The Influence of Institutional and Stakeholder Pressures on Carbon Disclosure Strategies: An Investigation in the Global Logistics Industry

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Abstract

This thesis employs a six study, mixed-method research focusing on extending and expanding upon the literature examining the influences of institutional and stakeholder pressures on carbon management practices and associated carbon disclosure strategies. More specifically, the research investigates how both pressures influence the extent of disclosure in the context of the global logistics industry. In doing so, the thesis provides insights into the mechanisms behind the adoption of carbon disclosure and the effectiveness of carbon management practices.

This research responds to previous research in carbon disclosure which has indicated that carbon management practices vary widely due to multiple internal and external pressures. The implications of pressures on carbon management practices have been investigated in diverse contexts such as its relationship to financial performance, carbon emissions reduction, or legitimisation tactics. Yet, the application of carbon management practices and their implications on carbon disclosure strategies and their underlying drivers has received limited research attention, in particular in the context of the global logistics industry. As a result, the first paper of this thesis addresses this gap through a systematic literature review, posing the first research question:

*RQ1. To what extent have carbon management practices been implemented in the global logistics industry?*

The results of the systematic literature review showed limited application of carbon management practices in the logistics industry, in particular carbon disclosure research was highly under-represented and was identified as the biggest opportunity for further research. These findings led to the development of Papers B and C, where similarities and differences in carbon reporting and disclosure were examined through an institutional lens. Using case studies from global logistics companies, both papers used a qualitative approach to provide insight into whether these companies follow a symbolic or substantial disclosure approach, and which underlying dominant logic drives carbon disclosure behaviour, in answering the research questions:

*RQ2. How does the sustainability logic influence carbon disclosure behaviour?*

*RQ2a. Which disclosure behaviour - symbolic or substantial - dominates carbon reporting in the global logistics industry?*
RQ2b. How does the emergence of sustainability influence the extent of carbon reporting?

The findings of this study revealed significant differences in the applied carbon disclosure approaches and their underlying logics. From an institutional logics perspective, corporate carbon disclosure practices are either dominated by a market logic emphasizing the economic benefits of carbon reductions, or by a sustainability logic following a more transparent approach. From a theoretical viewpoint, the study provides a more detailed conceptual foundation by linking the different carbon disclosure strategies to the underlying logics that drive carbon disclosure approaches.

However, although both papers provide important insights into the differences in carbon reporting behaviour, the focus on institutional logics provides only limited understanding of the conditions under which these different outcomes arise. This limitation led to the development of Paper D, a conceptual paper that integrates stakeholder theory with institutional theory. Paper D thereby provides a theoretical framework for examining institutional and stakeholder influences, and complements the institutional dimension with a stakeholder dimension, leading to the research question:

RQ3. How does the interaction between institutional and stakeholder pressures influence carbon disclosure strategies in global logistics companies?

The paper uses both dimensions to build an integrative model that depicts four types of carbon disclosure strategies in the global logistics industry based on the extent of institutional and stakeholder pressures. To examine the extent of institutional pressures, the paper introduces the concept of ‘logics centrality’, representing the position of the sustainability logic, that is, to what extent climate change values are internally integrated into a company’s value system. To examine stakeholder pressures, the paper follows the concept of stakeholder salience, that is, to what extent external stakeholder claims are given priority. The study in Paper D seeks to understand how stakeholder pressures and institutional logics interact, thereby advancing existing research by exploring how organisations are impacted by both firm-level agency and field-level pressures.

To apply the model from Paper D, Paper E was developed and represents an empirical study that utilises data collected from Bloomberg ESG and CDP data. In particular, 26 specific carbon
management practices were identified in order to examine the degree of institutional as well as stakeholder pressures and their influence on disclosure strategies, posing the research question:

*RQ4a. To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?*

*RQ4b. From a corporate perspective, what carbon disclosure strategies have been adopted?*

The findings show that the majority of companies align internal and external carbon management practices, reflecting a consistent strategic approach towards carbon disclosure. Most companies follow either a transparent or a symbolic approach, indicating that these companies are either engaged in both internal and external practices or in neither. From a theoretical viewpoint, the analysis indicates that most companies see the sustainability logic as a core function in the company, while at the same time giving priority to stakeholder claims that go beyond market-driven initiatives, leading to transparency and full carbon disclosure. However, although the study applies the model from Paper D and provides interesting results, it is limited as it does not address whether or how disclosure strategies have shifted over time, leading to the last research questions of this thesis:

*RQ4c. To what extent have internal and external pressures led to a change in carbon management practices?*

*RQ4d. To what extent have internal and external pressures led to a change in carbon disclosure strategies?*

Using a similar dataset as in Paper E, the findings show overall shifts to more transparent corporate carbon disclosure strategies between 2010 and 2015, with an increase in applied carbon management practices in both internal and external actions, driven by internal practices. From a theoretical viewpoint, the study shows that companies have increasingly integrated climate change into their value systems, represented by a shift of the sustainability logic closer to the organisational core function.

This research applies a more rigorous theoretical and empirical research approach to develop insight through an institutional and stakeholder lens, and therefore extends carbon disclosure research. Papers B and C identify not only the dominant logics behind carbon disclosure behaviour, but also provide interesting insights into the similarities and differences using real-life logistics examples. More importantly, Paper D develops a framework to distinguish between institutional and stakeholder pressures, providing a theoretical framework to examine the
influence of these pressures on carbon disclosure strategies. This marks the first conceptual model in carbon disclosure research that combines theoretical constructs from institutional and stakeholder theory to examine and categorise internal and external influences. Finally, Papers E and F examine the influence of carbon management practices on disclosure strategies by applying the model discussed in Paper D. Both Papers E and F empirically categorise carbon disclosure strategies which have not been previously identified in carbon disclosure research, and therefore have the potential to provide a better understanding of carbon disclosure practices and strategies.

**Keywords:** Institutional logics, stakeholder salience, carbon disclosure strategies, carbon reporting, carbon management practices, logistics, transportation, sustainable logistics, corporate sustainability management.
II Acknowledgements

Associate Professor Ki-Hoon Lee and Dr. Yong Wu, I want to thank you for the wonderful support throughout my PhD journey. Your availability, knowledge, support and words of wisdom during my candidature have been nothing but remarkable. I owe my deepest gratitude to Professor Lee, who took me under his guidance for this journey and is the person most responsible for my steep learning curve in academia. Ki-Hoon Lee has been an outstanding mentor throughout my candidature and I look forward to continuing to work with him in the future.

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III Statement of Original Authorship

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Signature:

Date: 17 January 2018
IV PhD specific publications

Presented as part of thesis

Journal articles

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 7

Chapter 8
Papers written during candidature related to the PhD topic but not included in this thesis

Refereed conference papers


# Table of contents

Abstract .......................................................................................................................2  
II Acknowledgements ...............................................................................................6  
III Statement of original authorship .......................................................................8  
IV PhD specific publications .....................................................................................9  
V List of figures .........................................................................................................16  
VI List of tables ..........................................................................................................17  
VII List of abbreviations ...........................................................................................18  
VIII Acknowledgement of papers included in this thesis .........................................20  

1 Chapter I: Introduction ...........................................................................................22  
  1.1 Background .........................................................................................................22  
  1.2 Research rationale and aims ..............................................................................23  
  1.3 Research design ..................................................................................................29  
  1.4 Contributions to theory ......................................................................................31  
  1.5 Contributions to practice ....................................................................................31  
  1.6 Structure of thesis ..............................................................................................32  
  1.7 Conclusion ..........................................................................................................36  

2 Chapter 2: Research design ....................................................................................37  
  2.1 Research paradigm and approach .......................................................................37  
  2.2 Research overview .............................................................................................38  
  2.2.1 Paper A: Systematic review of the literature 2000-2015 ...............................38  
  2.2.2 Paper B: Similarities and differences in carbon disclosure in global logistics companies .........................................................................................................................40  
  2.2.3 Paper C: The influence of sustainability logic on carbon disclosure ..............41  
  2.2.4 Paper D: The conceptual framework of carbon disclosure strategies .............43  
  2.2.5 Paper E: The interaction of internal and external pressures ............................43  
  2.2.6 Paper F: The interaction of internal and external pressures over time ..........44  
  2.3 Conclusion ..........................................................................................................45  

3 Chapter 3: Literature review ...................................................................................46
3.1 Introduction ................................................................. 46
3.2 Corporate climate change responses ........................................ 47
3.3 Paper A: Carbon management in the global logistics industry .......... 50
  3.3.1 Abstract ........................................................................ 52
  3.3.2 Introduction ..................................................................... 53
  3.3.3 Carbon management in logistics and transportation .................. 55
  3.3.4 Methodology .................................................................... 56
    3.3.4.1 Identifying literature and study selection ......................... 57
    3.3.4.2 Analysis of literature selection ....................................... 58
  3.3.5 Results and discussion ..................................................... 69
    3.3.5.1 Main characteristics ...................................................... 69
    3.3.5.2 Carbon management: Key topic results ......................... 70
    3.3.5.3 Carbon strategy ......................................................... 70
    3.3.5.4 Carbon risk assessment ............................................... 72
    3.3.5.5 Carbon target setting .................................................... 73
    3.3.5.6 Carbon reduction initiatives .......................................... 74
    3.3.5.7 Carbon performance and reporting................................. 77
  3.3.6 Identified gaps and directions for future research .................... 80
  3.3.7 Conclusions ..................................................................... 83
3.4 Carbon disclosure in the global logistics industry ......................... 85
3.5 Institutional pressures ................................................................ 87
  3.5.1 Institutional complexity and competing logics ....................... 90
  3.5.2 The influence of underlying competing logics on carbon disclosure 92
  3.5.3 Logics centrality ............................................................ 96
3.6 Stakeholder salience ................................................................ 99
3.7 The interaction between institutional and stakeholder pressures ....... 104
3.8 Conclusion ......................................................................... 106
4 Chapter 4 (Paper B): Similarities and differences in carbon disclosure in global logistics companies ........................................... 108
  4.1 Abstract ............................................................................ 110
  4.2 Introduction ...................................................................... 111
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 Carbon disclosure in the global logistics industry</td>
<td>112</td>
</tr>
<tr>
<td>4.4 The implications of carbon disclosure in the global logistics industry</td>
<td>114</td>
</tr>
<tr>
<td>4.5 Methods</td>
<td>117</td>
</tr>
<tr>
<td>4.6 Results and discussion</td>
<td>119</td>
</tr>
<tr>
<td>4.7 Conclusion</td>
<td>123</td>
</tr>
<tr>
<td>5 Chapter 5 (Paper C): The influence of sustainability logic on carbon disclosure</td>
<td>125</td>
</tr>
<tr>
<td>5.1 Abstract</td>
<td>128</td>
</tr>
<tr>
<td>5.2 Introduction</td>
<td>129</td>
</tr>
<tr>
<td>5.3 Carbon reporting in the global logistics industry</td>
<td>131</td>
</tr>
<tr>
<td>5.4 Legitimation and carbon reporting approaches</td>
<td>134</td>
</tr>
<tr>
<td>5.5 The influence of underlying competing logics on carbon disclosure</td>
<td>136</td>
</tr>
<tr>
<td>5.6 Research method</td>
<td>139</td>
</tr>
<tr>
<td>5.7 Results and discussion</td>
<td>144</td>
</tr>
<tr>
<td>5.7.1 Carbon strategy/climate change statements</td>
<td>144</td>
</tr>
<tr>
<td>5.7.2 Degree of transparency</td>
<td>149</td>
</tr>
<tr>
<td>5.7.3 Internal initiatives</td>
<td>152</td>
</tr>
<tr>
<td>5.7.4 External stakeholder engagement</td>
<td>155</td>
</tr>
<tr>
<td>5.8 Conclusions</td>
<td>159</td>
</tr>
<tr>
<td>6 Chapter 6 (Paper D): The conceptual framework of carbon disclosure strategies</td>
<td>162</td>
</tr>
<tr>
<td>6.1 Abstract</td>
<td>164</td>
</tr>
<tr>
<td>6.2 Introduction</td>
<td>165</td>
</tr>
<tr>
<td>6.3 The assumptions of the institutional framework</td>
<td>168</td>
</tr>
<tr>
<td>6.4 Institutional pressures</td>
<td>170</td>
</tr>
<tr>
<td>6.5 Institutional complexity and competing logics</td>
<td>172</td>
</tr>
<tr>
<td>6.6 Logic centrality</td>
<td>174</td>
</tr>
<tr>
<td>6.7 Stakeholder salience</td>
<td>176</td>
</tr>
<tr>
<td>6.8 Types of carbon disclosure strategies</td>
<td>180</td>
</tr>
<tr>
<td>6.8.1 Substantial disclosure</td>
<td>181</td>
</tr>
<tr>
<td>6.8.2 Symbolic disclosure</td>
<td>183</td>
</tr>
<tr>
<td>6.8.3 Transparent disclosure</td>
<td>184</td>
</tr>
<tr>
<td>6.8.4 Engaged disclosure</td>
<td>186</td>
</tr>
</tbody>
</table>
6.9 Conclusion........................................................................................................187

7 Chapter 7 (Paper E): The interaction of internal and external pressures ..........190
7.1 Abstract........................................................................................................192
7.2 Introduction ..................................................................................................193
7.3 Internal and external pressures ....................................................................195
  7.3.1 Internal practices .....................................................................................196
  7.3.2 External practices ....................................................................................196
7.4 The implications of carbon disclosure pressures ......................................197
7.5 Research design ..........................................................................................201
  7.5.1 Sample ....................................................................................................202
  7.5.2 Carbon disclosure variables ....................................................................202
  7.5.3 Measuring carbon management practices (CMPs) ................................204
  7.5.4 Carbon disclosure strategy measurement ..............................................205
7.6 Results .........................................................................................................206
  7.6.1 Descriptive statistics of CMPs .................................................................206
  7.6.2 Categorisation of carbon disclosure strategies .......................................208
7.7 Discussion of results ....................................................................................210
7.8 Conclusion and limitations ..........................................................................212

8 Chapter 8 (Paper F): The interaction of internal and external pressures over time ....215
8.1 Abstract........................................................................................................217
8.2 Introduction ..................................................................................................218
8.3 Strategic internal and external responses ....................................................220
8.4 Carbon disclosure responses and strategies ..............................................222
8.5 Research design ..........................................................................................225
  8.5.1 Sample ....................................................................................................226
  8.5.2 Carbon disclosure variables ....................................................................226
  8.5.3 Measuring carbon management practices (CMPs) ................................229
  8.5.4 Carbon disclosure measurement .............................................................230
8.6 Results .........................................................................................................230
  8.6.1 Descriptive statistics of CMPs .................................................................230
  8.6.2 Categorisation of carbon disclosure strategies .......................................233
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.7</td>
<td>Discussion of results</td>
<td>236</td>
</tr>
<tr>
<td>8.8</td>
<td>Conclusions and limitations</td>
<td>237</td>
</tr>
<tr>
<td>9</td>
<td>Chapter 9: Discussion and conclusion</td>
<td>239</td>
</tr>
<tr>
<td>9.1</td>
<td>Introduction</td>
<td>239</td>
</tr>
<tr>
<td>9.2</td>
<td>Research purpose and design</td>
<td>239</td>
</tr>
<tr>
<td>9.3</td>
<td>Addressing the research questions</td>
<td>240</td>
</tr>
<tr>
<td>9.3.1</td>
<td>Research question 1</td>
<td>240</td>
</tr>
<tr>
<td>9.3.2</td>
<td>Research question 2</td>
<td>241</td>
</tr>
<tr>
<td>9.3.3</td>
<td>Research question 3</td>
<td>244</td>
</tr>
<tr>
<td>9.3.4</td>
<td>Research question 4</td>
<td>246</td>
</tr>
<tr>
<td>9.4</td>
<td>Contributions to theory</td>
<td>247</td>
</tr>
<tr>
<td>9.5</td>
<td>Contributions to practice</td>
<td>250</td>
</tr>
<tr>
<td>9.6</td>
<td>Limitations</td>
<td>251</td>
</tr>
<tr>
<td>9.7</td>
<td>Conclusion</td>
<td>254</td>
</tr>
<tr>
<td>9.8</td>
<td>Implications and future research</td>
<td>256</td>
</tr>
<tr>
<td></td>
<td>Reference List</td>
<td>259</td>
</tr>
</tbody>
</table>
V List of figures

Figure 1.1: Thesis structure ...........................................................................................................34
Figure 2.1: Research overview .....................................................................................................108
Figure 3.1: Review structure ........................................................................................................48
Figure 3.2: The influence of competing (market vs. sustainability) logics ..............................92
Figure 3.3: Institutional and stakeholder influences (developed by author) .........................101
Figure 5.1: The influence of competing (market vs. sustainability) logics ..............................149
Figure 6.1: Institutional framework ............................................................................................185
Figure 6.2: Types of carbon disclosure strategies ........................................................................197
Figure 7.1: Carbon disclosure strategy types ..............................................................................222
Figure 7.2: Summary of the global logistics companies’ carbon disclosure strategies ..........232
Figure 8.1: Carbon disclosure responses ....................................................................................249
Figure 8.2: Summary of the shifts in carbon disclosure strategies ............................................260
VI List of tables

Table 3.1: Key topics and elements ........................................................................................................................................51
Table 3.2: Summary of the reviewed papers ..........................................................................................................................54
Table 5.1: Carbon disclosure categories ................................................................................................................................152
Table 5.2: Carbon strategy statements ..................................................................................................................................156
Table 5.3: Scope emissions reporting ..................................................................................................................................161
Table 5.4: Main internal initiatives ........................................................................................................................................165
Table 5.5: External stakeholder engagement ...........................................................................................................................168
Table 7.1: Carbon management practices (CMPs) ....................................................................................................................225
Table 7.2: Summary of descriptive statistics ............................................................................................................................229
Table 7.3: Scores by carbon disclosure strategy type ................................................................................................................233
Table 8.1: Carbon management practices (CMPs) ....................................................................................................................253
Table 8.2: Summary of descriptive statistics ............................................................................................................................257
Table 8.3: Drivers for change in carbon disclosure strategies ..................................................................................................261
VII List of Abbreviations

A4A  Airlines for America
ASTM American Society of Testing and Materials International
ATA American Truck Association
CAFFI Commercial Aviation Alternative Fuels Initiative
CDSB Climate Disclosure Standards Board
CEC Commission for Environmental Cooperation
CEO Chief Executive Officer
CO2 Carbon dioxide emissions
CDP Carbon Disclosure Project
CMP Carbon Management Practices
CSR Corporate Social Responsibility
DOE Department of Energy
EDTA Electric Drive Transportation Association
ESG Environment, social and governance
EPA Environmental Protection Agency
ETS Emission trading schemes
EU European Union
ESLC Energy Security Leadership Council
GDP Global domestic product
GFA Green Freight Asia
GFE Green Freight Europe
GHG Greenhouse gas
GRI Global Reporting Initiative
ICAO International Civil Aviation Organisation
ISO International Organisation for Standardization
LEED Leadership in Energy and Environmental Design
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED</td>
<td>Light-emitting diode</td>
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<tr>
<td>LNG</td>
<td>Liquefied natural gas</td>
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<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
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<tr>
<td>NGO</td>
<td>Non-government organisation</td>
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<td>NGV</td>
<td>Natural gas vehicle</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>PR</td>
<td>Public relations</td>
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<td>R&amp;D</td>
<td>Research and development</td>
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<td>SAFE</td>
<td>Securing America’s Future Energy</td>
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<td>SBSC</td>
<td>Sustainability balanced scorecard</td>
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<td>SDGs</td>
<td>Sustainable development goals</td>
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<td>US</td>
<td>United States</td>
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<td>UN</td>
<td>United Nations</td>
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<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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<td>WBCSD</td>
<td>World Business Council for Sustainable Development</td>
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<td>WCED</td>
<td>World Commission on Environment and Development</td>
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<td>WRI</td>
<td>World Resource Institute</td>
</tr>
<tr>
<td>WEF</td>
<td>World Economic Forum</td>
</tr>
</tbody>
</table>
VIII Acknowledgement of papers included in this thesis

ALL PAPERS INCLUDED ARE CO-AUTHORED

Section 9.1 of the Griffith University Code for the Responsible Conduct of Research (“Criteria for Authorship”), in accordance with Section 5 of the Australian Code for the Responsible Conduct of Research, states:

To be named as an author, a researcher must have made a substantial scholarly contribution to the creative or scholarly work that constitutes the research output, and be able to take public responsibility for at least that part of the work they contributed. Attribution of authorship depends to some extent on the discipline and publisher policies, but in all cases, authorship must be based on substantial contributions in a combination of one or more of:

- conception and design of the research project
- analysis and interpretation of research data
- drafting or making significant parts of the creative or scholarly work or critically revising it so as to contribute significantly to the final output.

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- accept or decline offers of authorship promptly in writing.
- Include in the list of authors only those who have accepted authorship
- Appoint one author to be the executive author to record authorship and manage correspondence about the work with the publisher and other interested parties.
- Acknowledge all those who have contributed to the research, facilities or materials but who do not qualify as authors, such as research assistants, technical staff, and advisors on cultural or community knowledge. Obtain written consent to name individuals.

Included in this thesis are papers in Chapters 3, 4, 5, 6, 7 and 8 which are co-authored with my principal supervisor. My contribution to each co-authored paper is outlined at the front of the relevant chapter. The bibliographic details (if published or accepted for publication)/status (if prepared or submitted for publication) for these papers including my co-author, are:

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Chapter 7: Submitted 25 September 2017 & under review
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Appropriate acknowledgements of those who contributed to the research but did not qualify as authors are included in each paper.

For this research, ethical clearance was approved by the Griffith University Human Research Committee and is recorded under GU Ref No: 2016/876.

Signatures

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17 January 2018
Principal Supervisor: Associate Professor Ki-Hoon Lee
Chapter 1: Introduction

1.1 Background

Climate change is a serious environmental issue of concern for the global audience. Evidence reveals that global warming is occurring mainly due to the burning of fossil fuels, which will lead to major global environmental, social and economic changes throughout the world if an appropriate and timely response that counters global warming is not carried out in the very near future. The United Nations (UN) regards climate change as one of the biggest challenges of our times and states: “From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale” (UN 2017, p.1).

To avoid these devastating effects, climate scientists argue that the increase in global temperature should not exceed 2 degrees Celsius by the end of the century (IPCC 2014). This, in turn, calls for a significant reduction of carbon emissions and thus for a reduction in the burning of fossil fuels. However, in the last three decades, an increase in carbon emissions from fossil fuels can be observed (Boden, Marland & Andres 2017), pointing to the contrary. This increase is partially driven by the growth in global trade, reflecting the strategies of multinational companies to reduce manufacturing costs by moving the production to developing countries while maintaining and supervising their supply chains (Rodrigue, Comtois & Slack 2016).

At the heart of global trade lies transportation, without which globalisation could not have occurred. Global transportation and logistics companies, as facilitators of global trade, rely heavily on fossil fuels with a share of 98-99 per cent, and can thus be regarded as significant contributors to carbon emissions output (Herold & Lee 2017a; Rodrigue, Comtois & Slack 2016). According to the World Economic Forum (2016), global logistics activities account for 5.5 per cent of global carbon emissions, resulting in pressures from governments, consumers and society to mitigate the implications of climate change.

In response to these institutional and stakeholder pressures, global logistics companies have engaged in various climate change activities through carbon management practices to reduce their carbon emissions output (McKinnon & Piecyk 2012). As a consequence, global logistics
companies have implemented multiple carbon management practices that include internal activities such as energy efficiency policies, investments in ‘green’ technologies and board level oversight of climate change actions, but also activities for external audiences such as carbon emission verification and stakeholder engagement (Herold & Lee 2017b; McKinnon 2010a). To communicate these carbon management practices, global logistics companies have increasingly adopted carbon disclosure as a tool to promote their activities and engagement (Hahn, Reimsbach & Schiemann 2015). Yet, the application of carbon management practices and its implication for carbon disclosure strategies and underlying drivers has received limited research attention, in particular in a global logistics context, leading to following inquiry:

*To what extent do institutional and stakeholder pressures influence the implementation of carbon management practices and associated carbon disclosure strategies within the global logistics industry?*

Studies show that the disclosure of carbon emissions may lead to the improvement of a company’s image or even to improved carbon management practices and to reduced energy consumption (Matisoff 2013; Sullivan & Gouldson 2012). Implementing carbon practices may not only help companies deal with natural and regulatory risks, but may also help investors to assess a company’s natural and regulatory risks related to global warming (McLaughlin 2011).

However, carbon management practices and the extent of carbon disclosure varies significantly in the global logistics industry, raising the question of why and how global logistics companies respond to these institutional and stakeholder pressures. We know relatively little about carbon disclosure strategies and the extent of applied carbon management practices, in particular in a global logistics context. The aim of this thesis is to shed light on the implications of institutional and stakeholder pressures on carbon disclosure strategies and the mechanisms behind it.

### 1.2 Research rationale and aims

Institutional scholars argue that carbon disclosure can be regarded as a response to a potential legitimacy gap, which can be defined as “where corporate performance remains unchanged, but societal expectations about that performance have changed” (Hrasky 2011, p.177). For example,
global logistics companies as facilitators of global trade face a heightened legitimacy gap, as the extensive use of logistics and transportation networks depends heavily on fossil fuels and results in high carbon emissions, leading to multiple pressures to reduce the negative impact on the environment (Herold & Lee 2017b; Onghena, Meersman & Van de Voorde 2014).

From a traditional institutional perspective, companies respond to these gaps with isomorphic behaviour, that is, companies will eventually implement similar organisational responses (DiMaggio & Powell 1983; Scott 1991; Thornton, Ocasio & Lounsbury 2012). But these responses are not a choice among unlimited possibilities but rather present a choice between a specific defined set of legitimate options (DiMaggio & Powell 1983; Wooten & Hoffman 2008). In relation to climate change, one way of closing the legitimacy gap is through targeted disclosure of information and activities related to carbon emissions.

From an institutional logics perspective, the presence of carbon disclosure can be attributed to the adoption of the sustainability logic within the global logistics industry. In this industry, the topic of global warming has heightened societal interests, and companies have responded with the adoption of the sustainability logic to reflect concerns about climate change. As a consequence, the sustainability logic, as part of a company’s value system, provides actors with templates for action, for example, the implementation of carbon disclosure practices to communicate these values and convince stakeholder audiences that their existence and their operations are legitimate.

While current research acknowledges that sustainability logic represents a way to close the legitimacy gap, companies are also driven by the logic of the market (Greenwood et al. 2010). The market logic can be considered a “central logic” (Thornton 2004, p.12) within the field of business organisations, as companies’ sustained existence in a competitive environment relies on reducing costs and increasing profits. Bebbington and Dillard (2009) describe the market logic as primarily driven by efficiency considerations, corresponding to a criterion for evaluation which is socially value-neutral and calculative. The sustainability logic, in this sense, is usually not seen as being very compatible with the prevailing market logic (Greenwood et al. 2010). Instead, it is viewed as a logic and set of practices in competition with extant economic practice. As such, the logics of ‘market’ and ‘sustainability’ reflect different ‘values and beliefs’ within global logistics companies and are what is called in the literature coexisting, but ‘competing’
logics (e.g. Lander, Koene & Linssen 2013; Pache & Santos 2013; Styhre 2011). In this ‘field of struggles’, actors are engaged in “a war or, if one prefers, a distribution of the specific capital which, accumulated in the course of previous wars, orients future strategies” (Calhoun 1993, p. 86).

Institutional scholars link the concept of competing logics to the institutional complexity within the organisational field, which is characterised by stakeholders who ‘fight’ for the influence of their preferred logic. More importantly however, these conflicting views and logics have a direct influence on carbon disclosure behaviour and the disclosure strategies of companies. Hrasky (2011) and Kim, Bach and Clelland (2007) distinguish between a symbolic management approach and a substantial management approach. Symbolic behaviour in carbon disclosure may be rhetorical statements designed to create an impression of sustainable or environmental responsibility, which is not necessarily accompanied by corporate action (Hrasky 2011; Kim, Bach & Clelland 2007), while substantial behaviour reflects action taken by a company to achieve carbon related accomplishments such as reducing its carbon footprint (Hrasky 2011).

As such, conflicting logics have an impact on the approach taken in the actual design and reporting of a company’s carbon report; particularly, whether a market or sustainability logic dominates or a mix of both rationales exists, mainly characterized by interplay between the two rationales. If carbon disclosure is influenced by a market logic, a company will seek sustainability activities that increase profits or reduce carbon emissions to save costs, and will link them to the finance and accounting department (Figge 2005). Schaltegger and Burritt (2015) call this practice the ‘business case’ for sustainability, that is, to identify and realise the monetary potential of voluntary sustainable actions. The action-oriented or substantial reporting method links the information provided about carbon emissions to a rather substantial approach to reporting practices. If, however, sustainability logic characterises the underlying rationale of carbon disclosure, a company may put the public relations department in charge, introduce concepts such as stakeholder dialogue, and focus on the external communication of their social and environmental actions (Balachandran et al. 2011; Castelo Branco, Eugénio & Ribeiro 2008; Michelon 2011; Sridhar 2012). This behaviour can be linked to a more symbolic approach to reporting.
Therefore, it is of academic interest not only to examine whether companies respond to institutional pressures with a symbolic or substantial carbon disclosure approach, but also how these competing logics shape carbon disclosure practices in the global logistics industry. This leads to the following research question and two sub-research questions which form the basis of Paper B and Paper C of this thesis:

**RQ2. How does the sustainability logic influence carbon disclosure behaviour?**

**RQ2a. Which disclosure behaviour - symbolic or substantial - dominates carbon reporting in the global logistics industry?**

**RQ2b. How does the emergence of sustainability influence the extent of carbon reporting?**

As discussed above, the dominance of conflicting logics, in this case, the logic of the ‘market’ and the logic of ‘sustainability’, is influenced by their positions in the field. For example, stakeholders who hold environmental interests are increasingly demanding more transparency, indicating a shift of the sustainability logic to the company’s core function, thus challenging the dominant market logic in the global logistics industry (Hörisch, Freeman & Schaltegger 2014; Kolk, Levy & Pinkse 2008). The influence of sustainability on the company therefore depends on the extent to which the sustainability logic can manifest itself as a core feature that is central to organisational functioning. This positioning as or around the core function in an organisation is what Besharov and Smith (2014) call the ‘centrality’ of institutional logics in the field.

Institutional theory considers the market logic as being a ‘core’ function within any business organisation (Ansari, Wijen & Gray 2013); thus the positioning of the market logic can be regarded as being central to any company, including global logistics companies. The positioning of sustainability logic, however, varies between global logistics companies, as the differences in carbon management practices indicate (CDP 2010d). While some global logistics companies have integrated climate change into their strategy to reduce carbon emissions, others are more restrictive in their provision of carbon related information and rely more on symbolic management behaviour (Herold & Lee 2017b; Hrasky 2011).

