informational Levels of Informal Reporting Practices in this Setting

The materiality of sustainability issues has been defined in the sustainability accounting literature from both a managerial and a reporting perspective. That is, the application of materiality concerns both the prioritization of issues communicated to stakeholders in the sustainability reports (AccountAbility, 2008; GRI G3, 2000-2011; GRI G4, 2013; Zadek & Merme, 2003), as well as managerial actions taken in response to issues that they assess as significant to stakeholders and the firm (AccountAbility 2006; 2008; KPMG, 2014; Murninghan, 2013). In Chapter 4, a justification was provided for the reciprocal relationship between informational priority and managerial priority from an accountability perspective with respect to the extent to which an issue that matters to the firm is reflected at either the managerial or informational level. The materiality level of an issue is similar when assessed from either a managerial or informational perspective, as was confirmed empirically in the Exxon case.

A problem in determining materiality of sustainability issues in the Fu farm lay in reporting priority. The levels of managerial action in response to issues were assessed based on the criteria of time, cost and resources expended. However, the level of information provided to stakeholders was difficult to define clearly, given the absence of formal reports in this business setting. As the accounting literature focuses on materiality within a formal report setting without addressing the role of informal reporting practices, materiality in the informal report setting of the Fu farm is discussed in Sections 6.7.2 to 6.7.6. This show sthe connection between the managerial priority and the reporting priority of sustainability issues.

**Informational levels and informal reports**

The informational content of each informal reporting practice in each of the 18 issues was
assessed at either a low, medium or a high level based on the effort taken by Fu to interact with stakeholders orally, or by enhancing the direct vision of his actions.

The three informational levels are:

- **Low** – minimal effort taken by Fu to inform stakeholders
- **Medium** – some effort taken by Fu to inform stakeholders
- **High** – significant effort taken by Fu to engage in informing stakeholders

The assessment criteria of the informational content of communication between the firm (the Fu farm) and the three stakeholders were based on an *informal account* prepared for each issue. The informal account consists of two major forms of practices engaged in by Fu to communicate with stakeholders, categorized as ‘direct vision’ and ‘verbal interaction’.

**Informal account (I): Direct vision**

Direct vision means the action taken by Fu is visible to stakeholders. Direct vision was the main account-giving method in the Fu farm, as indicated by Fu in the comment: “An action is more than ten thousand words ... they (stakeholders) would know everything occurred in my farm even if I were mute. But if I talked with them, they would catch it better”.

The assessment of informational content of the informal reporting practices where Fu provided information to stakeholders requires an analysis of the direct vision for each issue. Direct vision could be a passive activity where Fu did not attempt to enhance the visibility of his actions, or an active process where Fu deliberately engaged in behaviour aimed at increasing the visibility and intensity of his action to stakeholders concerning the issues and the responsive action.

Table 6.3 shows Fu’s actions relating to direct vision, categorized as passive, active or energetic. This categorization corresponds to the three informational levels of low, medium or high.
Table 6.3: Three Methods of Direct Vision

<table>
<thead>
<tr>
<th>Direct vision methods</th>
<th>Description</th>
<th>Reference to levels of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive</td>
<td>Fu does not attempt to enhance the visibility of his actions.</td>
<td>Low</td>
</tr>
<tr>
<td>Active</td>
<td>Fu deliberately engages in behaviour to increase the visibility of his action.</td>
<td>Medium</td>
</tr>
<tr>
<td>Energetic</td>
<td>Fu deliberately engages in behaviour to increase the visibility and intensity of his action to impress stakeholders.</td>
<td>High</td>
</tr>
</tbody>
</table>

Informal Account (II): Verbal interaction

Apart from direct vision, Fu also interacts with stakeholders by verbal methods including casual conversations, purposeful justifications, and extensive communications. One method is extensive communication that, given the time, effort and resource expended, is regarded as being of high informational content. Purposeful justification is also another method of verbal interaction practice that involves time and consideration before communication with stakeholders. A purposeful justification is regarded as having more informational content than the casual conversation method.

Table 6.3 shows these categorized verbal interaction practices.

Table 6.4: Types of Informal Reporting Practices in the Fu Farm Case

<table>
<thead>
<tr>
<th>Verbal interaction method</th>
<th>Descriptions</th>
<th>Reference to levels of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual conversation</td>
<td>Fu meets with stakeholders informally and unplanned. They may talk about a range of topics, but which includes the specific issue of concern to stakeholder(s).</td>
<td>Low</td>
</tr>
<tr>
<td>Purposeful</td>
<td>This is where Fu provides an explanation to stakeholder(s) of the specific issue of concern, by phone.</td>
<td>Medium</td>
</tr>
</tbody>
</table>
### Assessment criteria for informal reporting practices in the Fu farm case

The informal practices of one issue includes an array of informal reporting methods from direct vision and verbal interaction. For example, an issue may provoke three reporting methods including energetic vision, extensive communication and purposeful justification. Another array of passive vision and casual conversation may fall in the informal account of another issue.

The rationale for the assessment of informal reporting practices is as following:

- If an issue provokes either energetic vision or extensive communication, Fu demonstrates his extensive efforts in stakeholder communications, thus indicating a high informational content level for this issue.

- Where neither energetic vision nor extensive communication is provoked, but either active vision or purposeful justification is involved in Fu’s response to an issue, the informal account should be classified as being at a medium level.

- If only passive vision or/and casual conversation is taken on an issue, minimal efforts taken by Fu are shown in stakeholder communication, and then a low level of informational content is allocated to the informal account relating to this issue.
6.5 Sustainability Issues Identified from the Field Study

Eighteen issues were identified from the field study. Table 6.5 shows the categorization of these issues into 6 sustainability performance themes:

Table 6.5: Summary of the Six Sustainability Themes and 18 Issues

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pig waste management</td>
<td>The firm discharges pig waste, which contaminated the adjacent land and village rice field irrigation system. The three issues differ based on the amount of pig waste discharged at different stages during the growth of the pig livestock business.</td>
</tr>
<tr>
<td>2 Pond waste management</td>
<td>Maintaining the hygiene of the pond requires regular extraction of fish faeces sunk into the pond. The three issues relate to the different methods of discharging pond waste.</td>
</tr>
<tr>
<td>3 Safety management</td>
<td>The three issues concern the slope of the pond wall and adjacent walking path and the associated risk for villagers and workers.</td>
</tr>
<tr>
<td>4 Water management</td>
<td>Three issues emerged concerning pond water cleaning and replacement.</td>
</tr>
<tr>
<td>5 Food quality (fish)</td>
<td>The ecological condition of the pond significantly influences the health of the fish. Three issues are identified relevant to problems and solutions concerning the health of the fish.</td>
</tr>
<tr>
<td>6 Food quality (meat)</td>
<td>The three issues are associated with different sources of risk that threaten the health of pigs, and result in different actions taken by traders to exert pressure on the firm.</td>
</tr>
</tbody>
</table>

Sections 6.5.1 through to 6.5.6 describe and analyse the 18 issues summarized in Table 6.5.
6.5.1 Sustainability Theme 1: Pig Waste Management

Pig waste refers to the excrement and urine of the pigs. Maintaining the hygienic conditions of the pig house requires prompt and complete discharge of the pig waste.

### Issue 1.1 Low-level discharge of pig waste

**Duration of issue:** Feb to May 2012  
**Data sources:** Interviews with Fu

This issue occurred in the beginning stage of the livestock business, when the firm had one sow and 12 piglets. Pig waste was discharged into a neighbouring deserted rice field owned by a villager who had migrated to the town. This deserted land is connected with other rice fields that share a common irrigation system. Some of the pig waste remains in the deserted field, some pig waste enters other farms through the irrigation system, and the remaining waste eventually enters the local river system. The environmental impact from the discharge of pig waste is soil and water contamination.

**Significance of the issue to stakeholders**

**S1: Neighbours**  
Both neighbours discussed this issue with Fu and concluded that the negative impact of the pig waste on rice fields was minimal. They cautioned Fu that the discharge of pig waste must be confined to the vacant land.  
These stakeholder actions are assessed as *weak* (value = 1).

**S2: Village council**  
There is no evidence of council action relevant to this issue.  
Action assessed as weak (value = 1).

**S3: Traders**  
There is no evidence of interest in this issue by traders as their focus is on the quality of the product.  
Action assessed as weak (value = 1).

The stakeholder action set is {1,1,1}

**Managerial action taken by the firm in response to the issue**

**Level of expertise: no external advice required**

Fu did not seek a solution to this issue. Fu continued to discharge pig waste into the vacant land, but advised the neighbours that he would control the situation, with no impact on their rice fields.

**Cost and time of labor: level 1**
No cost or labour of Fu was involved in solving this issue. 

**Firm action taken assessed as slight** (value = 1). 

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + CC

**Direct vision (passive)**

No additional action was taken by Fu to enhance the visibility of his action taken in response to stakeholders, thus suggesting passive direct vision communication.

**Causal conversion**

Fu discussed the issue with neighbours as they worked in their rice fields.

**Informational content of the informal account for this issue is assessed as low**

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### Issue 1.2 Increased pig waste

Duration of the issue: July to October 2012

Data sources: interview with Fu; direct observation; business records

Fu advised that, when the piglets were 3 months old, he decided to expand the pig farm by purchasing two breeding sows. The increased pig population caused a large increase in the amount of waste discharged so that pollution to the rice paddy and water system became significant.

**Significance of the issue to stakeholders**

**S1: Neighbours**

Both neighbours regarded the increased pollution as a threat to their rice paddies, and requested that the firm reduce the impact of pig waste on their farm. One neighbour visited Fu and communicated his level of concern with criticism and a verbal warning.

These actions are assessed as *moderate* (value = 2).

**S2: Village council**

No evidence is available that shows any involvement by the council in this issue. According to Fu, the council may have been aware of this issue, yet they would probably have regarded this as a conflict to be resolved between Fu and his two neighbours.

Action assessed as weak (value = 1).

**S3: Traders**

There is no evidence of interest in this issue by traders

Action assessed as weak (value = 1).

**The stakeholder action set is** {2,1,1}

**Managerial action taken by the firm in response to the issue**

**Level of expertise: useful advice**

Fu discussed the issue with several villagers. One villager advised that Fu might discharge the pig waste into the fish pond.
**Cost and time of labor: level 2**

Fu installed two new drain pipes to discharge half of the pig waste into the fish pond, and the other half to nearby vacant land. After being informed of this action, the neighbours ceased their criticism of Fu. This work cost 85RMB and required two hours for installation. Fu advised this action successfully appeased the neighbours’ concerns.

**Firm action taken assessed as small (value = 2).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV

**Direct vision (active)**

The new discharge pipe was shown to the stakeholders. Fu advised that he intentionally placed the larger pipe in a specific position above the pond, so that it was more visible to stakeholders.

**Informational content of the informal account for this issue is assessed as medium**

![Image 6.1 The two methods of discharging pig waste](image)

This photo shows the two drain pipes used to discharge pig waste. At the top of the image, the pipe discharging to the deserted land can be seen, and the second pipe discharges waste into the fish pond.

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**Issue 1.3 Increased discharge of waste**

Duration of the issue: Feb 2013 to May 2013

Data sources: interviews with Fu; business records; direct observation

The pig stock on the farm increased to 20 adult pigs and 10 piglets. The increased waste created substantial contamination of the deserted land and neighboring rice fields. Both neighbours urged Fu to resolve the pollution problem. The village council was concerned with the potential of the pollution to infect the village’s water system.

**Significance of the issue to stakeholders**

**S1: Neighbours**

Both neighbours requested Fu to stop discharging waste into the vacant land on account of the threat of pollution to their own fields. One neighbour threatened using mud or cement to block the discharge pipe.

Action assessed as strong (value = 3)

**S2: Village council**
The council informed Fu of possible damage to the entire village agricultural system owing to water system pollution from the pig waste. However, the extent of this damage was uncertain. The council advised Fu that he must fix this problem.

Action assessed as moderate (value = 2)

**S3: Traders**

The traders warned that the increased pig waste into the fish pond would reduce water quality and the eating quality of the fish, thus resulting in lower fish prices.

Action assessed as moderate (value = 2)

**The stakeholder action set is (3,2,2).**

**Managerial action taken by the firm in response to the issue**

**Level of expertise: expertise**

Fu acknowledged the seriousness of this issue and consulted the council. A senior council officer advised Fu to consider a biogas-filter system and he assisted Fu to gain access to an engineering team to install it. Fu employed the team of technicians to install a biogas-filter system to clean the wastewater before external discharge. This system turns pig waste into biogas used for lighting and cooking.

**Cost and time: Level 4.**

Fu did not resolve it with his own labour. But the cost of this system with professional installation was 8,000 RMB.

**Firm action taken assessed as strategic (value = 4).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + EC + PJ

**Direct vision (energetic)**

Stakeholders observed the installation (for one week) and clean water discharged from the new waste-filter system. Fu regarded this project a symbol of his farm’s contribution to maintaining the health of the village ecosystem.

**Extensive communications**

Fu invited 20 villagers to the farm and explained how the new filter system worked. He hosted a tea party on the farm inviting traders, council officers and the technician to celebrate the installation of the new filter system.

**Causal conversion**

Fu occasionally chatted with neighbours and villagers during the period of installation.

**Informational content of the informal account for this issue is assessed as high**
Image 6.2 Waste-filter system

The photo on the left shows the underground storage of the waste filter system. Before being discharged, the pig waste is accumulated here, most of which is turned into biogas.

The photo on the right shows the filter outlet system that discharges clean water. Native plant growth around the outlet indicates the minimal impact of waste water discharge from the filter system.\(^8\)

6.5.2 Sustainability Theme 2: Fish Pond Waste Management

Solid waste from the fish pond is caused by the accumulation of fish faeces on the bottom of the pond referred to as *pond mud*. Pond mud reduces water quality and causes fish disease. Fu regularly cleans the pond by extracting the pond mud using a tube powered by a pump. Three issues concerning the dumping of fish pond waste were identified.

Issue 2.1 Mud left on the surface of the bank

Duration of the issue: April to June 2011

Data sources: direct observation, interviews with Fu; business records

This issue occurred at the beginning stage of the aquatic business. Next to the large fish pond is marshland (refer Figure 6.1), with two earthen banks bordering the marshland: bank 1 between the marshland and rice fields; bank 2 between the marshland and the fish pond. The surface of bank 1 was smoother than bank 2, so Fu installed a discharge pipe across bank 1 to dump the pond waste into the marsh.

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\(^8\) These native plants shown in Image 6.2 cannot survive in soil contaminated by pig waste. The locals, including Fu, referred this pollution as ‘saltified soil’. That is, for native plants, pig waste is never a fertilizer, but a threat. However, some introduced plants such as water lettuce thrive in the saltified soil and strongly impact the local ecosystem.
Significance of the issue to stakeholders

S1: Neighbours
Bank 1 is an access path for the two neighbours to their rice fields. During the waste discharge process, some pond mud was left on the bank surface making the path slippery. The neighbours warned Fu that he must keep bank 1 clean and safe.
Action assessed as moderate (value = 2).

S2: Village council
There is no evidence of action taken by the council regarding this issue.
Action assessed as weak (value = 1).

S3: Traders
This issue was not considered relevant to traders.
Action assessed as weak (value = 1).

The stakeholder action set is \{2,1,1\}.

Managerial action taken by the firm in response to the issue

Level of expertise: no external advice required
Fu did not seek advice for this issue.

Cost and time: level 2
Fu spent 3 hours relocating the tube from bank 1 to bank 2. No concerns were raised by the neighbours concerning the discharge of fish pond waste after Fu took this action.
Firm action taken assessed as limited (value = 2).

Informal reporting practices taken by the firm in response to the issue
Informal reporting practices: DV
Direct vision (active)
Fu intentionally took action to relocate mud discharged at a time when neighbors worked in their rice fields, to ensure clear visibility of his action.
Informational content of the informal account for this issue is assessed as medium

Issue 2.2 Mud discharged to marshland

Duration of the issue: July to August 2011
Data sources: direct observation, interviews with Fu; business records
The accumulation of discharged pond mud resulted in an increase in the height of the marshland base. During heavy rain, the marsh water would rise and threaten to breach both banks.

Significance of the issue to stakeholders

S1: Neighbours
The neighbours warned Fu that the bank would become soft and unstable during rain.
Action assessed as moderate (value = 2).
**S2: Village council**

There is no evidence of action taken by the council regarding this issue.

Action assessed as weak (value = 1).

**S3: Traders**

During periods of rain, many small holes would emerge in the bank between the pond and marshland. According to the traders, these holes weaken the soil bank, thereby making it difficult for the trader’s harvest team to install the large net. The trader identified this potential problem would lead to increased costs of harvesting.

Action assessed as moderate (value = 2).

The stakeholder action set is {2,1,2}.

Managerial action taken by the firm in response to the issue

**Level of expertise: no external advice required**

Fu did not seek advice from others.

**Cost and time: level 3**

Fu spent three days (15 hours of work) to strengthen both banks with solid blocks and sand.

Firm action taken assessed as operative (value = 3).

Informal reporting practices taken by the firm in response to the issue

**Direct vision (active)**

Fu believed the action taken would attract the attention of his neighbours. In addition, Fu invited neighbours and traders to view this specific action.

**Purposeful justification**

Fu invited his neighbours and the traders to the bank and explained how the action taken would strengthen the bank.

Informational content of the informal account for this issue is assessed as medium

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*Image 6.3 The change in the marsh water level*

The image (6.3) shows the marsh base height increasing due to dumped pond mud, thereby
resulting in a higher water level during rainy periods. On account of water pressure from both sides on the top part of the bank, which is quite thin, temporary small holes are formed, thus resulting in looseness of the soil in the side where the net for harvest will be installed.

**Issue 2.3 Larger threat from dumped pond mud**

Duration of the issue: Feb to April 2012  
Data sources: interviews with Fu; business records

The continuous pond mud dumping activities significantly increased the height of the marshland base, thereby leading to increased water levels in the marshland during rain. This threatened to contaminate both the neighbours’ rice fields and Fu’s fish pond.

**Significance of the issue to stakeholders**

*S1: Neighbours*  
Two neighbours expressed concern that the high water level of the marshland in the rainy season would submerge bank 1 and wash the topsoil into their rice field. There was an additional concern that bank 1 would collapse and require rebuilding. These problems would lead to a claim for compensation for damages estimated at 1,100 RMB.  
Action assessed as strong (value = 3).

*S2: Council*  
There is no evidence of action taken by the council regarding this issue.  
Action assessed as weak (value = 1).

*S3: Traders*  
According to experienced farmers and the traders, there was a threat during the wet season that marshland water would rise above the bank, flow into the fish pond and reduce the strength of the bank (as per Image 6.4). The bank would become slippery and unstable, which creates the problems for the trader’s fish harvesting workers.  
Action assessed as strong (value = 2).  
**Stakeholder action set {3,1,2}.**

**Managerial action taken by the firm in response to the issue**

*Level of expertise: consultation*  
Fu consulted the council officers. He was advised to discharge waste to a place on the hill nearby (refer Figure 6.1 the map of the farm)

*Cost and time: level 4*
Fu stopped dumping waste mud into the marshland, and diverted the waste discharged to a hill near the village. This action cost 300 RMB, which was expended to rent trolleys to transfer the mud, and needed 60 hours of labour.

**Firm action taken assessed as strategic (value = 4).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + CC

*Direct vision (energetic)*

Fu deliberatively removed pond mud when traders regularly visited the farm and when neighbours worked at the rice fields. This action involved extensive labor, with Fu commenting, “I needed everyone to witness my sweat dropping on the earth, and they did.”

*Causal conversion*

Fu chatted with neighbours and traders about the issue.

**Informational content of the informal account for this issue is assessed as high**

![Diagram showing the change in water level and base after mud dumping](Image 6.4 Shaving the pond bank)

**6.5.3 Sustainability Theme 3: Safety Management**

As shown in the farm map (Figure 6.1), adjacent to the large fish pond is a walking path connecting the main village road. This path is used by villagers, and is also employed for fish harvesting activities. Using this path, the fish harvesting workers transport harvesting instruments including large nets and containers to the fish pond. They also transport fish to the truck for delivery via this pathway. Three issues were identified concerning the safety of the villagers and harvest workers.
**Issue 3.1 The slippery surface**

Duration of the issue: Feb 2011

Data source: interviews with Fu

The surface of the path near the big fish pond was wet and slippery owing to rain.

**Significance of the issue to stakeholders**

*S1: Neighbours*

This issue was not relevant to the two neighbours who do not use this path.

Action assessed as weak (value = 1).

*S2: Village council*

The council informed Fu that some villagers may be affected by the slippery path and hoped that Fu would improve the situation.

Action assessed as weak (value = 1).

*S3: Traders*

This issue did not relate to productivity or quality and did not involve traders.

Action assessed as weak (value = 1).

**Stakeholder action set {1,1,1}**.

**Managerial action taken by the firm in response to the issue**

*Level of expertise: no external advice required*

Fu did not contact any other for advice of solution.

*Cost and time: level 1*

Fu did not perceive any significant negative consequences from this issue so he spent 10 minutes adding dirt to the path surface to save face.

**Firm action taken assessed as slight (value = 1).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV

*Direct vision (passive)*

Fu regarded his action as a face-saving activity and a polite response to the council officer who identified the issue. Fu did not care whether this action was observed.

**Informational content of the informal account for this issue is assessed as low**
Issue 3.2 Unsafe fish pond bank

Duration of the issue: Feb to March 2011
Data source: interviews with Fu; direct observation

The large fish pond bank alongside the walking path is steep and slippery and potentially unsafe for villagers walking along the path who risk accidental falls into the fish pond during wet weather or at night.

**Significance of the issue to stakeholders**

**S1: Neighbours**
This issue was not relevant to the neighbours as they do not use this path.
Action assessed as weak (value = 1).

**S2: Village council**
The council expressed concern that rain could wash soil from the slope causing the path to collapse. Furthermore, they were concerned that villagers using the path could slip into the fish pond. The council criticized Fu and said that the safety problem was his responsibility to fix.
Action assessed as moderate (value = 2).

**S3: Traders**
This issue did not relate to traders.
Action assessed as weak (value = 1).

**Stakeholder action set {1,2,1}**.

**Managerial action taken by the firm in response to the issue**

**Level of expertise: no external advice required**
Fu did not contact others for the advice of this issue.

**Cost and time: level 2**
Fu planted grass and liana vine vegetables such as pumpkins to cover the surface of the slope. This action prevented the loss of soil from the slope during rain improving safety. The time of labour involved in this action was estimated as 3 hours, including 2 hours for planting and 1 hour for looking after these plants.

**Firm action taken assessed as limited (value = 2).**

**Informal reporting practices taken by the firm in response to the issue**
Informal reporting practices: DV

**Direct vision (passive)**
No action taken by Fu to enhance visibility of action taken.

**Informational content of the informal account for this issue is assessed as low**
Issue 3.3 Dangerous path condition

Duration the issue: March to April 2011
Data source: interviews with Fu; direct observation; business records

At one point where the large fish pond bank connects with the walking path, the bank was almost vertical and was dangerous for villagers using the path. This problem increased the difficulty of transporting harvest equipment along the path.

Significance of the issue to stakeholders

S1: Neighbours
This issue was not relevant to the neighbours as they do not use this path.
Action assessed as weak (value = 1).

S2: Village council
The council indicated the potential risk to villagers using the path, and delivered a warning to Fu to fix the problem.
Action assessed as moderate (value = 2).

S3: Traders
The traders noted that this vertical bank increased the difficulty and costs of harvest that would need to be reimbursed by Fu.
Action assessed as moderate (value = 2).

Stakeholder action set {1,2,2}

Managerial action taken by the firm in response to the issue

Level of expertise: consultation
He consulted about the issue with a trader and was advised that the construction of some concrete steps could address the safety problem. He also consulted a villager who once worked as a house builder with regard to how to construct the steps on the slope.

Cost and time: level 3
Fu constructed concrete steps at the vertical point in the fish pond bank. These steps are now
used to deliver harvest equipment and they mitigate the risk of accidental falls into the fish pond. This work cost Fu 300RMB and required 2 hours of labour.

**Firm action taken assessed as medium (value = 3).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + PJ + CC

**Direct vision (active)**

As both villagers and traders used the path, Fu knew that they would notice the improvement in the path’s condition. Fu advised that he installed white concrete steps that were distinct from the yellow bank to increase visibility to stakeholders.

**Purposeful justification**

Fu invited the traders and council officers to the site and explained how these steps addressed safety concerns.

**Causal conversion**

Fu chatted with neighbours and some villagers about the issue.

**Informational content of the informal account for this issue is assessed as medium**

![Image 6.6 Concrete steps](image)

The concrete steps were built at the vertical danger point on the fish pond slope to enhance safety and enable harvesting.

6.5.4 Sustainability theme 4: Water management

The firm has to clean the pond water by discharging dirty water and replacing with clean fresh water supplied by a well owned by Fu. The discharged pond water is pumped from the pond via a tube into the rice field irrigation system, with some subsequent flows into the local river. This theme involves three issues relevant to water replacement.
**Issue 4.1 Standard cleaning process**

Duration of the issue: weekly replacement from Feb 2011

Data source: interviews with Fu; Direct observation

The quality of water in both fish ponds reduces as the fish grow. Each week, Fu replaces an estimated 3% of the pond water.

**Significance of the issue to stakeholders**

**S1: Neighbours**

Both neighbours warned Fu of the risk of inundation of sections of the rice fields owing to this water discharge, which especially during the seedling stage could result in rice plants being washed away.

Action assessed as moderate (value = 2).

**S2: Village council**

There is no evidence of action taken by the council regarding this issue.

Action assessed as weak (value = 1).

**S3: Traders**

This issue is not considered relevant to the quality of the fish product and is therefore of no interest to traders.

Action assessed as weak (value = 1).

**Stakeholder action set {2,1,1}**.

**Managerial action taken by the firm in response to the issue**

**Level of expertise: no external advice required**

Fu did not contact others for advice on the action.

**Cost and time: level 2**

Fu justified his actions by explaining that he would discharge pond water to the main water system via a longer pipe rather than into the field ditches during the seedling stage. In addition, he slowed down the water discharge speed by adjusting the pump speed. The neighbours accepted this action. This action required extra labour of three hours to adjust the pump and observe the water flow.

**Firm action taken assessed as limited (value = 2).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + PJ + CC

**Direct vision (active)**

The neighbours observed the new discharge method and noticed no inundation occurred.

**Purposeful justification**

Fu invited neighbours to view the relocation of the water discharge pipe and explained its operation.
Causal conversion
Fu chatted with neighbours about the issue.
Informational content of the informal account for this issue is assessed as medium

Issue 4.2 Prevention of fish disease

Duration of the issue: April 2011
Data source: interviews with Fu
When fish disease occurs, Fu replaces the entire water in both ponds within one week.

Significance of the issue to stakeholders

S1: Neighbours
The neighbours strongly disagreed with the emission of large amounts of pond water into the rice field irrigation system as soil would be washed away and their rice plants damaged. If this issue continued, they said they would claim compensation from Fu.
Action assessed as moderate (value = 2).

S2: Village council
The village council assessed two aspects of this issue as relevant to the public interest. First, the amount of water released into the water system would flow into the rice fields of not only the two neighbours but also those of other villagers. Second, some villagers were concerned that the quality of pond water infected by fish disease would contaminate their soils and plants.
Action assessed as moderate (value = 2).

S3: Traders
This issue was regasded as irrelevant to traders.
Action assessed as weak (value = 1).

Stakeholder action set \{2,2,1\}.

Managerial action taken by the firm in response to the issue

Level of expertise: consultation
Fu consulted some villagers on solution. They studied the geographical characteristics of the hill opposite the pig house and rice fields (as shown in Figure 6.1) and the village road, and advised Fu to install a new water discharge system. Using a long pipe across the road, the water was discharged to the hill and absorbed by the hill soil, without any significant impact on rice fields of neighbours or villagers.

Cost and time: level 3
Fu and his family worked for 12 hours to install this new system.
Firm action taken assessed as operative (value = 3).

Informal reporting practices taken by the firm in response to the issue
Informal reporting practices: DV + EC + PJ

**Direct vision (energetic)**
Fu invited council officers to the site and demonstrated the new water discharge method.

**Extensive communication**
This solution involved in-depth dialogues with the council officers and some villagers on the possible effects of this new water discharge on the hill and road.

**Purposeful justification**
Fu invited council officers to the site and justified the new method.

**Informational content of the informal account for this issue is assessed as high**

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**Issue 4.3 Cleaning the large fish pond before harvesting**

Duration of the issue: biannual harvests from Oct 2011

Data source: interview with Fu; business records; direct observation

Before the harvesting of mature fish, most of the pond water must be released within several hours to confine all fish within a small area. This volume of water is beyond the carrying capacity of the village’s agricultural water system. Even discharged into the hill, this water would wash soil and rocks down the hill, thus blocking paths and the main village road beneath the hill. As the neighbours’ rice fields are at the foot of the hill, falling mud, dirt and rocks could damage their crops and land.

**Significance of the issue to stakeholders**

**S1: Neighbours**
The neighbours strongly disagreed with the emission of large amounts of pond water into their rice field irrigation system, for they believed that it would wash away soil and submerge plants. If this occurred, they would claim compensation from Fu, which would be a significant amount.

Action assessed as strong (value = 3).

**S2: Village council**
The village council officer told Fu this issue was contrary to the public interest, and informed him of the negative consequences of inappropriate water discharge. He stated that Fu would also face serious punishment, including clean-up of damage and payment of compensation to villagers.

Action assessed as strong (value = 3).

**S3: Traders**
This issue was regarded as irrelevant to the traders.

Action assessed as weak (value = 1).

**Stakeholder action set** {3,3,1}.

**Managerial action taken by the firm in response to the issue**

**Level of expertise: expertise**
Fu consulted one trader regarding how other farmers discharge water during harvest time. The trader advised about a new method of water release using a pump and long pipe to discharge the pond water to the nearby river. In doing this, Fu needed a pipe professional in another town to design and complete the construction.

Cost and time spent by Fu: level 4
The cost of the pipe and pump was 1000 RMB, and this work required 20 hours of labour. The stakeholders have not shown any concern regarding this issue since this new discharge method was established.

Firm action taken assessed as strategic (value = 4).

Informal reporting practices taken by the firm in response to the issue

Direct vision (energetic)
The installed pipe was so long and the installation so complex that the new water discharge system was distinctly visible to the entire village during harvesting. Fu regarded this action as an iconic image of the farm, thereby emphasizing his contribution to the village.

Purposeful justification
Fu visited the neighbours’ homes to justify his plan before the action.

Informational content of the informal account for this issue is assessed as high

6.5.5 Sustainability theme 5: Pond ecosystem management

The fish were classified into three size categories prior to sale

- Large fish, where each fish weighs more than 0.5 kilograms and attracts a price of 10.6 RMB per kg.
- Medium fish, where each fish weighs between 0.3 to 0.5 kg kilograms and attracts a price of 8.6 RMB per kg.
- Small fish, where each fish weighs less than 0.3 kg kilograms and attracts a price of 3.2 RMB per kg.
- Traders refuse to buy dead fish.

The small size and death of fish is caused by either low-quality pond water or disease.
**Issue 5.1 Inactive fish**

Duration of the issue: Feb 2012  
Data source: interviews with Fu; business records  
This issue occurred at the beginning stage of the aquatic business. Fu found that some fish were so inactive that a large portion of forage remained uneaten. Fu understood that this situation was due to unclean pond water, as the regular water replacement (issue 4.1) was insufficient.

**Significance of the issue to stakeholders**

**S1: Neighbours**  
This issue is irrelevant to the neighbours.  
Action assessed as weak (value = 1).

**S2: Village council**  
This issue is irrelevant to public interest and hence the council.  
Action assessed as weak (value = 1).

**S3: Traders**  
Inactive fish signalled the problem of fish disease, thereby leading to small fish and a reduced price from the traders.  
Action assessed as moderate (value = 2).

**Stakeholder action set** \{1,1,2\}.

**Managerial action taken by the firm in response to the issue**

**Level of expertise: Consultation**  
Fu consulted the traders and was advised to use a chemical water cleaning treatment for this situation.

**Cost and time spent by Fu: level 2**  
Fu purchased chemical water cleaning treatments and used them in the pond. The situation improved and the fish increased their consumption of forage. The cost of this action included 80 RMB for chemicals and 4 hours travelling to the city to purchase the product.

**Firm action taken assessed as operative (value = 3).**

**Informal reporting practices taken by the firm in response to the issue**

**Direct vision (active)**  
Fu invited traders to the farm to observe the improved health and eating habits of fish.

**Purposeful justification**  
Fu informed traders by phone regarding the method that he used to fix this problem.

**Informational content of the informal account for this issue is assessed as medium.**

210
**Issue 5.2 Pond oxygen deficiency**

Duration of the issue: April 2012

Data source: interview with Fu; business records; direct observation

This issue occurred two months after issue 5.1. Fu noticed that a lot of fish were inactive during feeding time, and a few dead fish floated to the surface of the pond. Fu was advised that this situation indicated a lack of pond water oxygen owing to the fish density in the pond. This problem would worsen as the fish grow as they require more oxygen. Fu acknowledged that using chemicals as in Issue 5.1 did not resolve this new issue.

**Significance of the issue to stakeholders**

**S1: Neighbours**

The neighbours observed the dead fish floating on the surface of the fish pond; they showed concern, but no action was taken.

Action assessed as moderate (value = 1).

**S2: Village council**

This issue is irrelevant to public interest and hence the council.

Action assessed as weak (value = 1).

**S3: Traders**

Insufficient oxygen in the pond would lead to unhealthy small fish and the trader showed concern and suggested a substantial reduction in payment.

Action assessed as moderate (value = 3).

**Stakeholder action set {1,1,3}**

**Managerial action taken by the firm in response to the issue**

**Level of expertise: expertise**

Following the advice of one trader, Fu bought an oxygen machine and employed two technicians to install it, which was a complex undertaking solution. This involved special modification of the cabling for the electricity, and a special custom design to stabilize the machine above the pond surface. Fu learnt how to operate and maintain this machine from the technicians over three days.

**Cost and time spent by Fu: level 3**

The cost of the machine and installation was 750 RMB. The pond ecosystem was revived, increasing water quality and improving both productivity and quality of fish alleviating the traders’ concerns.

Firm action taken assessed as operative (value = 4).

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + PJ + CC

**Direct vision (energetic)**
Fu intentionally located the oxygen machine at the center of the pond, so that it was directly visible and obvious to stakeholders. Fu impressed traders with the substantial improvement in the health of fish health and pond ecosystem.

**Purposeful justification**
Fu invited the traders to the farm, and introduced the oxygen machine and its contribution to the fish health.

**Casual Conversation**
Fu chatted with neighbours and some villagers about this machine, which some of them had never seen before.

**Informational content of the informal account for this issue is assessed as high**

**Image 6.7 Oxygen machine**
The oxygen machine is located in the center of the pond. No floating dead fish have been observed since installation. The installation of this machine involved complex techniques.

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**Issue 5.3 Fish disease outbreak**

Duration of the issue: July to Dec 2012
Data source: interviews with Fu; business records

Some aquatic farmers from neighbouring towns suffered an outbreak of fish disease, which caused the sickness of an entire population of fish in a pond. The fish disease also threatens biodiversity within the rice field ecosystem. Wild fish and frogs that grow in the shallow water of the rice fields provide food and are hunted by the neighbours and villagers. Villagers believed that this food source was being impacted by the health of Fu’s fish pond owing to the regular discharge of pond water into the rice field irrigation system.

**Significance of the issue to stakeholders**

**S1: Neighbours**
This issue impacted on the rice fields of both the neighbours and villagers, who worried that their rice paddy fish would be infected by the fish pond disease. Compensation would be low as this was not an important food source.

Action assessed as moderate (value = 2).

**S2: Village council**
The council showed concern regarding this issue and requested that Fu control and prevent the disease, which might impact the ecosystem of the village rice fields.

Action assessed as moderate (value = 2).

**S3: Traders**

The trader would refuse to trade with Fu if the fish disease occurred, as Fu must guarantee the quality of fish sold to his customers.

Action assessed as strong (value = 3).

**Stakeholder action set {2,2,3}**.

**Managerial action taken by the firm in response to the issue**

**Level of expertise: expertise**

In light of the consultation provided by one trader, Fu attended a special lesson organized by aquatic experts in the town. To prevent disease outbreaks, one effective way is to increase pond diversity. Fu adopted this method and increased the diversity of fish species in the pond, thereby reducing his potential for profit, as some high-price fish were replaced with low-price or unsalable fish. But the health of the pond ecosystem was enhanced.

**Cost and time spent by Fu: level 4**

The diversity method would require significant extra work and a reduction of profit of approximately 3,000 RMB.

**Firm action taken assessed as high (value = 4).**

**Informal reporting practices taken by the firm in response to the issue**

Informal reporting practices: DV + EC + PJ

**Direct vision (energetic)**

During the regular visits by traders, Fu spent considerable time catching sample fish of each species to confirm their health. Fu invited the neighbours and council officers to the farm to show the different fish species and the clean pond environment.

**Extensive communication**

Fu spent one month resolving the issue. During this period, Fu frequently communicated with the traders on the ecological situation of the pond.

**Purposeful justification**

Fu invited the neighbours and council officers to the farm and demonstrated how the diversity of fish species effectively protects the pond from disease and hence contributes to the rice field ecosystem.

**Informational content of the informal account for this issue is assessed as high**
6.5.6 Sustainability Theme 6: Livestock Health Management

After the pigs are sold, traders keep the pigs in their own pig pens for several days, before delivering the pigs to the meat factories and restaurants in the city. Some pigs may die in the traders’ pens or during transport. Traders bear the full responsibility of any loss once the pig leaves the farm. Hence, traders carefully examine the health conditions of the pigs before purchasing them.

**Issue 6.1 Harmful insects**

Duration of the issue: every summer since 2012
Data source: interviews with Fu; direct observation
In summer, mosquitoes and other harmful insects infest pigs reducing their growth.

**Significance of the issue to stakeholders**

**S1: Neighbours**

There is no evidence suggesting that this issue is relevant to neighbours.
Action assessed as weak (value = 1).

**S2: Village council**

This issue is irrelevant to public interest and hence the council.
Action assessed as weak (value = 1).

**S3: Traders**

Traders paid less for inactive pigs owing to concern that these pigs were or would become sick and therefore die during the long delivery journey.
Action assessed as moderate (value = 2).

**Stakeholder action set {1,1,2}.

Managerial action taken by the firm in response to the issue**

**Level of expertise: consultation**

Fu consulted an old villager on a local traditional method to repel mosquitoes and harmful flies by using a local herb that grows in the nearby forest. The old villager educated Fu how to identify, collect, store, and use this herb.

**Cost and time: level 2**

Fu and his family collected this special species of herb. They burnt the herb near the pig house, so that the smoke repelled insects. Fu also located dry herbs in front of the pig house door and windows. The estimated time for this action was 3 hours.

Firm action taken assessed as operative (value = 3).

**Informal reporting practices taken by the firm in response to the issue**
Informal reporting practices: DV + PJ + CC

**Direct vision (active)**

Fu deliberately placed the herbal solution on the pig house door, even though placing it inside the pig house would have the same effect of repelling insects, as this would enhance the ability of the traders to see the solution. Fu showed the traders that no harmful insects were found in the pig house now that his solution had been implemented.

**Purposeful justification**

Fu reported his action to the traders when they visited the farm.

**Casual conversion**

Fu chatted with some villagers about the issue, who observed the smoke when the herb was burnt.

**Informational content of the informal account for this issue is assessed as medium**

![Image 6.8 Herbs for repelling insects](Image 6.8 Herbs for repelling insects)

The picture shows the herbs hanging on the pig house door to repel insects.

---

**Issue 6.2 Pig sickness**

Duration of the issue: Dec. 2012

Data source: interviews with Fu; direct observation; business records

Common pig illnesses include indigestion and influenza.

**Significance of the issue to stakeholders**

**S1: Neighbours**

There is no evidence suggesting that this issue is relevant to the neighbours.

Action assessed as weak (value = 1).

**S2: Village council**

This issue is irrelevant to public interest and hence the council.

Action assessed as weak (value = 1).

**S3: Traders**

Traders refuse to purchase sick pigs but do purchase healthy pigs from the same pig house, but require extra health examinations and isolation from other pigs. The extra costs are borne by Fu.
Action assessed as moderate (value = 2).

**Stakeholder action set** {1,1, 2}.

**Managerial action taken by the firm in response to the issue**

*Level of expertise: consultation*

Fu consulted one villager who once experienced pig sickness in his farm, and was advised that isolative measures and extra care for sick pigs were necessary. This villager also recommended a medicine for the sick pigs.

*Cost and time: level 3*

Fu’s family isolated the sick pigs, and spent several days caring for these pigs, including cleaning the pigs and feeding them specific food. Fu also spent one-day travelling to the town centre to buy medicine. The entire action was estimated at taking 36 hours (6 hours for travel for the medicine, 30 hours for caring).

**Firm action taken assessed as operative (value = 3).**

*Informal reporting practices taken by the firm in response to the issue*

Informal reporting practices: DV + PJ

*Direct vision (active)*

Fu showed the traders the extra care given to sick pigs, the health of other pigs, and the hygienic state of the pig house.

*Purposeful justification*

Fu made phone calls to traders to report the recovery of the sick pigs.