But while the previous discussion shows that the relative position of sustainability logic in a global logistics company’s core functions influences the extent of carbon disclosure, the current literature on institutional logics provides only limited insight into the conditions under which
these different outcomes arise. Although existing research acknowledges that stakeholders affect institutional logics (Greenwood & Kamoche 2013), it is limited in describing the salience of stakeholder influences within the same organisational field. An investigation into such salience would complement institutional theory, as is discussed below.

The most significant distinction between institutional and stakeholder theory is that in institutional theory the unit of analysis is the company itself, while stakeholder theory focuses on the relationships between the company and its stakeholders. To identify the pressures in the relationship between stakeholders and companies, stakeholder theory provides a theoretical foundation from which to categorise the multi-level and multi-dimensional perspectives of stakeholders (Freeman 1983). As such, stakeholder theory is often used to examine environmental practices in companies, as it considers a complex business environment which is influenced by multiple stakeholders, described as “any group or individual who can affect or is affected by the achievement of an organisation’s objectives” (Freeman 1983, p.46).

From a company perspective, one main task of stakeholder management is to convince stakeholder audiences that the existence of an organisation is legitimate. In the case of climate change, it is therefore crucial for companies to persuade stakeholders that the company’s operations are legitimate and that it is operating in an environmentally responsible manner (Hrasky 2011). To do so, companies need to understand or categorise stakeholders’ claims according to their influence. Mitchell, Agle and Wood (1997) developed the most frequently used concept to define the degree of influence in stakeholders’ relations, and this concept has since been used regularly by practitioners and research alike. We adopt their concept of stakeholder salience, which is defined as “the degree to which managers give priority to competing stakeholders’ claims” (Mitchell, Agle & Wood 1997, p.854). In particular, Mitchell and colleagues argue that stakeholder salience is a function of the stakeholder possessing one or more of three relationship 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.

In the global logistics industry, where the sustainability logic has been adopted, the degree of salience depends on the extent to which stakeholders can hold companies accountable for carbon disclosure related practices. In other words, institutional pressures alone cannot provide answers
to questions about the extent to which carbon related information is disclosed. Relevant internal stakeholders may have a direct influence on a company’s carbon report, while external stakeholders have only indirect influence by applying external pressure. However, the shift in the global logistics industry towards the sustainability logic to maintain legitimacy puts increasing pressure on companies to disclose relevant carbon related information. Thus, the dynamics of this relationship represents a constant fight for power between management and stakeholders outside of the company regarding the extent of disclosure of carbon related information.

Therefore, we argue that both dimensions - the ‘centrality’ of the sustainability logic on one hand, and the ‘salience’ of stakeholders on the other - are critical in determining a company’s carbon disclosure strategy and behaviour, but existing research is limited when it comes to describing and distinguishing the determinants of institutional and stakeholder influences that lead to different organisational responses within the same organisational field. In particular, the issue of whether the interaction between field-level pressures and firm-level influences can play an important role in carbon disclosure strategies in the global logistics industry remains to be explored. Therefore, we set the following research question which forms the basis of Paper D:

_RQ3. How does the interaction between institutional and stakeholder pressures influence carbon disclosure strategies in global logistics companies?_

Together, the dimensions of logic centrality and stakeholder salience provide an integrative model for understanding the influences of the sustainability logic and its outcomes on carbon disclosure. While the centrality reflects the degree to which the sustainability logic is central to organisational core functions, the salience of stakeholders represents the extent to which carbon disclosure claims are given priority. To establish a clear distinction between those dimensions, it is argued that centrality reflects the degree of the _internal_ dissemination of the sustainability logic – that is, how corporate climate change values and principles are exhibited by top management and are shared by organisational members to commit to common corporate environmental goals and aspirations (Linnenluecke & Griffiths 2010). From a stakeholder perspective, it is argued that salience represents the degree of _external_ pressure arising from stakeholders with regard to climate change – that is, how much relevant carbon-related information is disclosed to relevant external stakeholders.
To answer RQ3 and to understand the implications of these multiple pressures, this paper builds a model based on institutional and stakeholder theory and its constructs to distinguish between internal and external influences. However, in order to categorise carbon disclosure strategies, a more detailed investigation of internal and external carbon management practices is required. Therefore, the following sub-questions will be addressed:

**RQ4a. To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?**

**RQ4b. From a corporate perspective, what carbon disclosure strategies have been adopted?**

The questions above examine the internal and external carbon-related actions, and answer the question regarding the relationship between these actions, and how this relationship affects the implementation of carbon management practices associated disclosure strategies. However, the literature to date has not examined specific carbon management practices and how they may have changed over time; thus, the key issue of how a change of internal and external carbon management practices may lead to a change in carbon disclosure strategies remains underexplored. In order to understand this change and the influence on carbon disclosure strategies, a more detailed investigation of carbon management practices over time is required, which leads to the last two research questions in this thesis:

**RQ4c. To what extent have internal and external pressures led to a change in carbon management practices?**

**RQ4d. To what extent have internal and external pressures led to a change in carbon disclosure strategies?**

### 1.3 Research design

A six paper, mixed-method research design was used to address the stated research questions. **Paper A** utilised a systematic literature review to qualitatively evaluate the extent to which relevant carbon management practices were applied in the global logistics industry. The review was based on 66 papers published from 2000 to 2015 in international peer-reviewed journals. The papers were analysed according to the key topics in carbon management: carbon strategy,
carbon risk assessment, carbon target setting, carbon reduction initiatives and carbon performance and reporting.

**Paper B** comprises a comparative dual case study, using the two cases of FedEx and UPS. The research applied a qualitative research approach and combines carbon data from sustainability and Carbon Disclosure Project (CDP) reports provided by FedEx and UPS. **Paper C** adds another company (DHL) to the case study, thereby increasing validity by examining three companies and expanding the study geographically. Methodologically, the study adopts an interpretative content analysis approach to the statements and declarations of DHL, FedEx and UPS in their reports of the Carbon Disclosure Project (CDP).

**Paper D** introduces a conceptual study that integrates stakeholder theory into institutional theory. The study uses key constructs of both theories to build an integrative model that depicts four types of carbon disclosure strategies in the global logistics industry, based on the extent of institutional and stakeholder pressures. It thereby provides a theoretical framework to examine institutional and stakeholder influences, and complements the institutional dimension with a stakeholder dimension.

**Paper E** presents an empirical study that examines internal and external carbon management practices using the integrative model of four carbon disclosure strategy types discussed in Paper D. This phase utilises data collected from Bloomberg ESG which includes CDP data. In particular, 26 specific carbon management practices are identified and categorised according to their institutional and stakeholder influences. The examination of the carbon management practices allows conclusions to be drawn about the degree of institutional as well as stakeholder pressures and their influence on internal and external carbon management practices, and the associated disclosure strategies.

**Paper F** extends the former research and presents an empirical study that shows how carbon management practices and disclosure strategies have shifted over time, comparing data between 2010 and 2015. The data collected is from the same source as in Paper D and consists of the same 26 carbon management practices, thus also allowing companies to be categorised according to their carbon disclosure strategies, according to the model in Paper D.
1.4 Contributions to theory

Limited research has examined the difference in organisational responses regarding carbon disclosure practices and strategies, in particular in a global logistics industry context. Existing research in this area often lacks a theoretical underpinning (Doda et al. 2016) and typically focuses on the ecological or economic effects (Busch & Hoffmann 2011; Giannarakis, Zafeiriou & Sariannidis 2017; Luo & Tang 2014). In rare cases, where carbon disclosure strategies are discussed, they are limited to a single theory (Hrasky 2011; Luo 2017).

This research advances the theoretical foundations to empirically examine and categorise carbon disclosure strategies in the global logistics industry, and determines how companies respond differently to institutional and stakeholder pressures. This research therefore extends carbon disclosure research by providing a more detailed conceptual approach, not only to how to examine internal and external pressures, but also by providing a model to categorise specific corporate carbon disclosure strategies. Essentially, the thesis builds on research showing the need for, and potential value of, the application of both institutional and stakeholder theory in the context of global logistics companies. In so doing, this research also addresses the need for additional research investigating the extent of climate change activities. This study contributes to understandings about carbon disclosure, and from a corporate perspective, whether it is an effective tool in the mitigation of global warming.

Against that background, this thesis not only advances research on competing logics by exploring how organisations are impacted by firm-level agency and field-level pressures, but also provides an understanding of different corporate carbon disclosure positions by developing four types of carbon disclosure strategies. This thesis therefore addresses the inherent uncertainty associated with carbon related information and provides clarity about a company’s true carbon position.

1.5 Contributions to practice

This thesis provides utility for sustainability practitioners through the investigation of the extent of applied carbon management practices and their implications for carbon disclosure strategies in the context of global logistics companies. This knowledge is essential for the development of
future carbon disclosure policies, and therefore could have an impact on decisions made by sustainability managers and investors working in the global logistics industry. More specifically, it provides a clear conceptual framework of how to examine multiple pressures. This framework can be extended to a broad range of other environmental contexts to address greater audiences. The comprehensive research process illustrated in Papers D, E and F combines the valid constructs from two perspectives and thus presents a more innovative form of research than simply focusing on one single theory which continues to dominate carbon disclosure research (Doda et al. 2016; Giannarakis, Zafeiriou & Sariannidis 2017; Hahn, Reimsbach & Schiemann 2015; Hrasky 2011; Luo 2017; Luo & Tang 2014). Through the identification of four specific carbon disclosure strategies based on internal and external influences (Paper D), global logistics companies could be categorised and allocated (Paper E), and drivers behind shifts to more transparent behaviour could be identified (Paper F). For sustainability managers and policymakers, these findings are helpful, since an understanding of how the extent of carbon disclosure influences carbon disclosure strategies and their effectiveness allows management to better identify which practices should be targeted. Even more importantly, these findings illustrate how a more effective carbon disclosure design can be developed.

1.6 Structure of the thesis

This thesis is presented as a series of published and unpublished papers, consisting of a collection of writings on the research topic that have been submitted, accepted for publication, or published during the candidature. As such, the core component of this thesis are six key studies (3 published, one revised/resubmitted, one submitted/under review and one prepared for publication), which are presented in journal article format in Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7 and Chapter 8.

These six key papers build on each other, and combined they create a coherent research narrative. Overall, the thesis is comprised of nine chapters (see Figure 1.1) and a brief summary of each chapter is given hereafter.

Chapter 2 features the justification of the research context and the design of the research study. It summarises the research approach and outlines the research methods for each study. Unlike in other theses, the inclusion of the Paper A (publish in: Herold, D.M. and Lee, K.H.,


The application of institutional and stakeholder theory and its interaction provides a conceptual foundation from which to examine the influences of institutional and stakeholder pressures on carbon disclosure practices and strategies. It concludes with the identification of the gaps in the literature and proposes the study’s research question. In addition, Chapter 3 comprises Paper A which has been published in the journal Carbon Management. Paper A is a quantitative systematic literature review and provides an overview of the role of carbon management practices with a focus on the global logistics industry.

Chapter 4 (Paper B) discusses the second study which has been published as book chapter in Springer: Pathways to a Sustainable Economy: Bridging the gap between COP21 commitments and 2030 targets of emission control. The book chapter comprises a comparative dual case study, using the two cases of FedEx and UPS. It examines and discusses the emergence of carbon disclosure and its influence on carbon reporting. The research applies a qualitative analysis approach and combines carbon disclosure data from sustainability and Carbon Disclosure Project (CDP) reports provided by FedEx and UPS.
Chapter 5 (Paper C) extends the research from phase two and adds another company (DHL) to the case study, thereby increasing validity by examining three companies and expanding the study geographically. The research also addresses the limitations mentioned in phase two and further expands on the theoretical and methodological framework. The study adopts an interpretative content analysis approach to the statements and declarations of DHL, FedEx and UPS in their reports of the Carbon Disclosure Project (CDP).

**Chapter 1: Introduction**

Background, problem statement, reasoning and overview of research design.

**Chapter 2: Methodology**

Describes the justification of the research design of the research study, summarises the research approach and outlines the research methods for each study.

**Chapter 3: Literature review**

Outlines the developments in carbon disclosure research and how internal and external pressures, in the form of institutional and stakeholder impacts, influence carbon management practices and disclosure strategies in the context of the global logistics industry.

Includes Paper A (systematic literature review):

**Chapter 4: Similarities and differences in carbon disclosure in global logistics companies**


**Chapter 5: The influence of the sustainability logic on carbon disclosure**

Chapter 6: A conceptual framework of carbon disclosure strategies


Chapter 7: The interaction of internal and external pressures


Chapter 8: The interaction of internal and external pressures over time


Chapter 9: Discussion and conclusion

Discussion of results, practical and theoretical contributions, limitations and conclusion

Figure 1.1: Thesis structure

Chapter 6 (Paper D) is a conceptual study that integrates stakeholder theory and institutional theory. It thereby provides a theoretical framework upon which to examine institutional and stakeholder influences and complements the institutional dimension with a stakeholder dimension. The study uses both dimensions to build an integrative model that depicts four types of carbon disclosure strategies in the global logistics industry based on the extent of institutional and stakeholder pressures.

Chapter 7 (Paper E) presents an empirical study that examines internal and external carbon management practices using the integrative model of four carbon disclosure strategy types from Paper D. This phase utilises data collected from Bloomberg ESG which includes CDP data. In particular, 26 specific carbon management practices are identified and categorised according to their institutional and stakeholder influences. The aim of the study is to draw conclusions about the degree of institutional as well as stakeholder pressures, and their influence on internal and external carbon management practices and the associated disclosure strategies.

Chapter 8 (Paper F) presents an empirical study showing how carbon management practices and disclosure strategies have shifted over time, comparing data between 2010 and 2015. The
data collected is from the same source as in Paper D and consists of the same 26 carbon management practices, thus allowing the categorisation of companies according to their carbon disclosure strategies, according to the model in Paper D. Chapter 8 analyses carbon management practices over time and draws conclusions about the extent to which internal and external carbon management practices have changed, and if or how this can lead to a shift in carbon disclosure strategies.

1.7 Conclusion

This chapter provided an overview of this thesis, and began by detailing the background to this research, before introducing the research questions and aims of this research. Next, the research design used to address all of the stated research questions was outlined. Subsequently, the theoretical and practical contributions of this research were presented. Chapter 1 finished with an overview of the entire thesis structure, commencing with Chapter 2 and concluding with Chapter 9.
Chapter 2: Research design

2.1 Research paradigm and approach

A research paradigm is “the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed” (Kuhn, 1962), representing the researcher’s worldview. It is important to understand the research paradigm in which a researcher operates and to clarify its associated assumptions. As such, the research paradigm influences the researcher’s choice of methodologies according to the epistemological and ontological assumptions of his or her worldview. Ontology reflects the research’s view on the nature of reality (‘What is reality?’), while epistemology is concerned with the researcher’s perceived relationship with the knowledge (‘How do you know something?’) (Guba & Lincoln 1994).

This thesis is based on the philosophical paradigm of critical realism, which holds that while reality exists, any attempt to measure an objective reality will be imperfect, and its apprehension probabilistic (Heron & Reason 1997). Ontologically, this means that models and frameworks can help to predict behaviours and measure results, yet they will never represent a mirror image of a specific person’s actions. In other words, it is impossible for humans to truly perceive reality with their imperfect sensory perception and intellectual limitations (Cook, Campbell & Day 1979). Therefore epistemologically, a critical realist takes on a modified objectivist stance that entitles one to acquire and measure knowledge in the full awareness of human limitations (Healy & Perry 2000). This is achieved by attempting the utmost neutrality, by being aware of one’s own predispositions, and by relying on such ‘critical traditions’ as peer review (Guba & Lincoln 1994), alertness and awareness of one’s own actions. The essential underpinning belief is the notion of improvement, which suggests that knowledge can be infinitely progressed, and therefore constantly improved. In order to contribute to theory and practice as a critical realist, one must use a sound methodological approach. Triangulation of collected data is essential, since multiple data collection methods can yield a more objective and holistic view of the data (Neuman, 2006). Researchers who focus solely on a single method or procedure to investigate phenomena will be subject to the inherent limitations of that method. In contrast, using a mixed...
research methodology affords a more complex and complete picture of the research subject (Hoyle, Harris & Judd 2002), and thereby brings more rigour to the research study (Creswell 2013). Therefore, this thesis adopts a mixed-methods approach, as outlined in the next section.

2.2 Research overview

To address the research questions, the thesis comprises six studies. A mixed-method research strategy was adopted to understand the complexity of interactions and institutional and stakeholder pressures and their influences on carbon management practices and disclosure strategies. The thesis includes case studies and secondary datasets from different sources and uses them to analyse carbon management practices and disclosure strategies in the global logistics industry. It takes a sequential step-by-step approach, presenting a thesis by published papers comprising six publications which build on each other (see Figure 2.1). The methodology provided aims at understanding the varied approaches to carbon management as well as filling the absence of a theoretical underpinning to categorise carbon disclosure strategies and, in doing so, extends a range of methods. This approach allows the coverage of the global logistics industry context in a more comprehensive way than would be possible with existing approaches. Furthermore, the study not only provides the framework for a new categorisation of carbon disclosure strategies, but will also apply the proposed framework. The six studies are summarised in turn and detailed in Chapters 3, 4, 5, 6, 7 and 8.

2.2.1 Paper A: Systematic review of the literature 2000-2015

The systematic literature review builds the foundation for the research on carbon disclosure. It is a conceptually and thematically structured overview of carbon management practices, with a focus on the global logistics industry. A systematic literature review allows researchers to critically assess the knowledge base, identify gaps in the existing literature, and as a result, find new directions for future research (Beske-Janssen, Johnson & Schaltegger 2015).
Paper A
Method: Quantitative systematic literature review
Title: ‘Carbon management in the logistics and transportation sector: An overview and new research directions’
Aim: Overview about carbon management practices in the logistics industry, carbon disclosure as gap identified

Paper B
Method: Qualitative dual-case study
Title: ‘Carbon Disclosure Strategies in the Global Logistics Industry: Similarities and Differences in Carbon Measurement and Reporting’
Aim: Analysis of institutional pressures on carbon disclosure using a comparative dual case study in the logistics industry

Paper C
Method: Qualitative multi-case study
Title: ‘The Influence of the sustainability logic on carbon disclosure in the global logistics industry: The case of DHL, FDX and UPS’
Aim: Analysis of institutional pressures on carbon disclosure through interpretative content analysis of Carbon Disclosure Project (CDP) reports

Paper D
Method: Theoretical / conceptual paper
Title: ‘The interaction between institutional and stakeholder pressures: Implications on carbon disclosure strategies’
Aim: Extend the institutional lens by integrating stakeholder theory and building a framework with both dimensions to categorise carbon disclosure strategies for further analysis

Paper E
Method: Mixed-method empirical study
Title: ‘The influence of internal and external pressures on carbon management practices and disclosure strategies’
Aim: Categorise the carbon disclosure strategies in the global logistics industry based on the framework of institutional and stakeholder pressures from Paper 4

Paper F
Type: Mixed-method empirical study
Title: ‘Has carbon disclosure become more transparent? An investigation of corporate carbon disclosure strategies between 2010 and 2015’
Aim: Analyse the shift of carbon disclosure strategies in the logistics industry over time based on the framework of institutional and stakeholder pressures from Paper 4

Figure 2.1: Research overview
Method: The aim of the systematic literature review is to examine the current status of carbon management practices in the literature in the area of logistics and transportation to classify and analyse the key characteristics and topics in the field of carbon management. The literature review also aims to identify and reveals gaps in the literature to propose directions for future research and implications. A search of literature was conducted in several online databases (EBSCO, Scopus, Science Direct), which represent the most reliable and comprehensive business research databases in the field. The search, which comprised carbon management articles in the databases, was conducted by applying keywords and multiple combinations of keywords, for example “carbon accounting”, “carbon management”, “carbon reporting”, “carbon disclosure”, “carbon measurement”, “carbon performance”, “carbon emissions”, “scope 1”, “scope 2”, “scope 3”, “carbon footprint” or “carbon reduction”, but always in combination with “logistics”, “3PL”, “LSP” or “transportation”.

This paper is the first study to review and categorise carbon management practices in the global logistics industry. This study found that carbon disclosure research was highly under-represented and provides the greatest opportunity for further research. The review was based on 66 papers published from 2000 to 2015 in international peer-reviewed journals, and papers were analysed according to the key topics in carbon management: carbon strategy, carbon risk assessment, carbon target setting, carbon reduction initiatives and carbon performance and reporting. The definition of the key topics for the content analysis had the aim of opening a discussion on the key topics that emerged from the literature analysis. Further methodological details are provided in Section 2.3.

2.2.2 Paper B: Similarities and differences in carbon disclosure in global logistics companies

Paper B employs a dual case study to analyse the similarities and differences in carbon disclosure. Case studies are deemed useful in supporting research because of their focus towards understanding complex issues (Yin 2013). Case studies are both relevant and practical owing to the complex nature of decision-making processes in organisations. As such, case studies are a useful design for answering questions of how and why about events over which a researcher has little or no influence (Miles & Hubermann, 1994). As Mertens (2005, p.27) points out, a case
study is “a method for learning about a complex instance, based on a comprehensive understanding of that instance, obtained by extensive descriptions and analysis of that instance taken as a whole and in its contexts”. Paper B examines and discusses the emergence of carbon disclosure and its influence on carbon reporting, using the cases of FedEx and UPS. This study provides a first step in understanding why and how companies engage in carbon disclosure, but it should be stressed that the study is limited to two cases and one geographical area only.

**Method:** The research applies a qualitative research approach and analyses carbon reporting information provided by FedEx and UPS. This information was drawn from two types of reports: carbon-related information provided in the company’s sustainability reports and the information provided by FedEx and UPS in the reports of the Carbon Disclosure Project (CDP) in 2015. To analyse the similarities and differences, measures of specific disclosures related to issues associated with carbon-related information were built, in particular, seven categories. To compare and analyse the reports, the papers adopts Styhre (2011) discourse analysis to interpret the first four categories. Discourse analysis is the contextualization of communication and seeks to reveal the characteristics and motivations behind a text or a particular choice of words. In an organisational context, Hardy, Palmer and Phillips (2000) argue that discourse theory does not suggest that the ‘realities’ of the social world reside inside people’s minds’ but they conceive of social relations as being embedded in social relations and identities that are previously “constituted in discourse and reified into institutions and practices” (p.1235). Thus, discourse analysis provides a foundation from which to reveal the meaning behind the statements in corporate reporting, and whether FedEx or UPS follow either a symbolic or substantial approach, or a mix of both. For the remaining three categories, a comparative analysis of disclosure behaviour over time was applied. More details and results can be found in Chapter 4.

**2.2.3 Paper C: The influence of the sustainability logic on carbon disclosure**

Paper C extends on the research in Paper B and adds another company (DHL) to the case studies of FedEx and UPS, thereby increasing validity by examining three companies and expanding the study geographically. Multi-case studies investigate “a particular phenomenon (or group of phenomena) at a number of different sites” (Stewart 2010, p.2). By employing a multi-case study methodology, the researcher is able to ascertain casual linkages between different elements in the
case, as well as between the cases (Yin, 1994). That is, by examining a set of cases, each resulting in a specific set of facts and general conclusions, the examined cases can be used to establish conclusions and predictions that can apply to any case similar to the ones being examined. By using multiple cases, the generalisation of the results is potentially more valid compared to single case studies, more so given the premise that the cases used are a fair representation of the population (Stake 1995, 2013). The findings of this study reveal significant differences in the applied carbon disclosure strategies and their underlying logics, but the study lacks the ability to classify or categorise institutional and stakeholder influences from a theoretical view.

**Method:** The aim of this study is to examine the reporting behaviour and the underlying logic between UPS, FedEx and DHL. The study adopts an interpretative content analysis approach to the statements and declarations of DHL, FedEx and UPS in their reports of the Carbon Disclosure Project (CDP). CDP reports were chosen because the information in them has been completed by the company’s management, hence it negates research bias in the collection phase and reflects a company’s values and attitudes towards carbon disclosure.

Adopting interpretative content analysis provides in-depth insights into the reporting behaviour of the companies and enables a discussion of the underlying logic behind their behaviour. Interpretative analysis captures meaning by disaggregating narrative into its constituent parts and then describing the contents of each disaggregated component (e.g., Cormier & Gordon 2001; Milne, Tregidga & Walton 2003). The capture of the actual content of narrative is important when researchers are interested in understanding disclosure practice (e.g., Hammond & Miles 2004). Thus interpretative studies aim to gain a greater understanding of what is communicated and how meaning is understood (e.g., Laine 2005). They are therefore concerned with the quality, richness or qualitative character of the narrative. In other words, interpretative analysis is the contextualization of communication, and seeks to reveal the meanings and motivations behind statements in corporate reporting, and in this case, what logic drives DHL, FDX and UPS to follow either a symbolic or substantial disclosure approach. To assess carbon disclosure behaviour as well as the logic behind it, the paper focused on four categories: (1) the company’s carbon strategy; (2) the extent of carbon information provided (the degree of transparency); (3) internal initiatives; and (4) external stakeholder engagement, all categories of which were subsequently analysed and compared. The research also addressed the limitations mentioned in Paper B and further expands
on the theoretical and methodological framework. More details and results can be found in Chapter 5.

2.2.4 Paper D: The conceptual framework of carbon disclosure strategies

Paper D presents a conceptual study that integrates stakeholder theory into institutional theory. It thereby provides a theoretical framework to examine institutional and stakeholder influences and complements the institutional dimension by including a stakeholder dimension. The paper thus provides insight into how stakeholder pressures and institutional logics interact, thus advancing existing research by exploring how organisations are impacted by both firm-level agency and field-level pressures. This framework builds the foundation for Papers E and F, in which empirical studies are conducted based on the model of institutional and stakeholder influences.

**Method:** The paper uses both dimensions to build an integrative model that depicts four ideal types of carbon disclosure strategies in the global logistics industry based on the extent of institutional and stakeholder pressures. To examine the extent of institutional pressures, the paper introduces the concept of ‘logics centrality’, representing the position of the sustainability logic, that is, to what extent climate change values are integrated into a company’s value system. To examine stakeholder pressures, the paper follows the concept of stakeholder salience, that is, to what extent external stakeholder claims are given priority. Further details and the framework can be found in Chapter 6.

2.2.5 Paper E: The interaction of internal and external pressures

Paper E presents an empirical study that examines internal and external carbon management practices using the integrative model of four carbon disclosure strategy types examined in Paper D. In particular, carbon management practices are identified and categorised according to their institutional and stakeholder influences. The examination of the carbon management practices allows conclusions to be drawn about the degree of institutional, as well as stakeholder, pressures, and their influence on internal and external carbon management practices and the associated disclosure strategies. However, although the study applies the model from Paper D
and provides interesting results, the study is limited as it does not address questions of whether or how disclosure strategies have shifted over time.

**Method:** To understand the internal and external influences on carbon disclosure strategies, and the subsequently categorisation according the carbon disclosure strategy model, the internal and external carbon management practices of companies needs to be examined. According to Beattie (2014) and Unerman (2000), disclosure indexes are a popular way to quantify the extent of disclosure. Paper E adopt his approach and used a merged dataset from Bloomberg ESG terminals and Carbon Disclosure Project (CDP) reports that includes 26 specific carbon management practices (CMPs) that a company may have applied. To achieve reliability and validity of the data, Paper E focuses on a small sub-set of items (CMPs) as well as on inter-company differences in a specific industry (i.e., global logistics) and uses an industry index to measure the disclosure level (Beattie, McInnes & Fearnley 2004; Botosan 1997). The analysis follows a two-step approach. Firstly, an examination is conducted of the extent to which the internal and external practices of each company are applied or implemented. An analysis of these specific CMPs allows an understanding of the interaction between internal and external practices and provides the foundation for the second step: the categorisation of companies according to the carbon disclosure strategy model. Constructing the CMPs as variables to calculate and categorise carbon disclosure strategies is a novel contribution of this study. The dataset covers the timeframe from the years 2012 to 2014 and contains 3,120 corporation-year observations of CMPs.

2.2.6 Paper F: The interaction of internal and external pressures over time

Paper F addresses the limitation of Paper E and presents an empirical study that shows how carbon management practices and disclosure strategies have shifted over time, using the integrative model of four carbon disclosure strategy types presented in Paper D. Again, carbon management practices are identified and categorised according to their institutional and stakeholder influences. An examination of the carbon management practices over time allows conclusions to be drawn about the extent to which internal and external carbon management practices have changed, and whether or how this leads to a shift in carbon disclosure strategies.
**Method:** To understand the shift in internal and external influences on carbon disclosure strategies over time, the study compared data between 2010 and 2015. The data collected is from the same source as in Paper E, the disclosure index from Bloomberg ESG and CDP data, and consists of the same 26 carbon management practices. This similar approach allows the categorisation of companies according to their carbon disclosure strategies, according to the model in Paper D. The dataset covered the years from 2010 to 2015 and contains 1,950 corporation-year observations of CMPs.

**2.3 Conclusion**

This chapter has outlined the research design. First, it illustrated the philosophical position of the research. This was followed by the research methodology of the six papers in which the research design was described by illustrating the data collection, sampling, and the analysis methods selected.
Chapter 3: Literature review

3.1 Introduction

This chapter presents a review of literature concerning the role of institutional and stakeholder influences on carbon disclosure. First, a brief background covering corporate climate change responses and the emergence of carbon management practices is provided. The review turns specifically to carbon disclosure in the global logistics industry, different practices are reviewed and implications are discussed. The chapter moves to examine the concepts that relate to institutional pressures on carbon disclosure. In this section concepts including institutional complexity, multiple logics and multi-level frameworks of institutional pressures are explored. Finally, by drawing from stakeholder research, stakeholder concepts are incorporated and factors are identified that relate to the varied carbon disclosure outcomes. This integration is necessary as carbon disclosure is an institutional multi-level process in which stakeholders participate and can shape different outcomes. The multi-level examination and integration of stakeholder pressures into institutional literature provides an understanding of the current state of research into carbon disclosure practices and allows for the identification of knowledge gaps that need to be addressed by specific research questions. The proposed research questions develop from the preceding review, build on each other and are aligned with the literature and findings in the papers in Chapters 4, 5, 6, 7 and 8.

3.2 Corporate climate change responses

During the 1990s, societies, governments and businesses became increasingly aware of the threats of global warming (Kolk, Levy & Pinkse 2008), leading to the first global agreement on climate change, the United Nations Framework Convention on Climate Change in 1992 (UN 1992). Part of the process that led to this agreement was the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1998, which represents the most authoritative body of climate change scientists worldwide. The IPCC has regularly published reports describing the implications of climate change. In particular, the fourth report of the IPCC in 2007 stated that the global average surface temperature is most likely to increase substantially within this century if no action is taken to reduce the amount of greenhouse gas (GHG) emissions (IPCC 2007). This report can be regarded as an important milestone in the climate change discussion and attracted the attention of a broad audience, who take this issue particularly seriously (Kolk & Pinkse 2007).