**Informational content of the informal account for this issue is assessed as medium**

---

**Issue 6.3 The pig plague**

Duration of the issue: March 2013

Data source: interviews with Fu; business record

The pig plague (such as swine fever) struck the pig house. Six pigs suffered this illness and risked death if no appropriate treatments were taken. The whole pig farm was under threat from the plague.

**Significance of the issue to stakeholders**

*S1: Neighbours*

There is no evidence suggesting that this issue is relevant to neighbours.

Action assessed as weak (value = 1).

*S2: Village council*

This issue is irrelevant to public interest and hence the council.

Action assessed as weak (value = 1).
S3: Traders
If the situation continued to worsen, the trader would refuse to purchase any pig from the Fu farm.
Action assessed as strong (value = 3).
Stakeholder action set \{1,1,3\}.
Managerial action taken by the firm in response to the issue
Level of expertise: expertise
One specialist vet from the city was invited to the Fu farm to assist in treating the disease. The action taken by Fu in response to this issue was in accordance with the advice provided by the vet.
Cost and time: level 4
The whole family spent considerable time keeping the pigs clean. The family established a temporary pen for sick pigs with extra care being provided for them. This work lasted for more than two weeks. The cost of action was estimated to be 1200 RMB and required 70 hours of labour. Fu also paid for the specialist vet.
Firm action taken assessed as strategic (value = 4).
Informal reporting practices taken by the firm in response to the issue
Informal reporting practices: DV + EC
Direct vision (energetic)
Fu invited the traders and some villagers to the farm to show them the recovery of the pig population. Fu described this action as “energy of nine bulls and two tigers” (a Cantonese saying meaning great effort), and rated the action as “a reconstruction of the building from the debris”. This was part of the triumphant image he intended to create for stakeholders.
Extensive communication
Fu invited the traders, the vet, and some villagers to a dinner on his farm to express appreciation of the vet’s effort. Fu also conducted a ritual in the village temple to celebrate his success at repelling the livestock disease. Fu regarded this as one of the biggest issues in the farm’s history and worthy of formal celebration to rebuild the trust of the stakeholders.
Informational content of the informal account for this issue is assessed as high

6.6 Empirical Illustration of the HSM Structure
In this section, the empirical illustration of the HSM structure in the Fu farm case setting is completed by drawing on the 18 issues presented in Section 6.5. Both this case and the previous Exxon case support the claims that the HSM structure endures in different closure
settings and underlies materiality practices in varying contexts. The following confirmation of the HSM structure demonstrates how the 18 issues are explained systematically by this HSM mechanism. Figure 6.2 illustrates the HSM structure in the Fu farm case.

**Figure 6.2: HSM Structure in the Fu Farm Case**

The HSM structure in the Fu farm case setting consists of three stakeholders, an issue, and an account of the issue described by the following five steps:

1. an issue impacts three different stakeholders;
2. each stakeholder perceives the influence of the issue and takes a different action so as to influence Fu to protect their specific interest;
3. Fu feels the pressure from each stakeholder, and takes action in response to address the claims of the three stakeholders;
4. Fu provides an account of his action in response to the issue to the stakeholders;
5. The stakeholders assess Fu’s account and consider whether the issue is resolved or not.

Only under the condition of transparency, are Steps 2 and 3 in Figure 6.2 activated, where the stakeholders are able to perceive the issue and assess the firm’s action in response to stakeholder pressure, rather than relying solely on the firm’s self-generated accounting reports, which may not accurately disclose the issue or action taken by the firm.
In Section 6.6.1, how the Fu farm case setting achieves this transparency condition and how the five step materiality process is realized are explained.

6.6.1 The Transparency Condition

The Fu farm case setting presents a special form of the transparency condition that enables the HSM structure, as the firm and actions taken by the firm are clearly visible to each of the stakeholders (Gray, 1992; Osborne, 2004; Robert, 2009). This direct visibility is the main account-giving method that is naturally embodied in the Fu farm case system. This enabled each of the three stakeholders to observe the occurrence of each issue as well as the action taken by the firm in response to stakeholder pressure, which exerts further pressure on the firm to provide an account of its actions.

The following statement by Fu describes this condition of transparency:

“This village is so small that villagers know immediately what occurs. What I have done and what I am doing can never escape from their eyes. They recognize even a movement of grass in the breeze*”.

* A Cantonese saying meaning even the slightest activities can be sensed.

The direct vision of the neighbours and the village council is shown in Themes 1, 2 and 4 and presented in Section 6.5, where it was seen that the neighbours and village council were concerned with pig waste discharge, pond waste disposal, and pond water replacement. We also saw how these issues impacted on neighbouring rice fields and the public interest within the village community.

The direct vision of the traders is demonstrated by their close examination of product quality and is exemplified in Issue 1.3 (pig waste discharge into the fish pond, which reduces the eating quality of fish), Theme 5 (illness of fish) and Theme 6 (illness of pigs). Empirical evidence from interviews with Fu, together with direct observation, show that the traders visited the farm regularly to check whether there were any problems with the quality of the products on offer. In particular, the traders examined the health of pigs and fish before any purchase, which in some cases led to them refusing to buy sick pigs, or reducing the price paid on account of the small size of the fish. The traders were also concerned about the safety
of the harvest workers who work directly for the traders. They investigated safety problems as a result, as illustrated in Issues 2.2 (unstable bank), 2.3 (unsafe bank) and 3.2 (high-risk section of the bank).

6.6.2 Heterogeneous Stakeholder Actions

Steps 1 and 2 of the HSM structure depicted in Figure 6.2 state that the impacts of an issue on different stakeholders varies on account of their heterogeneous interest in the issue. This leads to varied action taken by stakeholders so as to pressure the firm to resolve and provide an account of the issue. Evidence of heterogeneous stakeholder action is provided in the Fu case setting for each of the three stakeholders: the neighbours, the village council, and traders, as follows:

**Neighbours**

Both neighbours emphasized during the interviews that they relied on their rice fields to support their families. They expected to maintain a harmonious relationship with Fu, based on the mutual respect of each other’s interest. As one neighbour stated, “if you respect me for one foot, I will reward you for ten feet” (a Cantonese saying means kindness always returned tenfold). The neighbours’ actions are evidenced in: Theme 1 (pig waste management) in the form of their response to soil contamination in their rice fields; Theme 2 (pond waste management) via their complaints to Fu regarding the impact on the stability of the rice field banks; and Theme 4 (water management), on account of their complaints about overflow from the Fu farm fish pond into their rice fields.

**Village council**

The council officer emphasized the responsibility of the council to protect the public interest of the village community, which includes monitoring the Fu farm and intervening if necessary. Council interventions occurred to resolve Issues 1.3, 3.2, 3.3, 4.2 and 4.3. These actions aimed to protect the village irrigation system, villagers’ safety and the health of the village ecosystem.

**Traders**

The trader expressed his interest in the quality of the product from the Fu farm by using a Cantonese saying: “A good must be worth every cent paid for it”. The actions taken by all the
traders purchasing Fu farm products included reducing the purchase price or refusing to buy on account of inferior product quality, as is documented in Themes 5 and 6 pertaining to health concerns. A further concern of the fish traders was the safety risk during harvest documented in Themes 2 and 3, where the traders criticized the workplace as potentially unsafe for their harvesting staff, and claimed extra fees for additional services provided in response to this risk.

6.6.3 Firm’s Response to Stakeholder Action

Step 3 in Figure 6.2 concerns the firm response to stakeholder action which in the Fu case setting demonstrates the principle of inclusivity. This is where the firm takes action in response to the collective claims of all stakeholders, rather than prioritizing the claims of individual stakeholders (Bellal, 2002; ISEA, 1999; Mitchell et al., 1997; Owen et al., 2001; Rasche & Esser, 2006). The empirical evidence provided by the 18 issues shows that Fu acted to resolve the issue to address stakeholders’ concerns. One example is Issue 1.3, which concerned the large amount of pig waste discharge. This issue impacted each of the three stakeholders differently: by contaminating the soil and water of the neighbours’ rice fields; by polluting the village irrigation system protected by the village council; and the reduction in fish quality, which was a major concern for the traders. The single action taken by Fu to install the waste-filter system resolved this issue so as to satisfy each of different stakeholder interests.

Fu advised that the Traders were the most important stakeholder given that they control revenue to the farm; however, the claims of all stakeholders were taken into consideration when taking action to resolve issues: “I would not insult any of them. The best solution to a problem is to make everyone happy”.

6.6.4 Informal Accounts

In Figure 6.2, the firm provides an account to the stakeholders (Step 4), who then assess the firm’s action to resolve the issue and decide whether to accept or reject the account (Step 5), which may lead to further stakeholder action (Dubnick, 2003; Lindberg, 2009; 2013; Mulgan, 2000). Step 4 concerning the account giving activities is realized when stakeholders directly observe the action taken by Fu. Step 5 is enabled by the transparency condition where
stakeholders are able to assess Fu’s action based on their direct observation of the action. This provides an account of the firm’s actions beyond the formal accounting process, thus allowing the stakeholders to avoid the risk of being deceived by relying excessively on potentially biased information produced by the firm. Furthermore, a range of informal reporting practices were observed in the Fu case setting where Fu justified his action or inaction to stakeholders. These informal accounts enabled Fu to communicate to stakeholders, and enabled stakeholders to assess the performance of the Fu farm, thereby completing Steps 4 and 5 of the materiality process depicted in Figure 6.2.

Section 6.6.5 focuses on a discussion of the materiality of sustainability issues where there is a reliance on informal accounts.

**6.6.5 Correlation between Managerial and Informational Action Levels**

Prior accountability literature highlights a strong correlation between managerial performance and corporate reporting practice (Christensen & Lægreid, 2012; Dubnick, 2003; Lægreid et al., 2008). In light of this, this study provides empirical evidence, from the accounts of the 18 issues introduced above, of a strong positive correlation between the levels of managerial action taken by the firm in response to an issue with the informational content relating to the informal account of the issue.

Figure 6.3 illustrates these issues arranged according to the managerial action level and informational content level.

**Figure 6.3: Comparison between Managerial and Informational Levels**

- **Slight action** (1.1), (3.1)
- **Small action** (3.2), (1.2), (2.1) (4.1), (5.1)
- **Medium action** (6.1), (6.2), (3.3) (2.2), **(4.2)**
- **High action** (4.3), (1.3), (2.3) (5.2), (5.3), (6.3)

- **Low informational level** (1.1), (3.2), **(3.2)**
- **Medium informational level** (1.2), (2.1) (4.1), (5.1), (6.1), (6.2), (3.3), (2.2)
- **High informational level** (4.2), (4.3), (1.3), (2.3), (5.2), (5.3), (6.3)
Figure 6.3 indicates a strong correlation between managerial action levels and informational content levels across the 18 issues reported in the Fu farm case. That is, low informational content corresponds to slight action (Issues 1.1 and 3.1); medium informational content corresponds to small or medium action (Issues 1.2, 2.1, 4.1, 5.1, 6.1, 6.2, 3.3, and 2.2); and high informational content corresponds to high action (Issues 4.3, 1.3, 2.3, 5.2, 5.3 and 6.3). This correlation is with the exception of two issues highlighted in red italics, these being Issues 3.2 and 4.2.

The preceding analysis presents three findings specific to this business setting where the accountability discharge is underpinned by informal accounting practices:

- First, the informational content is implicit owing to the complex nature of direct vision. This means the theoretical stance of GRI G3 (2000-2011), GRI G4 (2013) and AA1000APS (Accountability, 2008), which associates materiality to informational priority, is maintained, but encounters operational problems in the absence of formal accounts.
- Second, the strong correlation between managerial action level and informational content level reinforces the argument inferred from sustainability accounting literature that materiality can be defined from either an informational or managerial perspective.
- Third, where there is a lack of formal accounts, the managerial action level should be the focus of materiality assessment.

Each of the five steps depicted in Figure 6.2 that form the HSM structure are confirmed by the empirical evidence collected in the Fu case setting. Hence, the HSM structure is confirmed empirically in both the Exxon case and the Fu farm case, even though these two settings differ significantly in terms of closure, transparency and complexity.

Furthermore, the account-giving methods vary significantly between the two case settings. The Exxon case involves accounts provided by formal reports, whereas direct vision is the main method of account giving in the Fu farm case, together with three other informal reporting practices summarized in Table 6.4. Evidence from the Fu farm case supports the findings of Hardy and Ballis (2013), who argue that informal accounts play a significant role in accountability practices in some organizational settings.
6.7 Empirical Testing of the HSM Mechanism

In this section, each of the six sustainability themes are used to test the HSM mechanism postulated in Chapter 4 and illustrated in Figure 4.2. The 5-step process (refer to Figure 4.2) is used below for determining the materiality of issues. The HSM mechanism is expressed in terms of an elementary change in stakeholder action level, represented by the condition of singular stakeholder movement where only one stakeholder takes a different action in response to two comparative issues. This can be set out as follows:

- **Step 1.** Issue A is more significant to Issue B in the view of only one stakeholder, Si, while, for other stakeholders, the two issues are of identical significance.
- **Step 2.** Only Si takes stronger action against the firm for Issue A relative to Issue B, while the other stakeholders remain unchanged in their actions for both issues.
- **Steps 3, 4 and 5.** Accordingly, Issue A is more material than Issue B to the firm, which prioritizes Issue A over Issue B in managerial and reporting practices in response to the collective claims of all stakeholders.

The empirical evidence from the Fu study shows a strong correlation between the level of managerial action taken by Fu with the level of informational content in the informal account provided by Fu, as illustrated in Figures 6.3 and 6.4.

**Figure 6.4: Materiality, Managerial Action and Informational Content**

<table>
<thead>
<tr>
<th>Materiality</th>
<th>Managerial action (value)</th>
<th>Informational content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immaterial</td>
<td>Slight (1)</td>
<td>low</td>
</tr>
<tr>
<td>Marginal material</td>
<td>Small (2)</td>
<td>medium</td>
</tr>
<tr>
<td>Moderately material</td>
<td>Medium (3)</td>
<td></td>
</tr>
<tr>
<td>Highly material</td>
<td>High (4)</td>
<td>high</td>
</tr>
</tbody>
</table>

In the following analysis of the materiality of issues in the Fu farm case, materiality is assessed with reference to managerial action taken by Fu. As indicated in Figures 6.3 and 6.4, this provides an almost identical assessment of materiality of issues as indicated by informational content.
6.7.1 Testing the Mechanism within one Sustainability Theme: An Example

Table 6.6 shows the values for stakeholder action and firm action for the first theme, which involves three issues.

**Table 6.6: Stakeholder and Firm Action Levels for Theme 1**

<table>
<thead>
<tr>
<th>Theme 1</th>
<th>Neighbors’ action (S1)</th>
<th>Village’s action (S2)</th>
<th>Traders’ action (S3)</th>
<th>Fu’s managerial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue 1.1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Issue 1.2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Issue 1.3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

This theme provides two tests, one for the HSM mechanism and a second test of the lemma of consistent change. As shown in Table 6.6, only neighbours upgraded their action from a value of 1 (for Issue 1.1) to 2 (for Issue 1.2), while the action levels of other stakeholders S2 and S3 remained unchanged for both issues. This satisfies the conditions of Steps 1 and 2 in the five-step HSM mechanism. The mechanism predicted that Fu would take stronger managerial action for Issue 1.2, and this was confirmed by the empirical result shown in Table 6.6, where Fu’s managerial action for Issue 1.2 is valued at 2, as compared to the action valued as 1 for Issue 1.1.

The mechanism is validated where there is change only in any one of the three stakeholders where the condition of singular stakeholder movement is met. Where there is change in more than one stakeholder’s action level, this provides a test of the lemma of consistent change, as tested in the Exxon case setting.

Tests of either the mechanism or lemma across the remaining five themes are presented in Section 6.7.2, as follows.

**6.7.2 Full Account of Action Levels for 18 Issues**

Table 6.7 provides the full account of all six sustainability themes involving the 18 issues observed from this closed system during the natural or field experiment.
### Table 6.7: Account of 18 Issues Observed

<table>
<thead>
<tr>
<th>Theme</th>
<th>Issue</th>
<th>Stakeholder Action set</th>
<th>Firm action level</th>
<th>Theme</th>
<th>Issue</th>
<th>Stakeholder action set</th>
<th>Firm action level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pig waste management</td>
<td>1.1</td>
<td>1 1 1 1</td>
<td>1</td>
<td>Four water management</td>
<td>4.1</td>
<td>2 1 1 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>2 1 1 2</td>
<td>2</td>
<td></td>
<td>4.2</td>
<td>3 2 1 3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>3 2 2 4</td>
<td>4</td>
<td></td>
<td>4.3</td>
<td>3 3 1 4</td>
<td>4</td>
</tr>
<tr>
<td>2. Pond waste management</td>
<td>2.1</td>
<td>2 1 1 2</td>
<td>2</td>
<td>Five Healthy food (fish)</td>
<td>5.1</td>
<td>1 1 2 3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>2 1 2 3</td>
<td>3</td>
<td></td>
<td>5.2</td>
<td>1 1 3 4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>3 1 2 4</td>
<td>4</td>
<td></td>
<td>5.3</td>
<td>2 2 3 4</td>
<td>4</td>
</tr>
<tr>
<td>3. Safety management</td>
<td>3.1</td>
<td>1 1 1 1</td>
<td>1</td>
<td>Six Healthy food (livestock)</td>
<td>6.1</td>
<td>1 1 2 3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>1 2 1 2</td>
<td>2</td>
<td></td>
<td>6.2</td>
<td>1 1 2 3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>1 2 2 3</td>
<td>3</td>
<td></td>
<td>6.3</td>
<td>1 1 3 4</td>
<td>4</td>
</tr>
</tbody>
</table>

S1: Neighbours; S2: Village council; S3: Traders.

For issues within each theme, either the singular stakeholder movement condition or the consistent change condition is satisfied. This leads to tests of either the mechanism or the lemma. The two tests provided within Theme 1 in the previous section tested the mechanism using issues 1.1 and 1.2, and then tested the lemma using Issues 1.2 and 1.3. Table 6.8 presents the tests of the mechanism or lemma within each theme.

### Table 6.8: Test Results within each Sustainability Theme

<table>
<thead>
<tr>
<th>Sustainability Theme</th>
<th>Issues for test</th>
<th>Verification result</th>
<th>Singular stakeholder in movement</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pig waste</td>
<td>1.1 and 1.2</td>
<td>Mechanism</td>
<td>S1</td>
<td>Only S1 upgraded action level; S2 and S3 remained unchanged.</td>
</tr>
<tr>
<td></td>
<td>1.2 and 1.3</td>
<td>Lemma</td>
<td>N/A</td>
<td>All stakeholders upgraded action level.</td>
</tr>
<tr>
<td>2. Pond-mud dumping</td>
<td>2.1 and 2.2</td>
<td>Mechanism</td>
<td>S3</td>
<td>Only S3 upgraded action level; S1 and S2 remained unchanged.</td>
</tr>
<tr>
<td></td>
<td>2.2 and 2.3</td>
<td>Mechanism</td>
<td>S1</td>
<td>Only S1 upgraded action level; S2 and S3 remained unchanged.</td>
</tr>
<tr>
<td>3.</td>
<td>3.1 and 3.2</td>
<td>Mechanism</td>
<td>S2</td>
<td>Only S2 upgraded action level; S1</td>
</tr>
<tr>
<td>Muddy Path</td>
<td>3.2 and 3.3</td>
<td>Mechanism</td>
<td>S3</td>
<td>Only S3 upgraded action level; S1 and S2 remained unchanged.</td>
</tr>
<tr>
<td>4. Pond water discharge</td>
<td>5.1 and 5.2</td>
<td>Lemma</td>
<td>N/A</td>
<td>S1 and S2 upgraded action level; S3 remained unchanged.</td>
</tr>
<tr>
<td>5. Pond ecosystem</td>
<td>5.2 and 5.3</td>
<td>Mechanism</td>
<td>S2</td>
<td>Only S2 upgraded action level; S1 and S3 remained unchanged.</td>
</tr>
<tr>
<td>6. Pig health</td>
<td>6.1 and 6.3</td>
<td>Mechanism</td>
<td>S3</td>
<td>Only S3 upgraded action level; S1 and S2 remained unchanged.</td>
</tr>
<tr>
<td></td>
<td>6.2 and 6.3</td>
<td>Lemma</td>
<td>N/A</td>
<td>S1 and S2 upgraded action level; S3 remained unchanged.</td>
</tr>
<tr>
<td></td>
<td>7.1 and 7.3</td>
<td>Mechanism</td>
<td>S3</td>
<td>Only S3 upgraded action level; S1 and S2 remained unchanged.</td>
</tr>
<tr>
<td></td>
<td>7.2 and 7.3</td>
<td>Mechanism</td>
<td>S3</td>
<td>Only S3 upgraded action level; S1 and S2 remained unchanged.</td>
</tr>
</tbody>
</table>

The test results presented in Table 6.8 confirm both the mechanism and the lemma. Each of the three stakeholders was involved in at least one test where this stakeholder acted as the singular stakeholder increasing their action level, which led to increased managerial action by Fu. In the Exxon case, only the lemma was tested and confirmed using four specific issues, whereas the Fu farm case demonstrates a direct manifestation of the mechanism utilizing 18 issues. A further comparison between the two cases is presented in Chapter 9.

### 6.7.3 An empirical reflection on the critical accountability perspectives

This section discusses how the accounting process of materiality in the Fu farm case relates to the critical accountability school (section 2.3.6), including for-the-other accountability (Shearer, 2002; Messner, 2009) and intelligent accountability (Roberts, 2009).

**For-the-other accountability**

The for-the-other accountability (Shearer, 2002; Messner, 2009), refers to an obligation to account for interests of the principal in addition to the interests of the agent. This form of accountability is realized in the HSM structure where the five-step materiality process conjoins “what matters to the agent (self)” and “what matters to the principal (other)”.

The question highlighted in Section 2.3.6 as to how the firm is able to discharge accountability to
“all the others out there” (Messner, 2009, p.923) is resolved by the integration of the stakeholder inclusivity assumption into this HSM structure.

The Fu farm case empirically manifests for-the-other accountability in accounting for material issues. As addressed in section 6.6.3, Fu explicates an intention of satisfying all three stakeholders when making decisions. According to Fu, his social relationship with stakeholders is prioritized over money or profits (section 6.4.3), which echoes a for-the-other orientation guiding his behaviour. The effectiveness of solutions to these issues relies on accounting for concerns and interests of stakeholders, rather than accounting for merely Fu’s own financial profits. Fu’s sensitivity to stakeholders is exemplified particularly in his decision in Issue 3.1, where, although no significant negative consequences from this issue were perceived, Fu still took some action with a face-saving purpose to show his respect to stakeholders.

Intelligent accountability
The social system of the Fu farm case presents an example of Roberts’ (2009) conception of intelligent accountability in reference to socializing and cooperating practices, through which the agent (self) and the principal (other) strengthen their interdependence. Fu emphasized that understanding and solving problems resulted in benefits from a stronger social network (Section 6.4.3).

Consultation of stakeholders is normal and necessary for Fu to seek effective solutions to material issues in fulfilling his role of discharging accountability. In this case, stakeholders, including the traders, council officials and senior villagers, actively took part in the accounting materiality process including identifying, assessing and resolving material issues. For example, the traders advised different potential risks from two issues (2.2 and 2.3) concerning the bank construction during the wet season. Fu consulted the village council on Issue 2.3, and his final decision was based on the council’s advice. Stakeholders’ experiences essentially assisted Fu to understand what were the issues, what impacts these issues generated, and how to resolve them. That is, accountability discharge is not in a traditional individualizing form, but is grounded by an ongoing socializing process through cooperation of Fu with his stakeholders.

Intelligent accountability also is supported by informal reporting practices (Roberts, 2009).
As addressed in Section 6.6.1, the whole social system was open and visible on account of unrestrained, uncontrolled and casual communication between Fu and his stakeholders, including direct vision, casual conversation, frequent field visits, routine interviews and social events such as ceremonies. These diverse communications led to a situation where “well-placed trust grows out of active enquiry rather than blind acceptance” (Roberts, 2009, p.966) and “a greater shared resilience (is created) based on reciprocal understanding” (Roberts, 2009, p.967).

In summary, the Fu farm case provides evidence of practices that support the critical accountability distinction between the for-the-other and intelligent accountability perspectives. In this case, the discharge of accountability enacted by materiality practices are not merely distancing the firm and stakeholders into two conflicting parties, but are annexing all of them into a community. Here, these social actors are able to understand interdependencies with other community members and collaborate with each other in problem resolving.

6.8 Concluding Remarks

This chapter presented the results from the second study of the HSM structure and mechanism, but within a stable, simple and closed social system. This is what critical realism philosophers, such as Bhaskar (1998c; 2008) and Sayer (1992), regard as the ideal setting for exploration of a social phenomenon from a critical realism perspective. The field study presented in this chapter analysed data collected over three years and identified 18 relevant sustainability issues, thereby providing a rich source of data used to achieve three major outcomes.

First, the HSM structure is illustrated empirically in the setting of the Fu farm case. The HSM structure, which reveals how materiality practices enable the discharge of the firm’s accountability to an entire set of heterogeneous stakeholders, underlies the contextual materiality practices in the Fu farm settings. Second, the Fu farm case presents a cluster of 18 sustainability issues, which enabled substantial tests of the HSM mechanism. Third, the Fu farm field study provides a contribution to the accounting literature by exploring materiality
assessment where only informal accounts of issues and action taken by the firm exist, thus typifying the kind of cases rarely researched in materiality studies.

The next chapter continues an exploration based on the Fu farm setting. It demonstrates the transfactual operation of the mechanism in either observable or unobservable domains, and exemplifies application of the mechanism in sustainability management practices.
Chapter 7
Empirical Study III
Transfactual operation and practical relevance of the
HSM Mechanism (The Fu Farm Case Continued)

This chapter explores the practical relevance of the HSM mechanism that has been postulated and empirically tested in the previous chapters. This exploration of transfactuality is important in critical realism philosophy as it refers to the application of the causal mechanisms in both the empirical and unobservable domains.

This chapter follows three steps:

- The first step is enabled by the transfactual nature of the mechanism, which is used to construct a complete materiality index encompassing all possible stakeholder action sets in the Fu farm setting.
- The second step is to predict Fu’s response to two hypothetical issues, based on the materiality index produced in the first step. The result exemplifies application of “the enduring and transfactually active mechanism” (Bhaskar, 2008, p.xvii) in predicting firm behaviour in response to stakeholder action provoked by issues.
- The third step concerns application of the materiality index to evaluate different solutions to a sustainability problem.

This chapter contributes to both the realism and accounting bodies of literature by exploring the theme of transfactuality, which is not evident in prior accounting research, and demonstrates the practical relevance of the HSM mechanism to materiality practice.

7.1 Transfactuality

As briefly introduced in Section 3.3, which dealt with the terminology of critical realism,
transfactuality refers to the universal existence and operation of the mechanisms underlying observable phenomena. This study explores the transfactual operation of the HSM mechanism, and how this transfactual nature enables the mechanism to apply in sustainability management practices. Transfactuality signifies the “depth of critical or transcendental realism” (Bhaskar, 1979, p.xii). Two aspects of transfactuality are identified: the vertical and the horizontal. The vertical aspect refers to the reality that laws of nature operate in any contextual setting, and that they “operate independently of both the conditions and their identification” (p.xiii). The vertical aspect of transfactuality is demonstrated in Chapters 5 and 6, where the operation of the mechanism is validated in two different settings.

This chapter focuses on the horizontal aspect of transfactuality, which refers to the possibility of the mechanism enduring in events not observed. Transfactuality “provides the rationale or ground for practical and applied explanatory, diagnostic, exploratory, scientific work too” (Bhaskar, 1979, p.xii). The mechanism, through its transfactual nature, explains and predicts the materiality practices of the firm in response to possible but unactualized issues, and enables an evaluation of alternative solutions to sustainability problems.

### 7.2 The Complete Materiality Index

In this section, the transfactual nature of the mechanism is used to construct a complete materiality index for all possible issues, including the 18 issues observed during the field study of the Fu farm.

#### 7.2.1 The Materiality Account of Observable Issues

The 18 issues observed in the Fu farm case setting (Table 7.1, Column 3) correspond to 11 distinct sets of stakeholder actions in Column 2, categorized within the four materiality or managerial action levels in Column 1. Note that some of the 18 issues provoke the same stakeholder action set. For example, Issues 1.2, 2.1, and 4.1 provoke the same stakeholder action set \( \{2,1,1\} \), and all are classified as marginally material to the firm whose actions in response to these issues was assessed as small (materiality level =2).
Table 7.1: Summary of Materiality of Observed Issues in the Fu farm Case

<table>
<thead>
<tr>
<th>Materiality level (Fu’s managerial action)</th>
<th>Stakeholder action sets</th>
<th>Issues observed from the Fu farm case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 immaterial (slight action)</td>
<td>{1,1,1}</td>
<td>1.1; 3.1</td>
</tr>
<tr>
<td>2 Marginally material (small action)</td>
<td>{2,1,1}</td>
<td>1.2; 2.1; 4.1</td>
</tr>
<tr>
<td></td>
<td>{1,2,1}</td>
<td>3.2</td>
</tr>
<tr>
<td>3 Moderately material (medium action)</td>
<td>{2,1,2}</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>{1,2,2}</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>{3,2,1}</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>{1,1,2}</td>
<td>5.1; 6.1; 6.2</td>
</tr>
<tr>
<td>4 Highly material (high action)</td>
<td>{3,2,2}</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>{3,1,2}</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>{3,3,1}</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>{1,1,3}</td>
<td>5.2; 5.3; 6.3</td>
</tr>
</tbody>
</table>

7.2.2 Unidentified Stakeholder Action Sets

The Fu farm case system involved three active stakeholders, with three possible action levels, which results in 27 (3*3*3 = 27) different permutations of stakeholder action sets. Given that only 11 different stakeholder action sets were identified in the Fu case setting, there should be 16 (27 – 11 = 16) further stakeholder action sets that logically exist, but were not observed in the Fu farm case setting. The transfactual nature of the mechanism enables the application of the law stated in the mechanism to all possible sets, including the 16 unobserved sets.

According to the mechanism or the lemma, in a hypothetical case involving three stakeholders, for stakeholder action set for issue A \{s1, s2, and s3\} and stakeholder action set for issue B \{s’1, s’2, s’3\}, if s1 ≥ s’1, s2 ≥ s’2, and s3 ≥ s’3, issue A is more material than issue B to the firm. The following proposition is thus deduced:

Suppose there are two recognized stakeholder action sets, set High \{cs1, cs2, cs3\} in materiality level H and set Low \{es1, es2, es3\} in the materiality level L respectively, and one unrecognized set Middle \{ds1, ds2, ds3\}. If cs1 ≥ ds1 ≥ es1; cs2 ≥ ds2 ≥ es2; cs3 ≥ ds3 ≥ es3, then the materiality level M, on which set Middle is allocated, leads to
Therefore, if there are two observed stakeholder action sets and one unobserved stakeholder action set, and each element of the unobserved sets lies between each corresponding element of the two observed sets, it can be concluded that the materiality level of the unobserved stakeholder action set must lie between the materiality levels of the two observed stakeholder action sets. Now all unobserved stakeholder action sets can be assigned to their corresponding materiality levels according to this proposition. To begin with, the set \{3,3,3\}, which is unobserved in the Fu farm case, is allocated the highest materiality level (4). This means that issues falling under this set provoke each stakeholder to their highest possible action level.

The materiality level of the unobserved stakeholder action sets can be confirmed if only one possible materiality level can be inferred for that set (see Table 7.2). However, eight out of the 16 unobserved stakeholder action sets could correspond to more than one materiality level, as displayed in Tables 7.3 and 7.4. Tables 7.2, 7.3, 7.4 and 7.5 list all unobserved stakeholder action sets and infer their possible materiality levels.

In Table 7.2, the seven unobserved stakeholder action sets lie between the high and low action sets within the category of level 4 materiality, therefore these eight unobserved stakeholder action sets are confirmed as materiality level 4, which is highly material.

<table>
<thead>
<tr>
<th>High Set - materiality level 4</th>
<th>Middle Set (Unobserved sets)</th>
<th>Low Set - materiality level 4</th>
<th>Materiality level for Middle Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>{3, 3, 3}</td>
<td>{2, 2, 3}</td>
<td>{1, 1, 3}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{3, 1, 3}</td>
<td>{1, 1, 3}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{1, 3, 3}</td>
<td>{1, 1, 3}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{2, 3, 3}</td>
<td>{1, 3, 3}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{3, 3, 2}</td>
<td>{3, 3, 1}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{1, 2, 3}</td>
<td>{1, 1, 3}</td>
<td>4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{2, 1, 3}</td>
<td>{1, 1, 3}</td>
<td>4</td>
</tr>
</tbody>
</table>

In Table 7.3, each of the four unobserved stakeholder action sets lie between a high action set
in the category of level 4 materiality and a low action set within the category of level 3 materiality, therefore these unobserved stakeholder action sets fall within either materiality levels 3 or 4.

Table 7.3: Unobserved Sets Conjoining to Materiality Level 3 or 4

<table>
<thead>
<tr>
<th>High Set - materiality level 4</th>
<th>Middle Set (unobserved sets)</th>
<th>Low Set - materiality level 3</th>
<th>Materiality level for Middle Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>{3, 3, 3}</td>
<td>{2, 3, 2}</td>
<td>{2, 1, 2}</td>
<td>3 or 4</td>
</tr>
<tr>
<td>{3, 2, 2}</td>
<td>{2, 2, 2}</td>
<td>{2, 1, 2}</td>
<td>3 or 4</td>
</tr>
<tr>
<td>{3, 3, 3}</td>
<td>{1, 3, 2}</td>
<td>{1, 2, 2}</td>
<td>3 or 4</td>
</tr>
<tr>
<td>{3, 2, 2}</td>
<td>{3, 1, 2}</td>
<td>{2, 1, 2}</td>
<td>3 or 4</td>
</tr>
</tbody>
</table>

Table 7.4 shows each of the two unobserved stakeholder action sets lying between a high action set within materiality level 3 and a low action set within materiality level 2. Therefore, each unobserved set falls within either materiality levels 2 or 3.

Table 7.4: Unobserved Sets Conjoining to Materiality Level 2 or 3

<table>
<thead>
<tr>
<th>High Set - materiality level 3</th>
<th>Middle Set (unrecognized)</th>
<th>Low Set - materiality level 2</th>
<th>Materiality level for Middle Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>{3, 2, 1}</td>
<td>{2, 2, 1}</td>
<td>{1, 2, 1}</td>
<td>2 or 3</td>
</tr>
<tr>
<td>{3, 2, 1}</td>
<td>{3, 1, 1}</td>
<td>{2, 1, 1}</td>
<td>2 or 3</td>
</tr>
</tbody>
</table>

Table 7.5 shows each of the two unobserved stakeholder action sets lying between a high action set within materiality level 4 and a low action set within materiality level 2. Therefore, each unobserved set falls within either materiality levels 2, 3 or 4.

Table 7.5: Unobserved Sets Conjoining to 3 Possible Materiality Levels

<table>
<thead>
<tr>
<th>High Set - materiality level 4</th>
<th>Middle set (unrecognized)</th>
<th>Low Set - materiality level 2</th>
<th>Materiality level for Middle Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>{3, 3, 1}</td>
<td>{1, 3, 1}</td>
<td>{1, 2, 1} in level 2</td>
<td>2 or 3 or 4</td>
</tr>
<tr>
<td>{3, 3, 1}</td>
<td>{2, 3, 1}</td>
<td>{2, 1, 1} in level 2</td>
<td>2 or 3 or 4</td>
</tr>
</tbody>
</table>
### 7.2.3 The Complete Materiality Index

Tables 7.2, 7.3, 7.4 and 7.5 infer materiality levels for the unobserved sets that are integrated into the complete materiality index shown in Table 7.6. The complete materiality index identifies all possible 27 stakeholder action sets and infers the materiality level for each set. The materiality index is established from the transfactual nature of the mechanism confirmed from stakeholder action sets for either issues empirically observed from the Fu farm case, or from the unobserved sets beyond the empirical scope of the Fu case.

**Table 7.6: The Complete Materiality Index**

<table>
<thead>
<tr>
<th>Possible action sets in Fu case (total 27)</th>
<th>Immaterial level 1 Slight action</th>
<th>Marginally Material level 2 Small action</th>
<th>Moderately Material level 3 Medium action</th>
<th>Highly material level 4 High action</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 observed sets</td>
<td>{1,1,1}; {2,1,1}; {1,2,1};</td>
<td>{2,1,2}; {1, 2, 2}; {3, 2, 1}; {1, 1, 2}</td>
<td>{3, 2, 2}; {3, 1, 2}; {2, 1, 3}; {1, 1, 3}</td>
<td></td>
</tr>
<tr>
<td>8 sets confirmed in materiality level 4</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4 sets fall in either materiality levels 3 or 4</td>
<td>N/A</td>
<td>N/A</td>
<td>{2, 2, 2}; {2, 3, 2}; {1, 3, 2}; {3, 1, 2}</td>
<td></td>
</tr>
<tr>
<td>2 sets fall in either materiality levels 2 or 3</td>
<td>N/A</td>
<td>{2, 2, 1}; {3, 1, 1}</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2 sets fall in either materiality levels 2 or 3 or 4</td>
<td>N/A</td>
<td>{1, 3, 1}; {2, 3, 1}</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
7.3 Transfactuality and Predictive Tests

In this section, the transfactual nature of the mechanism is used to predict firm behaviour.

7.3.1 Transfactual Operation of the Mechanism in the Fu Farm

Transfactuality infers operation of the mechanism in three domains: 1) the empirical domain where issues are both actualized and observed; 2) the actual domain where issues are actualized but may be unobserved; and 3) the real domain where issues may not be actualized (Bhaskar, 1998).

The materiality index presented in Table 7.6 shows how the mechanism transfactually applies in each of the three domains in the Fu farm setting. The empirical domain encompasses the 11 observed stakeholder action sets provoked by the 18 issues empirically observed in the Fu farm case study (presented in Chapter 6). The many tests applied to pairs of issues in each of the six sustainability themes confirm the operation of the mechanism in the empirical domain of the Fu farm.

The actual domain concerns some issues that may have occurred, but which were beyond our observation. For example, an issue could arise after the duration of the field study or an issue which did occur may be undetected by the researcher. In contrast, the real domain includes issues that have not occurred (actualized), and thus are empirically unobservable. The transfactuality of the mechanism states that if the unactualized issues were actualized, the materiality of this issue equates to the materiality index prediction. This domain provides strong direction for applying the mechanism to predict Fu’s behaviour in response to hypothetical issues. This is addressed in the Sections 7.3.2 and 7.3.3, where two hypothetical issues are proposed and tested. The two proposed issues were chosen on account of their observance in nearby farming communities and are issues that are regarded as relevant to the Fu Farm.

The test of each hypothetical issue involves three steps. First, a discussion with Fu as to how the issue would influence stakeholders and what actions stakeholders would be expected to take in response to the issues. Second, the materiality index in Table 7.6 is used to predict the
materiality level of each issue according to the estimated stakeholder action set. And, finally, Fu was asked what action he would take if each issue occurred. This enabled Fu’s answer to be compared with the predicted result.

7.3.2 Hypothetical Issue 1: Pig waste discharged to a nearby stream

Fu’s pig house is near a stream connected to the village irrigation system. The hypothetical issue is: **Fu discharges pig waste into the stream.**

Thus, this hypothetical issue is assessed as provoking a set of stakeholder actions represented as {3,3,1}. The materiality index locates this stakeholder action set at materiality level 4, which would lead to Fu responding at the highest action level. The set {3,3,1} is an observed set from the Fu farm case study (see Chapter 6, Issue 4.3) where Fu took high managerial action to resolve this issue.

---

**Hypothetical Issue 1: Discharge of pig waste to nearby stream**

**Significance of the issue to stakeholders**

**Neighbours (S1) & Village council (S2)**

This issue would strongly affect neighbours and other villagers, as the pig waste would flow into their rice fields via the irrigation system. Cattle and buffalo drink water from the stream. There is a risk of illness to these farm animals if the stream becomes contaminated.

- Action of S1 is assessed as strong (value = 3)
- Action of S2 is assessed as strong (value = 3)

**S3: Traders**

There is no evidence of interest in the issue of discharge of pig waste from traders.

- Action assessed as weak (value = 1).

**The stakeholder action set is {3,3,1}**

The assessment of this hypothetical issue as highly material was confirmed in discussions with Fu, who described the serious consequences of this issue, which was once discussed by the Fu family. The action he would need to take to resolve this issue would include ceasing the discharge of pig waste to the stream, cleaning up all residual waste, and providing significant compensation payments to neighbours and villagers to cover loss of rice production and illness of livestock. Fu confirmed the seriousness of this issue by emphasizing
that he would not use this method to discharge pig waste. The potential managerial action taken by Fu in response to this issue is evaluated as level 4. That is, it is a highly material issue that requires high managerial action to resolve.

7.3.3 Hypothetical Issue 2: The muscle-building agent

The muscle-building agent (its technical term is beta-adrenergic-agonist) is a synthetic drug that can increase the muscle mass of pigs all the while reducing their fat content. Pigs fed this muscle-building agent grow more quickly than other pigs and require less forage.