While the topic of climate change has now become a ‘mainstream’ issue and its threat is openly discussed and recognized by societies, governments and businesses, many international operating companies initially opposed the global initiatives and policy suggestions to measure and monitor the carbon output, often by doubting the scientific evidence of the problem (Jeswani, Wehrmeyer & Mulugetta 2008; Kolk & Levy 2001; Kolk, Levy & Pinkse 2008). In particular, carbon-intensive sectors such as mining, car manufacturing and steel and oil companies denied or neglected the impacts of climate change and established interest groups such as the Coalition for Vehicle Choice or the Global Climate Coalition to question the theoretic foundation on which the science of global warming is based (Kolk, Levy & Pinkse 2008). As such, companies were highly skeptical about the threat of global warming around the period of the mid-1990s (Haque & Deegan 2010; Kolk & Pinkse 2004).

Although the opposition from companies during the global warming debates was apparent until the mid-1990s, a gradual change could be observed by the late 1990s, with an increasing number of companies changing their position to one which was more cognizant of the climate change problem. This led to the implementation of climate change initiatives to deal with impending regulations from governments and international organisations. Many companies began to work with non-governmental organisations (NGOs) and other international bodies on
issues of climate change in order to find solutions in a collaborative way (Kolk, Levy & Pinkse 2008). One main reason behind the change in the companies’ behaviour was the Kyoto Protocol in 1997, representing a milestone in the climate change debate, which increased pressure from NGOs for the development of climate change policies and regulations on a global basis. Specifically, the Kyoto Protocol comprised placing legal limits on carbon emissions for developed and developing countries and was ratified by over 160 countries. As a result, new cross-sector stakeholder partnerships were established, such as the Greenhouse Gas Protocol Initiative\(^1\), leading to public and regulatory pressure on the corporate sector to reduce their negative environmental output. Consequently, companies reacted to this pressure by proactively engaging with the topic of climate change and the issues raised in the Kyoto Protocol (Haque & Deegan 2010; Kolk, Levy & Pinkse 2008).

One of the consequences of the Kyoto Protocol was that the European Union (EU) set up an emissions trading scheme in 2005, which represents another milestone in the climate change debate. The European Union GHG Emission Trading Scheme (EU ETS) comprised output limits for carbon-intensive industries and companies operating within the EU (Jeswani, Wehrmeyer & Mulugetta 2008). During the early 2000s, an increase in investor and shareholder interest in corporate climate change actions and disclosure could also be observed, which was accompanied by increasing climate change awareness within society and other groups such as customers, media and the scientific community. The emergence of this growing interest led to a change in the ‘social contract’ between companies and society, leading to a growing number of corporations publicly committing to the reality of global warming, and vowing to address the implications of their operations in the context of climate change.

Another milestone in the climate change debate was the Stern Review which discussed the (negative) economic implications of global warming and called for an immediate global response to the threat of climate change (Stern 2006). As a result, companies increasingly took more proactive measures to fight global warming and acknowledged climate change as a threat that should be treated strategically. Overall, the move from a general dismissal of global warming to

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\(^1\) GHG Protocol is a multi-stakeholder partnership of businesses, non-governmental organisations (NGOs), governments, and others convened by the World Resources Institute (WRI), a US-based environmental NGO, and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of 165 international companies. Launched in 1998, GHG Protocol’s mission is to develop internationally accepted greenhouse gas (GHG) accounting and reporting standards for business and to promote their adoption by businesses and policymakers alike (WRI/WBCSD, 2011).
the acceptance of climate change has led to gradual change in companies, in particular leading
global corporations, to implement organisational practices and mechanisms to reduce their
environmental impact. However, while this overall trend to reflect the climate change challenge
in companies is good sign from an environmental perspective, the implementation of practices
relating to how companies react to climate change varies extensively, with some companies
being very proactive and other being slow to align and adapt their processes.

This is particularly true for the global logistics industry, which accounts for 5.5 per cent of all
carbon emissions worldwide (World Economic Forum 2016). Global logistics companies,
representing a crucial part within the logistics industry, are seen as major contributors of carbon
emissions (CDP 2010d; Herold & Lee 2017a) and are also under increasing pressure from
multiple stakeholders to disclose information about their carbon related activities (Hahn,
Reimsbach & Schiemann 2015; Kolk, Levy & Pinkse 2008). In response, global logistics
companies have increasingly implemented carbon management practices (Borghei, Leung &
Guthrie 2016; KPMG 2014; Welbeck 2017). However, within the global logistics industry,
carbon management practices vary extensively between companies, which will be discussed in
the next section.
3.3. Paper A: Carbon management in the global logistics industry

Preamble:

This following paper (Paper A), published in the journal *Carbon Management*, utilised a systematic literature review to evaluate the extent to which relevant carbon management practices were applied in the global logistics industry. In particular, Paper A inquired:

*To what extent have carbon management practices been implemented in the global logistics industry?*

The review was based on 66 papers published from 2000 to 2015 in international peer-reviewed journals, which was the latest available timeframe at the time that paper was written. Papers were analysed according to the key topics in carbon management: carbon strategy, carbon risk assessment, carbon target setting, carbon reduction initiatives and carbon performance and reporting. The results of the systematic literature review showed limited application of carbon management practices in the logistics industry. In particular, carbon disclosure research was highly under-represented and was identified as a major opportunity for further research.

Because there is a lack of a common, detailed definition of the global logistics industry, whenever the term ‘global logistics industry’ or ‘global logistics companies’ is used, this thesis refers to worldwide active logistics companies (including third-party providers/3PL) which distribute, plan, implement and control the efficient, effective forward and reverse flows and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers’ requirements.

This first paper of the research provides a foundation for further consideration and examination of carbon disclosure practices and its strategies, leading to development of Papers 2 and 3, where real-world cases are analysed and discussed.
Carbon management in the logistics and transportation sector: An overview and new research directions

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David M. Herold and Ki-Hoon Lee designed the systematic literature review. David M. Herold conducted the database searches. All articles that surpassed exclusion criteria were examined by David M. Herold and Ki-Hoon Lee, first by David M. Herold and then jointly. David M. Herold led the drafting of the manuscript and both authors contributed to and have approved the final manuscript.

**Conflict of Interest**

Both authors have declared no conflict of interest.

**Authors Signatures**

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3.1 Abstract

While many studies have addressed the issue of environmental sustainability within the supply chain as a whole, no attempt so far has been made to investigate specifically the current status of carbon management related literature in logistics and freight transportation. This paper aims to fill this gap by providing a systematic literature on carbon management in logistics and transportation to categorise the research according to key topics in order to identify gaps in the literature. The review is based on 66 papers published from 2000 to 2015 in international peer-reviewed journals. The academic papers were analysed according to both their defining characteristics (i.e., publication year, journals title, countries addressed and research methodology adopted) and defined key topics in carbon management. Five key topics were examined: carbon strategy, carbon risk assessment, carbon target setting, carbon reduction initiatives and carbon performance and reporting. As such, this paper makes several contributions to the literature. First, as far as the authors are aware, our work is the first study that reviews and categorises carbon management practices in the logistics and transportation sector. Second, our study identifies research gaps of carbon management practices for the logistics and transportation sector and provides a theoretical foundation for future research.

Keywords: carbon management, carbon reduction, logistics, transportation, environmental sustainability


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environmentally friendly activities. Among other policy instruments, this may include carbon standards for vehicles or investment in rail services. We conclude that the responsibility for reducing or mitigating carbon emissions is, and will be, a long-term challenge. Further collaboration between academics, managers and policy makers can significantly help to address the identified gaps and to tackle climate change.

3.4 Carbon disclosure in the global logistics industry

During the last decade, the topic of climate change has led to increasing institutional and stakeholder pressures on companies to track and disclose their emissions by asserting that carbon management provides a mechanism for assessing climate-related business risks and opportunities (Lash & Wellington 2007; Lee & Vachon 2016). In response to these pressures, the disclosure of carbon-related information about companies’ activities in the form of carbon disclosure has increased markedly over the last several years (KPMG, 2014; Hahn et al., 2015). This is particularly true for global logistics companies, as the logistics industry accounts for 5.5 per cent of all carbon emissions worldwide (KPMG 2014; World Economic Forum 2012).

Thus, transport and logistics activities, as facilitators of global trade, can be regarded as a significant source of carbon emissions. Global logistics activities comprise all our main transport modes (air, rail, road and ocean), and the resources and systems for the transportation of goods can be regarded as being extensive in terminals, means of transportation and handling equipment (Onghena, Meersman & Van de Voorde 2014). The extensive use of the logistics and transportation network that depends heavily on fossil fuels results in high carbon emission outputs, leading to scrutiny from stakeholders and an increasing adoption of carbon reporting within the global logistics industry (CDP 2010d; Kolk, Levy & Pinkse 2008).

However, carbon disclosure constitutes a mainly voluntary organisational practice within companies (Hahn, Reimsbach & Schiemann 2015). By bypassing formal regulatory mechanisms, carbon reporting can be regarded as a ‘non-state market driven governance system’ (Cashore, Auld & Newsom 2004) or as a form of ‘civil regulation’ (Murphy & Bendell 1999). Its voluntary nature allows companies and management to choose which tools or guidelines to apply in order to measure carbon and environmental performance. For example, The Greenhouse Gas Protocol: A
*Corporate Accounting and Reporting Standard (Revised Edition)*, states that companies can choose different carbon-measurement and reporting schemes for their carbon emissions (WRI/WBCSD 2011). Although most global logistics companies have integrated climate change into their strategies and follow *The Greenhouse Gas Protocol*, a first glance reveals that although their operations can be seen as very similar, differences in measuring and reporting of carbon-related activities can be observed within the industry (CDP 2010d; Herold & Lee 2017b).

For instance, to measure the targets, most global logistics have implemented ‘intensity’ targets compared with ‘absolute’ targets. An ‘absolute’ target would reduce the total amount of carbon emissions, and there are management fears that this could constrain the companies’ growth. Therefore, an ‘intensity’ target is preferred; this measures the target as a decline in carbon emissions relative to the level of logistical activity (McKinnon & Piecyk 2012). However, companies need to decide the variable against which the reduction will be measured. Although the majority of companies have adopted the ‘intensity’ approach, their variables differ. For instance, FedEx addresses only Scope 1 emissions and defines its carbon-reduction target in ‘ton-miles’ for its aircraft emissions and in ‘miles per gallon’ for its vehicle fleet (CDP 2015c). In contrast, DHL relates carbon emissions to the total square metres of space in its warehouses (Deutsche Post DHL 2011). And while UPS also addresses Scope 1 aircraft emissions in ‘ton-miles’, it has developed more detailed ratios for each Scope 1 and 2 emissions of its divisions and assigned each a different weighting factor (CDP 2015d; McKinnon & Piecyk 2012).

A further important point concerns the reporting of Scope 1, 2 and 3 emissions within the global logistics industry. *The Greenhouse Gas Protocol* provided by the WRI/WBCSD (2011) distinguishes three GHG emissions, categorising emissions into Scopes 1, 2 or 3. Scope 1 emissions are all direct GHG emissions caused by owned or controlled facilities of an individually regarded company. Examples include the burning of fossil fuels, transportation by company-owned vehicles, and the chemical and physical processes necessary for producing electricity. Scope 2 emissions refer to indirect GHG emissions caused by the supply of purchased electricity generated outside the system boundaries. Scope 3 emissions are not caused directly by the company itself, but indirectly by its activities. This includes various categories such as purchased transportation, fuel- and energy-related activities, business travel, and so on. While Scope 1 and 2 reporting is mandatory, Scope 3 reporting is voluntary, and logistics companies
use different approaches to measure their carbon output (CDP 2010d). For global logistics companies, purchased transportation by air, rail, road and ocean accounts for the largest source of Scope 3 carbon emissions (FedEx 2014; UPS 2014).

Furthermore, differences can be observed in the extent to which GHG emissions are included in the reporting (CDP 2010d). When carbon reporting is examined in a logistics context, not only CO₂ emissions, but all relevant GHG emissions, have to be taken into account; the relevant indicator to measure the impact of emissions on climate change is CO₂ equivalents (Schaltegger & Csutora 2012). Apart from CO₂ as the major emission, others include methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), per fluorinated compounds (PFCs) and hydro fluorocarbons (HFCs) (European Commission 2007; Schmidt 2009).

Despite similar pressures within the global logistics industry, these examples demonstrate a wide range of various approaches regarding carbon disclosure practices, leading to the question of the extent to which institutional and stakeholder pressures influence carbon management practices and associated disclosure strategies. In this thesis, an institutional lens is used to examine the institutional pressures on carbon disclosure, in particular to understand the different drivers that lead to the adoption of carbon disclosure and the various approaches.

### 3.5 Institutional pressures

The adoption of carbon disclosure can be viewed as a reaction to multiple institutional pressures to maintain or gain legitimacy. Legitimacy is “a generalised perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions” (Suchman 1995, p.274). Organisational legitimacy can be linked to a ‘social contract’, where organisations agree to perform various desired actions in return for approval of its objectives, other rewards and its ultimate survival (e.g. Dowling & Pfeffer 1975; Guthrie & Parker 1989).

Global logistics companies, as facilitators of global trade, face a heightened legitimacy gap, as the extensive use of the logistics and transportation network depends heavily on fossil fuels and results in a high carbon emissions output, leading to pressure from multiple institutions to
reduce the negative impact on the environment (Hrasky 2011; Onghena, Meersman & Van de Voorde 2014). Moreover, Zyglidopoulos (2002) found that global companies are subject to additional pressures from foreign institutions, which adds to the legitimacy gap. In the traditional view of institutional theory, organisations respond to this potential legitimacy gap by isomorphic behaviour, in particular within the same organisational field (Powell & DiMaggio 1991). As global logistics companies can be regarded as entities which constitute a single organisational field, these companies increasingly resemble each other and have converging perceptions of how to respond to climate change (Lenssen et al. 2008). These responses, however, are not choices among unlimited possibilities, but rather present a choice between a specific defined set of legitimate options (see DiMaggio & Powell 1983; Wooten & Hoffman 2008). In particular, companies facing similar institutional pressures will eventually adopt similar strategies or organisational practices to gain legitimacy (DiMaggio & Powell 1983; Scott 1991; Thornton, Ocasio & Lounsbury 2012).

The global logistics industry reacted to these pressures with the implementation of carbon disclosure, which could be related to some sort of power exerted by the industry or which must have been based upon an already existing successful model of carbon disclosure which can be reproduced. While the former mechanism leads to normative isomorphism (that is, induced by the industry) the latter - the presence of successful models - leads towards mimetic isomorphism (that is, induced by competitors). Moreover, the implementation of carbon disclosure might also be induced by regulatory pressures. These coercive pressures are defined by influences carried out by those in power - for example, through pressure from regulators and actors on which the organisation is dependent for resources. One example of coercive isomorphism is the influence of governmental pressure. Governments are legitimate and usually powerful stakeholders who can exert pressure through legislation, regulation and policies (Sarkis, Gonzalez-Torre & Adenso-Diaz 2010; Schmidt et al. 2012). Transport policy decisions, for example, are the result of a government’s interest in transport emissions. This pressure, in the form of ‘authority requirements’ from governmental organisations, is often codified in laws and regulations, and increasing government regulations and disclosure requirements can be interpreted as being a threat to businesses (Bolton & Foxon 2015; Summerhays & De Villiers 2012). Many previous studies suggest that increasing regulatory enforcement and growing numbers of policy guidelines
on environmental protection and disclosure create direct pressure on companies to adopt carbon disclosure (Qian, Burritt & Chen 2015).

In industries with the same institutional pressures, however, the implementation of certain organisational practices such as carbon disclosure is often related to mimetic or normative isomorphism (Delmas & Toffel 2004; Powell & DiMaggio 1991). Mimetic isomorphism occurs when companies replicate their competitors’ successful behaviour (Aerts, Cormier & Magnan 2006). More importantly, institutional researchers have found that companies are more likely to mimic the organisational practices of other companies which are tied to them through networks, and this indicates normative isomorphism (Guler, Guillén & Macpherson 2002). Normative isomorphism can be defined as pressures arising from social institutions such as industry associations, non-governments organisations (NGOs) or media. For global logistics companies, industry pressures appear to play a significant role with regard to carbon disclosure (Kollman & Prakash 2002). For example, senior managers in global companies in various industry associations interacted in determining actions to be taken to mitigate climate change, making this ‘issue arena’ of climate change itself an important institutional influence within companies (Levy & Kolk 2002). As a consequence, some industry associations, such as the Carbon Disclosure Project (CDP), are considered by global logistics companies to be serious partners in maintaining or gaining legitimacy (Anderies et al. 2013; CDP 2010d; CDSB 2014).

Other industry associations, such as the World Business Council for Sustainable Development (WBCSD), developed guidelines for carbon disclosure (The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard), and the majority of the global logistics companies follow their guidelines (CDP 2010d; WRI/WBCSD 2011). Delmas and Toffel (2004) argue that the pressure to adopt these guidelines is affected by market concentration, thus if an industry is dominated by a few big players, such as FedEx or UPS in the global logistics industry, environmental practices such as carbon disclosure lead to a greater degree of diffusion than it would have, had the industry been more fragmented.

In line with Rose et al. (2016), normative isomorphism in combination with mimetic processes appears to have led to a convergence in the perception of the climate issue within the global logistics industry. As a consequence, these pressures triggered the implementation of
carbon disclosure in order to demonstrate to government and to the broader community that global logistics companies are ‘good’ (Lee 2012a; Schaltegger & Csutora 2012).

3.5.1 Institutional complexity and competing logics

The main argument for isomorphism is that corporations which face similar institutional pressure will eventually adopt similar strategies in order to gain legitimacy. Therefore, isomorphic behaviour can be regarded as the critical process at the field level, illustrating why companies implement or ‘institutionalise’ carbon disclosure as an organisational practice. But isomorphism has two major limitations: firstly, according to this traditional notion of institutional theory, the corporate disclosure behaviours of organisations should converge over time, that is, no significant differences in carbon disclosure should be observed (Cormier, Magnan & Van Velthoven 2005; Luo, Lan & Tang 2012; Matisoff, Noonan & O'Brien 2013). Secondly, isomorphic pressures lead only to a fulfilment, but not to an excess, of the requirement (Pålsson & Kovács 2014). In other words, due to similar requirements in the global logistics industry, the disclosure of carbon related information leads only to a predetermined point (the actual requirement). A first glance at the carbon disclosure in this industry proves the contrary, as it varies greatly in extent and detail (CDP 2010d). In particular, these two key assertions neglect the difference in organisational responses to multiple institutional demands. Isomorphism is only valid within the field to a certain extent, and as such, the depth of response to institutional pressures, as well as the extensiveness of conformity, varies across organisations (Scott 2008). That is, companies have different viewpoints and positions regarding the degree of legitimacy required in their carbon reporting.

From a legitimacy perspective, two opposing legitimisation approaches can be distinguished with regard to carbon disclosure: ‘pragmatic’ and ‘moral’ legitimacy (Suchman 1995). Hrasky (2011) argues that moral legitimacy represents a normative orientation in an organisation and is acquired when the organisation’s stakeholders make a favourable evaluation of the organisation and its actual accomplishments. In contrast, pragmatic legitimacy involves engaging in self-interested behaviour calculated to portray an image of the organisation that is honest and trustworthy, sharing and promoting the values that the audience also values (Suchman 1995).
According to Hopwood (2009, p.437), these opposing “legitimisation rationales” consequently lead to different approaches in carbon reporting. While a moral legitimacy approach in carbon reporting can be linked to rather transparent behaviour to disclose the corporate environmental activities and its consequences, a pragmatic legitimacy approach can be regarded as an attempt to create an image for its audience; here, less is known about the company despite an openness to reporting. Thus each approach to legitimisation may have a direct influence on the approach to carbon reporting. Hrasky (2011) and Kim, Bach and Clelland (2007) link pragmatic legitimacy to a symbolic management approach and normative legitimacy to an action-oriented or substantial management approach. Symbolic behaviour in carbon reports may constitute rhetorical statements designed to create an impression of sustainable or environmental responsibility, which are not necessarily accompanied by corporate action (Hrasky 2011; Kim, Bach & Clelland 2007). Symbolic behaviour can also be related to reputation management, which Schaltegger and Burritt (2015) describe as a company’s focus on societal, political and media attention. In a symbolic or reputational approach, carbon-related activities and their reporting are closely linked to the public relations (PR) department to gain the support of the company’s most immediate audiences (Hrasky 2011). Similar to a pragmatic legitimisation approach, symbolic management can be regarded as self-interested or narcissistic behaviour in carbon reporting, with more or less substantiated claims of carbon-related achievements (Schaltegger & Burritt 2015). In contrast, carbon reporting may reflect the substantial corporate action taken by a company to achieve carbon-related accomplishments, such as reducing its carbon footprint (Hrasky 2011).

Both carbon reporting approaches can be regarded as useful legitimization approaches. The specific nature of the disclosure response depends on the particular legitimization strategy or mix of strategies adopted. In other words, while it is evident that the differences in carbon reporting are related directly to the different legitimization approaches, it is still unclear what drives the different legitimization rationales. As isomorphic behaviour is limited in explaining these differences in carbon disclosure, it is argued that these rationales are related to companies’ different beliefs about the significance of carbon reporting – hence its underlying logics.
3.5.2 The influence of underlying competing logics on carbon disclosure

Instead of viewing the organisational field as a homogenous collection of organisational actors, we could take the view of Bourdieu and Wacquant (1992), who argue that the organisational field can be seen as dynamic or even a ‘field of struggles’. In this ‘field of struggles’, actors are engaged in “a war or, if one prefers, a distribution of the specific capital which, accumulated in the course of previous wars, orients future strategies” (Calhoun 1993, p. 86). The organisation field therefore becomes a locale in which actors’ relationships eventually fight for the adoption of cultural-cognitive, normative and regulative structures that provide stability and collective meaning to social behaviour (Scott 1995). In other words, the adoption of organisational practices such as carbon reporting provides the organising principles for a field and reflects the “assumptions and values, usually implicit, about how to interpret organisational reality, what constitutes appropriate behaviour and how to succeed” (Thornton 2004, p.70). These discursive practices represent what is called an institutional logic in the literature. Institutional logics underpin the appropriateness of organisational practices in given settings and at particular historical moments, which is influenced by multi-level political, cultural and social aspects of organisational behaviour and phenomena (Lounsbury & Ventresca 2003).

The adoption of carbon disclosure in the global logistics industry can subsequently be regarded as the adoption of sustainability logic, as heightened concerns about corporate carbon emissions have created a potential legitimacy gap (Suddaby & Greenwood 2005). But while it can be acknowledged that adoption of carbon reporting in the broader context of sustainability represents the logic behind the search for legitimacy, companies are also driven by the logic of the market (Greenwood et al. 2010). A market logic assumes that companies address sustainability issues only if this positively affects their financial performance, such as profits or shareholder value (Schaltegger & Hörisch 2015). Managers are constantly challenged to deal with sustainability while at the same time being responsible for the economic wellbeing of their organisation, so are embedded in this ‘field of struggles’, where multiple stakeholders fight for their dominant logic and attempt to transform the company’s structures and norms by a “political process that reflects the power and interests of organized actors” (Maguire, Hardy & Lawrence 2004, p.658). As a consequence, organisational responses to different stakeholders’ interests are unlikely to be
uniform, and organisational fields are usually characterized by conflicting logics (e.g. D'Aunno, Sutton & Price 1991; Hoffman 2004; Reay & Hinings 2005b).

In the context of this research, the logic of the market and the logic of sustainability can be regarded as coexisting but competing logics within the global logistics industry. Stakeholders’ demands for a dominant logic and companies’ different approaches to carbon reporting lead to differences in their carbon-disclosure behaviour, because each logic is associated with different organising principles and represents a different set of behaviours from those of stakeholders within the field (Schaltegger & Hörisch 2015). In other words, as carbon reporting is embedded in an organisational context, these competing logics at field level have an impact on carbon disclosure at firm level, whether a market or sustainability logic is dominant or whether a mix of both rationales can be found. Moreover, we argue that although different approaches to carbon disclosure at firm level – symbolic or substantial – are influenced by legitimisation rationales, the main drivers of carbon-disclosure behaviour are the underlying competing logics at the field level. In particular, the fight between the market and sustainability logic leads to either a pragmatic or a normative perspective within the organisation, which in turn determines either a more symbolic or a more substantial approach to carbon reporting (see Figure 2.2).
In global logistics companies, a market-driven logic represents the search for sustainability activities that will increase operational efficiencies or reduce carbon emissions to save costs. Schaltegger and Burritt (2015) call this behaviour the ‘business case’ for sustainability – that is, the identification and realization of the economic potential of voluntary environmental activities. It needs to be noted that, in the specific case of logistics companies, the economic factor is the decisive factor for environmental and carbon-reducing engagement (Carter & Rogers 2008; Oberhofer & Dieplinger 2014). Thus a purely operational efficiency-driven approach with substantial actions, with the main goal being to save costs along with carbon emissions, may not be enough to reflect a legitimacy-driven approach or the sustainability logic. The sustainability logic represents a normative rationale – that is, its orientation goes beyond economic outcomes or arguments, and it requires an additional “assessment of the techniques used to achieve the organisational accomplishments” (Hrasky 2011, p.180). We argue, therefore, that while the market
logic is driven by economic gains, the sustainability logic within the global logistics industry is influenced by legitimacy-driven outcomes that go beyond pure cost saving initiatives.

Another indicator for determining whether companies will follow a market or sustainability logic is the department which is responsible for collecting, controlling and communicating the carbon information (Schaltegger & Hörisch 2015). A company that puts its public relations and communications department in charge of carbon-related activities is likely to follow a sustainability logic, while aligning carbon-related information with the accounting or finance department indicates a market logic (Castelo Branco, Eugénio & Ribeiro 2008; Hogan & Lodhia 2011; Michelon 2011; Sridhar 2012). External communication of environmental activities and active engagement in stakeholder dialogues might also represent legitimacy-driven behaviour, which indicates business transparency and management’s commitment to, and concern about, reducing environmental impacts (UNEP/SustainAbility 2002). Moreover, in an engagement with full disclosure of carbon emissions along the supply chain, the degree of transparency might also be indicative of a market or sustainability logic (Kolk, Levy & Pinkse 2008; KPMG 2014).

Based on the above discussion, it is not clear what drives carbon disclosure behaviour, and this points to the need to systematically examine which underlying logic – market or sustainability, or a combination of both – dominates carbon disclosure in the global logistics industry. It is argued that the competition between the market and the sustainability logic leads not only to opposing legitimisation approaches, but also to differences in carbon disclosure in the global logistics industry. Given this lack of knowledge, the following research question is posed:

**RQ2: How does the sustainability logic influence carbon disclosure behaviour?**

Research question RQ1 focuses on investigating the different carbon disclosure approaches to allow for the investigation of the influence of competing logics and their relative dominance within companies in the same the organisational field. In particular, the literature review reveals a gap, allowing a systematic examination of underlying logics to determine whether market or sustainability logic, or a combination of both, dominates current carbon disclosure practices. The following research sub-questions results from this gap in knowledge and underline the necessity for this thesis to investigate the different carbon disclosure approaches:
**RQ2a:** Which disclosure behaviour - symbolic or substantial - dominates carbon disclosure in the global logistics industry?

**RQ2b:** How does the emergence of sustainability influence the extent of carbon reporting?

### 3.5.3 Logic centrality

Existing research acknowledges that organisations must frequently deal with multiple demands in their environment. These demands lead to an environment of ‘institutional complexity’ in which multiple logics are present and organisations are guided by different logics at the firm level (Battilana & Dorado 2010) or at the field level (Thornton, Ocasio & Lounsbury 2012), depending on the contexts in which they are embedded. Thus, different logics in a complex institutional environment may impose conflicting demands on organisational stakeholders within the field. Managers are constantly challenged to deal with sustainability practices, while at the same time being responsible for the wellbeing of their organisation (Schaltegger & Hörisch 2015). In a purely market driven view, the sustainability logic is regarded as a trade-off and as a problem regarding the pursuit of competitive advantages; this is particularly true in the logistics and transportation industry, which is characterised by high competition and price sensitivity (Glover et al. 2014; Oberhofer & Dieplinger 2014).

Each logic is associated with different organising principles and is not only influenced by diverse and multilevel political, cultural and social aspects, but is also characterised by a distinct institutional process and a degree of determinism in shaping organisational practices and structures (Greenwood et al. 2010). In other words, the organisational field can be seen as being dynamic, or as a “field of struggles” (Bourdieu & Wacquant 1992, p.97), in which the organisational field becomes a locale of ‘institutional complexity’ where stakeholders’ relationships determine the relative dominance of conflicting logics (Wooten & Hoffman 2008).

The dominance of conflicting logics, such as the logic of the ‘market’ and the logic of ‘sustainability’, is influenced by their position in the field. Within the field of business organisations, the market logic can be considered to be a “core logic” (Ansari, Wijen & Gray 2013, p.1017), as the company’s existence in a competitive environment relies on reducing costs.
and increasing profits. Recently however, stakeholders with environmental interests and powers are increasingly asking for more transparency with regard to carbon emissions disclosure (Hörisch, Freeman & Schaltegger 2014; Kolk, Levy & Pinkse 2008). These interests have become more powerful and more widespread in recent years, indicating a shift of the sustainability logic to a company’s core function, thus challenging the dominant market logic in the global logistics industry.

As such, the influence on the company’s carbon disclosure through the increasing shift towards sustainability depends on the extent to which the sustainability logic can manifest itself as a core feature that is central to organisational functioning. In other words, within a global logistics company, the closer the sustainability logic is to the company’s core function, the more it is treated as being equally valid and relevant to the market logic. This positioning as or around the core function in an organisation is what Besharov and Smith (2014) call the ‘centrality’ of institutional logics in the field, which represents our first key function in determining the implications on carbon disclosure in the global logistics industry.

The current literature suggests that companies, under conditions of institutional complexity, often respond to institutional pressures by differentiating between those pressures which are considered core tasks in a company and those pressures which are more peripheral to organisational functioning (Meyer & Rowan 1977). The influence of logics depends therefore on how centrally they are positioned within a company. Existing research in institutional theory considers the market logic as a ‘core’ function within any business organisation (e.g. Ansari, Wijen & Gray 2013); thus the positioning of the market logic can be regarded as being central to any company, including global logistics companies. The positioning of sustainability logic, however, varies between global logistics companies, as the differences in carbon management practices indicate (CDP 2010d). While some global logistics companies have integrated climate change into their strategy to reduce carbon emissions, other are more restrictive in their provision of carbon related information and rely more on symbolic management behaviour (Herold & Lee 2017b; Hrasky 2011).