This muscle-building agent is a risk to the health of meat consumers and is it forbidden to use this product in China (Ministry of Agriculture of China, Public Announcement No.176). However, lured by the potential for increased profit, some pig farmers purchase this muscle-building agent on the black market and feed it to their pigs (this information was provided by many locals, including Fu).

**Hypothetical Issue 2: Fu uses the muscle-building agent**

**Significance of the issue to stakeholders**

**S1: Neighbours**

This issue would be irrelevant to the paddy fields of the neighbours.

Action of S1 is assessed as weak (value = 1)

**S2: Village council**

This issue concerns public health and safety, which is serious to all villagers. Fu would lose the support of the local council.

Action of S2 is assessed as strong (value = 3)

**S3: Traders**

If the meat were found to contain this chemical agent during government quality inspection procedures, the traders would suffer government punishment, including a large fine or possible cancelation of their trade licences. The traders would cease the partnership with Fu if they detected this issue.

Action assessed as strong (value = 3).

**The stakeholder action set is {1,3,3}**

This issue would initiate a set of stakeholder actions hypothesized as set {1, 3, 3}. Although unrecognized empirically from the field study, this set corresponds to materiality level 4 and
high managerial action that would be taken by Fu as per the materiality index (Table 7.6). The result predicted by the materiality index matches the result of the discussion with Fu. This issue would strongly damage Fu’s reputation and business partnerships. To rebuild his trust with stakeholders, Fu advised that he would need to provide large financial compensation to traders and the village community, issue a formal public apology, and possibly repent in the village temple.

These two hypothetical issues exemplify the application of the mechanism in predicting firm behaviour in response to unobserved issues, enabled by its transfactual operation in the real domain. The next section demonstrates further practical relevance of the mechanism to evaluate the viability of different solutions to a sustainability problem.

### 7.4 Evaluating Solutions to Sustainability Problems

In this section, the practical relevance of the transfactual mechanism is demonstrated by an evaluation of possible alternative solutions to the problem of disposing of dead pigs on the Fu farm. Pigs that die from illness must be removed from the pig house as soon as possible to avoid infecting healthy pigs.

#### 7.4.1 Four Alternative Solutions

Next, four possible solutions for disposing of dead pigs that have been used by local farmers were analysed. This led to the selection of one solution based on the criteria of resulting in the least amount of stakeholder action and, therefore, the least amount of managerial action, as predicted by the materiality index (Table 7.6). This predicted best case solution was then compared with Fu’s advice as to which solution he implements, as this is a re-occurring issue on the Fu Farm. The four solutions are as follows:
Solution 1: Bury dead pigs in the forest

Fu and his brother could carry the dead pigs to the forest and bury them in a suitably deep hole.

Significance of the issue to stakeholders

S1: Neighbors
This solution would not impact the neighbours’ rice fields.
Action of S1 is assessed as weak (value = 1)

S2: Village council
The council would appreciate Fu’s effort to minimize impact to the village ecosystem and would not apply pressure to Fu.
Action of S2 is assessed as weak (value = 1)

S3: Traders
This solution is irrelevant to the trader.
Action assessed as weak (value = 1).

The stakeholder action set is {1,1,1}

Solution 2: dispose of dead pig in the river

Fu can dispose of dead pigs by dumping them in the nearby river. Some pig farmers from other villages have used this method of disposal.

Significance of the issue to stakeholders

S1: Neighbours
This solution would not impact the neighbours’ rice fields.
Action of S1 is assessed as weak (value = 1)

S2: Village council
According to Fu, some villagers worry that this method could cause the contamination of river water, whereas other villagers disregard this, believing the flowing water will carry the carcasses to the South China Sea. This issue did occur in this village and the council expressed concern.
Action of S2 is assessed as moderate (value = 2)

S3: Traders
This solution would be irrelevant to the trader.
Action assessed as weak (value = 1).

The stakeholder action set is {1,2,1}
**Solution 3: Dumping dead pigs on the village roadside**

Fu could carry the dead pigs on his motorbike and dump by the village road side near the hill (see Figure 6.1).

**Significance of the issue to stakeholders**

**S1: Neighbours**
This solution would not impact the neighbours’ rice fields.
Action of S1 is assessed as weak (value = 1)

**S2: Village council**
The village council would consider this a serious act against the public interest, as the dead animals would affect the ecosystem and produce a strong odour in the village. The council would require Fu to remove the dead pig and use the village media to blame Fu officially.
Action of S2 is assessed as strong (value = 3)

**S3: Traders**
This solution would be irrelevant to the trader.
Action assessed as weak (value = 1).

The stakeholder action set is {1,3,1}

---

**Solution 4: Sell dead pigs to illegal brokers**

Illegal pig brokers can purchase dead pigs at a low price of approximately 20 RMB each. These brokers provide a door-to-door pickup service to collect the dead animals and sell them to unlicensed meat factories.

**Significance of the issue to stakeholders**

**S1: Neighbours**
This solution would not impact the neighbours’ rice fields.
Action of S1 is assessed as weak (value = 1)

**S2: Village council**
Selling ‘dirty meat’ is regarded as deplorable by villagers. Fu and his family would suffer a loss of reputation and support from the village council.
Action of S2 is assessed as strong (value = 3)

**S3: Traders**
This illegal trade disrupts the local meat market and strongly reduces the price of fresh pigs. Fu’s pig traders dislike illegal brokers and boycott the famers involved in this illegal trade.
Action assessed as strong (value = 3).

The stakeholder action set is {1,3,3}
### 7.4.2 Evaluation of Solutions

Table 7.7 shows the analysis of stakeholder actions provoked by the four solutions.

**Table 7.7: Stakeholder Actions Provoked by the Four Solutions**

<table>
<thead>
<tr>
<th></th>
<th>Evaluation of stakeholder actions provoked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S1 (neighbours)</td>
</tr>
<tr>
<td>Solution 1</td>
<td>1</td>
</tr>
<tr>
<td>Solution 2</td>
<td>1</td>
</tr>
<tr>
<td>Solution 3</td>
<td>1</td>
</tr>
<tr>
<td>Solution 4</td>
<td>1</td>
</tr>
</tbody>
</table>

The four solutions correspond to four sets, set 1 \{1,1,1\}, set 2 \{1,2,2\}, set 3 \{1,3,1\}, and set 4 \{1,3,3\}, where the condition of singular stakeholder movement is satisfied, hence the mechanism can be directly applied to rank the four solutions. The mechanism infers that consequences of the four solutions are in the following order from high to low: solutions 4, 3, 2 and 1. That is, solution one generates the least material action by stakeholders and the Fu farm, and is the best solution from the stakeholders’ and Fu’s perspective; and solution four provokes the highest materiality level and would lead to the least desirable solution from Fu’s perspective.

Furthermore, the materiality index infers the result that set 1 corresponds to materiality level 1; set 2 to level 2; set 3 is uncertain, referring to either levels 2, 3 or 4; and set 4 to level 4. This is similar to the result predicted by direct application of the mechanism leading to the conclusion that the first solution is the optimal solution, and the second solution is the second best solution, and so on.

### 7.4.3 Comparison of Fu’s Solution Preferences

During discussions, Fu evaluated each of the four solutions presented in Table 7.8 with regard to their respective consequential impacts.
Table 7.8: Fu’s Evaluation of the Four Plans

| Fu’s comment on solution one | This solution was implemented by Fu, and is his preferred solution, because it resulted in no pressure from stakeholders and has in the past resulted in praise from the village council.  

*Consequence of solution one is assessed as: immaterial / slight action.* |
|---|---|
| Fu’s comment on solution two | Fu adopted this solution on one occasion.  
This led to criticism from some villagers, while other villagers were not concerned. Fu invited both supportive and concerned villagers and one council officer to his farm for afternoon tea to address the villagers’ concerns. In that meeting, Fu agreed that he would not again dump dead pigs in the river.  

*Consequence of solution two is assessed as: marginally material / small action.* |
| Fu’s comment on solution three | This solution has never been implemented by Fu, but he advised that it would result in public blame from the council and villagers. Fu would have to retrieve the dead pig and obtain help for the cleanup of the road used to transport the decomposing carcass.  

*Consequence of solution three is assessed as: either moderately material / medium action; or highly material / high action.* |
| Fu’s comment on solution four | This solution would create a large risk for Fu. The rebuilding of the trust from the village would require significant effort from Fu, including long-term support of and involvement in community projects. To maintain trade partnerships, Fu would need to seek the forgiveness of traders, and possibly sell at a discount for a prolonged period.  

*Consequence of solution four is assessed as: highly material / high action.* |

The significance of solution three is denoted as the set \( \{1, 3, 1\} \). This set is unrecognized from the experiment but is informed as materiality level 2, 3 or 4 from the materiality index. Based on Fu’s advice this solution is assessed as materiality level 3 or 4.

Thus Fu’s managerial response provoked by stakeholder action in response to the four proposed solutions (one to four above) are assessed as low to high action respectively. This evaluation is achieved from the direct application of the mechanism, or by reference to the index in the Section 7.4.2.
7.5 Concluding Remarks

The transfacuality of the HSM mechanism enables the construction of a materiality index encompassing all possible sets of stakeholder actions, identified from either observed or unobserved issues. The materiality index enables the prediction of a firm’s behaviour, and an evaluation of different solutions to a sustainability problem, thereby confirming the practical relevance of the HSM mechanism to the management of sustainability issues.

A further limitation occurs on account of the potential lack of precision in the measurement of the continuous mobilization variable, which is approximated in this research with a discrete variable consisting of four categories of stakeholder action and firm response levels. Thus, our empirical knowledge of the true existence of the HSM mechanism is derived from imperfect and limited observations, and by means of verifying the lemma of consistent change deduced from the mechanism, rather than the HSM mechanism itself.
Chapter 8
Empirical Study IV
The HSM Mechanism Survives Empirical Falsifications (the Zhong and Hui Farms Cases)

Theory is not an elliptical way of referring to experience, but a way of referring to hypothesized inner structures of the world, which experience can confirm or falsify.


8.1 Introduction

The previous three chapters concern how the HSM mechanism was contextually manifested in two significantly different closure settings of the Exxon case (Chapter 5) and the Fu farm case (Chapter 6), as well as how the mechanism transfactually operated in the unobserved domain of the Fu farm case (Chapter 7). This chapter focuses on another theme of critical realism: the mechanism survives empirical falsification. Simply put, where the closure setting is breached, the empirical observations may contradict the law stated in the mechanism; however, they do not disconfirm the reality of the mechanism. This chapter investigates how the HSM mechanism appears to be falsified by empirical observations, but on further investigation the enduring nature of the mechanism is confirmed. This leads to a discussion of the implications of the empirical falsification to materiality and sustainability management practices.

As was discussed previously in Section 3.3.8, empirical falsification is associated with the term epistemic fallacy, which is critiqued by Bhaskar (2008, p.5) as “metaphysical dogma”, which contends that reality can be known and defined based on empirical observation. In contrast to the view of epistemic fallacy, the critical realism philosophy contends that scientific knowledge must start from a hypothesized inner structure that can be confirmed in ideal closed systems, regardless of apparent falsification within open systems where
researchers normally locate their empirical observations (Bhaskar, 2008; 2011; Sayer 1992; 1998). Accordingly, empirical observations may be inconsistent with, or even contradict the underlying mechanism, but nevertheless cannot disconfirm the enduring existence and operation of the mechanism (Bhaskar, 2008; 2011; Sayer, 1992; 1998). As Bhaskar (1998a) states, the law of gravity supports the empirical observation that a heavy object will drop down to the ground; however, the hovering of a heavy helicopter that contradicts such empirical evidence cannot disconfirm the law of gravity. This is because the empirical phenomenon may be influenced by the intervention of another mechanism, or the mechanism in question is inactivated on account of specific conditions (Sayer, 1992).

In this chapter, six issues are presented that occurred on two farms referred to as the Zhong and Hui farms. Examination of these issues appears to provide empirical results that contradict the fundamental logic of the mechanism that maintains that the firm must take action to that which matters to stakeholders. Compared to the Fu farm case, a longitudinal study where substantial primary data were accessible to establish accounts for 18 empirical issues, the data sets for the two cases presented here are limited, as the two farm owners were only available for interview and field visits for two days each. The value of these two cases is due to the unusual empirical results observed during the field visits, thus allowing the apparent empirical falsification of the HSM mechanism to be investigated.

The Zhong farm case concerns no action being taken by the firm to a significant issue to stakeholders. This contradictory result of materiality practices is analysed as to the situation where the mechanism is not activated on account of the absence of the necessary transparency condition. The Hui farm case concerns high level action taken by the firm in response to an issue that is seemingly insignificant to stakeholders. This contradictory result of materiality practices is analysed as an intervention of other mechanisms into the empirical result.

8.2 The Zhong Farm Case

The farm is owned by Zhong (called the Zhong farm hereafter). Similar to the Fu farm, the Zhong farm is located in a small isolated village to the south of Huazhou City, Guangdong
Province, China.

As with the Fu farm, the Zhong farm produces fish and pigs and involves three active stakeholders:

S1: One neighbour whose rice fields are adjacent to Zhong’s pig house and fish pond;
S2: The village council in charge of public issues; and
S3: The traders to whom Zhong sells his pigs and fish.

Some basic facts relevant to the Zhong farm are:

- Business start-up: The aquatic business was owned by a villager before it was taken over by Zhong in Sep. 2011. Zhong developed the pig livestock business in March 2012.
- Area of the fish pond is 2,000 m².
- Annual productivity of the fish pond is approximately 5,000 kg.
- Annual income from the fish pond is 35,000 RMB.
- Area of the pig house is 380 m².
- Annual productivity of the pig house is 70 pigs sold for meat (note: different from the Fu farm, the Zhong farm does not raise female pigs but purchases piglets directly from livestock breeders). The pig waste discharge of the Zhong farm is estimated as double that of the Fu farm.
- Annual income from the livestock trade is approximately 50,000 RMB.
- Annual net profit is approximately 19,000 RMB.

In the Zhong farm case, two issues labeled as issues T1 and T2 concern the same method of discharging pig waste at two different times. However, T1 and T2 generated different empirical result concerning the actions taken by the stakeholders and the firm. The same criteria used to quantify stakeholder actions and the firm’s managerial action in the Fu farm case (Chapter 6) were used in examining the Zhong farm case.
T1: Pig waste discharge in absence of transparency

Duration of the issue: March to June 2012;
Data sources: interview with Zhong; direct observation during field visit

Zhong was informed that villagers disposed of organic waste on village-owned vacant land 400 metres from his farm and away from the villagers’ homes. Zhong installed a short two-metre pipe to give the appearance that he was discharging waste from the pig house to the fish pond. However, this pipe was never used. He also installed a 400-metre pipe mostly hidden underground to actually discharge waste from the pig house to the vacant land. As Zhong’s farm is located on higher ground than the vacant land, Zhong used water to dilute the pig waste that then flowed through the pipe to the vacant land.

Nobody in the village noticed the actual operation of Zhong disposing of pig waste.

Significance of the issue to stakeholders

S1: Neighbours
The waste disposal did not affect neighbours’ rice fields.
Action assessed as weak (value = 1)

S2: Village council
The council did not acknowledge this issue. However, this issue should have been significant to the village as discharging this amount of pig waste would negatively impact the village ecosystem. However this significance is not reflected by stakeholder action.
Action assessed as weak (value = 1)

S3: Traders
No waste was discharged into the fish pond so there was no impact on fish quality.
Action assessed as weak (value = 1)

Stakeholder action set {1,1,1}.

Materiality of the issue to the Zhong farm
Zhong continued to discharge large volumes of pig waste to the vacant land without suffering any pressure from stakeholders.
The farm action assessed as slight (level = 1)
Photo 8.1 shows that Zhong’s pig house is built next to the fish pond.
Photo 8.2 shows the drain which exits the pig house feeds into the underground pipe.
Photo 8.3 shows on-ground part of the pipe, which appears to be an irrigation tube but in fact is the waste discharge pipe. Another part of the pipe is underground and avoids direct observation from villagers.
Photo 8.4 shows the outlet of the waste discharge pipe emerging from underground and discharging into the vacant land.
T2: The discharge of pig waste under condition of transparency

Duration of the issue: June 2012
Data source: interview with Zhong; direct observation

The problem of disposing of pig waste to the vacant land drew the attention of the village council when they decided to investigate farm waste disposal. The council imposed a levy on the disposal of organic waste and disallowed any residential waste such as plastics or electronic appliances. After investigation, the village council identified all farms discharging waste into the vacant village land.

Significance of the issue to the stakeholders

S1: Neighbours
The waste discharge system did not affect the neighbours’ rice fields.
Action assessed as weak (value = 1)

S2: Village council
The council requested a levy of 660 RMB per year based on the scale of the pig farm business. Zhong believed that this was the largest levy imposed by the village council on a farm.
Action assessed as strong (value = 3)

S3: Traders
The waste disposal was irrelevant to productivity and quality.
Action assessed as weak (value = 1)

Stakeholder action set {1,3,1}

Managerial action taken by the firm
Zhong paid an annual levy to the Council of 660 RMB.
The assessment of the cost of the managerial solution applies a similar quantification criterion as used for the Fu farm (section 6.4.3), but with an adjustment to the boundary cut offs according to the ratio of net incomes of the two farms (19,000 RMB: 16,000). The action levels taken by the Zhong farm are assessed as:
- level 1, cost less than 19 RMB;
- level 2, cost between 19 to 190 RMB;
- level 3, cost between 190 to 950 RMB;
- level 4, cost more than 950 RMB.
- The cost of 660 RMB is allocated in level 3.

The level of managerial action taken by Zhong is assessed as medium (level = 3).
Image 8.5 the village-owned vacant land.
This photo shows the deserted land away from the village living area. Zhong pays the landfill fee (levy) to the village council and continues to discharge waste here. One plant shown in the photo is Pistia (water lettuce), which thrives in wetlands with a high nutrient content (in this deserted land, accumulation of pig waste results in high nutrient content).

Overgrowth of these plants blocks light, oxygen and air in the water and thus has an impact on native plants.

Issue T1 presents an unusual empirical result that contradicts the logic on which the HSM mechanism is grounded. The mechanism states that an issue of more significance to stakeholders should be prioritized by the firm, thereby resulting in stronger managerial action. In the Zhong case, the large amount of pig waste would lead to significant environmental impacts contrary to the public interest. According to the mechanism and with reference to the experience of the Fu case (sustainability theme 1: pig waste management), it is reasonable to infer that this issue should be highly material and thus lead to decisive action. However, the managerial response to issue T1 was inaction, hence T1 appeared immaterial to the Zhong farm.

The empirical observation of this issue appears to falsify the mechanism. However, this empirical falsification does not deny the reality of the mechanism, which is only activated under the essential condition of transparency. For issue T1, the absence of the transparency condition for Zhong’s disposal of pig waste to the vacant land blocks the first step of the five-step materiality process (refer Figure 8.1). Despite the potential significance of this issue to the village, the council did not take any action as it failed to recognize the issue (T1) until a later time (T2). This is when the council discovered the problem and decided to exact a levy on Zhong.

Figure 8.1 shows how the HSM mechanism was disabled in the time T1 of the Zhong farm case when stakeholders were unable to perceive the issue. The first step of the materiality
process was blocked, which led to discontinuity with regard to the subsequent steps. As a result, the mechanism was inactive in this issue, so the empirical observation here is unnecessary to reflect the claim presented by the mechanism.

**Figure 8.1 HSM Structure in Absence of Transparency**

The next section concerns another form of empirical falsification of the mechanism: extremely high action to an insignificant issue.

### 8.3 The Hui Farm Case

This case concerns another form of empirical falsification resulting from intervention of other HSM mechanisms.

#### 8.3.1 Background of the Hui farm

This farm is owned by Hui (called the Hui farm hereafter), located in a town in the north-east of Huazhou city, Guangdong, China. The farm comprises a pig house and a large pond situated on 130 acres. This farm is different from the Fu and Zhong farms in that the aquatic business of the Hui farm is to raise water turtles. Some species of turtles are marketed as a luxury food popular in the south of China, and some turtles are sold as pets. Some traders sell turtle shells for Chinese traditional medicine.
When the Hui farm business started in 1998, the lake was used to produce fish; but, in 2007, Hui started raising water turtles. The stakeholder environment of this case setting is similar to the Zhong and Fu farms, with three active stakeholders:

- Neighbours (S1): three neighbours who own rice fields near the Hui farm.
- Village council (S2): the village council monitors the performance of the Hui farm to protect the village’s interests.
- Traders (customers) (S3): traders purchase the pigs and water turtles, but unlike the Fu and Zhong farms, the Hui farm sells directly to customers, who visit the farm to select turtles of specific species and size.

All issues included in the Hui farm case involve only one level of managerial action, which is assessed as high action (level 4) owing to the high level of expertise employed, the expense and Hui’s comments, as presented in the following section.