The integration of climate change policies into a company’s strategy indicates a closer position of the sustainability logic to a company’s core functioning, while a more symbolic approach indicates a more peripheral position of the sustainability logic. Thus, centrality is high
when the sustainability logic and the market logic are integrated as core organisational activities central to a company’s operations, and it is lower when the market logic guides core activities while the sustainability logic is manifest in peripheral activities not directly linked to a company’s operations.

Centrality can be influenced by features of the organisational field, such as institutions and organisations. Organisational characteristics such as a company’s strategy and mission statement can interact with field characteristics which indicate the centrality of certain logics within the company. Corporate statements can be related to the concept of the institutional statement, which Crawford and Ostrom (1995, p.583) describe as “a shared linguistic constraint or opportunity that prescribes, permits, or advises actions or outcomes for actors (both individual and corporate).” Thus, a mission statement can be regarded as a reflection of the corporate strategy which situates a company in a particular location and thereby exposes it to different logics within the field. A change in institutional pressures can also lead to a change in mission statements in an effort to reduce uncertainty, which indicates an increase in centrality (Thornton, Jones & Kury 2005). In the global logistics industry, climate change statements may indicate the importance of the sustainability logic and their relatively central position within a company (Purdy & Gray 2009).

For example, the mission statements on climate change of the global logistics company DHL indicate a shift to an increase in centrality of the sustainability logic in recent years (Herold & Lee 2017b). In 2011, the climate change statements issued by DHL stated that “carbon efficiency is (...) directly related to (...) cost efficiency” (CDP 2011a, p.3), indicating a focus on the market logic (Schaltegger & Burritt 2015). In 2013, however, the climate change statement changed and included more legitimacy-seeking statements such as to “share (...) expertise (...) with our customers” (CDP 2014b, p.3), which indicates a shift to the sustainability logic. As global logistics companies are subject to complex operations and cover several areas of expertise, they must draw from the logics associated with each area of expertise which increases centrality (Besharov & Smith 2014). The change in climate change statements indicates a stronger focus on the expertise in the area of carbon management and thus represents a shift of the sustainability logic to a more central position in the company’s functioning.
While the previous discussion shows that the relative position of sustainability logic in a global logistics company’s core functions influences the extent of carbon disclosure, the current literature on institutional logics provides only limited insight into the conditions under which these different outcomes arise. Although existing research acknowledges that stakeholders affect institutional logics (see e.g. Greenwood & Kamoche 2013; Kim, Bach & Clelland 2007), it is limited in describing the salience of stakeholder influences within the same organisational field.

### 3.6 Stakeholder salience

The most significant distinction between institutional and stakeholder theory is that in institutional theory the unit of analysis is the company itself, while stakeholder theory analyses the relationships between the company and its stakeholders. To identify the pressures in the relationship between stakeholders and companies, stakeholder theory provides a theoretical foundation upon which to categorise the multi-level and multi-dimensional perspectives of stakeholders (Freeman 1983). As such, stakeholder theory is often used to examine environmental practices in companies, as it considers a complex business environment which is influenced by multiple stakeholders described as “any group or individual who can affect or is affected by the achievement of an organisation’s objectives” (Freeman 1983: 46). From a corporate sustainability perspective, Stead and Stead (2013, p.153) identify a “large cadre” of stakeholders with environmental interests, including shareholders, consumers, financiers, employees, NGOs and regulators, as well as standard setters such as business associations. In particular, NGOs, in concert with the media, can be regarded as having played an important role in increasing transparency in environmental practices, as increased transparency encourages companies and its stakeholders to mutually find innovative pathways to sustainability (Awaysheh & Klassen 2010). For example, the GRI reporting guidelines link reporting of sustainability practices to stakeholder engagement. The goal of this approach is not only to inform stakeholders, but also to increase exchanges between stakeholders and create mutual interests (GRI 2016). Examples like this shape sustainability oriented mindsets and reflect the ongoing trend of companies to integrate environmental practices due to heightened societal sensibilities to climate change.
One main task of stakeholder management from a company perspective is to convince stakeholder audiences that the existence of an organisation is legitimate. However, perceptions of legitimacy vary between companies and stakeholders. Companies have to seek legitimacy from stakeholders, while stakeholders need to perceive the company’s behaviour as being acceptable in order to legitimise the organisation (Hrasky 2011). Managers are influenced by multiple factors such as organisational values, principles and strategies as well as personal beliefs and self-serving interpretations (Gioia & Chittipeddi 1991; Weick, Sutcliffe & Obstfeld 2005). In this vein, Santana (2012) argues that the assessment of a stakeholders’ legitimacy is a social construction of reality, and the way a company’s management perceives the legitimacy of a stakeholder may or may not be in accordance with the stakeholder’s perception of legitimacy, which is, in turn, another social construction.

In the case of climate change, it is therefore crucial for companies to persuade stakeholders that the company’s operations are legitimate and are taking place in an environmentally responsible manner (Hrasky 2011). To do so, companies need to understand or categorise stakeholders’ claims according to their influences. Mitchell, Agle and Wood (1997) developed the most frequently used concept to define the degree of influence in stakeholders’ relations, and this concept has since been used regularly by practitioners and researchers alike. We adopt their concept of stakeholder salience, which is defined as “the degree to which managers give priority to competing stakeholders’ claims” (Mitchell, Agle & Wood 1997, p.854). In particular, Mitchell and colleagues argue that stakeholder salience is a function of the stakeholder possessing one or more of three relationship 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.

Stakeholders’ power refers to the influence of those who control the company’s critical resources, which means that these stakeholders have the power, or access to material or financial resources, to enforce their will within the relationship. These powerful stakeholders are not contractually bound with the company to exert pressure - for example, through regulations and policies. The second factor, legitimacy, refers to those stakeholders who achieve legitimacy when they have legitimate claims over the company, where the relationships’ legitimacy may derive from an exchange, contract, legal or moral right or at-risk status (Hill & Jones 1992). However, a legitimate claim can only be regarded as salient if the stakeholder has the power to
impose its will, or if the claim is perceived as urgent. The third factor, urgency, is related to the level of importance and attention attributed to the claim. Mitchell, Agle and Wood (1997) characterise this factor as time sensitivity (claims which need to be given priority) and necessity (claims which are crucial and highly important).

In the global logistics industry, where the sustainability logic has been adopted, the degree of salience depends on the extent to which stakeholders can hold companies accountable for carbon disclosure related practices. To increase the salience of their claims, stakeholders may coordinate their goals and actions with organisations that are involved in carbon related information gathering, monitoring or analysis, such as NGOs (e.g., the Carbon Disclosure Project), business associations (e.g., the World Business Council for Sustainable Development) and consulting companies (e.g., auditing firms such as KPMG or PWC). Such engagement with already legitimate and powerful organisations may lead to higher stakeholder salience, and thus to greater pressure on companies to give priority to stakeholders’ claims for full carbon disclosure (Hill & Jones 1992). As such, stakeholder salience is high when logistics companies have implemented an open and transparent approach with the aim of full disclosure, and it is lower when stakeholder pressure is uncoordinated or can be neglected with no serious implications for the company’s legitimacy.

The attribute of power within Mitchell, Agle and Wood (1997) salience framework however, appears to be a crucial factor with regard to its influence on carbon disclosure strategies. For example, the extent of disclosed carbon related information in global logistics companies depends on the relative power of internal and external stakeholders. External stakeholders’ power, however, is subject to ‘power differentials’ (Hill & Jones 1992), which reflects the information asymmetry between the company’s management and external stakeholders. Management has control over the decision-making mechanisms within the company, which puts them in a better position to exert power over stakeholders. In other words, the company’s management can be regarded as the most powerful and the most legitimate stakeholder of any company (Pålsson & Kovács 2014), and that is because top management eventually decides on the design of the carbon report and the amount of carbon emissions reported.

For example, based on the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), in order to report their carbon emissions, companies can
choose different carbon measurement and reporting schemes. These different schemes provide guidelines to set boundaries for carbon emissions reporting, and companies can choose between two different control approaches, namely either ‘financial’ control or ‘operational’ control. In the financial approach, companies need only to report emissions from ventures in which they hold more than 50 per cent interest (WRI/WBCSD 2011). In other words, companies that follow the financial approach do not need to report carbon emissions created within partnerships or in cooperation with pick-up and delivery services, if they do not own more than 50 per cent of the partner’s company. Compared to the ‘operational’ approach, this may lead to less complete reporting, because when operational control is applied, the measurement and reporting of carbon emissions “is not limited to majority-held ventures, it also applies to minority ventures” (IPIECA 2011, p.3-5). Thus, an operational approach increases the amount of carbon emissions, as it tries to capture emissions from the entire operational network.

Another example is the company’s decision whether to use outsourced transportation services or to perform logistical activities in-house. This initial difference in choosing a certain approach has a significant impact with regard to carbon emissions disclosure purposes. Logistics companies, or companies involved in transportation using an in-house approach, are required to report their carbon output under Scope 1 emissions, while all outsourced logistics activity falls under the Scope 3 category, where disclosure is voluntary and thus is not a requirement. Although institutional and stakeholder pressure may influence and affect a company’s decision about what kind of carbon information is disclosed, both examples show that the eventual decision lies with the company’s management. Our conceptual framework depicts this process with the company as a bottleneck (see Figure 2.3), where all pressures are consolidated and filtered.
In other words, institutional pressures alone cannot provide answers to questions about the extent to which carbon related information is disclosed. Relevant internal stakeholders, in particular company managers, have a direct influence on a company’s carbon report, while external stakeholders have only indirect influence by applying external pressure. However, the shift in the global logistics industry towards the sustainability logic to maintain legitimacy puts increasing pressure on companies to disclose relevant carbon related information. Thus, these dynamics of the relationship represent a constant fight for power between management and stakeholders outside of the company regarding the extent of disclosure of carbon related information. Therefore, we argue that both dimensions - the ‘centrality’ of the sustainability logic on one hand, and the ‘salience’ of stakeholders on the other - are critical in determining a company’s carbon disclosure strategy.

Although prior studies acknowledge the prevalence of competing logics, they are limited when it comes to describing the determinants of stakeholder influences that lead to different organisational responses within the same organisational field. In particular, the issue of whether the interaction between field-level pressures and firm-level influences can play an important role

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**Figure 3.3: Institutional and stakeholder influences (developed by author)**
in carbon disclosure strategies in the global logistics industry remains to be explored. We specifically set the following research question:

*RQ3: How does the interaction between institutional and stakeholder pressures influence carbon disclosure strategies in global logistics companies?*

### 3.7 The interaction between institutional and stakeholder pressures

These two dimensions of institutional and stakeholder pressures can be associated with a company’s internal and external actions. While internal actions are addressed at achieving structural change, for example, structural mimicry or the implementation of certain of accepted and appropriate organisational practices or structures, external actions aim to gain organisational endorsement by external stakeholders. Theoretically, these internal and external actions can be linked to institutional theory (e.g., Ansari, Wijen & Gray 2013; Besharov & Smith 2014) and stakeholder theory (Freeman 1983; Mitchell, Agle & Wood 1997). While internal actions reflect the extent to which certain institutional logics are integrated inside the boundaries of the company (i.e., management, owners, employees), external actions reflect the extent of influences from stakeholders outside of the organisation (i.e., government, customers, suppliers, investors).

In particular, internal actions represent inward-looking practices involving organisational steps to develop organisational capabilities to meet the expectations of the internal actors upon which the organisation depends for critical resources (Hawn & Ioannou 2016; Meyer & Rowan 1977). In the context of carbon disclosure, the set of internal practices may include the implementation of climate change policies or energy-reducing initiatives as well as forming a board-level sustainability committee. As such, the extent of applied or implemented carbon management practices within the organisation can be regarded as an indicator of the company’s overall carbon disclosure strategy.

Externally, companies engage in public and visible activities, as well as in communication tactics that involve the presentation of ceremonies to persuade stakeholders that the company’s operations are legitimate and the company is operating as an environmentally responsible citizen (Hörisch, Freeman & Schaltegger 2014; Hrasky 2011). In particular, inter-organisational networks (Stuart, Hoang & Hybels 1999), media attention (Sine, David & Mitsuhashi 2007) and
legitimacy of external ties (Baum & Oliver 1991) can be regarded as crucial practices to gain legitimacy. In the context of carbon disclosure, the set of external practices may include the verification of the company’s emissions through a third party, engagement with business or investor organisations such as the Carbon Disclosure Project (CDP), the acknowledgement of industry guidelines (e.g., GRI) or signatories with international organisations (e.g., United Nations Global Compact). Therefore, the extent of applied or implemented carbon management practices outside the organisation can be regarded as an indicator of the company’s overall carbon disclosure strategy.

Hawn and Ioannou (2016) argue that both internal and external actions may generate legitimacy. Whereas internal actions signal conformity with accepted structures and thus help organisations to gain legitimacy, external actions target specific audiences that confer legitimacy upon the organisation. It is therefore crucial to differentiate between the two types of internal and external actions and pressures to understand how they influence carbon disclosure strategies. However, given the broad range of approaches to the mix of internal and external carbon management practices (see e.g. Gibassier & Schaltegger 2015; Hrasky 2011; Kolk, Levy & Pinkse 2008; Lee 2011b), the key issue of how the dynamic interaction between external and internal carbon management practices may be associated with a company’s carbon disclosure strategy remains unanswered. In order to categorise carbon disclosure strategies, a more detailed investigation of internal and external carbon management practices is required. Therefore, the following research questions will be addressed:

**RQ4a.** To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?

**RQ4b.** From a corporate perspective, what carbon disclosure strategies have been adopted?

However, the literature to date has not examined specific carbon management practices and how they may have changed over time; thus, the key issue of how a change of internal and external carbon management practices may lead to a change in carbon disclosure strategies remains underexplored.
Companies may take internal and external actions at the same time, for example, while focusing on internal initiatives for structural change, they may seek to appease or satisfy immediate audiences and key stakeholders (Lee & Vachon 2016). Moreover, companies can choose their actions, that is, a company may focus on one particular dimension and subsequently neglect others. However, until now, this process has been little understood with regards to carbon management practices and their implications for disclosure strategies. It may be that carbon disclosure strategies are driven by prior internal actions in combination with current external actions. As internal actions often dictate organisational changes, these actions may take longer to materialise than externally focused and predominantly ceremonial actions (Hawn & Ioannou 2016). A good example is carbon reporting. The issuance of a carbon report can be considered to be an external action a company initiates to inform stakeholders about their internal actions introduced in the prior year, assuming that it takes at least a year for these carbon practices to be implemented and have an impact (for example, the implementation of energy-efficiency policies or climate change initiatives) (Herold & Lee 2017b). In other words, while external actions announce the start of internal carbon practices, external actions following a year of internal practices being implemented may present actual results or progress which external audiences value more than simple communication of climate change engagement (Hawn & Ioannou 2016).

In order to understand the change and the influence on carbon disclosure strategies, a more detailed investigation of carbon management practices over time is required, which leads to two research questions:

RQ4c. *To what extent have internal and external pressures led to a change in carbon management practices?*

RQ4d. *To what extent have internal and external pressures led to a change in carbon disclosure strategies?*

### 3.8 Conclusion

This chapter began by discussing corporate climate change responses and describing the emergence of carbon disclosure over the last two decades. It emphasized the role of business in fighting climate change and the different approaches within carbon management practices,
focusing on the global logistics industry. Section 3.3 presented Paper A, a systematic literature review which discussed carbon management practices within the logistics and transportation sector and highlighted carbon disclosure as the most promising field for future research. Consequently, Section 3.4 introduced carbon disclosure in the global logistics industry and discussed specific variances between companies due to multiple institutional and stakeholder pressures, leading to an examination of carbon disclosure practices through an institutional lens. The influences on carbon disclosure from an institutional theory perspective were discussed and key gaps were identified, leading to the first research questions to examine the influence of different logics and rationales on carbon disclosure practices and strategies. Next, the limitations of institutional theory were discussed and the integration of stakeholder theory was proposed, complementing institutional theory examining the influences on carbon disclosure. The integration of stakeholder theory led to research questions concerning not only how the interaction between internal and external institutional and stakeholder interests influences carbon discourse practices and strategies, but also what strategies are adopted within the global logistics industry and how they have changed over time.
Chapter 4 (Paper B): Similarities and differences in carbon disclosure in global logistics companies

Preamble:

This paper (Paper B) was published as a book chapter in Springer: Pathways to a Sustainable Economy: Bridging the gap between COP21 commitments and 2030 targets of emission control. The paper resulted from the identified gap in the systematic literature review (Paper A) which shows the limited application of carbon management practices in the logistics industry, in particular in the carbon disclosure research area. It examines and discusses the emergence of carbon disclosure and its influence on carbon reporting. The study comprises a comparative dual case study, using the cases of FedEx and UPS. Applying an institutional lens, the paper uses a qualitative approach, combining carbon disclosure data from sustainability and Carbon Disclosure Project (CDP) reports provided by FedEx and UPS. The aim was to provide insight into whether these companies follow a symbolic or substantial disclosure approach, and which underlying dominant logic drives carbon disclosure behaviour, answering the research questions:

*RQ2a. Which disclosure behaviour – symbolic or substantial – dominates the carbon reporting in the global logistics industry?*

*RQ2b. How does the emergence of sustainability influence the extent of carbon reporting at FedEx and UPS?*

This paper provides an introduction to the varied carbon disclosure approaches in the global logistics industry, however, it was limited to two cases and one geographical area, thereby leaving room to extend the scope of the research. This has been addressed in Paper C.
Carbon disclosure strategies in the global logistics industry: Similarities and differences in carbon measurement and reporting

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David M. Herold and Ki-Hoon Lee designed the dual-case study. David M. Herold conducted the content analysis and led the drafting of the manuscript and both authors contributed to and/or have approved the final manuscript.

Conflict of Interest
Both authors have declared no conflict of interest.

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4.1 Abstract

The transportation industry can be regarded as a significant contributor to greenhouse gases which puts pressure on global logistics companies to disclose their carbon emissions in form of carbon reports. However, the majority of these reports show differences in the measurement and in the reporting of carbon information. Using an institutional theory lens, this paper discusses the emergence and the institutionalisation of carbon disclosure and their influence on the carbon reporting, using the two cases of FedEx and UPS. In particular, the paper examines if the carbon reports follow a symbolic or substantial approach and which institutional logic dominates the rationale behind the company’s carbon disclosure. We uncover significant variances between those companies that provide insights into the different dominant logics and their influence on carbon reporting. Our results show that both companies adopt different dominant logics due to heterogeneous carbon reporting practices. In a quest for market controlled sustainability initiatives, this research is important (a) for understanding ways in which major carbon contributors operate between market and sustainability logics, and (b) for policymakers to provide an understanding how to encourage investments in carbon performance without reducing the ability to compete in the marketplace, thus initiating a shift to more environmentally friendly activities.

Keywords: carbon disclosure, sustainability reporting, environmental sustainability, CO2, institutional logics, sustainability logic, logistics, FedEx, UPS

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Chapter 5 (Paper C): The influence of the sustainability logic on carbon disclosure

Preamble:
This paper (Paper C), published in Sustainability, extends the research from Paper B and adds another company (DHL) to the case study, thereby increasing validity by examining three companies and expanding the study geographically. The aim of this study was to examine the reporting behaviour and the underlying logic between UPS, FedEx and DHL. The study adopts an interpretative content analysis approach of the statements and declarations of DHL, FedEx and UPS in their reports to the Carbon Disclosure Project (CDP). To assess carbon disclosure behaviour as well as the logic behind it, the paper focused on four categories: (1) the company’s carbon strategy; (2) the extent of carbon information provided (the degree of transparency); (3) internal initiatives; and (4) external stakeholder engagement, all of which were subsequently analysed and compared. The research also addressed the limitations mentioned in Paper B and further expands on the theoretical and methodological framework, answering the research question:

*RQ2. How does the sustainability logic influence carbon disclosure strategies and behaviour?*

The findings of this study revealed significant differences in the applied carbon disclosure approaches and their underlying logics. From an institutional logics perspective, corporate carbon disclosure practices are either dominated by a market logic emphasizing the economic benefits of carbon reductions, or by a sustainability logic following a more transparent approach. From a theoretical viewpoint, the study provides a more detailed conceptual foundation by linking the different carbon disclosure strategies to the underlying logics that drive carbon disclosure approaches. However, although both papers provide insights into the differences in carbon reporting behaviour, the focus on the construct of institutional logics within institutional theory provides only limited insight into the conditions under which these different outcomes arise, in particular neglecting the impact of stakeholder salience. This limitation led to the
development of Paper D; a conceptual paper that integrates stakeholder theory into institutional theory.
The influence of sustainability logic on carbon disclosure in the global logistics industry: The case of DHL, FDX and UPS

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David M. Herold contributed to the manuscript by providing the initial concept development, data collection and analysis. Ki-Hoon Lee conducted further development of conceptual framework, research design and analysis approach to contribute to this paper. Both authors jointly wrote the paper.

**Conflict of Interest**

Both authors have declared no conflict of interest.

**Authors Signatures**

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5.1 Abstract

As a significant contributor to carbon emissions, global logistics companies are under scrutiny from various stakeholders, and respond by disclosing carbon-related information in the form of carbon reports. Carbon disclosure is, however, a mainly voluntary practice that allows for a broad range of interpretation from management, which leads to different approaches to the measurement and reporting of carbon-related information. From a theoretical perspective, these different carbon-disclosure approaches in global logistics companies can be attributed to the underlying construct of competing logics, namely the market and the sustainability logic. While competing logics are frequently discussed in the current literature, little is known about their influence on shaping carbon-disclosure practices. This aim of this article is to examine the similarities and differences in the measurement and reporting of carbon-related information in order to capture the underlying logic that drives carbon-disclosure behaviour in the global logistics industry. We adopt an interpretative content analysis approach and examine the carbon-related information using the Carbon Disclosure Project (CDP) reports of DHL, FDX and UPS. The analysis reveals significant differences in the applied carbon-disclosure strategies, as well as in the degree of transparency between the three companies. The results also indicate that the carbon-disclosure practices of FDX are dominated by a market logic that emphasizes the economic benefits of carbon reductions, while DHL and UPS have prioritized the sustainability logic to gain a competitive advantage.

Keywords: carbon disclosure, sustainability reporting, sustainability logic, global logistics industry

5.2 Introduction

The risk of climate change has put sustainability high on the corporate agenda, and companies are under scrutiny from various stakeholders to disclose information about their carbon-related activities (Kolk, Levy & Pinkse 2008). This is particularly true for global logistics companies, as their output accounts for around 5.5 per cent of global carbon emissions (KPMG 2014; World Economic Forum 2012). Global logistics companies respond to these pressures by disclosing information in the form of carbon reports. However, carbon disclosure is still mainly a voluntary organisational practice, and global logistics companies can choose which tools or guidelines to apply in order to measure environmental and carbon performance (Hahn, Reimsbach & Schiemann 2015). This voluntary approach allows for a broad range of interpretation of carbon-related information, and leads to significant differences in carbon measurement and reporting, although the operations within global logistics companies can be regarded as broadly similar.

Although many contributions on the topic of carbon reporting and disclosure have been made in the extant literature, little attention has been given specifically to carbon-disclosure practices in the logistics and transportation sector. Research on carbon disclosure and management from the perspective of logistics companies is still limited (Abbasi & Nilsson 2016; Evangelista et al. 2013; Hahn, Reimsbach & Schiemann 2015; Herold & Lee 2017a; Kolk, Levy & Pinkse 2008; Lieb & Lieb 2010; Perotti et al. 2012). The majority of existing studies address carbon issues either only partly, or do not focus specifically on logistics companies, pointing to a need to examine carbon-disclosure practices within the logistics and transportation sector. Such an examination and analysis of carbon-disclosure strategies in the logistics and transportation sector therefore complements the existing literature and provides new insights into this emerging field of carbon management.

Carbon-disclosure strategies on a firm level can be divided into two main approaches (Gotsi & Wilson 2001). One is symbolic behaviour, which can be described as rhetorical statements to create an impression of environmental responsibility, but without relevant corporate action. The other is substantial behaviour, which reflects carbon-related accomplishments through instrumental corporate action that reduces carbon emissions and is congruent with societal expectations (Hrasky 2011; Kim, Bach & Clelland 2007). Although both approaches can be useful carbon-disclosure strategies, the symbolic and substantial approaches can be linked to different
legitimisation ‘rationales’ within organisations, which are characterised by either a pragmatic or a normative view (Hopwood 2009; Suchman 1995). A normative rationale in carbon reporting can be linked to rather transparent behaviour to disclose corporate environmental activities and their consequences, while a pragmatic rationale may be regarded as an attempt to create an image for its audience; in such a situation, less is known about the company despite an openness to reporting (Hrasky 2011).

It is argued that the different legitimisation rationales, and subsequently the differences in carbon measurement and reporting, are related to the companies’ different beliefs about the significance of carbon disclosure. Companies are constantly challenged to deal with carbon-related activities while at the same time being responsible for the (economic) wellbeing of their organisation (Schaltegger & Hörisch 2015). In the academic literature, this ‘field of struggles’ (Calhoun 1993), which is represented by actors with multiple interests, is characterised by two coexisting but competing logics: the market logic and the sustainability logic. While the market logic is driven by economic gains, the sustainability logic within the global logistics industry is influenced by legitimacy-driven outcomes that go beyond pure cost savings initiatives (Hrasky 2011; Schaltegger & Hörisch 2015). Therefore, the stakeholders’ demands for a dominant logic and their different approaches to carbon disclosure are embedded in an organisational context and, because each logic is associated with a different set of behaviours, the competing logics at the field-level influence carbon-disclosure practices at the firm level.

This article therefore seeks to find some answers regarding how these competing logics influence and shape carbon-disclosures practices and strategies in global logistics companies. Adopting an interpretative content analysis approach embedded within a comparative case study, the carbon-related information of the CDP reports of global logistics companies DHL Express (DHL), Federal Express (FDX) and United Parcel Service will be analysed and discussed. All three companies disclose carbon information, and are very homogenous in their operations; thus they represent an organisational field (Onghena, Meersman & Van de Voorde 2014; Scott 1991). Moreover, differences in the measurement and reporting of carbon emissions in all three companies can be observed, making this specific industry within the global logistics industry a suitable example to examine carbon-disclosure practices. To examine the similarities and differences in the carbon reports and capture the companies’ logic, this article applies specific measures related to carbon-related information and focuses on (1) each company’s carbon strategy;
(2) the extent of carbon information provided; (3) internal initiatives; and (4) external stakeholder engagement.

The article is structured as follows. The next section provides an overview of carbon reporting in the logistics industry and highlights the development and the general differences within carbon disclosure. This is followed by a review of the current literature, and a description of how different views of legitimacy are linked to the companies’ carbon-reporting approaches. In the fourth section, we take the literature review further and introduce the institutional construct of competing logics as an underlying concept to explain influences on the carbon-reporting approaches. The fifth section explains the methodology and the dataset. This is followed by an analysis and a discussion of the results with regard to carbon approaches and the related market or sustainability logic orientation. The final section discusses the limitations of this study and draws conclusions for research and corporate practice.

5.3 Carbon reporting in the global logistics industry

Over the last two decades, the social consciousness of carbon-related issues has increased gradually in society, and revealed a potential legitimacy gap for companies and their carbon performance (Hrasky 2011). It started in the 1990s, when European companies responded to climate change by developing new technologies that would lead to modest but rapid Greenhouse Gases (GHGs) emission reductions, while US-based companies were actively resisting climate science and lobbied against regulatory change (Levy 2005; Levy & Egan 2003). It took until the early 2000s for European as well as US-based companies to acknowledge the role of GHGs in climate change and the need for more action. Fossil fuel-related sectors such as the logistics industry recognized that carbon constraints were a threat to existing business models and could not only generate significant impacts on markets and costs, but also lead to institutional pressures through regulatory policies. As a result, companies in the logistics industry acted to engage in a variety of voluntary schemes to inventory, curtail and trade carbon emissions (Kolk, Levy & Pinkse 2008). Moreover, senior managers in these firms have interacted with each other quite frequently through various industry associations, conferences and climate negotiations, leading to some convergence in their perceptions of climate-change issues and of their interests. In a sense, these global industries and the ‘issue arena’ of climate change itself have become more
important institutional influences on corporate strategy than the home country environment (Levy & Kolk 2002).

During the last decade, this development has led to an increasing amount of locally and globally engaged environmental groups, which have exerted pressure on companies to track and report their emissions by asserting that carbon management provides a mechanism for assessing climate-related business risks and opportunities (Lash & Wellington 2007; Lee & Vachon 2016). In response to these stakeholder pressures, the disclosure of carbon-related information about the company’s activities in the form of carbon reports has increased markedly over the last several years (KPMG 2014; Hahn et al. 2015). This is particularly true for global logistics companies, as the logistics industry accounts for 5.5 per cent of all carbon emissions worldwide (KPMG 2014; World Economic Forum 2012).

Thus, transport and logistics activities, as facilitators of global trade, can be regarded as a significant source of carbon emissions. Global logistics activities comprise all our main transport modes (air, rail, road and ocean), and the resources and systems for the transportation of goods can be regarded as extensive in terminals, means of transportation and handling equipment (Onghena, Meersman & Van de Voorde 2014). The extensive use of the logistics and transportation network that depends heavily on fossil fuels results in high carbon emission outputs, leading to scrutiny from stakeholders and an increasingly adoption of carbon reporting within the global logistics industry (CDP 2010d; Kolk, Levy & Pinkse 2008).

However, carbon reporting constitutes a mainly voluntary organisational practice within companies (Hahn, Reimsbach & Schiemann 2015). By bypassing formal regulatory mechanisms, carbon reporting can be regarded as a ‘non-state market driven governance system’ (Cashore, Auld & Newsom 2004) or as a form of ‘civil regulation’ (Murphy & Bendell 1999). Its voluntary nature allows companies and management to choose which tools or guidelines to apply in order to measure carbon and environmental performance. For example, within The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), companies can choose different carbon-measurement and reporting schemes for their carbon emissions (WRI/WBCSD 2011). DHL, FDX and UPS have integrated climate change into their strategies and follow The Greenhouse Gas Protocol, but a first glance reveals that although their operations
can be seen as very similar, differences in measuring and reporting of carbon-related activities can also be observed between the three companies (Lee & Herold 2015).

For instance, to measure the targets, FedEx and UPS have implemented ‘intensity’ targets compared with ‘absolute’ targets. An ‘absolute’ target would reduce the total amount of carbon emissions, and there are management fears that this could constrain the companies’ growth. Therefore, an ‘intensity’ target is preferred; this measures the target as a decline in carbon emissions relative to the level of logistical activity (McKinnon & Piecyk 2012). However, companies need to decide the variable against which the reduction will be measured. Although DHL, FDX and UPS have adopted the ‘intensity’ approach, their variables differ. FedEx addresses only Scope 1 emissions and defines its carbon-reduction target in ‘ton-miles’ for its aircraft emissions and in ‘miles per gallon’ for its vehicle fleet (CDP 2015c). DHL relates carbon emissions to the total square metres of space in its warehouses (Deutsche Post DHL 2011). And while UPS also addresses Scope 1 aircraft emissions in ‘ton-miles’, it has developed more detailed ratios for each Scope 1 and 2 emissions of its divisions and assigned each a different weighting factor (CDP 2015d; McKinnon & Piecyk 2012).

A further important point concerns the reporting of Scope 1, 2 and 3 emissions within the global logistics industry. The Greenhouse Gas Protocol provided by the WRI/WBCSD (2011) distinguishes three GHG emission categorising emissions into Scopes 1, 2 and 3. Scope 1 emissions are all direct GHG emissions caused by owned or controlled facilities of an individually regarded company. Examples include the burning of fossil fuels, transportation by company-owned vehicles, and the chemical and physical processes necessary for producing electricity. Scope 2 emissions refer to indirect GHG emissions caused by the supply of purchased electricity generated outside the system boundaries. Scope 3 emissions are not caused directly by the company itself, but indirectly by its activities. This includes various categories such as purchased transportation, fuel- and energy-related activities, business travel, and so on. While Scope 1 and 2 reporting is mandatory, Scope 3 reporting is voluntary, and logistics companies use different approaches to measure the carbon output (CDP 2010d). For global logistics companies, purchased transportation by air, rail, road and ocean accounts for the largest source of Scope 3 carbon emissions (FedEx 2014; UPS 2014).
Furthermore, differences can also be observed in the extent to which GHG emissions are included in the reporting (CDP 2010d). When carbon reporting is examined in a logistics context, not only CO₂ emissions, but all relevant GHG emissions, have to be taken into account; the relevant indicator to measure the impact of emissions on climate change is CO₂ equivalents (Schaltegger & Csutora 2012). Apart from CO₂ as the major emission, others include methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), per fluorinated compounds (PFCs) and hydro fluorocarbons (HFCs) (European Commission 2007; Schmidt 2009).

5.4 Legitimation and carbon reporting approaches

The most common approach to the introduction of corporate reporting is to view disclosure as a reaction to environmental factors. Thus disclosure can be regarded as a way to legitimize actions by the business through a social contract, where it agrees to perform various desired actions in return for approval of its objectives, other rewards and its ultimate survival (Guthrie & Parker 1989). Organisational legitimacy has long been acknowledged as crucial for the survival of any organisation (Dowling & Pfeffer 1975). Legitimacy is “a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions” (Suchman 1995, p.274). Legitimacy can also be regarded as the underlying rationale, or the dominant motivation, for carbon reporting (Hahn, Reimsbach & Schiemann 2015; Hrasky 2011; Kolk, Levy & Pinkse 2008).

Legitimacy building in the traditional view of institutional theory can occur through isomorphic behaviour, in particular within the same organisational field. As DHL, FDX and UPS can be regarded as entities that constitute a single organisational field, these companies may increasingly resemble each other with converging perceptions of how to respond to climate change (Lenssen et al. 2008). In other words, contemporary institutional theory indicates that organisational practices within a field, such as carbon reporting, are driven by isomorphism and become similar over time (DiMaggio & Powell 1983; Scott 1991). Thus the adoption of carbon reporting within the same organisational field can either be related to some sort of power exerted from the industry or there must already exist a successful model of carbon reporting that can be reproduced. While the former mechanism leads to normative isomorphism (i.e. induced by the industry), the latter – the presence of successful models – leads towards mimetic isomorphism (i.e.
induced by competitors). Coercive isomorphism (i.e. pressures induced by regulators) can be regarded as a subordinated mechanism in this study, as all companies in this narrow organisational field face similar institutional pressures.

As a consequence of isomorphic behaviour, DHL, FDX and UPS should respond to these pressures in the same way. But although DHL, FDX and UPS have responded by providing carbon information in the form of carbon reports, the carbon reporting shows significant differences (Lee & Herold 2015). Thus isomorphism can be regarded as only valid to a certain extent within the field (i.e. the depth of response to institutional pressures as well as the degree of legitimisation varies across companies). That is, companies have different viewpoints and positions regarding the degree of legitimacy required in their carbon reporting. In general, two opposing legitimisation approaches can be distinguished with regard to carbon reporting: ‘pragmatic’ and ‘moral’ legitimacy (Suchman 1995). Hrasky (2011) argues that moral legitimacy represents a normative orientation in an organisation and is acquired when the organisation’s stakeholders make a favourable evaluation of the organisation and its actual accomplishments. In contrast, pragmatic legitimacy involves engaging in self-interested behaviour calculated to portray an image of the organisation that is honest and trustworthy, sharing and promoting the values that the audience also values (Suchman 1995).

According to Hopwood (2009), these opposing legitimisation ‘rationales’ consequently lead to different approaches in carbon reporting. While a moral legitimacy approach in carbon reporting can be linked to a rather transparent behaviour to disclose the corporate environmental activities and its consequences, a pragmatic legitimacy approach can be regarded as an attempt to create an image for its audience; here, less is known about the company despite an openness to reporting. Thus each legitimisation approach may have a direct influence on the carbon reporting approach. Hrasky (2011) and Kim, Bach and Clelland (2007) link pragmatic legitimacy to a symbolic management approach and normative legitimacy to an action-oriented or substantial management approach. Symbolic behaviour in carbon reports may constitute rhetorical statements designed to create an impression of sustainable or environmental responsibility, which are not necessarily accompanied by corporate action (Hrasky 2011; Kim, Bach & Clelland 2007). Symbolic behaviour can also be related to reputation management, which Schaltegger and Burritt (2015) describe as a company’s focus on societal, political and media attention. In a symbolic or reputational approach, carbon-related activities and their reporting are closely linked to the PR department to gain the
support of the company’s most immediate audiences (Hrasky 2011). Similar to a pragmatic legitimation approach, symbolic management can be regarded as self-interested or narcissistic behaviour in carbon reporting with more or less substantiated claims of carbon-related achievements (Schaltegger & Burritt 2015). In contrast, carbon reporting may reflect the substantial corporate action taken by a company to achieve carbon-related accomplishments such as reducing its carbon footprint (Hrasky 2011).

Both carbon reporting approaches can be regarded as useful legitimation approaches. The specific nature of the disclosure response depends on the particular legitimation strategy or mix of strategies adopted. In other words, while it is evident that the differences in carbon reporting are related directly to the different legitimation approaches, it is still unclear what drives the different legitimation rationales. As isomorphic behaviour is limited to explain these differences in carbon disclosure, it is argued that these rationales are related to the companies’ different beliefs about the significance of carbon reporting – hence its underlying logics.

5.5 The influence of underlying competing logics on carbon disclosure

Instead of viewing the organisational field as an homogenous collection of organisational actors, we could take the view of Bourdieu and Wacquant (1992), who argue that the organisational field can be seen as dynamic or even a ‘field of struggles’. In this ‘field of struggles’, actors are engaged in “a war or, if one prefers, a distribution of the specific capital which, accumulated in the course of previous wars, orients future strategies” (p.86) (Calhoun 1993). The organisation field therefore becomes a locale in which actors’ relationships eventually fight for the adoption of cultural-cognitive, normative and regulative structures that provide stability and collective meaning to social behaviour (Scott 1995). In other words, the adoption of organisational practices such as carbon reporting provides the organising principles for a field and reflects the “assumptions and values, usually implicit, about how to interpret organisational reality, what constitutes appropriate behaviour and how to succeed” (p.70) (Thornton 2004). These discursive practices represent what is called an institutional logic in the literature. Institutional logics underpin the appropriateness of organisational practices in given settings and at particular historical moments, which is influenced by multi-level political, cultural and social aspects of organisational behaviour and phenomena (Lounsbury & Ventresca 2003).
The adoption of carbon disclosure in the global logistics industry can subsequently be regarded as the adoption of a sustainability logic, as heightened concerns about corporate carbon emissions have created a potential legitimacy gap (Suddaby & Greenwood 2005). But while it can be acknowledged that adoption of carbon reporting in the broader context of sustainability represents the logic behind the search for legitimacy, companies are also driven by the logic of the market (Greenwood et al. 2010). A market logic assumes that companies address sustainability issues only if this positively affects their financial performance, such as profits or shareholder value (Schaltegger & Hörisch 2015). Managers are constantly challenged to deal with sustainability while at the same time being responsible for the economic wellbeing of their organisation, so are embedded in this ‘field of struggles’, where multiple stakeholders fight for their dominant logic and attempt to transform the company’s structures and norms by a “political process that reflects the power and interests of organized actors” (p.658) (Maguire, Hardy & Lawrence 2004). As a consequence, organisational responses to different stakeholders’ interests are unlikely to be uniform, and organisational fields are usually characterized by conflicting logics (D’Aunno, Sutton & Price 1991; Hoffman 2004; Reay & Hinings 2005b).

In the context of our research, the market logic and the sustainability logic can be regarded as coexisting but competing logics within the global logistics industry. The stakeholders’ demand for a dominant logic and their different approaches to carbon reporting lead to differences in their carbon-disclosure behaviour, because each logic is associated with different organising principles and represents a different set of behaviours from those of stakeholders within the field (Schaltegger & Hörisch 2015). In other words, as carbon reporting is embedded in an organisational context, these competing logics at the field level have an impact on the carbon disclosure at the firm level, whether a market or sustainability logic is dominant or whether a mix of both rationales can be found. Moreover, we argue that although the different approaches to carbon disclosure at the firm level – symbolic or substantial – are influenced by legitimisation rationales, the main drivers for the carbon-disclosure behaviour are the underlying competing logics on the field level. In particular, the fight between the market and the sustainability logic leads to either to a pragmatic or a normative perspective within the organisation, which in turn determines either a more symbolic or a more substantial approach to carbon reporting (see Figure 5.1).
For global logistics companies, a market-driven logic represents the search for sustainability activities that will increase operational efficiencies or reduce carbon emissions to save costs. Schaltegger and Burritt (2015) call this behaviour the ‘business case’ for sustainability – that is, the identification and realization of the economic potential of voluntary environmental activities. It needs to be noted that, in the specific case of logistics companies, the economic factor is the decisive factor for environmental and carbon-reducing engagement (Carter & Rogers 2008; Oberhofer & Dieplinger 2014). Thus a purely operational efficiency-driven approach with substantial actions, with the main goal being to save costs along with carbon emissions, may not be enough to reflect a legitimacy-driven approach or the sustainability logic. The sustainability logic represents a normative rationale – that is, its orientation goes beyond economic outcomes or arguments, and it requires an additional “assessment of the techniques used to achieve the organisational accomplishments” (p.180) (Hrasky 2011). We argue, therefore, that while the
market logic is driven by economic gains, the sustainability logic within the global logistics industry is influenced by legitimacy-driven outcomes that go beyond pure cost savings initiatives.

Another indicator to determine whether companies will follow a market or sustainability logic is what department is responsible to collect, control and communicate the carbon information (Schaltegger & Hörisch 2015). A company that puts its public relations and communications department in charge of carbon-related activities is likely to follow a sustainability logic, while aligning carbon-related information with the accounting or finance department indicates a market logic (Castelo Branco, Eugénio & Ribeiro 2008; Hogan & Lodhia 2011; Michelon 2011; Sridhar 2012). External communication of environmental activities and active engagement in stakeholder dialogues might also represent a legitimacy-driven behaviour, which indicates business transparency and management’s commitment to and concern about reducing environmental impact (UNEP/SustainAbility 2002). Moreover, in an engagement with full disclosure of carbon emissions along the supply chain, the degree of transparency might also be indicative of a market or sustainability logic (Kolk, Levy & Pinkse 2008; KPMG 2014).

Based on the above discussion, it is not clear what drives carbon disclosure behaviour and points to the need to systematically examine which underlying logic – market or sustainability, or a combination of both – dominates carbon disclosure in the global logistics industry. It is argued that the competition between the market and the sustainability logic lead not only to opposing legitimisation approaches, but also lead to differences in the carbon disclosure between DHL, FDX and UPS. Thus, the research aim of this study is to examine whether DHL, FDX and UPS follow a symbolic or substantial measurement and reporting approach and what logic – market or sustainability – dominates the carbon disclosure behaviour of each company.

5.6 Research method

To address the research aim of determining the dominant logic that drives the different carbon-disclosure behaviour of DHL, FDX and UPS, the similarities and differences in the carbon-related information of the companies were analysed. In particular, we adopted an interpretative content analysis approach of the statements and declarations of DHL, FDX and UPS in their reports of the Carbon Disclosure Project (CDP). CDP is a prominent international collaboration that works together with more than 3000 of the largest corporations to provide information relevant to
investors relating a wide range of climate-related activities, including measurement of emissions, organisational structure, initiatives and engagement, and trading and offsets (CDP 2016). The CDP reports were chosen because the information in them has been completed by the company’s management, hence it negates research bias in the collection phase. The information provided in these reports is extensive and reflects a company’s values and attitudes towards carbon disclosure. Consequently, they provide a good example that not only reveals and highlights the similarities and differences in the statements, but also give an indication of the rationale behind disclosure decisions.

Adopting interpretative content analysis provides in-depth insights into the reporting behaviour of the companies and enables a discussion of the underlying logic behind it. It is therefore not a quantitative comparison of carbon emissions, goals and achievements. Rather, interpretative analysis captures meaning by disaggregating narrative into its constituent parts and then describing the contents of each disaggregated component (Cormier & Gordon 2001; Milne, Tregidga & Walton 2003). The capture of the actual content of narrative is important when researchers are interested in understanding disclosure practice (Hammond & Miles 2004). Thus, interpretative studies aim to gain a greater understanding of what is communicated and how meaning is understood (Laine 2005). They are therefore concerned with the quality, richness or qualitative character of the narrative. In other words, interpretative analysis is the contextualization of communication, and seeks to reveal the meanings and motivations behind statements in corporate reporting and in this case, what logic drives DHL, FDX and UPS to follow either a symbolic or substantial disclosure approach.

Membership of the CDP was obtained to gain access and obtain the carbon information that the companies provided to stakeholders and investors. CDP reports are regularly published on an annual basis and all available reports from DHL, FDX and UPS were accessed and analysed. All companies provided information for the timeframe 2010–15, with the exception of UPS, which also published CDP reports in 2008 and 2009. However, the information provided for 2008 and 2009 was rather marginal, thus this study focuses on the statements from 2010 to 2015 where comparisons are possible.

To assess the similarities and differences as well as the logic behind the disclosure behaviour, measures of specific disclosures related to issues associated with carbon-related information are
needed. Following the structure of the CDP papers, this article focuses on four categories: (1) the company’s carbon strategy; (2) the extent of carbon information provided (the degree of transparency); (3) internal initiatives; and (4) external stakeholder engagement (see Table 5.1).

Table 5.1: Carbon disclosure categories. Source: adapted from Hrasky (2011, p.184)

<table>
<thead>
<tr>
<th>Reporting type</th>
<th>Description</th>
<th>Analysis</th>
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<tbody>
<tr>
<td>Carbon Strategy / Climate Change</td>
<td>Statements indicating the intention of the carbon strategy, the motivation, commitment and recognition of the importance of carbon footprints, global warming and climate change</td>
<td>Review and analysis of the carbon / climate change statements and the organisational structure with regard to the company's strategic positioning and logic of carbon-related activities</td>
</tr>
<tr>
<td>Degree of Transparency</td>
<td>The extent and details as well as the approach and development of carbon information provided in the reports</td>
<td>Review and analysis of the transparency of carbon information provided with a focus on exemplary behaviour of measurement and reporting of Scope 1, 2 &amp; 3 emissions as well as the verification of the carbon data</td>
</tr>
<tr>
<td>Internal Initiatives</td>
<td>Statements about specific internal corporate actions taken relevant to carbon footprints, global warming and climate change</td>
<td>Review and analysis of the internal carbon-related initiatives and that have a direct impact on the reduction of the company's carbon footprint</td>
</tr>
<tr>
<td>Stakeholder Engagement</td>
<td>Statements of the companies' external stakeholder engagement in activities relevant to carbon footprints, global warming and climate change</td>
<td>Review and analysis of companies' external engagement with multiple stakeholders and their influence of carbon-related activities</td>
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</tbody>
</table>
The first category investigates the company’s carbon strategy – that is, how carbon management is integrated into the company’s strategy and how climate change risks and opportunities are assessed. It consists of two sub-categories. The first is an indicator to analyse whether the commitment and the climate change strategy are corporate climate change statements. From an organisational perspective, corporate statements can be related to the concept of the *institutional statement*, which Crawford and Ostrom (1995, p.583) describe as “a shared linguistic constraint or opportunity that prescribes, permits, or advises actions or outcomes for actors (both individual and corporate)”. Hence climate-change statements within a corporate report can be regarded as a reflection of the corporate strategy and a call for action through the introduction or implementation of an organisational practice. Following Criado-Jiménez et al. (2008), the unit of analysis was key sentences that might be reflective of a symbolic or substantial disclosure approach and underpin the logic behind the strategy. Consequently, the climate-change statements from DHL, FDX and UPS in the CDP reports from 2010 to 2015 were analysed to highlight the key messages. We expected that these key messages would not only highlight the differences in the corporate statements, but would also provide an indication of the intention, and thus the rationale behind the decision, to engage in carbon-related activities.

Schaltegger and Hörisch (2015) examine how carbon management is integrated into the organisational structure as an additional indicator to determine the rationale or logic behind carbon disclosure. If the market logics dominates, we can expect finance or accounting to be important internal actors assessing and deciding on carbon projects and measures (Burritt, Hahn & Schaltegger 2002), whereas if the sustainability logic dominates, the legal and public relations departments are likely to be the important internal forces promoting carbon disclosure (Clark 2000). Thus, as a second sub-category, this article will analyse what department in the organisation is dealing with carbon-related activities to ensure that either the carbon strategy or, more generally, the intended direction in carbon management implementation is effectively pursued.

The second category deals with the degree of transparency of the provided carbon information. To investigate the degree of transparency, this article focuses on three points in the timeframe of 2010 to 2015: (1) the extent of Scope 1, 2 and 3 reporting; (2) the verification of data through third parties; and (3) the measurement and control approach. With regard to the extent of Scope emissions, it will be assessed whether Scope 1, 2 and 3 emissions are reported and what level of detailed carbon information is available – particularly for the reporting of Scope 3 emissions. For
global logistics companies, purchased transportation by air, rail, road and ocean accounts for the largest source of Scope 3 emissions, and the level of detail of Scope 3 emissions may be an indicator for transparency efforts (CDP 2010d). Another indicator of transparency is the verification of carbon data through third-party providers, such as accountants and consultancy firms. Finally, we assess the measurement and control approach of DHL, FDX and UPS. Based on The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), companies can choose different carbon measurement and reporting schemes for their carbon emissions (WRI/WBCSD 2011). These different schemes provide guidelines to set boundaries for carbon emissions reporting, and companies can choose between two different control approaches, namely either ‘financial’ control or ‘operational’ control. The choice of approach changes how carbon emissions are categorised, which therefore not only influences the amount of carbon emissions to be reported, but may also indicate the level of transparency (IPIECA 2011).

The third category investigates the internal initiatives to lighten the corporate carbon footprint, as internal activities are an indicator of symbolic or substantial behaviour (Hrasky 2011). We analyse the development of carbon-related initiatives over the timeframe 2010–15 in order to understand whether these initiatives have a more symbolic character or are actually reducing the carbon footprint, hence showing substantial behaviour. Another indicator to investigate the influence of the logic or rationale within the respective companies is the comparison of similar initiatives over the timeframe from 2010–15. While a first-mover initiative may signal normative and exemplary behaviour, the adoption of a similar initiative at a later stage may indicate isomorphic behaviour (Wooten & Hoffman 2008).

The fourth category deals with the external stakeholder engagement of DHL, FDX and UPS. In particular, this category investigates the extent to which the respective companies engage in public policy climate-change activities, such as engagement with policy makers and board membership in business associations, or whether research organisations are funded. We analyse the engagement of DHL, FDX and UPS with regard to their legislation focus, geographical area and partnering with international organisations.
5.7 Results and discussion

The results show significant variances between the carbon reports of DHL, FDX and UPS. Based on the categories in Table 1, we analysed the content of CDP reports to reveal the meaning behind the information and corporate statements of DHL, FDX and UPS in the context of their carbon reporting, measurement and engagement.

5.7.1 Carbon strategy/climate change statements

The findings of the carbon strategy of DHL, FDX and UPS and their related statements comprise two outcomes. First, we analysed the corporate statements and focused on the key messages that contained reflections about the corporate strategy. An analysis of statements provides insight into the range of different key messages and indicates the logic that dominates the carbon strategy. On one end of the spectrum is the market logic – that is, statements that focus on economic benefits, representing a profit-seeking view. At the other end is the sustainability logic – that is, statements that foster transparency or highlighting collaborations, representing a legitimacy-seeking view. Second, we examine the position of department that manages the organisation’s carbon management or sustainability structure. The outcome determines the level of authority and, in turn, indicates the logic behind the carbon disclosure.

We analysed the corporate strategy statements from all three companies on an annual basis from 2010 to 2015 (see Table 5.2). A corporate statement not only specifies the purpose and the set of institutional rules, but also indicates whether the statement must, must not, or may be followed (Crawford & Ostrom 1995). Moreover, corporate statements change over time, as does the demand for or prohibition on a particular behaviour, which may lead to heterogeneity in disclosure practices within companies. The analysis shows that the three companies changed their statements at different stages, which is reflected in the different key messages about the carbon strategy in the CDP reports of DHL, FDX and UPS.
Table 5.2: Carbon strategy statements

<table>
<thead>
<tr>
<th>Carbon Strategy - Statements</th>
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<tr>
<td><strong>DHL</strong></td>
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<td>“...main aspect for a global logistics provider (...) is the carbon efficiency of its operations” / “Our long-term strategy is influenced by (...) ‘Shared Value’ approach...” / “We share (...) expertise with our customers, (...) helping them minimize the environmental impact of their business activities.” / “…improve efficiency (against target) including both own and subcontract operations” / “…growing influences in regulatory changes...” / “…we address key risk factor (...): potential pricing scenarios for GHG.”</td>
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<tr>
<td><strong>FDX</strong></td>
</tr>
<tr>
<td>“...Our short-term business strategy is heavily influenced by the longer-term goals (...) around aircraft emissions intensity and vehicle fuel efficiency...” / “…manage their environmental performance in line with business needs” / “…fuel efficiency and alternative energy development should put us in in a position to take (strategic) advantage of any significant opportunities associated with climate change...” / “…GHGs emitted by companies in the airline and transportation industry could harm our reputation...”</td>
</tr>
<tr>
<td><strong>UPS</strong></td>
</tr>
<tr>
<td>“...UPS’s short term strategy (...) focus on avoiding and reducing energy use and emissions and (...) and management of Scope 3 emissions...”/ “…UPS’s long term strategy (is) influenced (...) how customers will depend on UPS’s transparency and accuracy information to calculate (...) CO2 inventories...” / “UPS advocates full disclosure (Scope 1,2, &amp; 3)...” / “…commitment to natural gas.” / “…UPS believes its climate change strategy results in gaining strategic advantages over its competitors.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th><strong>DHL</strong></th>
<th><strong>FDX</strong></th>
<th><strong>UPS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 - 2013</td>
<td>“...main aspect for a global logistics provider (...) is the carbon efficiency of its operations” / “Our long-term strategy is influenced by (...) ‘Shared Value’ approach...” / “We share (...) expertise with our customers, (...) helping them minimize the environmental impact of their business activities.” / “…improve efficiency (against target) including both own and subcontract operations” / “…growing influences in regulatory changes...” / “…we address key risk factor (...): potential pricing scenarios for GHG.”</td>
<td>“...Our short-term business strategy is heavily influenced by the longer-term goals (...) around aircraft emissions intensity and vehicle fuel efficiency...” / “…manage their environmental performance in line with business needs” / “…fuel efficiency and alternative energy development should put us in in a position to take (strategic) advantage of any significant opportunities associated with climate change...” / “…GHGs emitted by companies in the airline and transportation industry could harm our reputation...”</td>
<td>“...UPS’s short term strategy (...) focus on avoiding and reducing energy use and emissions and (...) and management of Scope 3 emissions...”/ “…UPS’s long term strategy (is) influenced (...) how customers will depend on UPS’s transparency and accuracy information to calculate (...) CO2 inventories...” / “UPS advocates full disclosure (Scope 1,2, &amp; 3)...” / “…commitment to natural gas.” / “…UPS believes its climate change strategy results in gaining strategic advantages over its competitors.”</td>
</tr>
<tr>
<td>2012 - 2010</td>
<td>“...GoGreen is the core of our Climate Strategy is key constituent of our Corporate Strategy...” / “…Carbon efficiency is of strategic importance, since our carbon emissions are directly related to our fuel and energy</td>
<td>“...main responsibility to create and sustain long-term stockholder value.” / “…we undertake (environmental) initiatives for business reasons.”</td>
<td>“Our long-term strategy is to optimize the processes that consume non-renewable resources.” / “…UPS is a critical component of our customers’ supply chains, and we have an obligation to help them operate in a...”</td>
</tr>
</tbody>
</table>
|  | consumptions and thus to cost efficiency.”  
2011 - 2010 | “...continue to look at and identify our areas of exposure with regard to greenhouse gas emissions.”  
“...determine the level of potential impact...”  
“...set appropriate plans, including goals...”  
“...monitor progress...” | more environmentally sustainable way...” |
The corporate strategy statements of the early CDP reports of all three companies are mainly related to improving operational efficiency and fuel savings, stating to “optimise the processes that consume non-renewable resources” (UPS) (CDP 2010c, p10), “carbon efficiency is … directly related to … cost efficiency” (DHL) (CDP 2011a, p.3) and to undertake (environmental) initiatives for business reasons” (FDX) (CDP 2012a, p.5). These statements focus on the economic benefits of sustainability activities and are referred to by Schaltegger and Burritt (2015) as the ‘business case’ for sustainability, indicating a focus on a market logic-driven perspective. However, all three companies changed their strategic climate change statements. UPS changed its statement in 2011, and DHL and FDX made major changes in 2013; the statements of the three companies did not change again up until 2015. This finding reveals that all three companies did appear to be responding to societal changes at different stages. The time pattern observed suggests that UPS was the first company to shift away from a rather market-logic driven perspective towards a sustainability logic, followed by DHL and FDX in 2013.

One indication of the integration of the sustainability logic is the key messages that integrate customers and suppliers. Hoffman (2006) analyses corporate strategies for addressing climate change and notes that an integration of suppliers and customers is an important component of a successful climate-management strategy. In the updated corporate statements, DHL and UPS changed their key message accordingly, stating that “customers will depend on UPS’s transparency” (CDP 2012b, p.6) and that the aim is to “share … expertise … with our customer” (DHL) (CDP 2014b, p.3). Moreover, a focus on Scope 3 emissions in also included as a key message of DHL, with the company claiming to “improve efficiency including both own and subcontract operations” (CDP 2013, p.3). UPS’s message is to “advocate full disclosure (Scope 1, 2 & 3)” (CDP 2011b, p.6). According to Suddaby and Greenwood (2005), the development of a statement can build legitimacy if it includes institutional vocabulary that articulates the rationale behind an organisational practice and language that reflects the pace and the necessity of change within the field. Following that argument, although DHL and UPS both still include the market logic in their statements – UPS: “focus on avoiding and reducing energy use and emissions” (CDP 2012b, p.6); DHL: “[the] main aspect … is the carbon efficiency of its operations” (CDP 2013, p.3) – the inclusion of messages beyond economic benefits indicates a transition or the provision of greater attention to legitimacy-driven statements. As such, DHL
and UPS are in line with the findings of Bouteiligier (2011) that companies integrate environmental values into their corporate strategies.

In contrast, FDX does not address full disclosure of Scope 3 emissions or its suppliers’ transparency issues, but rather includes general forward-looking statements such as that “GHGs emitted by companies in the airline and transportation industry could harm our reputation” (CDP 2015c, p.4). This statement highlights a potential legitimacy gap for FDX as the result of a change in social values due to the evolving environmental consciousness in society about climate change, but does not indicate legitimacy-driven actions to close the gap. Thus the ongoing lack of legitimacy-driven statements in the climate-change strategy of FDX may indicate a potential breach of the ‘social contract’, where corporate performance remains largely unchanged, but social expectations about performance have evolved (O'Donovan 2002). Moreover, FDX delegates corporate action to all operating companies to ‘manage their environmental performance in line with business needs’ (CDP 2015c), which indicates a stronger focus on the market logic compared with DHL and UPS. In other words, while FDX appears to have reacted to changed social pressures with a direct ‘business case’ response, DHL and UPS seem to have offered an indirect legitimation response that further integrates the stakeholders’ perceptions that are maintaining the social contract.

Differences can also be observed in the three companies’ organisational structures and how carbon reporting in the broader context of sustainability is integrated into each company’s strategy. UPS had appointed a Chief Sustainability Officer (CSO), who was responsible for the industry leadership of sustainable business practices, transparency and meeting the company’s emissions-reduction goals. UPS’s CSO had a direct reporting line to the SVP of Global Engineering and Sustainability, a member of the UPS Management Committee (CDP 2015d). A direct reporting line to an engineering department may indicate a focus on operational issues, and hence substantial measures to reduce carbon emissions. In contrast, the sustainability or carbon management at DHL had a direct reporting line to the public relations department (CDP 2015b). The responsible person for sustainability management at DHL was the head of the Corporate Communications and Responsibility Department, who discussed environmental projects on a bi-weekly basis with the CEO of DHL. According to Schaltegger and Hörisch (2015), the integration of sustainability or carbon management into the public relations department indicates a legitimacy-driven behaviour. FedEx follows a different approach, as it delegates the management of environmental performance
to the operating companies and has implemented Sustainability Impact Teams (SITs), which report to the FedEx Enterprise Sustainability Council (FESC), chaired by the Vice President for Environmental Affairs and Sustainability. Interestingly, FedEx does not disclose its direct reporting line or which level of authority is given to the FESC (CDP 2015c).

The corporate strategy statements of all three companies, as well as the organisational structure behind carbon disclosure, provide a clear indication of the rationale behind their carbon reporting. If climate-change statements and carbon-related activities are designed in a way that will, or is likely to, increase profits, the company is likely to follow a profit-seeking rationale or the market logic (Schaltegger & Hörisch 2015). In contrast, an engagement from UPS that “advocates full disclosure” (CDP 2011b, p.6) or DHL’s rhetorical strategy to implement a “shared value” approach (CDP 2013, p.3) indicates that carbon-related activities are designed secure legitimacy. The analysis indicates that the three companies are committed to reducing carbon reporting, but are following different strategies. While FedEx emphasizes a more profit-seeking behaviour of sustainability in its statement, DHL and UPS emphasize the legitimacy perspective to gain a competitive advantage over other competitors.