8.3.2 Issue Hui (1): Large investment to resolve a seemingly insignificant issue

<table>
<thead>
<tr>
<th>Issue Hui (1): The steep slope of the pond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of the issue: 2008</td>
</tr>
<tr>
<td>Data source: interview with Hui; direct observation</td>
</tr>
</tbody>
</table>

**Significance of the issue to the stakeholders**

Hui extended the fish pond area and started to raise turtles. This resulted in increased steepness of some sections of the bank surrounding the pond. The council put forward their concerns regarding the safety of the walkers and bicycle riders using the bank path and asked Hui to improve the safety of the path. This issue provoked action taken by the council only, which is assessed as moderate (value = 2).

**The stakeholder action set is {1, 2, 1}**

**Managerial action taken by the firm**

Hui employed a team of technicians to construct a two-metre-high concrete wall enclosing the entire turtle pond. This project required two months to complete and cost approximately half of an annual net profit. Hui regarded the project as one of his largest business investment projects. The wall protects walkers and cyclers using the path along the bank of the fish pond.
Managerial action is assessed as high (level = 4)

Image 8.6 Indoor turtle nursery
Image 8.7 The concrete plate wall enclosing the turtle pond

The empirical outcome of Issue 1 on the Hui farm is unusual. This issue is similar to Issue 3.2 in the Fu farm case (addressed in Section 6.5.3), which only provoked the council’s concern. Issue 3.2 was marginally material to Fu and only required some plants on the fish pond bank to enhance its stability. As Issue 1 on the Hui farm was insignificant to stakeholders \{1,2,1\}, the managerial action taken by Hui to resolve this issue should not have been high, as informed by the HSM mechanism.

However, the solution of installing a large concrete wall to resolve this insignificant issue contradicts the logic of the HSM mechanism, which is that only slight managerial action should be taken in response to an issue that is not significant to stakeholders. The apparent empirical falsification of the mechanism in this issue is further investigated in Sections 8.3.3 and 8.3.4, where it is argued that mutual influence of other issues on the Hui farm led to the high-level managerial action.

8.3.3 Involvement of Other Issues in Managerial Action

This section concerns three issues, Hui (2), Hui (3) and Hui (4), which share the same solution of the concrete wall as Hui (1), although the impacts of these issues on stakeholders vary.
**Issue Hui (2): Escaping turtles**

Duration of the issue: 2008  
Data source: interview with Hui  

Turtles normally stay at the bottom of the pond, but sometimes they may crawl onto the land and, unless contained, may escape from the farm.

**Significance of the issue to stakeholders**

This issue caused impacts on traders and customers. Traders and customers often pay in advance to guarantee supply. If Hui is unable to meet supply on time, he will be required to pay compensation to the traders and customers, and risk damage to his reputation and possibly cessation of existing business partnerships.  
The action level of traders was estimated as high (value 3).  
The stakeholder action set is {1, 1, 3}

**Managerial action taken by the firm**

The concrete plate wall effectively prevented escapes of turtles.  
Managerial action is assessed as high (level = 4)

---

**Issue Hui (3): Snakes**

Duration of the issue: 2008  
Data source: interview with Hui; direct observation  

Although most local snakes are not poisonous, some snakes do occupy the pond shore.

**Significance of the issue to the stakeholders**

**Neighbours (S1)**  
Sometimes snakes are seen in neighbours’ rice fields, although it may be frogs in the rice fields that attract the snakes, rather than the turtle pond.  
Action level of neighbours is assessed as weak (value = 1).

**Village council (S2)**  
Some villagers reported the movement of snakes along the pond bank. Given the possible threat from snakes to villagers walking near the bank, the council criticized Hui’s lack of action to fix the snake problem.  
Action level of the village council is assessed as moderate (value = 2)

**Traders and customers (S3)**
Hui was uncertain as to whether the snakes would hurt the turtles, but customers and traders could be scared by snakes when inspecting the turtle pond. Some traders did express their concern. Action level of the traders and customers is assessed as moderate (value = 2).

The stakeholder action set is \{1, 2, 2\}

Managerial action taken by the firm
The wall effectively prevents snakes from entering the turtle pond. Hui also raised several geese to guard the pond to discourage and expel any intruding animals, including snakes, inside the pond wall.

Managerial action is assessed as high (level = 4)

Image 8.8 Geese guarding the turtle pond.

Issue Hui (4): Theft

Duration of the issue: 2008
Data source: interview with Hui;

The Hui farm was exposed to the potential theft of water turtles. Before installation of the concrete wall, villagers noticed an unknown car in the village near the Hui farm for several nights. The village council and Hui believed that this was a sign of increased risk of theft, so Hui decided to take protective measures.

Significance of the issue to the stakeholders

Neighbours (S1)
This issue was irrelevant to the rice fields of the neighbours.
Action level of neighbours is assessed as weak (value = 1)

Village council (S2)
The council regarded the theft of turtles to be a threat to the public interest as the thieves may harass or attack villagers. The council linked this public safety threat to the turtle pond, and requested that Hui resolve this problem.

Action level of the village council is assessed as moderate (value = 2)

**Traders and customers (S3)**

A significant loss of the turtles would mean that Hui was unable to meet the supply agreement. As the Hui farm is the only turtle farm in this region, Hui would need to pay compensation to these stakeholders.

The action level of traders and customers is assessed as high (level = 3).

The stakeholder action set is \{1, 2, 3\}

**Managerial action taken by the firm**

The two-meter-high concrete wall and the geese reduce the risk of theft of turtles.

Managerial action is assessed as high (level = 4)

---

**8.3.4 Analysis of Apparent Empirical Falsification**

In this section, the four Hui farm issues are used to justify how the mechanism is falsified when the empirical outcome is influenced by other HSM mechanisms.

As discussed in Chapter 4, through the five-step materiality process, the HSM mechanism triggers the firm’s managerial and reporting practices in response to an issue, and expresses the level of managerial action as a consequence of the significance of an issue to stakeholders, as a stakeholder action set. The mechanism is grounded on the basic logic that high managerial action is taken to resolve an issue of high significance to stakeholders. Figure 8.2 depicts how empirical falsification of the issue of Hui (1) is a result of the intervention of other mechanism(s) into the observed events (Sayer, 1992) which includes the issue and the actions in response to the issue.
As shown in Figure 8.2, the HSM mechanism determines Hui’s managerial action in response to Hui (1). However, Hui’s managerial action in response to this issue falsifies the basic logic of the HSM mechanism, which is that only minimal action would be taken in response to a trivial issue and high action is response to highly material issues. In this case, Hui’s managerial action to Hui (1) is observed to be high, although the issue is insignificant to stakeholders, which contradicts the basic logic of the HSM mechanism. However, this empirical result cannot deny the reality of the HSM mechanism. In this case, the managerial action taken by Hui is not only triggered by the HSM mechanism ascribed to issue Hui (1), but also motivated by other HSM mechanisms, which are ascribed to other issues Hui (2), Hui (3) and Hui (4).

In the Hui farm case, the empirical event of the concrete wall was a result of the combination of four HSM mechanisms, rather than the singular HSM mechanism specified for issue Hui (1). Accordingly, empirical observation of Hui (1) is unable to confirm the HSM mechanism. This supports the argument of Bhaskar (1975) and Sayer (1992) that the mechanism would be falsified by empirical observation, where other mechanisms intervene to modify the empirical outcome.
8.4 Implications of Empirical Falsifications in Practice

This section discusses three implications of empirical falsifications from the Hui and Zhong farm cases. These include context-specificity of materiality practice, transparency condition, and the innovation of sustainability management.

8.4.1 Context-Specificity: A Critical Realism Justification

Chapters 5 and 6 present materiality practices varying across two different business settings which both achieve the closure condition, indicating the contextual manifestations of the HSM structure and mechanism. The Zhong farm case presents an example of how apparent empirical falsification result in two forms of context-specificity with respect to materiality:

1. Time-specificity: the matter is less material to the entity at one time, but more material at another time (GRI G3, 2000-2011; Zadek & Merme, 2003; AccountAbility, 2006).

2. Entity-specificity: the matter is more material to one entity, but less material to another (SASB, 2011; GRI G3, 2000-2011; Zadek & Merme, 2003; AccountAbility, 2008).

*Time-specificity of materiality practices*

The Zhong farm case concerns the same matter of discharging pig waste to vacant land at two different points in time (T1 and T2). In T1, this matter is immaterial to the Zhong farm, which suffered no pressure from stakeholder action. But, in T2, the same matter suddenly became material to the Zhong farm, as it experienced strong action from the village council.

The time-specificity of materiality in the Zhong farm case is analysed from a critical realism perspective. The two different points in time when these actions were observed concern two different operations of the mechanism. At T1, the HSM mechanism was inactivated on account of the absence of the transparency condition, which led to the empirical result of immateriality of the issue, which is not predicted by the mechanism. In contrast, at T2, when the transparency condition is met, the mechanism accurately predicts the materiality of T2, which is confirmed by observation. That is, from a critical realism perspective, the time-specific materiality practices in this case manifest in two different empirical forms, caused by
the operation of the same mechanism. Differing outcomes are due to the respective absence and existence of the essential condition of transparency.

*Entity-specificity of materiality practices*

Two issues pertaining to large volumes of pig waste discharged by the Zhong farm are comparable to Issue 1.3 in the Fu farm case. Comparison of waste management practices on the two farms indicates two possible sources of entity-specificity: 1. the essential condition of activating the mechanism; 2. contextual variations between the two entities.

The first source of entity-specificity reflects on the comparison between the immateriality of Issue T1 to the Zhong farm when the mechanism was disabled because of the absence of the transparency condition, with the high materiality of Issue 1.3 in the Fu farm case being the result of the existence of transparency. The second source of entity-specificity, contextual difference, explains the result of different materiality levels of Issue T2 (Zhong) and Issue 1.3 (Fu). In the context of the Fu farm, there is no opportunity for Fu to discharge large amounts of waste external to his farm, as any waste discharged immediately impacts neighbouring rice fields. In contrast, the Zhong farm context involves a large area of vacant land enabling direct discharge of pig waste. The contextual difference leads to two different managerial actions taken by the two farms to resolve the same sustainability issue. For Fu, the solution is expensive and involves innovative technology. For Zhong, however, it requires a landfill levy paid to the village council.

**8.4.2 Transparency Resulting from Stakeholders’ Effort to Overcome the Firm’s Preference for Non-transparency**

The necessary role of transparency in enabling the Zhong farm to be accountable to its stakeholders is reinforced from a critical realism perspective. Zhong took no action in response to Issue T1, which caused potentially serious environmental impacts for the village. This unaccountable behaviour, from a critical realism perspective, appears to falsify the mechanism, thereby leading to the inability to discharge accountability to stakeholders; that is, to ensure the discharge of accountability, it is essential to avoid empirical falsification of the mechanism. This is done by ensuring that the mechanism is activated by fulfilling all essential conditions, which, in the Zhong farm case, was the transparency condition.
Furthermore, this case implies that transparency is not inherent in a social system; rather, transparency requires deliberate action by stakeholders to monitor the operations of the firm. The firm motivated by self-interest may reduce transparency to avoid accountability. At T1, Zhong intentionally hid the discharge pipe underground and pretended to discharge waste into the pond. This phenomenon manifests as empirical falsification of the mechanism. At T2, the council’s monitoring activities represent deliberate action by stakeholders to achieve transparency, which activates the mechanism, thereby leading to the discharge of accountability to stakeholders as the firm responds to material issues. This phenomenon manifests as empirical confirmation of the mechanism.

8.4.3 Plurality of Mechanisms and the Innovation Potential

In contrast with the empirical falsification observed in the Zhong farm case pertaining to the non-discharge of firm accountability to stakeholders, the empirical results falsifying the mechanism in the Hui farm case relate to the discharge of accountability to stakeholders using innovative actions to resolve not just one specific issue, but a collection of issues.

The Hui farm falsification of the HSM mechanism supports the conception by Eccles and Serafeim (2013) of a performance frontier, which refers to overall improvement of sustainability performance based on identification and resolution of bundles of environmental, social and governance (ESG) issues that are material to the firm. Eccles and Serafeim (2013, p.56) argue that

[the performance frontier requires] ... entirely new products, process, and business models that improve performance in ‘bundles’ of material issues. Developing a single product and process innovation to address a specific issue may be part of the solution but in and of itself won’t shift the performance frontier.

In the Hui farm case, a narrow observational scope focusing on Issue Hui (1) contradicts the logic of materiality inherent to the HSM mechanism with respect to inaction taken by the firm regarding an issue that does not matter to stakeholders. This falsification implies an over-allocation of resources to install the concrete wall in response to an insignificant issue, which was resolved with limited effort by Fu. However, extended analysis of the four issues Hui (1), Hui (2), Hui (3) and Hui (4) indicates that this solution was a rational approach to
resolve the four issues. Therefore, the performance frontier is advanced by this solution. Hence empirical falsification caused by the plurality of HSM mechanisms provides a useful perspective for understanding Eccles and Serafeim’s idea of the impact of innovative sustainability management practices on firm performance.

8.5 Concluding Remarks

This chapter explored how the HSM mechanism is falsified in empirical observation and the implications of empirical falsification for sustainability management practice. The two cases of the Zhong and Hui farms present two different situations where the empirical results contradict the basic logic of materiality, on which the HSM mechanism is grounded:

1. Contradictory empirical result: the Zhong farm case provides evidence of inaction to Issue T1 significant to stakeholders;
2. Contradictory empirical result: the Hui farm case provides evidence of high action to Issue Hui (1), which was insignificant to stakeholders.

In this chapter, the Zhong case of empirical falsification is explained as a result of the inactivation of the mechanism on account of the absence of the essential transparency condition, while the Hui case of falsification is explained by the operation of other HSM mechanisms ascribing to other issues. Both cases echo Sayer’s (1992) deliberations on two possible conditions, thereby leading to the mechanism being falsified: one is where the mechanism is not activated; and the other is where the event is intervened by other mechanisms.

This chapter presented two cases that endorse the fundamental critical realism claim that the mechanism survives falsification of empirical observations (Bhaskar, 2008; Sayer, 1992). Furthermore, it concluded that there are three implications of the empirical falsification for sustainability management practice. These are as follows:

1. The situation where the HSM mechanism is falsified empirically is one source of context-specificity of materiality practices, including both time-specificity and entity-specificity.
2. An outcome falsifying the HSM mechanism owing to the absence of
transparency may represent a preference by the firm to avoid accountability. Transparency is not inherent in social systems; instead, it is constructed deliberately by stakeholders.

(3) The second form of empirical falsification of the HSM mechanism refers to an empirical result concerning the combined impact of HSM mechanisms ascribed to different issues. The implication of this falsification is positive to the firm and stakeholders, for it suggests a means of innovation management by which a managerial action is developed to resolve a bundle of issues, rather than just one specific issue (Eccles & Serafeim, 2013).

In summary, the HSM mechanism not only can be manifested contextually in different empirical closure settings (Chapters 5 and 6), and transfactually operate in the unobserved domain (Chapter 7), but also can be falsified from empirical observations in particular empirical situations, as this chapter illustrated. However, the falsification does not disconfirm the reality of the HSM mechanism. Empirical falsification has implications for explaining context-specific materiality practices. In particular, it justifies the effort of stakeholders to construct transparency in order to avoid the firm’s potential unaccountability (as illustrated in the Zhong farm case). And this study puts forward a new understanding of the innovation management method that Eccles and Serafeim’s (2013) promote, in which the firm should “innovate products, processes and business models” to “improve performance in “bundles” of material issues” (2013, p.56) (per the Hui farm case).
Chapter 9
Discussion

The previous four chapters (5 to 8) presented empirical tests of the HSM mechanism in different settings, thus signifying completion of step 2 of Bhaskar’s (1975; 2008) logic of scientific discovery. This chapter (9) presents the critical realism knowledge claims, by integrating these contextual empirical results and the theoretical implications of the HSM mechanism. This chapter is organized according to two aspects relating to two critical realism claims, these being:

1. How the materiality phenomenon is explained using the HSM knowledge. In this chapter, the HSM conceptual work and the empirical findings are explicated as a critical realism account drawing on the “structure of causal explanation” (Sayer 1992, p.109). This account presents the enduring structure and mechanism that underlie the complex materiality practices that vary across contexts or settings.

2. How this thesis achieves the critical realism ontology and epistemology. This chapter presents the stratified reality of materiality into the real, actual and empirical domains in light of the critical realism ontology, and demonstrates how knowledge from all the three domains can be generated by adopting Bhaskar’s (2008) framework for the logic of scientific discovery.

9.1 The Critical Realism Account of Materiality

In this section, Sayer’s (1992) “structure of causal explanation” is used to construct a critical realism account, in which the HSM conception and relevant empirical findings are stated and integrated into a systematic body of knowledge to explain the complex context-specific materiality phenomenon.
9.1.1 Overview of the Critical Realism Account of Materiality

Sayer (1992, p.109) proposes the “structure of casual explanation” as a scientific model to explain phenomena based on critical realism. Sayer’s model is reproduced in Figure 9.1:

**Figure 9.1: The Structure of Causal Explanation**

![Figure 9.1: The Structure of Causal Explanation](image)

X: object; S: structure; p: power; l: liability; C: condition; e: event.

--- necessary relations;

---------- Contingent relations

**Source: Sayer, 1992, p.109.**

In Figure 9.1, the unbroken line denotes necessary relation; in contrast, the dotted line symbolizes contingent relation; that is, the structure is necessarily inherent to object X, and the powers/liabilities are necessarily held by the object within in such a structure. But the events that we observe are contingent on the particular conditions or settings where object X is located.

Sayer (1992, p.109) formulates the critical realist explanation of the phenomenon as follows:

Object X, having structure S, and necessarily possessing causal powers (p) and liabilities (l), under specific conditions (c), will (c1) not activated hence producing no change - event1, (c2) produce event e2, (c3) produce e3, etc.

Figure 9.2 illustrates the application of Sayer’s critical realist model in this research context. The account in this study involves two components, the conceptual and the empirical. How these components are related is shown in the following figure.
As shown in Figure 9.2, this critical realism account involves three sections:

- The social actors or objects possess necessary sanctioning power and liability as to answerability leading to materiality practices;
- The HSM structure and mechanism is hypothesized (Chapter 4);
- Materiality practices from empirical observations vary across settings (Chapters 5 to 8).

The first two sections of this account concern the HSM conceptual work developed from the creative model building course (Chapter 4), and the third component concerns the empirical study conducted in Chapters 5 to 8; both the conceptual and the empirical components of HSM knowledge are summarized in Sections 9.1.2 through to 9.1.4. In Section 9.1.5, the two parts are integrated into the critical realism account depicted in Figure 9.3.

9.1.2 The Conceptual Component

The HSM conception involves three major products: the HSM structure, the HSM mechanism, and the Lemma of Consistent Change.

The HSM structure is inferred logically through a creative model-building course. This modelling course starts from settling the basic logic of materiality as to action taken to what really matters, on the accountability relationship between a principal (accountee) possessing sanction power demanding an account, and an agent (accountor) having the ability of to provide an account. This settlement involves a process involving five steps, through which the four elements, a principal, an agent, an issue that matters to the principal, and an account,
are structured. This structure is called the *elementary materiality structure* (Figure 4.1). This reveals the way in which the agent discharges accountability to the principal through materiality practices with respect to managerial and reporting actions, both of which are carried out in response to issues that matter to the principal. However, the five-step *materiality process* operates under the transparency condition achieved by monitoring controls. Where the agent’s behaviour is opaque to the principal, the principal cannot appropriately exert the sanction power that he/she possesses; that is, the *elementary materiality structure* cannot be sustained in absence of transparency.

Adopted in the heterogeneous stakeholder environment, the elementary materiality structure is reified to become the HSM structure indicating the materiality practices of sustainability issues. Through the five-step *materiality process*, the firm (agent), the stakeholders (principal), the issue, and the account are structured, where the firm discharges accountability to stakeholders by materiality practices involving both managerial and reporting actions pertaining to the issue. In addition, the HSM structure is conditioned by transparency, which could be achieved by monitoring controls such as social audits and assurances.

Where two comparative issues are dealt with through the five-step *materiality process*, the HSM mechanism states the law for how the firm prioritizes the more material issue (Issue A) compared to the less material one (Issue B) in the managerial and reporting practices. Issue A is more material than Issue B, provided a stronger action is taken by only one stakeholder in response to Issue A compared to Issue B, while other stakeholders remain unchanged in their actions to both issues. This test condition addressing the elementary change between two set of stakeholder actions is referred to as *singular stakeholder movement*.

Nevertheless, the condition of *singular stakeholder movement*, by which the mechanism is confirmed, is not easily achieved. To address this problem, the Lemma of Consistent Change is deduced from the HSM mechanism, and is tested under the *consistent change* condition, where Issue A provokes more than one stakeholders to take stronger actions than is provoked by Issue B, while others remain unchanged. The lemma states that the firm prioritizes Issue A as the more material issue in the managerial and reporting practices, if the two issues satisfy the *consistent change* condition. Therefore, despite the difficulty of directly testing the HSM mechanism, this mechanism is indirectly confirmed by verification of the lemma.
9.1.3 Empirical Manifestations of the HSM Mechanism

The empirical part of the account as shown in Picture 9.2 presents the context-specific materiality practices across four empirical settings: Exxon (Chapter 5), the Fu farm (Chapters 6 and 7), the Zhong farm and the Hui farm (Chapter 8). The empirical results indicate:

1. The contextual manifestations of the HSM mechanism in the Exxon and Fu farm cases demonstrate the achievement of closure and transparency conditions.
2. The materiality practice concerning a particular issue in the Zhong farm case falsifies the HSM mechanism, where the transparency is absent because of insufficient monitoring controls.
3. The materiality practice concerning a particular issue in the Hui farm case falsifies the HSM mechanism, where other mechanisms operating in other issues intervene in the empirical results.

The contextual manifestations of the mechanism

Table 9.1 summarizes in what aspects the manifestations of the HSM mechanism vary across the two closure settings of Exxon and the Fu farm.

Table 9.1: Different Contextual Manifestations of the HSM Mechanism between Two Closure Settings

<table>
<thead>
<tr>
<th></th>
<th>Exxon</th>
<th>The Fu farm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business type</strong></td>
<td>Multinational, oil giant</td>
<td>Local, tiny, family, agricultural,</td>
</tr>
<tr>
<td><strong>Stakeholders</strong></td>
<td>Complex stakeholder environment</td>
<td>Simple stakeholder environment</td>
</tr>
<tr>
<td></td>
<td>Numerous stakeholders</td>
<td>Only 3 active stakeholders</td>
</tr>
<tr>
<td><strong>Account</strong></td>
<td>Formal reports</td>
<td>Informal accounts</td>
</tr>
<tr>
<td><strong>Closure conditions</strong></td>
<td>Approximated closure</td>
<td>Quasi-closure</td>
</tr>
<tr>
<td></td>
<td>A slowly developing system</td>
<td>An isolated village; a stable system</td>
</tr>
<tr>
<td><strong>Transparency condition</strong></td>
<td>Transparency achieved by social audits and other monitoring controls including governmental and non-governmental investigations and</td>
<td>Transparency condition resting on the great openness in this system, where the stakeholders are able to perceive directly what occur in the case</td>
</tr>
</tbody>
</table>
| **Data collections** | Secondary data:  
A collection of four particular issues;  
Examine actions taken by observable stakeholders and assume other stakeholders with actions so limited as to not be observed. | A field study focusing on primary data  
Multiple sources of data  
18 issues identified  
Examining actions taken by all the three stakeholders provoked by each issue. |
|---------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| **Testing result**  | The HSM structure operates.  
An indirect confirmation of the mechanism by verifying the lemma. | The HSM structure operates.  
The mechanism directly tested and confirmed. |

The contextual differences between the two cases are significant: the Exxon case pertains to a complex system comprising of one multinational oil giant and numerous stakeholders; in contrast, the Fu farm case represents a simple system where there are a tiny agricultural farm and only three active stakeholders. Another distinct difference lies in the forms of accounts and account giving. In the Exxon case, the accounts focus on formal reports and public announcements made by Exxon on its actions or strategies to resolve the issues. In contrast, in the Fu farm case, the main method of account giving is direct open vision, with some complementary informal reporting practices.

Both case settings achieve closure conditions. The Exxon setting relates to an approximate closure (Sayer 1992), referring to a slowly developing social system, where Exxon has been a multinational oil giant for a long time, and has developed in a mature business environment. The Fu farm system is a small isolated village, which is similar to the research of Laycock (1985) in some remote villages in Wales, a context regarded, as has been pointed out previously, as the ‘best case’ for critical realism researchers to identify the underlying mechanism (Pawson & Tilley, 1997, p.86).

The two case studies vary in their respective approaches, by which particular sequences of events were collected to test the HSM mechanism, following the recommendation of Bhaskar (2008). In the Exxon case, four issues were deliberately selected in accordance with two aspects. First, each issue must allow for sufficient accessible evidence relevant to the actions
taken by stakeholders and Exxon, so as to construct a reliable base, on which the stakeholder action set and Exxon’s action is quantified. Second, these issues must meet either the consistent change or singular stakeholder movement conditions, under which the lemma or mechanism is testable. Different from the Exxon case involving only few satisfactory issues identified from the source of secondary data in testing the mechanism/lemma, the Fu farm case was conducted within the context of a field study. Here, a total of 18 issues were identified from multiple sources of primary data within a timespan of three years, and substantial tests of the mechanism were able to be conducted.

The Exxon case study fails to confirm directly the HSM mechanism, owing to the difficulty of achieving a singular stakeholder movement situation within a complex system involving many stakeholders. This situation requires only one stakeholder to modify its actions, while other stakeholders remain constant to two issues. Nevertheless, the mechanism is indirectly confirmed through the manifestation of the lemma. The setting of the Fu farm as a stable simple closed system entails the emergence of a number of issues that satisfy the singular stakeholder movement situation, thus enabling direct confirmation of the HSM mechanism.

In short, both cases confirm the HSM structure and the HSM mechanism as fundamentally underlying the contextual materiality practices.

9.1.4 Empirical Falsifications and Context-Specific Materiality Practice

Sometimes empirical observations appear to falsify the mechanism, although they cannot disconfirm it (Bhaskar, 1979; Bhaskar, 2008; Sayer, 1992). The Zhong and Hui cases provide empirical evidence on this. The empirics of either inaction taken by Zhong to significant issues, or great effort taken by Hui to insignificant issues, contradicts the basic materiality logic, where it is expected that stronger action will be taken to deal with issues that are more significant (Hicks, 1964; Bernstein, 1973; Jeffries, 1981; APB, 1985; Edgley, 2014). This, of course, is the essential premise on which the HSM mechanism is grounded. With respect to the two cases that provided contrary outcomes:

- The Zhong farm case concerns the issue of discharging pig waste, which should be significant to stakeholders. However, this issue failed to provoke adequate action of the farm in the beginning stage. This falsification occurred where the mechanism is inactivated in the absence of transparency.
• The Hui farm case addresses a seemingly insignificant safety issue of the walk path adjacent to the turtle pond. Yet Hui spent a great amount of resources on this issue. This falsification is a consequence of *intervention of other mechanisms* ascribing to three other issues taking place at the same time.

Empirical observations of these particular issues seem to contradict the knowledge claim of the mechanism; however, the mechanism survives these empirical falsifications, as will be explained further below (Bhaskar, 2008; Sayer, 1992).

Falsified empirical results of the HSM mechanism open a window to studying the context-specificity of materiality. Time-specificity was evidenced in the Zhong farm case, particularly with respect to comparing materiality practices in two different periods of the same pig waste issue. In the first stage of this issue, the HSM mechanism was not activated because the transparency condition was not achieved due to insufficient monitoring controls. Accordingly, the issue seemed immaterial, as no action was taken by the farm. In contrast, in a later stage of the same issue, the transparency condition was satisfied when the monitoring controls were imposed by the village council. Here, the HSM mechanism was activated, thereby inferring that this issue was material in provoking the farm’s action.

Entity-specificity is examined by a comparison between the responses of the Zhong and Fu farms to the pig waste issue. The Zhong farm setting involved the availability of a large, deserted, public piece of land, able to contain the pig waste. By way of contrast, the Fu farm had to discharge the waste into the ditches that affected the neighbours and village community. This contextual difference results in different materiality practices, given the two farms are identical in many other aspects. Suffering strong actions from stakeholders, the Fu farm invested a costly filter system to manage the pig waste. In contrast, the Zhong farm addressed the pig waste issue with just payment of a levy to the village council for using the vacant land.

**9.1.5 The Critical Realism Explanation of the Materiality Phenomenon**

Figure 9.3 offers a critical realism account of the materiality phenomenon, based on the above discussions, and with reference to Sayers’ model for the *Structure of Causal Explanation* depicted in Figure 9.1. Note the integration of the conceptual and empirical
components in explaining the materiality phenomenon.

Figure 9.3: Critical Realism Account of Materiality

The HSM structure: Four elements including a firm, stakeholders, an account and an issue are structured through the five-step materiality process, through which stakeholders exert their sanction power to demand an account and the firm exercises its answerability to give an account.

The HSM mechanism inferred from the HSM structure presents the law of prioritizing issues regarding their materiality levels.

The Lemma deduced from the HSM mechanism to prioritize issues where the consistent change condition is achieved.

Source: An adaption of Sayer’s causal model (Sayer, 1992, p.109) to explain the materiality phenomenon in this thesis.

The HSM structure and mechanism are presented as:

- Four things, including a firm, heterogeneous stakeholders, an issue and account are structured into an integrative body, the HSM structure, through a process of five steps progressed under transparency conditions. The HSM structure underlies materiality practices referring to the managerial and reporting practices of the firm in response to the issue.

- The HSM mechanism concerns where two comparative issues are progressed through the five-step materiality process in the HSM structure. It states a law that the firm prioritizes a more material issue from two issues in the managerial and reporting practices, in the situation of singular stakeholder movement, which refers to the elementary change of the stakeholder environment provoked by the two issues.
The HSM structure and mechanism present the enduring way of how materiality is practised and through which accountability of the firm is discharged to stakeholders. However, in different settings, the HSM structure and mechanism leads to different forms of materiality practices. In particular:

- The HSM mechanism is manifested in contexts where both the closure and transparency conditions are met. In this research, different materiality practices associating operation of the HSM mechanism are produced in the settings of the Exxon and the Fu farm.
- The HSM mechanism is not manifested empirically where it is not activated in absence of transparency, as the Zhong farm case demonstrated.
- The HSM mechanism is not manifested where the closure condition is broken as empirics are influenced by other mechanisms, as the Hui farm case demonstrated.

In summary, the critical realism account of materiality provides an effective explanation of materiality phenomenon: the HSM structure and mechanism endure and underlie complex materiality practices that vary across contexts.

### 9.2 Critical Realism Ontology of this Research

The ontological and epistemological stances of this thesis are introduced briefly in Chapter 3. This section explains further how the reality of materiality is stratified into the empirical, actual and real domains (Bhaskar, 2008), and how this stratified reality is known by means of Bhaskar’s (2008) framework, *the logic of scientific discovery*, and is derived by means of abductive logic.

To recall Bhaskar’s ontological model presented in Chapter 3, reality is stratified into three domains, these being the real, the actual and the empirical. The kinds of phenomena associated with each stratum is summarized in Figure 9.4.
In this model, the existence and operation of mechanisms as real things is independent of the conditions necessary for a researcher to access them. As a result, the mechanisms must be intransitive beyond experiences. As Bhaskar (2008, p.46) states: “Mechanisms are real and distinct from the patterns of events that they generate; just as events are real and distinct from the experiences in which they are apprehended”.

This stratified ontology differentiates critical realism from other research paradigms including positivism, constructivism and critical theory, in the following ways:

- The mechanisms exist independently of experience and point to an objective reality, in contrast with the subjective reality that constructivism or critical theory ascribe to experiences.
- Positivism regards objective reality as able to be apprehended directly from experiences. But in the view of critical realists, the reality is “normally hidden or present to men only in distorted form” (Bhaskar, 2008, p.48), thereby making it impossible to observe directly.

The stratified reality of materiality in the empirical cases of this thesis manifests as:

- Experiences from the empirical domain referring to responsive materiality practices observed by researchers;
- Events contained in the actual domain including materiality practices that actually occurred, either observed or not observed by researchers; and
- The real domain including not only issues that actually occurred, but also issues that have not occurred. The mechanism and structure are things transfactually operating in all issues.
The stratified reality of materiality in the Fu farm case manifests as:

- The empirical domain comprised of the materiality practices of Fu in response to 18 issues;
- The actual domain included not only the 18 empirical issues from the empirical domain, but also other issues that actually occurred but were not observed. In theory, the Fu farm setting constitutes 27 sets of stakeholder actions (Chapter 7). These 18 empirical issues refer to only 11 sets. Some issues associated with another 16 unidentified sets may have actually occurred, but were not observed.
- The real domain concerning all possible issues, regardless of whether they actually occur or not. The transfactual operation of the HSM mechanism in the real domain has been addressed in Chapter 7 using a predicative test of two hypothetic issues and an evaluation of four solutions to one sustainability problem.

The stratified reality in the Exxon case setting manifests as:

- The empirical domain involving materiality practices to the four issues identified in the case.
- The actual domain including not only the four issues, but also many other issues that actually occurred, but were not been observed in this case study.
- The real domain including any actual or possible issues, on all of which the HSM structure and the mechanism operate.

The Exxon case system is complex, involving numerous stakeholders. Suppose the number of stakeholders of Exxon is N. If four action levels are assigned to each stakeholder, the total number of stakeholder action sets in this case setting should be

\[ T = 4^N \]

Given that only four sets are identified from the Exxon case, the HSM mechanism exists in all possible Exxon issues, to which these T sets refer. In other words, the mechanism is believed to act transfactually with respect to any possible issue, including the four observable issues (in the empirical domain), the actual but unobservable (in the actual domain), and the possible issues which have not occurred (in the real domain).
The stratification of the materiality reality reinforces the justification of the critical realism paradigm selected in this research. The enduring HSM structure and mechanism denote the objective reality independently of researchers’ minds and views, thereby eliciting a refusal of the subjective reality that constructivism and critical theory paradigm contend. Furthermore, critical realism researchers contend that mechanisms manifest contextually in emprics and can be confirmed empirically only when certain closure conditions are satisfied (Bhaskar, 2008). This contrasts with positivistic knowledge claims drawn directly from the normal empirical world, which is open, complex and dynamic (Sohb & Perry, 2006).

9.3 Critical Realism Epistemology of the Research

9.3.1 Abductive Logic in this Research

This section addresses how the conduct of this materiality research follows the path of abductive logic and reinforces the argument that the knowledge from a critical realism study must involve abduction (Bhaskar, 1998c; 2008; Modell, 2009; Sayer, 1992). The realist epistemology holds that what can be known is grounded in the stratified world (Bhaskar, 2008). Bhaskar (p.134) states:

Science attempts to capture the stratification of the world…., to acquire knowledge of the enduring and transfactually acting mechanisms of nature, in virtue of which some but not other sequences of events (that) are necessarily connected.

Bhaskar’s statement gives rise to two implications. First, realism knowledge reveals things in the real domain, which are expressed in the empirical domain, although they may not be observed directly. Second, such knowledge is not derived from any events, but from a particular sequence of events. The subsequent discussions address the limitations of deduction and induction in achieving knowledge about the nature of materiality, and how abduction resolves these limitations.
9.3.2 Limitations of Deduction and Induction in Researching the Nature of Materiality

Deductive logic or deduction is interpreted as: if the rule “M is P”, and the case “S is M” are true, the result that “S is P” must be true (CP 2.624). Deduction indicates a necessary relationship between the result and the rule, where the knowledge concerns predication of a result in light of a pre-set rule, or test of this rule by the empirical result. However, Bhaskar (1979, p.11) states that, “in open systems … deductively justified predications, and hence decisive test situations, are impossible”. In other words, empirical observation may or may not conform to what the rule of nature informs.

To illustrate, no rule is able to predict materiality practices in an open system, where materiality practices vary across social, industrial and organizational settings (AccountAbility, 2006; 2008; Eccles & Serafeim, 2013; GRI G3, 2000-2011). In the Zhong farm case, the pig waste issue is immaterial at one time without transparency, but material at another time when transparency was formed by monitoring controls. In addition, this same issue is highly material to the Fu farm, but less so to the Zhong farm on account of the geographic differences, which allow the Zhong farm to discharge waste onto vacant land, while this is not possible for the Fu farm. As a consequence, it is not possible to predict the materiality practices of an issue based on past experience in open systems, using deductive logic, as shown in Figure 9.5.

**Figure 9.5: Limitation of Deduction in Exploring Materiality**

| The empirics – Materiality practices vary across time, place and entities |
| In open systems, the observational results are unpredictable |
| A general law |

Induction is defined as generalizing a uniform property from a number of events into all events (Peirce, 1931, CP 2.624). For example, K events are observed. The inductive interpretant recognizes a common characteristic C from the K events and asserts that C is
common for all events, including others that are not observed.

Two problems are noticeable in applying inductive logic in search of in-depth understanding of the materiality phenomenon. First, the significant dissimilarities between materiality practices limit the possibility of identifying common properties among all the observables. Second, a common property refined from the known properties from the observations is not new knowledge, thus inductive logic is critiqued as contributing little to “a cumulative growth in our knowledge of nature” (Bhaskar, 1979, p.12). Figure 9.6 illustrates the limitation of induction in exploring the nature of the materiality phenomenon.

Figure 9.6: Limitations of Induction in Exploring Materiality

As shown in this diagram, it is difficult to attain commonality among the materiality practices that vary across contexts or settings. Although some common properties are identified, they remain as descriptive evidence of the empirical findings, other than new knowledge beyond those common or particular empirical phenomena.

9.3.3 The Abduction in this Study: An Overview

Abductive logic is developed from the hypothetic inference, where the case ‘S is M’ is a
reasonable guesswork from the rule ‘M is P’ and the observation result ‘S is P’. In Chapter 3, three examples of hypothetic inference provided by Peirce has been used to explain what is hypothetic reasoning. As mentioned, abductive logic is defined by Peirce (1931) as comprising three inferential steps:

**Table 9.2 The inferential process of abduction**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>The surprising fact C is observed;</td>
</tr>
<tr>
<td>(2)</td>
<td>If the hypothetic explanation A were a truth, C would be a matter of course of A;</td>
</tr>
<tr>
<td>(3)</td>
<td>It is reasonable to suspect that A is true.</td>
</tr>
</tbody>
</table>

Figure 9.7 shows how the conduct of this materiality research follows the path suggested oby Bhaskar's (1975) logic of scientific discovery, and how this research method is framed by abductive logic.

As shown in Figure 9.7, the materiality research of this thesis is in light of Bhaskar’s (1998) theoretical framework for the *logic of scientific discovery* involving two steps, as referred in Section 3.4 and Figure 3.3. The first step is a creative model building course leading towards the ‘hypothetic explanation A’ stated in the abductive logic definition. The ‘hypothetic explanation A’ refers to the HSM structure and mechanism, which are postulated to address the research questions refined from the extensive literature review.

The second step of the *logic of scientific discovery* is to test empirically the HSM mechanism. This leads to three empirical results: (1) confirmation of the mechanism in two closed systems, Exxon and the Fu farm (Chapters 5 and 6); (2) testing the transfactual operation of the mechanism in the Fu farm (Chapter 7); and (3) testing the particular issues in the Zhong and Hui farms, where the mechanism is inactivated or obfuscated because of the intervention of other mechanisms (Chapter 8).
The empirical tests produce a range of ‘surprising facts’ defined in abduction, thus leading to three pieces of knowledge by means of which the stratified reality is revealed. These surprising facts include:

- Fact C1: Materiality practices of Exxon in response to the four particular issues;
- Fact C2: Materiality practices of the Fu farm in response to the 18 issues identified from the field study;
- Fact C3: Potential materiality practices of the Fu farm in response to the two hypothetic issues and four possible solutions to a sustainability problem;
Fact C4: Materiality practice of the Zhong farm in response to the pig waste issue; and
Fact C5: Materiality practice of the Hui farm in response to the safety issue of the walk path.

The three forms of knowledge derived abductively from the surprising facts are as follows:

9.3.4 The three forms of knowledge

Knowledge 1: The HSM mechanism exists and manifests in closed systems of the empirical domain.