5.7.2 Degree of transparency

The analysis of the degree of transparency consists of three points: (1) the extent of Scope 1, 2 and 3 reporting; (2) the verification of data through third parties; and (3) the measurement and control approach. The Greenhouse Gas Protocol provided by (WRI/WBCSD 2011) distinguishes three GHG emission categorising emissions into Scopes 1, 2 and 3. Scope 1 emissions are all direct GHG emissions caused by owned or controlled facilities of an individually regarded company. Examples include burning of fossil fuels, transportation by company-owned vehicles, and the chemical and physical processes necessary for producing electricity. Scope 2 emissions refer to indirect GHG emissions caused due to the supply of purchased electricity generated outside the system boundaries. Scope 3 emissions are not caused directly by the company itself, but indirectly by its activities. These include various categories such as purchased transportation, fuel- and energy-related activities, business travel, and so on.

Between 2010 and 2015, the analysis of the Scope 1, 2 and 3 emissions and their verification shows similarities between DHL and UPS, but differences for FDX (see Table 5.3). While all
companies reported emissions in all categories, we found differences in the geographical boundaries and in the verification of carbon data. In 2010, DHL and UPS reported Scope 1 and 2 emissions on a global basis, while the FDX data was restricted to the United States. Moreover, no company had third-party verification of its data at that time (CDP 2010a, 2010b, 2010c). While DHL and UPS provided verified data for Scope 1 and 2 emissions for their global operations as of 2011, FDX lacked verification of Scope 1 emissions until 2014 and had not verified Scope 2 emissions in 2015 (CDP 2015b, 2015c, 2015d).

Table 5.3: Scope emissions reporting

<table>
<thead>
<tr>
<th></th>
<th>Scope 1</th>
<th></th>
<th></th>
<th>Scope 2</th>
<th></th>
<th></th>
<th>Scope 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DHL</td>
<td>FDX</td>
<td>UPS</td>
<td>DHL</td>
<td>FDX</td>
<td>UPS</td>
<td>DHL</td>
</tr>
<tr>
<td>2015</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2014</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2013</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2012</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2011</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2010</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Legend: ❑ = 3rd party verified; 🔧 = not verified by 3rd party

Another important point is the reporting of Scope 3 emissions within the global logistics industry. As all companies use partners worldwide for pick-up and delivery services, purchased transportation by air, rail, road and ocean accounts for the largest source of Scope 3 emissions at
DHL, FDX and UPS (CDP 2014b; FedEx 2014; UPS 2014). However, as subcontractors usually do not disclose information on fuel burn, scope 3 emissions are based largely on complex calculation models and scenarios, taking into account data from operational systems such as origins, destinations and routing, and may be an indicator of the extent to which DHL, FDX and UPS provide transparency in their Scope 3 emissions.

Based on the data from the CDP reports, only DHL and UPS seemed to report their full Scope 3 emissions from purchased transportation (CDP 2015b, 2015d). FedEx acknowledged the relevance of this data, but did not seem able to calculate relevant data. Its reporting of carbon emissions related to pick-up and delivery services was limited to the freight subdivision in the United States and Canada, and the feeder aircraft contractors, but was not available from pick-up and delivery subcontractors outside the United States and Canada (CDP 2015c). Moreover, the Scope 3 emissions of DHL and UPS were verified by an independent auditor, while FedEx had verification only for Scope 1 emissions (CDP 2014a). Moreover, UPS reported for four of the seven greenhouse gases covered by the Kyoto Protocol, including a table with a conversion rate of ‘Global Warming potential’, while DHL and FDX only reported for three greenhouse gases.

The measurement and control approach may also be an indication of transparency and the rationale behind carbon disclosure. Within the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), companies can choose different carbon measurement and reporting schemes for their carbon emissions (WRI/WBCSD 2011). These different schemes provide guidelines for setting boundaries for carbon emissions reporting. As discussed previously, companies can choose between two different control approaches: ‘financial’ control or ‘operational’ control. In both wholly owned and joint operations, the choice of approach changes how carbon emissions are categorised when operational boundaries are set, and therefore influence the amount of carbon emissions to be reported (WRI/WBCSD 2011).

Therefore, to measure carbon emissions, DHL, FDX and UPS were able to set different organisational boundaries – that is, they could follow different ‘control’ approaches to measure carbon emissions. While DHL and FDX followed the financial approach, UPS applied the operational approach. In the financial approach, companies need only to report emissions from ventures in which they hold more than a 50 per cent interest (WRI/WBCSD 2011). In other words, DHL and FDX did not need to report carbon from partnerships and cooperation for pick-up and
delivery services if they did not own more than 50 per cent of the partner company. Compared with that of UPS, ‘this approach may lead to less complete reporting’, because when an operational control is applied, the carbon measurement and reporting are “not limited to majority-held ventures, [but] also [apply] to minority ventures” (IPIECA 2011, p.3-5). Thus an operational approach can be regarded as a more complete and transparent approach, as it tries to capture emissions from the entire operational network.

Overall, with regard to transparency, it seems that UPS showed the most exemplary and transparent behaviour, closely followed by DHL. Both DHL and UPS reported their verified Scope 1, 2 and 3 emissions fully, while FDX showed a rather mimetic behaviour as it verified only Scope 1 emissions and did not seem able to fully disclose Scope 3 emissions. According to Hopwood (2009), the full disclosure of DHL and UPS is a clear indication of enhanced transparency of environmental activities, and represents a substantial behaviour of companies. He argues further that the lack of available transparent data may ‘thicken the corporate veil’ (p.437), and may indicate a rather symbolic management approach aimed at achieving pragmatic legitimacy. Moreover, the data suggest that DHL and UPS had started to integrate carbon measurements into their strategy at an earlier stage, which could explain the more detailed and comprehensive availability of the carbon data of DHL and UPS, as well as the more transparent information provided to stakeholders. However, the application of the ‘operational’ control approach and the higher number of reported greenhouse gases tends to support more transparent behaviour and a more complete reporting approach of UPS over DHL and FDX.

5.7.3 Internal initiatives

The commitment to reduce the carbon footprint within the operational network is also reflected in the internal activities of DHL, FDX and UPS. It needs to be emphasized that the internal activities in both companies were related mainly to operational excellence (see Table 5.4). In other words, most carbon footprint reductions are directly linked to improving operational efficiency and fuel savings. Both companies divided their initiatives into an aircraft and a vehicle segment. To reduce aircraft emissions, which represent almost 80 per cent of all transportation fleet emissions, FedEx established a ‘Fuel Sense’ program, which included algorithms to better predict fuel consumption for departure and arrival of planes as well as to reduce weight during the flight (CDP 2015b). UPS
internal activities included the installment of ‘Winglets’ to reduce fuel consumption and DHL implemented a ‘GoGreen’ initiative to drive behavioural change (CDP 2015c). For the transportation fleet, FedEx developed a program called ‘Reduce, Replace and Revolutionize’ to improve vehicle efficiency, which mainly focused on optimizing routes and the use of electric vehicles. In comparison, UPS focused on the implementation of an alternative fuel fleet, which included LNG tractors and the building of related infrastructure in the form of LNG fueling stations (CDP 2015d). DHL also focused on the deployment of electric or dual-fuel vehicles, and replaced vans with bikes in the main urban areas. All these internal activities from the three companies were voluntary initiatives that reduced the carbon footprint. But although these substantial activities indicate that carbon disclosure mirrors action, it may not result in real changes within the organisation and may create a façade that is fashioned to “thicken the veil and reduce scrutiny” (Milne & Patten 2002, p.375). In a similar vein, in his analysis of corporate climate change strategy, Hoffman (Hoffman 2006) notes a tendency to pick the “low-hanging” (p.16) fruit by reporting easily identified low-cost and/or low-risk actions without really embracing ongoing organisational adaption strategies to mitigate climate change.
Table 5.4: Main internal initiatives

<table>
<thead>
<tr>
<th>Year</th>
<th>DHL</th>
<th>FDX</th>
<th>UPS</th>
</tr>
</thead>
</table>
| 2015 | • Expand on road fleet aerodynamic deployment  
• Expand on replacing vehicles with bikes in urban areas  
• Introducing solar charging station for electric DHL scooters in Taiwan |
|       | • Testing / Developing Alternative Jet Fuel  
• Expand Fuel Sense (Aircraft Taxi Fuel Reduction)  
• Expand on hybrid/electric vehicles & alternative fuels |
|       | • Aircraft Modification (Installation of Winglets)  
• Expand on hybrid/electric vehicles & alternative fuels |
| 2014 | • Replace entire fuel delivery vehicles with electric vehicles in one city (Bonn, Germany)  
• Replace vehicles with bikes in urban areas (Netherlands, Greece, Luxembourg, Austria, UK, Croatia) |
|       | • Aircraft replacements  
• Intermodal (Truck to Train)  
• Trailer Fuel Efficiency (aerodynamics)  
• Expand on Energy Efficiency (Fuel Sense, Solar) |
|       | • Intermodal Transport (Air to Ground)  
• Expand on route optimization technologies |
| 2013 | • Road fleet aerodynamic deployment  
• Introduction of dual fuel vehicles (Diesel & LNG) |
|       | • Customer Carbon Reporting Tool  
• Drivers Coaching  
• Behavioral Change (work from home program) |
|       | • Customer Carbon Reporting Tool  
• Expand Telematics to Latin America & Europe (Idle time and miles reduction)  
• Drivers Coaching |
| 2012 | • Expand on Fuel Savings (Driver Training with own and subcontractors)  
• Behavioral Change (GoGreen Initiative) |
|       | • Introduction of Carbon Neutral Service  
• Vehicle Replacements / Hybrids & EV deployment |
|       | • Solar installations (US) |
| 2011 | • Test of aerodynamics devices for subcontractors (Poland)  
• Energy Efficiency (LED – Germany) |
|       | • LEED within FedEx Express (Energy Efficiency) |
|       | • Expand Package Flow Technology Introducing LNG vehicles  
• Intermodal Transport (Air to Ground / Ground to Rail) |
<p>| 2010 | • Introduction of electric vehicles |
|       | • Fuel Sense (Aircraft Fuel Optimization) |
|       | • Package Flow Technology (Routing - US) |</p>
<table>
<thead>
<tr>
<th>Fuel Savings (Routing Optimization, Vehicle Modifications)</th>
<th>Reduce, Replace, Revolutionize (Vehicle Routing Optimization, Electric Vehicles)</th>
<th>Telematics (US - Idle time and miles reduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Replacement</td>
<td>Solar Installations</td>
<td>Carbon Neutral Service (Envelope / from 2009)</td>
</tr>
<tr>
<td>Customer Carbon Reporting Tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Neutral Service (Envelope / from 2007)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thus, an analysis of the specific similar initiatives that are not related to energy efficiency may indicate exemplary behaviour or a legitimacy-seeking approach within the industry. One example might be the carbon-neutral envelope initiative. The carbon-neutral service for envelopes was introduced by DHL in 2007 and UPS in 2009, while FDX implemented the service in 2012 (CDP 2010a, 2010c, 2012a). Another initiative that is not related to operational excellence is the introduction of a carbon emissions tracker tool for customers. While DHL introduced a carbon tracker tool for customers in 2010, UPS and FDX followed suit in 2013. Thus, time differences in the implementation of non-efficiency driven initiatives can be observed, with DHL claiming the first-mover advantage. However, it is evident that DHL, FDX and UPS have implemented substantial activities to reduce carbon emissions that indicate the opposite of symbolic reporting behaviour.

5.7.4 External stakeholder engagement

Active external stakeholder engagement is an indicator of management’s commitment to reduce the environmental impact (UNEP/SustainAbility 2002). In the case of DHL, FDX and UPS, all three companies engaged in public policy climate-change activities and worked directly with policy makers as well as funding research organisations. However, only FDX and UPS worked actively with, or were board members of, trade organisations, while DHL did not list such an engagement (see Table 5.5).

The direct engagement of all three companies with policy makers focused on climate change legislation, and was related mainly to the main market of the respective companies, with the United States for FDX and UPS, and Europe for DHL. While DHL was involved in the Emission Trading Scheme (ETS) Cap & Trade system, FDX and UPS focused on fuel efficiency and clean energy.
generation in the US market. The overall legislative focus, however, addresses similar and more global challenges, such as standardized carbon-related measurement systems and energy efficiency standards. Based on the data of the CDP reports, DHL worked with the ‘Global Logistics Emissions Council’, while FDX and UPS seemed to be strongly involved with government agencies to lobby for these standards. FDX appeared to work closely with the Environmental Protection Agency (EPA) on greenhouse gas standards, while UPS listed the Department of Energy (DOE) and lobbied for dual-fuel engines in trucks.
### Table 5.5: External stakeholder engagement

<table>
<thead>
<tr>
<th>Public Policy Climate Change Activities</th>
<th>DHL</th>
<th>FDX</th>
<th>UPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Direct Engagement with policy makers</td>
<td>• Direct Engagement with policy makers</td>
<td>• Direct Engagement with policy makers</td>
<td></td>
</tr>
<tr>
<td>• Funding research organisations</td>
<td>• Trade Associations</td>
<td>• Trade Associations</td>
<td></td>
</tr>
<tr>
<td>Legislation focus</td>
<td>• Cap &amp; Trade (ETS) / EU</td>
<td>• Reduced GHG emissions and increased fuel efficiency / US</td>
<td>• Mandatory Carbon reporting / US</td>
</tr>
<tr>
<td></td>
<td>• Mandatory Carbon reporting / France</td>
<td>• Carbon pricing / Global</td>
<td>• Energy efficiency / US &amp; Germany</td>
</tr>
<tr>
<td></td>
<td>• Energy efficiency / EU</td>
<td></td>
<td>• Clean energy generation / US &amp; EU</td>
</tr>
<tr>
<td>Stakeholders involved</td>
<td>• Global Logistics Emissions Council</td>
<td>• SAFE (Securing America’s Future Energy) / US</td>
<td>• Department of Energy (DOE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Environmental Protection Agency (EPA) &amp; EPA SmartWay Transport Partnership / US</td>
<td>• International Civil Aviation Organisation (ICAO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Commission for Environmental Cooperation (CEC) / NAFTA</td>
<td></td>
</tr>
<tr>
<td>Board Membership &amp; Funding of Trade Associations</td>
<td>• No</td>
<td>• Yes</td>
<td>• Yes</td>
</tr>
<tr>
<td>Trade Associations Board Membership</td>
<td>-</td>
<td>• Airlines for America (A4A) / US</td>
<td>• Electric Drive Transportation Association (EDTA) / US</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• American Trucking Association (ATA) / US</td>
<td>• Natural Gas Vehicles of America (NGV) / US</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Energy Security Leadership Council (ESLC / Part of SAFE) / US</td>
<td>• US Chamber of Commerce / US</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Electrification Coalition / US</td>
<td>• Airlines for America (A4A) / US</td>
</tr>
</tbody>
</table>
| Other Stakeholders Membership | • Green Freight Europe (GFE) / Belgium  
  • Green Freight Asia (GFA) / Singapore  
  • Green Transformation Lab / Singapore  
  • WEF’s Climate CEOs Initiative | • Commercial Aviation Alternative Fuels Initiative (CAAFI)  
  • American Society for Testing and Materials (ASTM)  
  • EMBARQ / WRI (Center for Sustainable Transport)  
  • Yale Center for Environmental Law | • Green Freight Asia (GFA) / Singapore |
Moreover, FDX and UPS were working with trade associations to address carbon-related activities. Both companies worked with non-profit organisations towards achieving a shift from fossil fuels to electric transportation, and both were members of the Airlines for America (A4A) association, which advocates a carbon-neutral approach and an ‘aggressive set of measures and emission targets’ under the UN-led International Civil Aviation Organisation (ICAO). The FDX chairman and CEO was also involved in the Securing America’s Future Energy (SAFE) committee to stimulate the deployment of hybrid vehicles, while UPS engaged in the Natural Gas Vehicles (NGV) industry to reduce carbon emissions.

Furthermore, all three companies were involved in global non-profit organisations that dealt with carbon-related activities and sustainability. While DHL was part of the WEF’s (World Economic Forum) Climate Change CEO Initiative, FDX worked with the WRI (World Resource Institute). DHL and UPS were both members and funding partners of the Green Freight Asia (GFA) and FDX was working with the CAAFI (Commercial Aviation Alternative Fuels Initiative) on biofuels. All these initiatives can be regarded as substantial behaviours, and can be regarded as reflecting an active engagement in working on standards for and the transparency of carbon-related activities in the logistics industry.

5.8 Conclusion

The results provide interesting insights into the carbon-reporting behaviour of DHL, FDX and UPS in the global logistics industry. We found a great degree of variability and inconsistency in what DHL, FDX and UPS reported about their carbon impacts. Although our examination of the four categories showed similarities, it also revealed significant differences between the companies’ approach towards carbon disclosure. First, the analysis of the carbon strategy and the climate-change statements over time showed a transition from a tendency towards the market logic in the early CDP reports to the incorporation of legitimacy-seeking statements in more recent years for all three companies. However, DHL and UPS appeared to communicate their strategy intentions and statements differently from FDX. While the communications patterns of DHL and UPS included statements regarding a legitimate and more transparent disclosure approach for customers and suppliers, FDX focused on cost savings through operational excellence and included forward-looking statements. As such, the climate-change statements reveal that the three companies
pursued different carbon-related strategies. DHL and UPS paid greater attention to legitimacy-seeking arguments, while FDX focused more on the economic benefits that could be achieved through energy and fuel savings. It needs to be emphasised that both approaches are legitimate strategies to gain a competitive advantage. However, it appears that DHL and UPS focused on gaining a competitive advantage through the greater incorporation of the sustainability logic, whereas FDX seemed to focus more on the market logic.

The analysis of the disclosure behaviour regarding the degree of transparency also showed similar variations between DHL, FDX and UPS. While DHL and UPS fully disclosed Scope 1, 2 and 3 emissions, FDX Scope 3 emissions were limited geographically to North America and the feeder operations. Moreover, FDX was the only company of the three to lack full verification of the carbon data by an independent auditor in 2015. However, although DHL and UPS showed more transparent behaviour, a gradual increase in the transparency efforts of FDX from 2010 to 2015 can be observed. From an institutional theory perspective, the transparency efforts of FDX can be attributed to mimetic processes or normative isomorphism that incorporate a stronger focus on the sustainability logic in corporate practices. Similar to the findings within the corporate climate change statements, it seems that DHL and UPS started earlier to integrate carbon-related activities and legitimacy-seeking elements into their corporate strategies.

The analysis of the internal initiatives and the external stakeholder engagement of the three companies did not reveal surprising results or major differences. It seems that all three companies have been actively engaged in reducing carbon emissions in their operations, and all three companies have worked with key stakeholders on carbon-related standards and legislations. They have all implemented extensive initiatives to reduce aircraft emission and improve fuel efficiency in their transportation fleets. Moreover, all companies have started, or have plans, to replace fossil fuel, driven vans with dual-fuel or electric vehicles and invest in biofuels. While the main internal initiatives for operational excellence can be regarded as substantial, it may relate to the ‘low-hanging fruit’, thus not representing an ongoing organisational adaption climate change strategy.

However, the analysis over time with regard to the early adoption of initiatives reveals differences between the three companies. Again, similar to the findings in the climate-change statements and the degree of transparency, FDX introduced specific carbon-related products such as a carbon-neutral envelope service and the carbon tracker for customers after DHL and UPS,
again showing isomorphic behaviour. From a stakeholder engagement perspective, all three companies worked actively with policy-makers and government agencies on carbon-related topics. The analysis here suggests that all three companies have adopted similar substantial approaches towards carbon-reduction actions, with minor differences in the implementation of initiatives over time.

The results of the analysis must be interpreted in the light of its limitations. The sample size is very small, with only three cases, and this limits the generalizability of the results. Like all approaches adopting interpretative content analysis, the data analysis is inherently narrative, as it relies on reported information as reflective of corporate actions and intent. In addition, the analysis comprised only CDP reports, and it may be the case that different or more extensive disclosure is made elsewhere. We invite future research in the area of emerging logics and carbon reporting, and their influence on the organisational field. Although DHL, FDX and UPS can be regarded as representing an own industry or an organisational field, we encourage future research to expand the boundaries of this organisational field and apply research in the broader field of global logistics companies. Carbon disclosure in the global logistics arena is still in its infancy, and as organisations face institutional and regulatory changes, there is a need to understand how these affect organisational practices in the future.
Chapter 6 (Paper D): The conceptual framework of carbon disclosure strategies

Preamble:

This paper, submitted and under review in the *Sustainability, Accounting, Management and Policy Journal* presents a conceptual study that integrates stakeholder theory into institutional theory. It thereby addresses the limitations of the former studies that focused only on the construct of institutional logics and neglected the impact of stakeholder salience. By integrating stakeholder impacts, the paper provides a theoretical framework to examine institutional and stakeholder influences and complements the institutional dimension with a stakeholder dimension. The paper thus provides insight into how stakeholder pressures and institutional logics interact, thereby advancing existing research by exploring how organisations are impacted by both firm-level agency and field-level pressures, answering the research question:

*RQ3. How does the interaction between institutional and stakeholder pressures influence carbon disclosure strategies in global logistics companies?*

The paper uses both dimensions to build an integrative model that depicts four ideal types of carbon disclosure strategies in the global logistics industry based on the extent of institutional and stakeholder pressures. To examine the extent of institutional pressures, the paper introduces the concept of ‘logics centrality’, representing the position of the sustainability logic, that is, to what extent climate change values are integrated into a company’s value system. To examine stakeholder pressures, the paper follows the concept of stakeholder salience, that is, to what extent external stakeholder claims are given priority. This framework builds the foundation for Papers E and F, where empirical studies are conducted based on the model of institutional and stakeholder influences.
The interaction between institutional and stakeholder pressures: 
Implications on carbon disclosure strategies

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David M. Herold provided the initial concept development, Ki-Hoon Lee conducted further development of conceptual framework. David M. Herold led the drafting of the manuscript and both authors contributed to and/or have approved the final manuscript.

Conflict of Interest
Both authors have declared no conflict of interest.

Authors Signatures

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6.1 Abstract

**Purpose** - Multiple institutional and stakeholder demands have led to different strategies in the measurement and disclosure of carbon related information. While scholars acknowledge the prevalence of competing institutional logics as being a driver of different outcomes, existing research offers conflicting views on their implications, thus lacking clarity. In response, this paper proposes two frameworks (1) to clarify the institutional and stakeholder influences on carbon disclosure and (2) to depict four different types of carbon disclosure strategies to assess a company’s ‘true’ carbon position.

**Design/methodology/approach** - We identify various concepts of institutional fields, organisations and stakeholders which influence disclosure, and combine the two critical concepts of logic centrality and stakeholder salience to categorise the multiple institutional and stakeholder pressures on carbon disclosure.

**Findings** - First, based on institutional and stakeholder constructs, we demonstrate that institutional and stakeholder theory provide, on different levels, a theoretical foundation to examine the influences on carbon disclosure. Second, we build an integrative model to categorise carbon disclosure strategy types in terms of logic centrality and stakeholder salience.

**Practical Implications** - Categorising carbon disclosure strategies of companies can help policy makers and managers to assess the impact of carbon management initiatives.

**Social Implications** - The development of carbon disclosure strategies can support and meet environmental and social information needs from multiple stakeholders. This study provides a conceptual framework as well as practical examples to determine carbon disclosure strategies in order to support environmental and social management through a better informed sustainability society.

**Originality/value** - Both frameworks advance the understanding of the interaction between firm-level agency and field-level pressures, and synthesise current literature to offer conceptual clarity regarding the varied implications linked to carbon disclosure practices and strategies.

**Keywords:** carbon disclosure strategy, carbon management practices, institutional logics, stakeholder salience
6.2 Introduction

Climate change is a major environmental issue of concern for the global community and is increasingly recognised by corporate managers as one of the most important business challenges in the 21st century (Haque & Deegan 2010). Evidence shows that multinational companies are facing pressures from multiple stakeholders to disclose information about their carbon related activities (de Villiers & Alexander 2014; Hahn, Reimsbach & Schiemann 2015; Kolk, Levy & Pinkse 2008). In response to this pressure, companies have increasingly implemented carbon management practices (Borghei, Leung & Guthrie 2016; Herold & Lee 2017a; KPMG 2014; Welbeck 2017), however, the carbon management practices and the associated disclosure strategies vary extensively between companies (Hrasky 2011; Kolk, Levy & Pinkse 2008).

The differences in organisational responses have long been subject to scholarly investigation (e.g., Adams 2017; Besharov & Smith 2014; Delmas & Toffel 2004; Gibassier & Schaltegger 2015; Lee & Vachon 2016; Luo, Wang & Zhang 2017; Michelon et al. 2016; Oliver 1991), and research often draws on the concept of institutional logics to explore the implications of these different responses. Institutional logics, according to Scott (2012), reflect “values and norms, ideas, beliefs, and meaning systems that guide the behaviour of actors” (p.32). In other words, institutional logics provide the organising principles for an organisational field that shape cognition and behaviour in an industry (Besharov & Smith 2014).

In fact, the presence of carbon disclosure can be attributed to the adoption of the sustainability logic (Herold & Lee 2017b; Schaltegger & Hörisch 2015). The sustainability logic reflects the integration of ‘sustainability’ and ‘climate change’ principles into a company’s value system due to a potential legitimacy gap, which can be defined as “where corporate performance remains unchanged, but societal expectations about that performance have changed” (Hrasky 2011, p.177). In the case of climate change, the issue of global warming heightened societal interest, and companies responded by adopting the sustainability logic to reflect the concern about climate change. The adoption of the sustainability logic provides actors with templates for action, such as the implementation of carbon disclosure, to communicate these values and convince stakeholder audiences that the company’s existence and its operations are legitimate.

Companies, however, are subject to multiple influences and thus to multiple logics, reflecting the institutional complexity within the organisational field, which is characterised by
stakeholders with multiple views and interests. For example, companies are also driven by the logic of the market (Greenwood et al. 2010). The market logic represents a purely market driven view, characterised by an absolute focus towards reducing costs and increasing profits, where the sustainability logic is regarded as a trade-off and as a problem in regard to the pursuit of competitive advantage (Glover et al. 2014; Oberhofer & Dieplinger 2014). As such, the logic of the ‘market’ and the logic of ‘sustainability’ reflect different values and beliefs within companies and are known in the literature as ‘competing logics’ (e.g. Lander, Koene & Linssen 2013; Pache & Santos 2013; Styhre 2011). But while the market logic represents a central or “core logic” (Ansari, Wijen & Gray 2013, p.1017) in business organisations, the position of the sustainability logic varies between organisations. These two different logics, and their relative influence, impose conflicting demands on organisational stakeholders and consequently lead to different carbon management practices and disclosure strategies within organisations.

Although prior studies acknowledge the prevalence of competing logics, they are limited when it comes to describing the determinants of stakeholder influences that lead to different organisational responses within the same organisational field. In particular, the issue of whether the interaction between field-level pressures and firm-level influences can play an important role in carbon disclosure strategies remains to be explored. In this study, we aim to fill this void. We specifically set the following research question: How does the interaction between institutional and stakeholder pressures influence carbon disclosure strategies?

In this paper, we theorise about institutional and stakeholder influences which lead to the adoption of logics and their implications for organisations and institutional fields. The goal of this paper is twofold. Firstly, this study will illustrate how institutional and stakeholder pressures can not only influence a company’s carbon disclosure on a firm-level, but also how it shapes organisational practices on a field-level. To do so, we integrate stakeholder theory into institutional theory, and consolidate the critical concepts of both theories into an institutional framework which presents the influences on carbon disclosure strategies. We argue that institutional theory is limited to categorising the salience of stakeholders, and the inclusion of stakeholder theory provides a theoretical foundation which can complement institutional theory in order to categorise these influences. We identify various concepts within institutional fields, organisations and stakeholders which impact disclosure strategies in companies.
Secondly, we use the main concepts in the framework to build an integrative model that depicts four types of carbon disclosure strategies. Although researchers acknowledge the importance of voluntary carbon disclosure, the issue of the credibility of the disclosed information remains unanswered. This inherent uncertainty, which is due to a firm’s discretion over the release of carbon related information, makes it difficult to assess a company’s ‘true’ carbon position. We combine two critical dimensions in institutional and stakeholder theory to categorise carbon disclosure strategy types based on multiple institutional and stakeholder pressures. The first dimension represents the ‘centrality’ of the sustainability logic, which describes “the extent to which (…) logics manifest in core features that are central to organisational functioning” (Besharov & Smith 2014, p.365). The second dimension represents the ‘salience’ of stakeholders (Mitchell, Agle & Wood 1997) with regard to climate change, which is defined here as the extent to which managers give priority to stakeholder’s carbon disclosure claims for full disclosure.

By expanding insight into the concepts and implications of institutional and stakeholder influences within the organisational field, this paper provides several important contributions to the literature. Firstly, we present a conceptual model, which proposes that both institutional theory as well as stakeholder theory provide, on different levels, a theoretical foundation on which to examine the influences on carbon disclosure. This model thereby links the categorisation of stakeholder pressures at a firm level to the outcomes at a field level which affect a company’s carbon disclosure strategy. Secondly, by categorising the pressures in terms of their centrality and salience, our model proposes four types of carbon disclosure strategies, providing an understanding of the different corporate carbon disclosure positions. This study thereby addresses the inherent uncertainty associated with carbon related information and provides clarity about a company’s true carbon position.

Thirdly, the combination and the interaction of these concepts allow the identification and categorisation of various pressures on different levels in order to gain an understanding of the variances in carbon disclosure. In this regard, the framework advances the growing body of research on institutional complexity, which to date has been limited in providing an explanation of the influences of individual actors. Lastly, by categorising stakeholder influences on organisational outcomes, our framework points to practices through which management can exert agency to influence its preferred logics. In this respect, we provide important insight into
how stakeholder influences and institutional logics interact in order to influence carbon disclosure strategies, and we further develop research on competing logics by exploring how organisations are impacted by both firm-level agency and field-level pressures.

This paper is structured as follows: the next section introduces a framework which clarifies the institutional and stakeholder pressures, and discusses critical assumptions for this research. Sections Three and Four deal with the concepts and theories of institutional pressures. In particular, these sections discuss the adoption of carbon disclosure due to isomorphic pressures and describe, under the premise of institutional complexity, the concept of competing logics. This is followed by the introduction of the first key dimension in categorising carbon disclosure strategy at the field level: the logic centrality within organisations. As institutional concepts are limited in describing the determinants of stakeholder influences at the firm level, Section Six introduces the critical concepts of stakeholder theory and the second key dimension in categorising carbon disclosure strategies at the firm level: the salience of stakeholders. A combination of these two key dimensions is illustrated in Section Seven, where four strategy types of carbon disclosure are described and presented in a model. Finally, the conclusion highlights the contributions of this paper and discusses future research.

6.3 The assumptions of the institutional framework

In this section, we present our institutional framework and the assumptions that link institutional pressures with stakeholder pressures to illustrate the impact of these influences on a company’s carbon disclosure and the organisational field (see Figure 6.1). Of particular interest for this paper is the role of institutional logics in the field, which Friedland and Alford (1991, p.248) define as sets of “materials practices and symbolic constructions which constitute organising principles and which are available to organisations and individuals to elaborate”. In other words, these “logics are the cognitive maps, the belief systems carried by participants in the field to guide and give meaning to their activities” (Scott et al. 2000, p.20), and each logic is associated with different organising principles, and each requires a different set of behaviours from actors (Schaltegger & Hörisch 2015).
This description of institutional logics leads to four assumptions which are crucial to our framework. Firstly, we assume that carbon disclosure has been institutionalised at a field level. As such, carbon disclosure represents an established ‘social fact’, which companies take into account when determining what is considered to be an appropriate action (Meyer & Rowan 1977; Zucker 1977). Secondly, we assume companies operate in an organisational field with similar or the same institutional pressures - that is, the field consists of “those organisations that, in the aggregate, constitute a recognised area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organisations that produce similar services or products” (DiMaggio & Powell 1983, p.148).

Thirdly, we assume that, at a firm level, the differences in carbon disclosure within companies are attributed to the competing logics of the ‘sustainability’ and ‘market’ logic and their relative dominance. Companies are frequently engaged in environments in which competing logics are present, and thus reflect these in their organisational practices (Kraatz & Block 2008). The market logic assumes that companies address carbon issues only if this positively affects their financial performance (Greenwood et al. 2010; Schaltegger & Hörisch 2015). The market logic represents a core element within companies, and pure compliance will
avoid unnecessary costs for sustainability measures such as carbon disclosure (Oberhofer & Dieplinger 2014).

Fourthly, we assume that stakeholders can influence how logics and their organisational outcomes are shaped. On one hand, institutional logics consist of various sets of cultural justifications upon which stakeholders are deciding what organisational practices to support (Friedland & Alford 1991). On the other hand, stakeholders are constantly challenging the assumptions, values and rules considered to be appropriate, and thus play a central role in shaping institutional logics and organisational outcomes and behaviour (Powell & DiMaggio 1991; Thornton & Ocasio 2008). This argument is not only critical because it emphasises the agency of companies and stakeholders, but because it helps to understand how stakeholders’ influences contribute to the relative dominance of logics, and thus to different carbon management practices and disclosure strategies.

6.4 Institutional pressures

The adoption of institutional logics can be viewed as a reaction to multiple institutional pressures to maintain or gain legitimacy. Legitimacy is “a generalised perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions” (Suchman 1995, p.274). Organisational legitimacy can be linked to a ‘social contract’, where organisations agree to perform various desired actions in return for approval of its objectives, other rewards and its ultimate survival (e.g. Dowling & Pfeffer 1975; Guthrie & Parker 1989).

In the context of climate change, companies face a heightened legitimacy gap and are increasingly under pressure from multiple institutions and stakeholders to reduce the negative impact on the environment (Hrasky 2011). In the traditional view of institutional theory, organisations respond to this potential legitimacy gap by isomorphic behaviour, in particular within the same organisational field (Powell & DiMaggio 1991). In a single organisational field, companies increasingly resemble each other and have converging perceptions of how to respond to climate change (Kolk, Levy & Pinkse 2008; Lenssen et al. 2008). These responses, however, are not choices among unlimited possibilities, but rather present a choice between a specific defined set of legitimate options (see DiMaggio & Powell 1983; Wooten & Hoffman 2008).
particular, companies facing similar institutional pressures will eventually adopt similar strategies or organisational practices to gain or maintain legitimacy (DiMaggio & Powell 1983; Scott 1991; Thornton, Ocasio & Lounsbury 2012).

Institutional scholars argue that companies reacted to the pressures arising from climate change with the implementation of carbon disclosure, which could be related to some sort of power exerted by the industry or which must have been based upon an already existing successful model of carbon disclosure which can be reproduced (DiMaggio & Powell 1983). While the former mechanism leads to normative isomorphism (i.e., induced by the industry) the latter - the presence of successful models - leads towards mimetic isomorphism (i.e., induced by competitors). Moreover, the implementation of carbon disclosure might also be induced by regulatory pressures. These coercive pressures are defined by influences carried out by those in power - for example, through pressure from regulators and actors on which the organisation is dependent for resources. One example of coercive isomorphism is the influence of governmental pressure. Governments are legitimate and usually powerful stakeholders who can exert pressure through legislation, regulation and policies (Sarkis, Gonzalez-Torre & Adenso-Diaz 2010; Schmidt et al. 2012). This pressure, in the form of ‘authority requirements’ from governmental organisations, is often codified in laws and regulations, and increasing government regulations and disclosure requirements can be interpreted as being a threat for businesses (Bolton & Foxon 2015; Summerhays & De Villiers 2012). Many previous studies suggest that increasing regulatory enforcement and growing numbers of policy guidelines on environmental protection and disclosure create direct pressure on companies to adopt carbon disclosure (Qian, Burritt & Chen 2015).

In industries with the same institutional pressures, the implementation of certain organisational practices such as carbon disclosure is often related to mimetic or normative isomorphism (Delmas & Toffel 2004; Powell & DiMaggio 1991). Mimetic isomorphism occurs when companies replicate their competitors’ successful behaviour (Aerts, Cormier & Magnan 2006). More importantly, institutional researchers have found that companies are more likely to mimic the organisational practices of other companies which are tied to them through networks, and this indicates normative isomorphism (Guler, Guillén & Macpherson 2002). Normative isomorphism can be defined as pressures arising from social institutions such as industry associations, non-governments organisations (NGOs) or media. In particular, industry pressures
appear to play a significant role with regard to carbon disclosure (Kollman & Prakash 2002). For example, senior managers in global companies in various industry associations interacted in determining actions to be taken to mitigate climate change, making this ‘issue arena’ of climate change itself an important institutional influence within companies (Levy & Kolk 2002). As a consequence, some industry associations, such as the Carbon Disclosure Project (CDP), are considered by companies to be serious partners in maintaining or gaining legitimacy (Anderies et al. 2013; CDP 2010d; CDSB 2014).

Other industry associations, such as the World Business Council for Sustainable Development (WBCSD), developed guidelines for carbon disclosure (The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard), and the majority of the global companies follow their guidelines (WRI/WBCSD 2011). Delmas and Toffel (2004) argue that the pressure to adopt these guidelines is affected by market concentration, thus if an industry is dominated by a few big players, environmental practices such as carbon disclosure lead to a greater degree of diffusion than it would have had the industry been more fragmented.

In line with Rose et al. (2016), normative isomorphism in combination with mimetic processes appears to have led to a convergence in the perception of the climate issue within companies. As a consequence, these pressures triggered the implementation of carbon disclosure in order to demonstrate to government and to the broader community that companies are also ‘good citizens’ (Lee 2012a; Schaltegger & Csutora 2012).

6.5 Institutional complexity and competing logics

The main argument of isomorphism is that corporations which face similar institutional pressure will eventually adopt similar strategies in order to gain legitimacy. Therefore, isomorphic behaviour can be regarded as the critical process at the field level, illustrating why companies implement or ‘institutionalise’ carbon disclosure as an organisational practice. But isomorphism has two major limitations: firstly, according to this traditional notion of institutional theory, the corporate disclosure behaviours of organisations should converge over time, i.e., no significant differences in carbon disclosure should be observed (Cormier, Magnan & Van Velthoven 2005; Luo, Lan & Tang 2012; Matisoff, Noonan & O'Brien 2013). Secondly, isomorphic pressures lead only to a fulfilment, but not to an excess of the requirement (Pålsson & Kovács 2014). In other
words, due to the same institutional pressures, the disclosure of carbon related information leads only to a predetermined point (the actual requirement). A first glance at the carbon disclosure within companies proves the contrary, as it varies greatly in extent and detail (Herold & Lee 2018; Kolk, Levy & Pinkse 2008). In particular, these two key assertions neglect the difference in organisational responses to multiple institutional demands. Isomorphism is only valid within the field to a certain extent, and as such, the depth of response to institutional pressures, as well as the extensiveness of conformity, varies across organisations (Scott 2008).

Existing research acknowledges that organisations must frequently deal with multiple demands in their environment. These demands lead to an environment of ‘institutional complexity’ in which multiple logics are present and organisations are guided by different logics at the firm level (Battilana & Dorado 2010) or the field level (Thornton, Ocasio & Lounsbury 2012), depending on the contexts in which they are embedded. In a sustainability context, managers are constantly challenged to deal with sustainability practices while at the same time being responsible for the wellbeing of their organisation (Oliver 1997; Schaltegger & Hörisch 2015). Thus, different logics in a complex institutional environment may impose conflicting demands on organisational stakeholders within the field (Kostova, Roth & Dacin 2008; Luo 2017). For example, in a purely market driven view, the sustainability logic is regarded as a trade-off and as a problem regarding the pursuit of competitive advantages; in particular in industries characterised by high competition and price sensitivity (Glover et al. 2014; Oberhofer & Dieplinger 2014).

Each logic is associated with different organising principles and is not only influenced by diverse and multilevel political, cultural and social aspects, but is also characterised by a distinct institutional process and degree of determinism in shaping organisational practices and structures (Greenwood et al. 2010). In other words, the organisational field can be seen as being dynamic, or even as being a “field of struggles” (Bourdieu & Wacquant 1992, p.97), where stakeholders are engaged in “a war or, if one prefers, a distribution of the specific capital which, accumulated in the course of previous wars, orients future strategies” (Calhoun 1993, p.86). The organisation field therefore becomes a locale of ‘institutional complexity’ in which stakeholders’ relationships determine the relative dominance of conflicting logics (Kostova, Roth & Dacin 2008; Luo 2017; Wooten & Hoffman 2008).
The dominance of conflicting logics, such as the logic of the ‘market’ and the logic of ‘sustainability’, is influenced by their position in the field. Within the field of business organisations, the market logic can be considered to be a “core logic” (Ansari, Wijen & Gray 2013, p.1017), as the company's existence in a competitive environment relies on reducing costs and increasing profits. Recently however, increasingly stakeholders with environmental interests and powers are asking for more transparency with regard to carbon emissions disclosure (Hörisch, Freeman & Schaltegger 2014; Kolk, Levy & Pinkse 2008). These interests have become more powerful and more widespread in recent years, indicating a shift of the sustainability logic to a more central function in companies, thus challenging the dominant market logic.

As such, the influence on the company’s carbon disclosure through the increasing shift towards sustainability depends on the extent to which the sustainability logic is integrated or central to the organisational functioning. In other words, the closer the sustainability logic is to the company’s core function, the more it is treated as being valid and relevant to the market logic. This positioning around a central function in an organisation is what Besharov and Smith (2014) call the ‘centrality’ of institutional logics in the field, which represents our first key function in determining the implications on carbon disclosure within companies.

6.6 Logic centrality
The current literature suggests that companies, under conditions of institutional complexity, often respond to institutional pressures by differentiating between those pressures which are considered core tasks in a company and those pressures which are more peripheral to organisational functioning (Meyer & Rowan 1977). The influence of logics depends therefore on how centrally they are positioned within a company. Existing research in institutional theory considers the market logic as a ‘core’ function within any business organisation (e.g. Ansari, Wijen & Gray 2013); thus the positioning of the market logic can be regarded as being central to any company. The positioning of sustainability logic, however, varies between companies, as the differences in carbon management practices indicate (Herold & Lee 2017a).

While some companies have integrated climate change into their strategy to reduce carbon emissions, other are more restrictive in their provision of carbon related information and rely
more on symbolic management behaviour (Hrasky 2011). The integration of climate change policies into a company’s strategy indicates a closer position of the sustainability logic to a company’s core functioning, while a more symbolic approach indicates a more peripheral position of the sustainability logic. Thus, centrality is high when the sustainability logic is integrated and represents a central function in a company’s operations, and it is lower when the sustainability logic is manifest in peripheral activities not directly linked to a company’s operations.

The logics centrality can be influenced by features of the organisational field, such as institutions and organisations. Organisational characteristics such as a company’s strategy and mission statement can interact with the field characterises that indicate the centrality of certain logics within the company. Corporate statements can be related to the concept of the institutional statement, which Crawford and Ostrom (1995, p.583) describe as “a shared linguistic constraint or opportunity that prescribes, permits, or advises actions or outcomes for actors (both individual and corporate).” Thus, a mission statement can be regarded as a reflection of the corporate strategy which situates a company in a particular location and thereby exposes it to different logics within the field (Suddaby & Greenwood 2005). A change in institutional pressures can also lead to a change in mission statements in an effort to reduce uncertainty, which indicates an increase in centrality (Thornton, Jones & Kury 2005). As such, climate change statements may indicate the importance of the sustainability logic and its relative position within a company (Purdy & Gray 2009).

For example, the mission statements on climate change of the multinational company DHL indicate a shift of the sustainability logic to a closer position to the company’s functioning in recent years (Herold and Lee, 2017b). In 2011, the statements DHL issued regarding climate change stated that “carbon efficiency is (...) directly related to (...) cost efficiency” (CDP 2011a, p.3), indicating a focus on the market logic (Schaltegger & Burritt 2015). In 2013, however, the climate change statement changed and included statements seeking an increase in legitimacy, such as to “share (...) expertise (...) with our customers” (CDP 2014b, p.3), which indicates a shift to the sustainability logic. As companies are subject to complex operations and several areas of expertise, they must draw from the logics associated with each area of expertise which increases centrality (Besharov & Smith 2014). The change in statements regarding climate change indicates a stronger focus on expertise in the area of carbon management, and thus
represents a shift of the sustainability logic to a more central position in the company’s functioning.

While the previous discussion shows that the relative position of sustainability logic in a company’s core functions influences the extent of carbon disclosure, the current literature on institutional logics provides only limited insight into the conditions under which these different outcomes arise. Although existing research acknowledges that stakeholders affect institutional logics (see e.g. Greenwood & Kamoche 2013; Kim, Bach & Clelland 2007), it is limited in describing the salience of stakeholder influences within the same organisational field, which represents our second key function in determining carbon disclosure strategies.

6.7 Stakeholder salience

The most significant distinction between institutional and stakeholder theory is that in institutional theory the unit of analysis is the company itself, while stakeholder theory focuses on the relationships between the company and its stakeholders. To identify the pressures in the relationship between stakeholders and companies, stakeholder theory provides a theoretical foundation to categorise the multi-level and multi-dimensional perspectives of stakeholders (Freeman 1983). As such, stakeholder theory is often used to examine environmental practices in companies, as it considers a complex business environment which is influenced by multiple stakeholders described as “any group or individual who can affect or is affected by the achievement of an organisation’s objectives” (Freeman 1983, p.46). From a corporate sustainability perspective, Stead and Stead (2013) identify a large cadre of stakeholders with environmental interests, including shareholders, consumers, financiers, employees, NGOs and regulators, as well as standard setters such as business associations. In particular, NGOs, in concert with the media, can be regarded as having played an important role in increasing transparency in environmental practices, as increased transparency encourages businesses and stakeholders to jointly find innovative approaches to sustainability (Awaysheh & Klassen 2010). For example, the GRI reporting guidelines connect reporting of sustainability practices to stakeholder engagement. The goal of this approach is not only to inform stakeholders, but also to increase exchanges between stakeholders and create mutual interests (GRI 2016). Examples like
this shape sustainability oriented mindsets and reflect the ongoing trend of companies to integrate environmental practices due to heightened societal sensibilities to climate change.

One main task of stakeholder management from a company perspective is to convince stakeholder audiences that the existence of an organisation is legitimate. However, perceptions of legitimacy vary between companies and stakeholders. Companies have to seek legitimacy from stakeholders, while stakeholders need to perceive the company’s behaviour as being acceptable in order to legitimise the organisation (Hrasky 2011). Managers are influenced by multiple factors such as organisational values, principles and strategies as well as personal beliefs and self-serving interpretations (Gioia & Chittipeddi 1991; Weick, Sutcliffe & Obstfeld 2005). In this vein, Santana (2012) argues that the assessment of a stakeholders’ legitimacy is a social construction of reality, and the way a company’s management perceives the legitimacy of a stakeholder may or may not be in accordance with the stakeholder’s perception of legitimacy, which is, in turn, another social construction.

In the case of climate change, it is therefore crucial for companies to persuade stakeholders that the company’s operations are legitimate and that it is operating in an environmentally responsible manner (Hrasky 2011). To do so, companies need to understand or categorise stakeholders’ claims according to their influences. Mitchell, Agle and Wood (1997) developed the most frequently used concept to define the degree of influences in stakeholders’ relations, and this concept has since been used regularly by practitioners and research alike. We adopt their concept of stakeholder salience, which is defined as “the degree to which managers give priority to competing stakeholders’ claims” Mitchell, Agle and Wood (1997, p.854). In particular, Mitchell and colleagues argue that stakeholder salience is a function of the stakeholder possessing one or more of three relationship 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.

Stakeholders’ power refers to the influence of those who control the company’s critical resources, which means that these stakeholders have the power, or access to material or financial resources, to enforce their will within the relationship. These powerful stakeholders are not contractually bound with the company to exert pressure - for example, through regulations and policies. The second factor, legitimacy, refers to those stakeholders who achieve legitimacy
when they have legitimate claims over the company, where the basis of the legitimacy of the relationship may derive from a contract, exchange, legal or moral right, legal title or at-risk status (Hill & Jones 1992). However, a legitimate claim can only be regarded as salient if the stakeholder has the power to impose its will, or if the claim is perceived as urgent. The third factor, urgency, is related to the level of importance and attention attributed to the claim. Mitchell, Agle and Wood (1997) characterise this factor as time sensitivity (claims which need to be given immediate attention) and necessity (claims which are vital and highly important).

Under the assumption that the sustainability logic has been adopted, the degree of salience depends on the extent to which stakeholders can hold companies accountable for carbon disclosure related practices. To increase the salience of their claims, stakeholders may coordinate their goals and actions with organisations that are involved in carbon related information gathering, monitoring or analysis, such as NGOs (e.g., the Carbon Disclosure Project), business associations (e.g., the World Business Council for Sustainable Development) and consulting companies (e.g., auditing firms such as KPMG or PWC). Such engagement with already legitimate and powerful organisations may lead to higher stakeholder salience, and thus to greater pressure on companies to give priority to stakeholders’ claims for full carbon disclosure (Hill & Jones 1992). As such, stakeholder salience is high when companies have implemented an open and transparent approach with the aim of full disclosure, and it is lower when stakeholder pressure is uncoordinated or can be neglected with no serious implications for the company’s legitimacy.

The attribute of power within Mitchell, Agle and Wood (1997) salience framework however, appears to be a crucial factor with regard to its influence on carbon disclosure strategies. For example, the extent of disclosed carbon related information in companies depends on the relative power of internal and external stakeholders. External stakeholders’ power, however, is subject to ‘power differentials’ (Hill & Jones 1992), which reflects the information asymmetry between the company’s management and external stakeholders. Management has control over the decision-making mechanisms within the company, which puts them in a better position to exert power over stakeholders (Hawn & Ioannou 2016). In other words, the company’s management can be regarded as the most powerful and the most legitimate stakeholder of any company (Pålsson & Kovács 2014), and that is because the top management eventually decides on the design of the carbon report and the amount of carbon emissions reported.
A good example to illustrate the impact of corporate decision-making on reported carbon emissions is the ‘Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)’, in which companies can choose different carbon measurement and reporting schemes. These different schemes provide guidelines to set boundaries for carbon emissions reporting and companies can choose between two different control approaches, namely either ‘financial’ control or ‘operational’ control. In the financial approach, companies need only to report emissions from ventures in which they hold more than 50 per cent interest (WRI/WBCSD 2011). In other words, companies that follow the financial approach do not need to report carbon emissions created within partnerships, if they do not own more than 50 per cent of the partner’s company. Compared to the ‘operational’ approach, this may lead to less complete reporting, because when an operational control is applied, the measurement and reporting of carbon emissions “is not limited to majority-held ventures, it also applies to minority ventures” (IPIECA 2011, p.3-5). Thus, an operational approach increases the amount of carbon emissions, as it tries to capture emissions from the entire operational network.

Another example is a company’s decision whether to outsource services or to perform activities in-house. This initial difference in choosing a certain approach has a significant impact with regard to carbon emissions disclosure purposes. Companies that use an in-house approach, are required to report their carbon output under Scope 1 emissions, while all outsourced activity falls under the Scope 3 category, where disclosure is voluntary and thus is not a requirement. Although institutional and stakeholder pressure may influence and affect a company’s decision about what kind of carbon information is disclosed, both examples show that the eventual decision lies with the company’s management. Our conceptual framework depicts this process with the company as being a bottleneck (see Figure 1), where all pressures are consolidated and filtered.

In other words, institutional pressures alone cannot provide answers to questions about the extent to which carbon related information is disclosed. Relevant internal stakeholders, in particular corporate managers, have a direct influence on a company’s carbon report, while external stakeholders have only indirect influence by applying external pressure. The shift in companies towards the sustainability logic to maintain legitimacy, however, puts increasing pressure on companies to disclose relevant carbon related information. Thus, these dynamics of the relationship represent a constant fight for power between management and stakeholders.
outside of the company regarding the extent of disclosure of carbon related information. Therefore, we argue that both dimensions - the ‘centrality’ of the sustainability logic on one hand, and the ‘salience’ of stakeholders on the other - are critical in determining a company’s carbon disclosure strategy.

6.8 Types of carbon disclosure strategies

Taken together, the dimensions of logic centrality and stakeholder salience provide an integrative model which allows to categorise carbon disclosure strategies. While the centrality reflects the degree to which the sustainability logic is central to the company’s organisational functioning, the salience of stakeholders represents the extent to which carbon disclosure claims are given priority. To establish a clear distinction between those dimensions, it is assumed that centrality reflects the degree of the *internal* dissemination of the sustainability logic, i.e., how the values and principles of climate change are exhibited by top corporate management and how these values are shared by organisational members to commit to common corporate environmental goals and aspirations (Linnenluecke & Griffiths 2010). From the perspective of the stakeholders, it is assumed that salience represents the degree of *external* pressure they are able to exert regarding climate change - that is, how much relevant carbon related information is disclosed to relevant external stakeholders.

In this section, we combine these dimensions to propose four types of carbon disclosure strategies: substantial, symbolic, transparent and engaged. Figure 2 depicts the four types of strategies and we elaborate on each below. We used dashed rather than solid lines between the types to emphasise that centrality and salience are continuous dimensions and that carbon disclosure can therefore vary between the types, however, all four disclosure types can be regarded as useful legitimation strategies. Our framework reveals that the extent of carbon related information depends on the centrality of logics as well as on the salience of stakeholders. Our model below (see Figure 6.2) describes each type and explains how each type implies a distinct level of carbon disclosure. We illustrate our argument with examples from the literature.
6.8.1 Substantial disclosure

The first type of carbon disclosure behaviour in companies exhibits high centrality and low salience. In these companies, high centrality positions the sustainability logic as being relevant to the company’s functioning, leading to a convergence of market and sustainability goals. Low salience means inconsistent demands from stakeholders, confronting companies with divergent goals and means and therefore having little impact on the organisation. As a result, companies align their carbon measures with the market driven perspective, which results in substantial carbon emission reduction initiatives with the aim of reducing costs and increasing profits. We therefore label this type substantial.

Substantial activities reflect the corporate actions taken by a company to achieve carbon reduction related accomplishments in order to reduce its carbon footprint in line with cost reductions (Hrasky 2011; Schaltegger & Hörisch 2015). Because companies have a high
centrality, the sustainability logic is integrated in their strategies, as well as in their organisational structures, thus climate change values are shared by all organisational members. Moreover, because these companies face low salience, there is no need for the company’s management to include demands from stakeholders for carbon disclosure beyond the market logic requirements. Together, these factors result in an expectation about aligned sustainability and market goals to proactively and publicly manages institutional pressures and processes by, for example, implementing carbon efficiency initiatives to enhance the “economic fitness” (Oliver 1991, p.161) of a company.

An investigation into carbon emission reduction activities from a corporate perspective reveals that the majority of substantial initiatives are related to operational excellence (CDP 2010d; Oberhofer & Dieplinger 2014). In other words, most reductions in carbon footprint are directly linked to improving operational efficiency and are often expressed in form of energy-efficiency or carbon reduction policies. Busch and Schwarzkopf’s (2013) study of carbon disclosure strategies in the car manufacturing industry provides an illustration of how high centrality and low salience reflect a cost-efficiency approach. The study found that the carbon reduction efforts could be explained by companies seeking to achieve a competitive advantage, that is, initiatives to increase the company’s carbon efficiency resulting in a decrease in operational costs, informed by an alignment between the market and the sustainability logic, thus high centrality. In contrast, the authors found also indicators of low salience, for example, a limited engagement towards regulatory approaches, namely the European Trading System (EU ETS), as the car manufacturers doubted activities which are simultaneously pursued by their competitors can actually lead to a competitive advantage. Orsato (2006) proposes that such an advantage can only be generated if a company embarks on a unique strategy, for example, is the first to establish an environmental management system.

Although these substantial activities indicate that a company’s carbon disclosure mirrors action, Hoffman (2006), in his analysis of corporate climate change strategy, notes that operational efficiency driven activities reflect the tendency of companies to pick the ‘low-hanging’ fruit by disclosing easily identified low cost and/or low risk actions without really embracing ongoing organisational adaption strategies for climate change. Ultimately, the focus on carbon efficiency initiatives indicates a company’s internal decision to position the sustainability logic as a central function, but this focus neglects the pressure of stakeholders,
leading to a potential external demand for an increase in other carbon related activities in addition to pure cost saving initiatives.

6.8.2 Symbolic disclosure

The symbolic type of carbon disclosure in companies embodies low centrality and low salience. These companies, as in the substantial type, have to deal with uncoordinated actions taken by stakeholders and thus these stakeholders have little influence in demanding full carbon disclosure. Unlike the substantial driven companies, however, low centrality indicates that the sustainability logic is integrated into the company’s strategy to a lesser extent, leading to the market logic exerting a primary influence over the company’s functioning. As a result, these companies are neither under pressure to give priority to stakeholder claims, nor to implement any carbon related initiatives that lead to a reduction of their carbon footprint. However, to close the legitimacy gap created by heightened societal concerns about climate change, companies of this type focus on symbolic management, using rhetorical statements designed to create an impression of environmental responsibility. We therefore label this type symbolic.

Symbolic disclosure is a strategic option, that, according to Oliver (1991) can be described as “window dressing” (p.154), representing rather a symbolic acceptance of institutional norms, thereby ignoring authority or cultural expectations. A symbolic strategy can also be related to reputation management, which Schaltegger and Burritt (2015) describe as a company’s focus on societal, political and media attention. Because these companies have low centrality of the sustainability logic, carbon related activities and their disclosure may be closely linked to the company’s PR department to gain the support of its most immediate audience (Hrasky 2011). Moreover, because these companies face low salience, management may employ self-interested or narcissist behaviour with claims of carbon related achievements, which are not accompanied by corporate action (Schaltegger & Burritt 2015). Together, these factors result in low expectations about the relevance of carbon related information, as well as limiting the company’s strategy and organisational structure to the dominant market logic.

An investigation to identify rhetoric-driven behaviour from a corporate perspective reveals that companies within carbon-intensive industry sectors appear to be responding differently from those in less carbon-intensive industry sectors. Hrasky’s (2011) study of legitimation strategies
in the context of carbon disclosure illustrates the symbolic type. It was found that carbon
disclosure in less intensive sectors tend to be symbolic, rather than representative of underlying
substantial action to reduce either the company’s carbon footprint or that of those with whom it
interacts. In particular, the author highlights the financial sector, which has little motivation and
less urgent need, to take substantial action to reduce its carbon footprints, thus reflecting low
centrality. Moreover, the study illustrated that although an engagement with external
stakeholders is part of a successful climate change strategy (Hoffman 2006), the average carbon
disclosure rate to external parties in the financial sector was six times lower compared with all
other sectors.

The author suggested a regulatory response to facilitate cooperation with external stakeholder
groups to overcome the low salience and initiate carbon footprint reductions. Arguing for a
market response, Smith, Morreale and Mariani (2008) and Marshall and Brown (2003) found
that symbolic disclosure is insufficient in promoting informed decisions, so companies
eventually increase the centrality of the sustainability logic to seek opportunities to improve their
operational efficiency for economic gains. Ultimately, a focus on symbolic strategies may
neglect market forces, leading to a potential convergence of the sustainability logic towards the
market logic for profit reasons.

6.8.3 Transparent disclosure

In the third type of carbon disclosure strategies, companies are characterised by high centrality
and high salience. These companies have the sustainability logic integrated in their organisations,
therefore the sustainability values are reflected in their strategies and in their organisational
structures. In addition, stakeholders’ claims are given priority, as stakeholders can exert pressure
to demand relevant information. As a result, a combination of the sustainability logic as an
integrated function and the stakeholders’ legitimate claim, leads to an extensive disclosure of
relevant carbon related information. We therefore label this type transparent.

Companies with transparent carbon disclosure strategies rely on the assumption that climate
change values and principles as exhibited by top management will be widely shared and held by
all organisational members, leading to unity between organisational members that fosters a sense
of identity and commitment to common corporate carbon related goals and aspirations
(Linnenluecke & Griffiths 2010). Because these companies have a high centrality, the transparency in carbon disclosure indicates full accountability, i.e., a strategic design of internal information systems to collect carbon emissions accounting information to calculate key performance indicators (Schaltegger and Csutora, 2012). From a stakeholder perspective, high salience lead to an approach in which companies agree to substantial changes in practices (Reid & Toffel 2009). In the case of carbon disclosure, this reflect actions to make carbon related information accountable and comparable by the adoption of international technical and industry procedures, following official international guidelines (e.g., GRI) (Herzig & Schaltegger 2011).

Kolk’s (2008) research into accountability and corporate governance illustrates high centrality and high salience using the example of Shell. Shell was situated in a field where its core operations and practices were infused with a sustainability logic which emphasised governance through specific board committees and internal assurance systems. For example, the sustainability report states that “executives responsible for each Shell Business and country operation must provide annual assurance that their operations comply with our policies and standards” (Shell 2004, p.8). Moreover, Shell resorts to external verification, not only referring to international or national standards such as the Global Reporting Initiative (GRI), but also explaining their reporting procedures and indicators in detail. Shell’s position of high salience and greater transparency and accountability are sharply influenced by the Brent Spar incident, which placed the company clearly in the public spotlight. Thus, the implementation of internal oversight and the scrutiny of external stakeholders reflects both high centrality and high salience.