The inferential process of abduction is adopted in the empirical tests of the HSM mechanism in the Exxon case (Chapter 5) and the Fu farm case (Chapter 6):

<table>
<thead>
<tr>
<th>Inferential process of abduction</th>
<th>The Exxon case</th>
<th>The Fu farm case (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The surprising fact ‘C’ is observed;</td>
<td>The fact C1 is observed from the closed system of Exxon.</td>
<td>The fact C2 is observed from the Fu farm setting pertaining to a stable closed social system.</td>
</tr>
<tr>
<td>(2) If ‘A’ were true, ‘C’ would be a matter of course of ‘A’;</td>
<td>If the HSM mechanism were true (likewise, the lemma), the fact C1 would be a matter of course of the HSM mechanism; that is, the materiality practices of the four Exxon issues conform to the lemma, which is deduced from the mechanism.</td>
<td>If the HSM mechanism were true, the fact C2 would be a matter of course of the HSM mechanism; that is, the materiality practices of the 18 issues identified conforms to the mechanism.</td>
</tr>
<tr>
<td>(3) Thus it is reasonable to suspect that A is true.</td>
<td>It is reasonable to believe the HSM mechanism is true.</td>
<td>It is reasonable to believe the HSM mechanism is true.</td>
</tr>
</tbody>
</table>

By means of abductive logic, the HSM mechanism is confirmed in different empirical closed settings, where the surprising facts C1 and C2 are observed.
Knowledge 2: The HSM mechanism operates beyond the empirical domain.
The knowledge of transfactual operation of the HSM mechanism is refined by the abductive logic (Chapter 7):

Table 9.4 Abductively inferred knowledge on transfactual operation of the mechanism

<table>
<thead>
<tr>
<th>Inferential process of abduction</th>
<th>The Fu farm case (II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The surprising fact C is observed;</td>
<td>The fact C3 concerns prospective materiality practices of hypothetic issues (or possible solutions to sustainability problems) in the Fu farm setting.</td>
</tr>
<tr>
<td>(2) If A were true, C would be a matter of course of A;</td>
<td>If the explanation were true that ‘the HSM mechanism transfactually operates on these possible issues that have not occurred’, the fact C3 would follow as a matter of course.</td>
</tr>
<tr>
<td>(3) Thus it is reasonable to suspect that A is true.</td>
<td>It is reasonable to believe the HSM mechanism transfactually operates in the real domain covering issues that have not occurred but could occur.</td>
</tr>
</tbody>
</table>

Knowledge 3: The HSM mechanism appears to be falsified in the case of some particular issues.
Empirical falsification, the ‘hypothetic explanation A’ in the abductive inferential process, refers to the case where ‘the HSM mechanism survives the apparent empirical falsifications’. Abductive logic applies to the study of empirical falsification of the HSM mechanism (Chapter 8) as follows:

Table 9.5 Abductively inferred knowledge on the mechanism surviving empirical falsification

<table>
<thead>
<tr>
<th>Inferential process of abduction</th>
<th>The Zhong and Hui farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The surprising fact C is observed;</td>
<td>The facts C4 and C5, both of which appear to contradict the HSM mechanism, are observed from the Zhong and Hui farms respectively.</td>
</tr>
<tr>
<td>(2) If A were true, C would be a matter of course of A</td>
<td>If it is true that ‘the HSM mechanism survives empirical falsifications’ (explanation A), C4 and C5 would be explained as a matter of course.</td>
</tr>
<tr>
<td>(3) Thus it is reasonable to suspect that A is true.</td>
<td>It is reasonable to believe the HSM mechanism exists; however, it may be falsified in particular empirical cases.</td>
</tr>
</tbody>
</table>

As shown in the above table, three forms of knowledge are generated from abduction in this
research:

(1) The knowledge of operation of the HSM mechanism in the empirical domain, where observations conform to the HSM mechanism in different closure settings;

(2) The knowledge of operation of the HSM mechanism in the real domain involving the issues that are possible even they have not yet happened; and

(3) The knowledge of survival of the HSM mechanism despite apparent falsifications of empirical observations with respect to some particular issues.

Concluded from these three forms of knowledge, the HSM mechanism signifies the objectively existing nature of materiality practices, which is sustained in all the domains of reality and survives the apparent falsifications of empirical findings. This result corroborates the critical realist claim that both positivism and constructivism derive knowledge only from the empirical domain, and that this knowledge should not be falsified by empirical evidence (Bhaksar, 1979, 1998a, 2008). Using abductive logic emancipates the knowledge beyond the empirical domain where the materiality phenomenon is observed, and addresses the mechanism and structure which transfactually exist in the real domain (Bhaskar, 1979; 1998a; 2008).

9.4 Concluding Remarks

This chapter addressed discussions of the theoretical and empirical works as presented in previous chapters, from which two major outcomes are generated. With regard to the first outcome, a critical realist account of materiality systematically integrates the conceptual works and empirical results so as to reveal the nature of the complex materiality phenomenon. In this account, the HSM structure underlies the context-specific materiality phenomenon, while the firm, heterogeneous stakeholders, an issue, and an account are structured through a five-step process to make manifest the basic materiality logic as to actions taken regarding what matters. The HSM mechanism states the knowledge claim that, under the enduring HSM structure, where two issues occur and where the closure and transparency conditions are satisfied, the firm prioritizes the more material one in its managerial and reporting practices. The HSM mechanism is manifested contextually in different closure settings such
as the Exxon and the Fu farm, but appears to be falsified in another setting such as the Zhong farm, where the mechanism is inactivated owing to an absence of transparency, and the Hui farm, where other mechanisms are involved in the issue.

The second aspect concerns the methodology of using abductive logic in conjunction with critical realist ontology, where reality is stratified into the empirical, actual and real domains. Abductive logic allows for knowledge of the HSM to be derived from beyond the empirical domain, in contrast to positivism, constructivism and critical theory paradigms, which would limit knowledge to empirical observations alone. Objective knowledge gained in this research reveals that the HSM structure and mechanism explain the materiality practices by which the firm discharges accountability to stakeholders. The HSM structure and mechanism survives empirical falsifications, and endures in any domains of reality; that is, they work transfactually on issues observed empirically, or issues that are unobserved but have occurred, or even possible issues that have not occurred.
Chapter 10: Conclusion

The essence of this thesis has been to advance the understanding of materiality in sustainability accounting contexts where the firm is required to discharge accountability to stakeholders. The materiality concept originated from legal contexts in the mid-19th century, has become popular in financial accounting contexts during the past decades, and has been generalized into sustainability accounting contexts in recent years. The present research provides a new perspective for understanding and applying this long-standing accounting concept of materiality by developing a model for heterogeneous stakeholder materiality (HSM). This is embedded within the critical realism paradigm and draws upon different disciplinary insights.

This chapter represents a conclusion to this thesis and addresses four aspects: (1) how the HSM knowledge developed in this research provides answers for all the primary and secondary research questions; (2) practical implications of this research to sustainability accounting and management; (3) contributions of this research to accounting research methodology; and (4) limitations of this research and future research possibility.

10.1 Responses to the Research Questions

The literature review associates the materiality concept to different disciplines including financial accounting, sustainability accounting, accountability and stakeholder theory. Carrying out this literature review assisted in identification of deficiencies in current materiality conceptions, which led to the generation of primary and secondary research questions. These questions, in turn, guided the exploration of the materiality phenomenon. These research questions can be responded to as follows:

To recapitulate, the primary question for this research is:
PQ: How can the current understanding of materiality be developed to show how materiality practices contribute to the discharge of a firm’s accountability to stakeholders for issues that matter?

The response provided in this thesis is:

The system of HSM knowledge, developed from an interdisciplinary perspective and informed by the critical realism paradigm, is useful for exploring and explaining complex materiality practices in sustainability accounting contexts.

Each secondary question can be responded to as follows:

(1) How is the concept of materiality applied by the firm to discharge accountability to stakeholders?

The HSM structure and mechanism present the way for the firm to discharge accountability to stakeholders through materiality practices, which refer to both managerial and reporting actions taken by the firm in response to issues that matter to heterogeneous stakeholders. The structure and mechanism are empirically confirmed in two cases of Exxon and the Fu farm.

(2) How can the concept of materiality be developed to address a complex environment where stakeholders hold heterogeneous interests and expectations?

The stakeholder heterogeneity paradigm is integrated in the HSM structure, which presents that materiality practices taken by the firm as to make responses to all stakeholders having diverse interests and taking different actions for their claims. The law stated in the mechanism uses the presentation of stakeholder action set to compare materiality practices of two issues concerned with the heterogeneous stakeholders. This ‘heterogeneity’ view is incorporated in the claims of HSM structure and mechanism, and is supported by empirical evidence from the Exxon and Fu farm cases.

(3) How can it be empirically confirmed that different firms have different sustainability materiality practices?
This study reveals the HSM structure and mechanism, which are objective and enduring, and which underlie the changeable, context-bound materiality phenomena that are observable. The empirical study justifies different forms of context-specificity: first, contextual manifestations of the HSM structure in different closed systems such as the Exxon and the Fu farms; second, time-specificity is evidenced in the Zhong farm’s different response to the same pig waste issue, and is justified as when transparency was absent on the first occasion (the mechanism was inactive, thus leading to no response of the farm to an issue that should be material); third, entity-specificity is illustrated by a comparison between the Zhong farm and the Fu farm regarding materiality practices of the issue of pig waste (owing to the contextual differences between two entities).

(4) How is the concept of materiality applied to both the reporting and management of sustainability?

The HSM structure indicates the associative relationship between both managerial and reporting systems in materiality practices. The HSM mechanism states the consistency between managerial and reporting practices, which is endorsed in accountability literature. The managerial-reporting consistency is verified empirically in the Exxon and the Fu farm cases.

The HSM knowledge signifies an extension of current materiality understanding in sustainability accounting contexts. It establishes an exemplar to realize the interdisciplinarity in the research of sustainability accounting, thereby reinforcing the argument that sustainability accounting is an extension of traditional accounting and communicates other different disciplines including social and environmental knowledge (Birkin, 2000; Gray, 1992; Nyquist, 2000).

10.2 Practical Implications for Sustainability Accounting and Management

The practical implications of the HSM knowledge are presented from four aspects. First, the thesis establishes an effective explanation to the materiality phenomenon in different settings.
The HSM knowledge explains not only materiality practices in closed systems such as in Exxon and the Fu farm settings, but also justifies the unusual observable phenomena where the mechanism appears to be falsified, such as in the Zhong and Hui farm cases.

Second, as presented in Chapter 7, application of the HSM mechanism enables prediction of the firm’s behaviour in some possible issues, and evaluation of solutions to the sustainability problems, thereby demonstrating its value in the decision-making process and risk management.

Third, the case study where empirical observations seemingly falsified the HSM mechanism generates practical insights on sustainability management. In the Zhong farm case study, the empirical falsification is attributed to inactivation of the HSM mechanism in the absence of transparency. This informs the necessary role of stakeholders in establishing and maintaining transparency, since sometimes opaqueness may be favoured by firms in avoiding accountability (see Chapter 8). The Hui farm case study reveals that one HSM mechanism appears to be falsified when other mechanisms intervene in the empirical outcomes. This falsification is associated with the innovation management, which encourages the development of a new technique or business model to resolve a bundle of sustainability issues, rather than resolving them individually (see Chapter 8).

Fourth, the Fu farm case demonstrates the application of materiality to the context of small enterprises, where the formal reporting activities may be unnecessary in the stakeholder communication. This case study elicits a prospect for applying sustainability accounting concepts in practices of the small businesses and settings with informal accounting, given that current sustainability accounting standards and studies focus on formal reports in larger corporations.

### 10.3 Contributions to Accounting Research Methodology

The critical realism paradigm, on which this thesis is grounded, represents a novel approach for researching accounting practices, which have been traditionally interrogated using positivist, interpretivist, and critical theory approaches (Sohb & Perry, 2006). More recently,
accounting scholars have begun to recognize the potential of critical realism in exploring accounting phenomena, and have promoted application of this paradigm as a new approach in accounting research (Bisman, 2011; Modell, 2009). Given the scarcity of the critical realism studies in accounting literature to date, this thesis provides a concrete research case with a systematic application of critical realism, thereby enriching the accounting research literature.

The value of application of the critical realism approach can be summarized from the following three perspectives:

1. Based on the research questions derived from the literature review, this thesis justifies selection of critical realism other than other paradigms in this research. In Chapter 3, drawing on Sayer’s (1992) classic book, this thesis articulated a system of interrelated technical terms underpinning the critical realism philosophy. This terminology illustrates the philosophical stance of critical realism of this research by detailing implication and relevance of each technical term in the context of this research.

2. Bhaskar’s (2008) theoretical framework for the logic of scientific discovery was adopted to guide the design and methodology for this inquiry into the materiality phenomenon. Following the framework, the research proceeded via two steps: first, postulating the structure or mechanism underlying the phenomenon; and, second, empirically testing the mechanism in different empirical settings. These steps led to a critical realist account of HSM, which demonstrates the enduring HSM structure and mechanism underlying the complex materiality practices varying across settings and conditions.

3. Based on Peirce’s (1931) classic work of logic, this thesis clarifies why only the abductive logic is applicable to construct a critical realist account of materiality, and why deduction and induction are not suitable. It also reveals (1) how abductive logic frames Bhaskar’s (2008) logic of scientific discovery framework through which the knowledge in the real domain is achieved, (2) that the HSM mechanism survives empirical falsifications, and (3) that transfactually operates in any issues whether observed or not.
Adopting the critical realist approach revealed knowledge of the enduring realities underlying changeable and complex materiality practices. The philosophical implications of sustainability accounting materiality are demonstrated in this research, which provides insights for accounting scholars who are interested in promoting critical realism as a rival paradigm in accounting research to the traditional constructivism and positivism paradigms (Modell 2009; Bisman 2010).

10.4 Reflections on the school of critical accountability

Within the accountability literature, the critical accountability school explores new possibilities of accountability that differ from its traditional conception based on the agent’s self-interest and an individualized process relying on the agent’s own efforts in giving an account. This research reflects on two themes from this school.

The first reflection concerns the theme of for-the-other accountability, which grounds the accountability process on the agent’s obligation to the principal, instead of merely the agent’s own interests (Shearer, 2002; Messner, 2009). This view supports the argument of CGA-Canada (2006) and GRI G3 (2000-2011), where issues that are significant to stakeholders should be prioritized as significant to the firm. In this research, the HSM structure indicates intrinsic correlation between ‘significance to stakeholders’ and ‘significance to the firm’, thereby justifying stakeholder concerns and actions as the grounds on which materiality is assessed. One perplexing question resting on the for-the-other accountability view is how to discharge accountability to “all others out there” (i.e., all principals) (Roberts, 2009, p.923). This question is addressed in this research by integration of stakeholder inclusivity assumption into the HSM structure. Furthermore, the consideration of for-all-others is evidenced empirically in the Fu farm case study from Fu’s statement concerning satisfying all stakeholders and his deliberative actions in response to all relevant stakeholders.

The second reflection lies in the theme of intelligent accountability, where the agent and principals form a cooperative relationship based on mutual interdependence (Roberts 2009). This cooperative relationship renders accountability as an ongoing socializing process, through which the agent and principle share their understanding of problems, cooperate to
formulate solutions, leading to better outcomes for both. The Fu farm case provides evidence of how this intelligent form of accountability discharge are realized through the sustainability accounting materiality process. In this case, materiality practices including identifying, assessing, managing and reporting material sustainability issues are operationalized as Fu and stakeholders interact and cooperate through regular and diverse communication and account-giving methods, thereby leading to increased openness and active enquiry. The Fu farm case reflects a community rather than a traditional singular-actor stage where the firm (actor) reports to stakeholders (audience). This community comprises the Fu farm and stakeholders as normative members working together in a process of discharging accountability of material sustainability issues, all of which leads to a state of intelligent accountability.

By evolving the accountability-materiality connection this research has contributed to improving accounting for sustainability. Application of the materiality concept in accounting for sustainability will improve the accounting of interactions between humans and nature.

10.5 Limitations and Future Research

One limitation for this research lies in the small number of cases involved in confirming the mechanism. Bhaskar (1979; 1998a; 2001; 2008) and Sayer (1992) argue, it is particular sequences of events, which may be rare and emerge in closed systems, rather than normal cases in open systems, that enable identification of the mechanism. From this perspective, it may be reasonable to state that the mechanism is able to be identified from a “limited number of cases” (Sayer, 1992, p.242). In this thesis, only four cases (Exxon and three farms) were used to test the HSM mechanism. However, the transfacutal nature of the mechanism endorses opportunity of studying of the mechanism from many various contexts (Bhaskar, 1979; 2008), thereby enriching our understanding of the context-varied phenomenon. But, owing to the rarity of closed systems in the social world (Bhaskar, 1979; Danermark et al., 2002; Sayer, 1992), seeking a new case in a closed system, and then conducting extensive empirical study of the HSM mechanism in the context of this case would have invoked a significant expenditure of time, effort and resource allocated to explorations beyond the scope of this thesis. That is why this research is limited to only two cases in which closed systems are manifest.
The second limitation is the case-specificity of the materiality measurement method, from which the stakeholder actions and the firm’s managerial and informational response are quantified. Different organizations correspond to different sets of stakeholders, and the response modes of these organizations will vary. In this thesis, the quantification criteria differ between the Exxon setting and the small farm setting. In addition, the measurement methods developed for either setting of this thesis may not be suitable for cases in other settings, such as educational institutions, supermarkets, and e-commerce businesses. A new empirical case study should ideally involve development of the local materiality measurement method, based on an extensive analysis of the behaviour modes of the case organization, together with its stakeholders.

Future research possibilities could cover different approaches to explore the HSM mechanism. One possibility is to enrich practical implications of the mechanism by means of action research. Action research represents “an approach in which the action researcher and a client collaborate in the diagnosis of a problem and in the development of a solution based on the diagnosis” (Bryman & Bell, 2003, pp.303-304). A future research direction could to participate in one or more organizations and actively integrate the HSM knowledge such as the “complete materiality index” into the decision-making processes of these organizations. As addressed in Chapter 7, the practical relevance of HSM mechanism includes predicating the firm’s behaviour in response to sustainability issues and evaluating solutions to the sustainability problems. New practical implications of the mechanism may be generated in action research, including new materiality-relevant protocols, as well as concrete experiential knowledge in implementing the materiality models in different social, industrial, and organizational settings.

Another research possibility could be associated with empirical falsification of the mechanism. Chapter 8 has addressed the case of how a small farm intended to be unaccountable, while the materiality mechanism was not activated owing to an absence of transparency. This topic warrants further investigation conducted in different organizational settings. For example, this knowledge about falsification may facilitate a new research to explore the phenomena regarding how and why some big companies hide material issues in their reports, and how materiality practices relate to the process of improving transparency, which involves complex monitoring controls by a wide range of stakeholders.
10.6 Summary

This final chapter addressed four aspects of this study. First, knowledge concerning the HSM is provided, which allows responses to the research questions from both theoretical and empirical perspectives. Second, the HSM explains the materiality phenomenon, which would improve decision-making in sustainability management and shed light on accounting practices for small business and informal account settings. Third, the thesis serves as an exemplar of systematically applying the critical realism paradigm to construct a concrete accounting research methodology. Fourth, this thesis reflects on the school of critical accountability and shows how the accounting process of materiality enables a new form of accountability, signalled as fulfilment of the firm’s normative for-the-other obligation, and as a sustainable community mobilizing on reciprocal dependencies of the firm and stakeholders. Fifth, this chapter addressed the limitations of this thesis as to a small number of cases suitable to confirm the mechanism and case-specificity of measurement criteria, and also outlines future research possibilities, which include the potential use of action research to enrich practical implications of the HSM mechanism.

To conclude, this thesis extends materiality knowledge by means of adopting the critical realism paradigm, which has hitherto been applied only rarely in traditional accounting explorations. An innovative body of materiality knowledge has been constructed in this thesis from an interdisciplinary perspective, thereby providing new insights from an in-depth investigation of the complex materiality practices of sustainability issues.
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Appendix 1:
The data sources of the Exxon case study

Codes of data sources for each issue

Issue 1

- The background information (DS1.1; DS 1.2)
- Stakeholder actions:
  The S1 action (DS 1.3); the S2 action (DS 1.4); the S3 action (DS 1.5); the S4 action (DS 1.6); the S5 action (DS 1.6; DS 1.7; DS1.8)
- Exxon’s response:
  The managerial action of the firm (DS 1.5; DS 1.9); the informational response of the firm (DS 1.9; DS 1.10).

Issue 2

- The background information (DS 2.1; DS 2.2)
- Stakeholder actions:
  The S1 action (DS 2.3; DS 2.5; DS 2.9); the S2 action (N/A); the S3 action (DS 2.3; DS 2.4; DS 2.5); the S4 action (DS 2.6; DS 2.7); the S5 action (DS 2.1; DS 2.8)
- Exxon’s response:
  The managerial action (DS 2.10); the informational response (DS 2.9);

Issue 3

- The background information (DS 3.1; DS 3.2; DS 3.3)
- Stakeholder actions:
  The S1 action (DS 3.3); the S2 action (N/A); the S3 action (DS 3.1, p.15; DS 3.4); the S4 action (DS 3.1; DS 3.5); the S5 action (N/A).
- Exxon’s response:
  The managerial action (DS 3.5); the informational response (DS 3.5);

Issue 4

- The background information (DS 4.1; DS 4.2)
- The stakeholder actions:
  The S1 action (DS 4.1; DS 4.3); the S2 actions (N/A); the S3 actions (DS 4.4); the S4
actions (DS 4.5; DS 4.6; DS 4.7); the S5 action (N/A).

- Exxon’s response:

  The managerial action (DS 4.2); the informational response (DS 4.2).

**Data Sources of the Exxon Case Study**

**Issue 1**


**Issue 2**


**Issue 3**

(DS 3.1) Skjærseth, J. (2003). ExxonMobil: Tiger or turtle on social responsibility? (FNI


Issue 4