However, the combination of the sustainability logic as a central function and the stakeholders’ claim for full carbon disclosure indicates that companies exhibiting transparent behaviour are also driven by normative actions (see Hopwood 2009; Suchman 1995) that go beyond pure carbon efficiency initiatives. As such, a transparent disclosure approach is also reflective of active external stakeholder engagement which works on the standards and guidelines of carbon related activities (UNEP/SustainAbility 2002). Companies of this type are engaged in public policy climate change activities and work directly with policy makers and trade associations, as well as research organisations and non-profit organisations. Ultimately, the sustainability logic as a central function represents the company’s actions in developing an organisational culture that reflects climate change values. Moreover, high salience represents a
company’s approach to give priority to stakeholder claims that go beyond market driven initiatives, leading to transparency and full carbon disclosure.

6.8.4 Engaged disclosure

The fourth type of carbon disclosure strategies in companies exhibits low centrality and high salience. These companies have not integrated the sustainability logic into their operations which is thus dominated by the market logic. Unlike the symbolic type, however, these companies face high salience where stakeholders’ goals and actions are coordinated and demand the relevant information. As a result, and in contrast with companies where the sustainability is peripheral to the organisation’s function, they have to engage in consultation with well-structured and well organised stakeholders to discuss the company’s carbon disclosure related practices. We therefore label this type engaged.

Engaged companies work with stakeholders in discussing carbon issues mainly in order to garner support of the organisation’s most immediate audiences by sharing and promoting the values that the audience also values (Hrasky 2011). Due to the high salience, however, stakeholders will continually demand accountability with regard to carbon emissions, and this may include claims of adopting international technical and industry procedures and to follow official international guidelines. But because these companies have a low centrality, they companies face an “external expectation conflict” (Oliver 1991, p.153), leading only to a modification of practices more consonant with those espoused by the stakeholders (Reid & Toffel 2009), thus resisting organisational adaption strategies for climate change. As such, these companies are more active in promoting their own interests and will devote most of its resources to appease or placate stakeholder claims (Oliver 1991). Together, these factors result in minimal internal actions directed to the challenges arising from climate change.

An investigation to identify engaged behaviour has resulted in a focus on external stakeholder engagement. Damert and Baumgartner’s (2017) study of climate change strategies within the automotive industry illustrates low centrality and high salience in an engaged organisation. The authors found that corporate climate action is rather linked to reputational concerns rather than to compliance issues. They point out that actions focus on end consumers, as these are more visible to the public than those of suppliers, therefore exhibiting high salience.
From an industry view, the demonstration of initiatives on climate change within this specific group reflects a way to legitimize a company’s business operations and emphasizes an engaged approach. In contrast, the authors also found that climate change policies further upstream in the supply chain are underdeveloped, indicating low centrality.

While companies in the substantial type proactively engage with NGOs and business associations to reduce carbon emissions, companies in the engaged type react and fulfil only the minimum carbon disclosure requirements (Pålsson & Kovács 2014). Moreover, although the high salience indicates that stakeholders provide conditional support and may sit on advisory panels, managers of companies decide on the extent of conformity and may limit their involvement in sustainability to appease stakeholders (Friedman & Miles 2006). However, institutional demands for climate change activities have become more powerful and more widespread and thus deemphasize the exercise of individual agency. This agency shifts from “actorhood to otherhood” (Meyer & Jepperson 2000, p.107) in these companies may lead to lower levels of resistance to the integration of the sustainability logic into their operations. Ultimately, climate change pressures will lead to organisational change, with the sustainability logic shifting from the periphery and becoming an integral part within companies.

6.9 Conclusion

If institutional and stakeholder pressures affect carbon disclosure strategies in companies, then frameworks that describes these influences, and eventually categorise the strategies based on these influences, expand insight into the concepts and implications, and thus advance organisational research. Although institutional theory provides an explanation of institutional pressures at a field level, it is limited in its ability to categorise stakeholders’ influences on the organisational field and on the organisation. This paper’s intention has been to overcome these limitations and build frameworks that help to describe the interaction between stakeholders and institutional influences. To provide insight into the nature of these influences on carbon disclosure strategies, we developed two frameworks. The first framework showed that carbon disclosure is eventually influenced only by the company, but the company’s decision about what type of carbon disclosure strategy is pursued is related to the function of stakeholders’ pressure as well as to a managers’ perceptions of institutional pressure. We have clarified the conceptual
and theoretical elements and processes in the organisational field and illustrated how influences from these concepts affect a company’s carbon disclosure. In order to address the firm-level influences of stakeholders on carbon disclosure, we developed a model that combined pressure from institutions and from stakeholders’ claims. We proposed centrality and salience as being two key dimensions and built an integrative model that includes four types of carbon disclosure strategies.

As such, our framework makes several contributions to the literature on institutional theory and its interaction with stakeholder theory. First, it provides a conceptual model which shows that institutional theory as well as stakeholder theory provide, on different levels, a theoretical foundation on which to examine the influences on carbon disclosure. We show that stakeholders’ claims at the firm level can influence the extent of carbon related information, depending on the degree to which the sustainability logic is integrated as a central feature of a company’s functioning. The model also shows that institutional pressure at the field level affects carbon related activities, depending on the salience of stakeholders’ claims. It thereby links stakeholders’ pressure at the firm level to the outcomes at the field level that affect a company’s carbon disclosure strategy. Secondly, the clarification of institutional and stakeholder concepts and process with regard to carbon disclosure advances the body of research on institutional complexity, thereby expanding knowledge to enable the categorisation of firm-level influences that have field-level impacts. We showed that organised stakeholders can increase their salience when they support institutions which monitor and analyse carbon related information. This ‘building’ of ‘collective governance’, in the absence of an overarching authority, offers insight into how stakeholders, under the conflicting logics of the market and of sustainability, may rethink their position and shift the sustainability logic more towards a company’s central function.

Thirdly, by categorising the pressures in terms of their centrality and salience, our model provides a basis for understanding the varied implications of these influences on carbon disclosure strategies. For example, high centrality and lower stakeholder salience lead to a convergence of the market logic and the sustainability logic, while low centrality and high stakeholder salience indicates a conflict. Assuming an increase in pressure with regard to climate change, this conflict may foster change of the sustainability logic at a field level. Fourthly, by categorising stakeholders’ influence regarding organisational outcomes, our four-type model
points to practices through which management can exert agency to influence carbon disclosure strategies. For example, our categorisation of influences shows that mission statements and strategic decisions can create agency and influence the relative power of stakeholders.

These findings have to be viewed in the light of the model’s limitations. Although our findings may be applied to other fields, the particular case of carbon disclosure might be heavily influenced by regulations over the long term, thus more transparency in carbon disclosure in the future might be reached through coercive pressure rather than through firm-level influences. Moreover, we assumed that the differences in carbon disclosure are related to the conflicting logics of the market and of sustainability. In practice, however, companies are confronted by diverse logics and influences. We encourage future researchers to extend our framework by expanding on other key dimensions or logics. Companies are subject to complex processes and multiple institutional demands. The market logic and the sustainability logic are only two of many institutional logics within this organisational field. Further research may include other logics to test the influence on carbon disclosure. Overall, research in the field of carbon disclosure is still in its infancy, and the industry is increasingly affected by institutional and regulatory changes. Future research will help to understand how these influences affect organisations.
Chapter 7 (Paper E): The interaction of internal and external pressures

Preamble:

This paper (Paper E), submitted to the Australasian Journal of Environmental Management, presents an empirical study that examines internal and external carbon management practices using the integrative model of four carbon disclosure strategy types discussed in Paper D. Using a merged dataset from Bloomberg ESG terminals and Carbon Disclosure Project (CDP) reports, 26 specific carbon management practices were identified in order to examine the degree of institutional as well as stakeholder pressures and their influence on disclosure strategies, answering the research questions:

*RQ4a. To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?*

*RQ4b. From a corporate perspective, what carbon disclosure strategies have been adopted?*

The findings show that the majority of companies align internal and external carbon management practices, reflecting a consistent strategic approach towards carbon disclosure. Most companies follow either a transparent or a symbolic approach, indicating that these companies are either engaged in both internal and external practices or in neither. From a theoretical viewpoint, the analysis indicates that most companies see the sustainability logic as a core function in the company, while at the same time giving priority to stakeholder claims that go beyond market-driven initiatives, leading to transparency and full carbon disclosure. However, although this study applies the model from Paper D, it is limited as it does not address if or how disclosure strategies have shifted over time, leading to the development of Paper F.
The influence of internal and external pressures on carbon management practices and disclosure strategies

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David M. Herold and Ki-Hoon Lee designed the study. David M. Herold conducted the data analysis and led the drafting of the manuscript and both authors contributed to and/or have approved the final manuscript.

Conflict of Interest
Both authors have declared no conflict of interest.

Authors Signatures

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7.1 Abstract
As a result of institutional and stakeholder pressures, companies have increasingly implemented various internal and external carbon management practices, reflecting different carbon disclosure strategies. Existing research, however, is limited to distinguish between different types of carbon disclosure strategies and to explain the dynamic interaction between internal and external pressures. In response, drawing from institutional and stakeholder theory, this paper (1) proposes a framework that depicts different carbon disclosure strategies based on internal and external pressures, and (2) using a sample of 40 leading global logistics companies, subsequently categorises the companies based on the extent of applied internal and external carbon management practices. Using data from Bloomberg ESG and the Carbon Disclosure Project (CDP) reports, the analysis and the categorisation is based 26 specific carbon management practices during the timeframe from 2012 to 2014. The findings show that the majority of companies align internal and external carbon management practices, reflecting a consistent strategic approach towards carbon disclosure. However, most companies follow either a transparent or a symbolic approach, indicating these companies either are engaged in both internal and external practices or in neither. We found that the key internal drivers are the companies’ policies and procedures, while key external drivers include high engagement with policy makers and NGOs.

Keywords:
Carbon management practices, carbon disclosure strategies, stakeholder salience, institutional logics, logistics
7.2 Introduction

In recent years, global logistics companies have engaged in an increasing number of voluntary climate change initiatives (Herold & Lee 2017a; Kolk, Levy & Pinkse 2008; Schaltegger & Csutora 2012) in response to growing institutional pressures to reduce carbon emissions and increase transparency (de Villiers & Alexander 2014; Lee & Vachon 2016; Luo 2017; Welbeck 2017). Companies respond to such pressures by disclosing carbon related information aimed at internal audiences (e.g. board members, employees) as well as those that target audiences external to the organisation (e.g. business partners, non-governmental organisations). In addition, responding to institutional and stakeholder pressures through carbon disclosure is increasingly considered as a key strategic determinant for the company’s long-term sustainability of global logistics companies (CDP 2010d; Hrasky 2011; Lee 2012b; Massa, Farneti & Scappini 2015), with disclosure of carbon related information either taken proactively to mitigate the risk of potential stakeholders’ backlash or retroactively to integrate stakeholders’ demands and expectations into the company’s operations, structures and processes (Borghei, Leung & Guthrie 2016; de Villiers, Naiker & Van Staden 2011; Hawn & Ioannou 2016; Herold & Lee 2017b).

However, given the wide range of approaches to the mix of internal and external carbon management practices (see e.g. Gibassier & Schaltegger 2015; Hrasky 2011; Kolk, Levy & Pinkse 2008; Lee 2011b), the key issue of how the dynamic interaction between external and internal carbon management practices may be associated with a company’s carbon disclosure strategy remains unanswered. Therefore, this paper addresses this gap by asking the following question: “*How do internal and external pressures influence corporate carbon disclosure strategies?*”

To answer this question and to understand the implications of these multiple pressures, this paper builds a model to distinguish between internal and external influences based on institutional and stakeholder theory and its constructs. However, in order to categorise carbon disclosure strategies, a more detailed investigation of internal and external carbon management practices is required. Therefore, the following sub-questions will be addressed:

**RQ3a. “To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?”**
RQ3b. “What carbon disclosure strategies have been adopted from a corporate perspective?”

Our main theoretical focus is the distinction between internal and external pressures and how the interaction between them influences carbon disclosure strategies. To categorise the internal and external pressures as well as carbon disclosure strategies, we develop an integrative model based on underlying constructs within institutional and stakeholder theory. We argue that internal carbon management practices are influenced by the extent of dissemination of sustainability and climate change values within the organisation, representing structural change, i.e. by drawing on institutional theory, we examine how ‘central’ (Besharov & Smith 2014) the sustainability logic is integrated into the company’s value system (Thornton & Ocasio 2008). For external carbon management practices, we argue that these are influenced by the salience of stakeholders, i.e. by drawing on stakeholder theory (Freeman 1983), we examine to which extent carbon disclosure claims from stakeholders are given priority (Mitchell, Agle & Wood 1997). Based on the relative degree of the combined internal and external influences, we propose four ideal types of carbon disclosure strategies: Solid, Negligible, Intentional and Open.

In order to measure the company’s carbon disclosure strategy, we use a dataset from Bloomberg ESG and the associated data from Carbon Disclosure Project (CDP) reports, which allows us to conduct a company comparison and categorisation. Our final sample includes 3120 observations for 40 global logistics companies over three years (2012 to 2014). Methodologically, we introduce a novel empirical analysis using 26 specific carbon management practices (CMPs) from Bloomberg ESG and CDP data to calculate scores for the categorisation of carbon disclosure strategies according to the four types in the model.

The contribution of this paper is twofold. First, we conceptualise a model of carbon disclosure strategies that proposes four ideal types, thus providing an understanding of the dynamic interaction between internal and external management practices and their influence on carbon disclosure strategies. Second, we empirically categorise carbon disclosure strategies within the global logistics industry, thereby advancing the literature on strategic carbon management and disclosure and providing a tool to assess a company’s carbon disclosure position. Thus, this study presents a more nuanced empirical, as well as theoretical,
understanding of the mechanisms through which internal and external carbon management practices influence carbon disclosure strategies.

### 7.3 Internal and external pressures

Carbon disclosure can be regarded as a response to a potential legitimacy gap, which can be defined as “where corporate performance remains unchanged, but societal expectations about that performance have changed” (Hrasky 2011, p.177). For example, global logistics companies as facilitators for global trade, face a heightened legitimacy gap, as the extensive use of the logistics and transportation network depends heavily on fossil fuels and results in high carbon emissions, leading to multiple pressures to reduce the negative impact on the environment (Herold & Lee 2017b; Onghena, Meersman & Van de Voorde 2014).

In order to gain legitimacy, companies usually follow two ways: internally focused actions and externally focused actions (Hawn & Ioannou 2016). The former is aimed at achieving structural change, e.g. structural mimicry or the implementation of certain of accepted and appropriate organisational practices or structures while the latter aims to gain organisational endorsement by external stakeholders. The distinction between internal and external actions can be theoretically linked to institutional theory (e.g. Ansari, Wijen & Gray 2013; Besharov & Smith 2014) and stakeholder theory (Freeman 1983). While internal actions reflect to what extent certain institutional logics are integrated inside the boundaries of the company (i.e. management, owners, employees), external actions reflect the extent of influences from stakeholders outside of the organisation (i.e. government, customers, suppliers, investors). Further, Hawn and Ioannou (2016) argue that both internal and external actions may generate legitimacy: whereas internal actions signal conformity with legitimized structures and thus help organisations gain legitimacy, external actions target particular audiences that confer legitimacy upon the organisation (e.g., through their public endorsement). Legitimacy has long been acknowledged as important for the survival of any organisation (e.g. Ansari, Wijen & Gray 2013; de Villiers & Van Staden 2011; Dowling & Pfeffer 1975), it is therefore crucial to distinguish between the two types of internal and external actions and pressures to understand how they influence carbon disclosure strategies.
7.3.1 Internal practices

Based on the discussion above, the reaction to internal pressures represent inward-looking practices that involve organisational steps to develop organisational capabilities and to meet the expectations of those internal actors upon which the organisation depends for critical resources (Hawn & Ioannou 2016; Meyer & Rowan 1977). In the context of carbon disclosure, the set of internal practices may include the implementation of climate change policies or energy-reducing initiatives as well as forming a board-level sustainability committee. As such, the extent of applied or implemented carbon management practices within the organisation can be regarded as an indicator for the overall company’s carbon disclosure strategy.

From an institutional logics perspective, the extent of implemented internal carbon management practices can be related to the position of the so-called sustainability logic within the organisation (Herold & Lee 2017b). In other words, the extent of internal carbon management practices depend on how the sustainability logic can manifest itself as a core feature that is central to the organisational functioning, and is what Besharov and Smith (2014) call the ‘centrality’ of an institutional logic in the field. The positioning of sustainability logic, however, varies between companies, as the differences in carbon disclosure approaches indicate (CDP 2010d; Schaltegger & Csutora 2012). While some companies have integrated climate change into their policies to reduce carbon emissions, others are more restrictive in providing carbon-related information, and rely more on symbolic management strategy (Hrasky 2011). Thus, from a theoretical point, the relative position of the sustainability logic to the company core functions influences the extent of carbon disclosure and its applied internal carbon management practices, and may represent different carbon disclosure strategies.

7.3.2 External practices

In reaction to external pressures, companies engage in public and visible activities as well as in communication tactics that involve the presentation of ceremonies to persuade stakeholders that the company’s operations are legitimate and the company is operating as an environmentally responsible citizen (Hörisch, Freeman & Schaltegger 2014; Hrasky 2011). In particular, inter-organisational networks (Stuart, Hoang & Hybels 1999), media attention (Sine, David & Mitsuhashi 2007) and legitimacy of external ties (Baum & Oliver 1991) can be regarded as crucial
practices to gain legitimacy. In the context of carbon disclosure, the set of external practices may include the verification of the company’s emissions through a third party, engagement with business or investor organisations such as the Carbon Disclosure Project (CDP), the acknowledgement of industry guidelines (e.g. GRI) or signatories with international organisations (e.g. United Nations Global Compact). As such, the extent of applied or implemented carbon management practices outside the organisation can be regarded as an indicator for the overall company’s carbon disclosure strategy.

From a theoretical viewpoint, the extent of applied or implemented external carbon management practices is conceptually adjacent to the degree to which managers give priority to competing stakeholders’ claims, representing the concept of stakeholder salience in stakeholder theory (Freeman 1983; Mitchell, Agle & Wood 1997). In a climate change context, the degree of salience depends on the extent to which stakeholders can hold companies accountable for carbon-related practices. As such, stakeholder salience is high when companies have implemented an open and transparent strategy with the aim of full disclosure, and lower when stakeholder pressure is uncoordinated or can be neglected without serious implications for the company’s legitimacy. Thus, from a theoretical point, the relative salience of stakeholders influences the extent of carbon disclosure and its applied external carbon management practices, and may represent different carbon disclosure strategies.

External stakeholders have an indirect influence by applying external pressures to convince internal stakeholders, in particular the company’s management, to implement or follow relevant carbon management practices. These dynamics of this relationship represent a constant fight for power between management and stakeholders outside the company regarding the extent of carbon disclosure and the implementation of carbon management practices. Therefore, we argue that both dimensions – internal pressures on the one hand, as well external pressures on the other – are critical to determine carbon disclosure strategies.

7.4 The implications of carbon disclosure pressures

We use the dimensions of internal and external pressures to create an integrative model to understand their interaction between internal and external practices on carbon disclosure strategies. The internal perspective reflects how corporate climate change values and principles are exhibited
by top management and are shared by organisational members to commit to common corporate environmental goals and aspirations (Linnenluecke & Griffiths 2010). The external perspective represents the degree of external pressure arising from stakeholders with regard to climate change – that is, how much relevant carbon-related information is disclosed to relevant external stakeholders (Kumarasiri 2017). Thereby, this model provides a conceptual foundation to answer RQ1 (“How do internal and external pressures influence corporate carbon disclosure strategies?”) and provides subsequently a framework to analyse and categorise carbon management practices and strategies to answer RQ1a (“To what extent do specific internal and external carbon management practices influence corporate carbon disclosure strategies?”) and RQ1b (“What carbon disclosure strategies have been adopted from a corporate perspective?”).

We combine these dimensions to propose four ideal types of carbon disclosure strategies: Solid, Negligible, Intentional and Open. Figure 7.1 depicts the four types, but it needs to be emphasised that internal and external pressures are dynamic dimensions, and that carbon disclosure can therefore vary between the ideal types. Our framework shows that the extent of carbon-related information depends on internal and external pressures. Below, we describe each ideal type in our model and explain how it implies a distinct level of carbon disclosure.
Figure 7.1. Carbon disclosure strategy types

**Solid disclosure**

Solid strategies reflect the corporate actions taken by a company to achieve carbon-related accomplishments in order to reduce its carbon footprint in line with cost reductions (Hrasky 2011; Schaltegger & Hörisch 2015). Because companies have high internal pressures, the integration of climate change values is reflected in organisational structures and is exhibited by top management and shared by organisational members (Linnenluecke & Griffiths 2010). Moreover, because these companies face low external pressures, there is no need for the company’s management to include demands from stakeholders for carbon disclosure beyond market-driven initiatives. Together, these factors result in an expectation about aligned sustainability and market goals that consists of carbon efficiency initiatives that are, according to DHL, “of strategic importance, since our carbon emissions are directly related to our fuel and energy consumptions and thus to cost efficiency (CDP 2011a, p.3)”.
Negligible disclosure

Negligible strategies can also be related to reputation management, which Schaltegger and Burritt (2015) describe as a company’s focus on societal, political and media attention. Because these companies have low internal pressures, carbon-related activities and their disclosure may be closely linked to the PR department to gain the support of the company’s most immediate audiences (Hrasky 2011). Moreover, because these companies face low external pressures, management may employ self-interested or narcissist behaviour, with claims of carbon-related achievements that are not accompanied by corporate action and reflects the use of rhetorical statements designed to create an impression of environmental responsibility (Schaltegger & Burritt 2015). As a result, companies have to deal with uncoordinated action from stakeholders and thus with little demand for full carbon disclosure, nor being pushed to implement any carbon-related initiatives that lead to a reduction of the carbon footprint.

Open disclosure

Open strategies with regard to carbon disclosure relies on the assumption that the climate change values and principles exhibited by top management will be shared widely and held by all organisational members, leading to a unity between organisational members that fosters a sense of identity and commitment to common corporate carbon-related goals and aspirations (Linnenluecke & Griffiths 2010). From a stakeholder perspective, the high external pressures reflect an approach aimed at making carbon information comparable by an active engagement to work on the standards and transparency of carbon-related activities in the logistics industry (UNEP/SustainAbility 2002). This may include the adoption of technical international and industry procedures and following official international guidelines (e.g. GRI) as well as engagement in public policy climate change activities, working directly with policy-makers, trade associations, research organisations and non-profit organisation (Herzig & Schaltegger 2011).

Intentional disclosure

Engaged companies engage in consultations with well-structured and organised stakeholders to discuss the company’s carbon-related practices mainly in order to maintain legitimacy. Due to the
high external pressures, however, stakeholder will continually ask for accountability regarding carbon emissions, which may include requests to adopt technical international and industry procedures and to follow official international guidelines. But because these companies have low internal pressures, they will neglect organisational adaption strategies for climate change and react as little as possible to fulfil only the minimum and mandatory carbon disclosure requirements (Pålsson & Kovács 2014). Together, these factors result in a minimal engagement with the challenges arising from climate change.

7.5 Research design

To address the research aim of understanding the internal and external influences on carbon disclosure strategies, and the subsequently categorisation according the carbon disclosure strategy model, the internal and external carbon management practices of companies needs to be examined. According to Beattie (2014) and Unerman (2000), disclosure indexes are a popular way to quantify the extent of disclosure. We adopt his approach and use a merged dataset from Bloomberg ESG terminals and Carbon Disclosure Project (CDP) reports that includes 26 specific carbon management practices (CMPs) that a company may have applied. To achieve reliability and validity of the data, we focus on a small sub-set of items (CMPs) as well as on inter-company differences in a specific industry (i.e., global logistics) and use an industry index to measure the disclosure level (Beattie, McInnes & Fearnley 2004; Botosan 1997). The analysis follows a two-step approach: First, we examine to what extent the internal and external practices of each company are applied or implemented. An analysis of these specific CMPs will allow us to understand the interaction between internal and external practices and provides the foundation for the second step: the categorisation of companies according to the carbon disclosure strategy model.

Constructing the CMPs as variables to calculate and categorise carbon disclosure strategies is a novel contribution of this study. The dataset were the most up-to-date data available and covers the timeframe from the years 2012 to 2014. The complete dataset contained 3120 corporation-year observations of CMPs. The sample as well as a detailed description of the measurement of carbon management practices and disclosure strategies is given below.
7.5.1 Sample

The sample of the study focuses on global logistics companies, representing an own industry or an organisational field (Scott 1991), and thus providing homogeneous results that can be compared. The sample comprises the 50 world largest logistics companies in the year 2015, as measured by gross revenues (JOC 2015). Collectively, these 50 companies generated nearly US$230 billion in annual revenues. Corporate data of variables were retrieved from Bloomberg terminals, providing environmental, social and governance (ESG) information. In particular, Bloomberg provides ESG data for more than 9000 companies worldwide (Bloomberg 2016), including access to data from the Carbon Disclosure Project (CDP). The final sample of the study included 40 global logistics companies, as ten companies were excluded from the sample because the carbon disclosure data was not sufficient for comparison within the global logistics industry.

7.5.2 Carbon disclosure variables

To measure the internal and external influences, we used 26 carbon management practices (CMPs) from the Bloomberg ESG and CDP dataset that may have been implemented by the global logistics companies. Table 7.1 describes these CMPs in detail, and distinguishes between internal and external influences.

Table 7.1 Carbon management practices (CMPs)

<table>
<thead>
<tr>
<th>CMPs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTERNAL</strong></td>
<td></td>
</tr>
<tr>
<td>Structure and Accountability (SA#)</td>
<td>Indicates whether the company has a corporate social responsibility (CSR)/sustainability (or equivalent) committee that reports directly to the board.</td>
</tr>
<tr>
<td>CSR/Sustainability Committee</td>
<td></td>
</tr>
<tr>
<td>Responsible Body for Climate Change</td>
<td>Indicates if a board committee or other executive body has overall responsibility for climate change.</td>
</tr>
<tr>
<td>Exec Director for Sustainability</td>
<td>Indicates whether there is an executive director on the board with responsibility for corporate social responsibility (CSR)/sustainability.</td>
</tr>
</tbody>
</table>

2 Top 50 Global 3PL Companies, https://www.joc.com/special-topics/top-50-3pls
Non-Exec Director for Sustainability: Indicates whether there is a non-executive director on the board with responsibility for corporate social responsibility (CSR)/sustainability.

Climate Change Mgmt Incentives: Indicates whether the company provides incentives for individual management of climate change issues including attainment of GHG (Greenhouse Gas) targets.

Policies and Processes (PP#)
- Climate Change Initiatives/Policy: Indicates whether the company has outlined its intention to help reduce global emissions of the Greenhouse Gases that cause climate change through its ongoing operations and/or the use of its products and services.
- Energy Efficiency Initiatives/Policy: Indicates whether the company has implemented any initiatives to make its use of energy more efficient.
- Emissions Reductions Initiatives/Policy: Indicates whether the company has implemented any initiatives to reduce its environmental emissions to air.
- Envir. Quality Initiatives/Policy: Indicates whether the company has introduced any kind of environmental quality management and/or environmental management system to help reduce the environmental footprint of its operations.
- Environmental SC Initiatives/Policy: Indicates whether the company has implemented any initiatives to reduce the environmental footprint of its supply chain.

Climate Change Assessment (CA#)
- Assessment of regulatory CC opportunities: Indicates if the company considers itself exposed to potential climate change regulatory opportunity.
- Assessment of physical CC risk: Indicates if the company considers itself exposed to climate change physical risk.
- Assessment of physical CC opportunities: Indicates if the company considers itself exposed to potential climate change physical opportunity.
- Assessment of other CC risk: Indicates if the company considers itself exposed to any other risk associated with climate change.
- CC Risks discussion in Annual report: Indicates whether the Management Discussion and Analysis (MD&A) or its equivalent risk section of company's annual report discusses business risks related to climate change.
- CC Opportunities discussion in Annual report: Indicates whether the Management Discussion and Analysis (MD&A) and its equivalent section of company's annual report discuss business opportunities related to climate change.

<table>
<thead>
<tr>
<th>CMPs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTERNAL Verification and Assurance (VA#)</td>
<td></td>
</tr>
<tr>
<td><strong>Verification/Assurance</strong></td>
<td>Percentage of scope 1 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Scope 1 emissions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Verification/Assurance</strong></td>
<td>Percentage of scope 2 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td><strong>Scope 2 emissions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Verification/Assurance</strong></td>
<td>Percentage of scope 3 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td><strong>Scope 3 emissions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Policy/data verification via 3rd party</strong></td>
<td>Indicates whether the company's environmental policies and data were subject to an independent assessment for the reporting period.</td>
</tr>
</tbody>
</table>

**Stakeholder Engagement (SE#)**
- **Engagement with policy makers**
  Indicates if the company engages with policymakers on possible responses to climate change including taxation, regulation and carbon trading.
- **Signatory of the UNGC**
  Indicates whether the company is a signatory of the United Nations Global Compact (UNGC).
- **Usage of GRI framework**
  Indicates whether the company has used the Global Reporting Initiative (GRI) framework for guidance in its public reporting, to varying degrees of compliance.
- **Engagement with CDP**
  Indicates whether the company has disclosed their carbon emissions to the Carbon Disclosure Project (CDP).

**Perception and Awareness (PA#)**
- **Extend of disclosure to Bloomberg**
  Proprietary Bloomberg score based on the extent of a company’s environmental disclosure as part of Environmental, Social and Governance (ESG) data.
- **Extend of disclosure to CDP**
  Reflects the comprehensiveness of a company’s response in terms of the depth and breadth of its answers to the Carbon Disclosure Project (CDP) questionnaire.

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### 7.5.3 Measuring carbon management practices (CMPs)

In order to examine the carbon management practices, the 26 CMPs were grouped into six broader management sections to measure “the intensity of concern with each category” (Weber 1990, p.39), three covering the internal influences: ‘Structure and Accountability (SA#)’, ‘Policies and Processes (PP#)’, ‘Carbon Assessment (CA#)’, and three covering the external influences: ‘Verification and Assurance (VA#)’, ‘Stakeholder Engagement (SE#)’, ‘Perception and Awareness (PA#)’ (see Table 7.1). These six broader management sections are also used to calculate scores from the associated CMPs to indicate a specific strategy type for the categorisation of the studied companies.
For each CMP, a score between 0 and 1 was awarded, as a wide range of CMPs in the dataset was analysed by using a ‘yes/no’ (or 1/0) scoring approach. Where necessary, we re-scaled the scoring ranges in the raw data to the of 0 to 1. In our analysis, we interpret a zero CMP score as the absence of that practice from the company’s overall carbon management strategy during the years the scores were assigned. The scores refer to the state of corporate management practices from 2012 to 2014, averaging the score in during that timeframe. We interpret a non-zero as the presence of the practice within this timeframe, thus the more often a practice is applied in the timeframe, the higher the score. This makes the scoring ranges of the CMPs and management sections comparable and provides a solid foundation to answer the sub-question RQ1a. (“To what extent do specific carbon management practices influence corporate carbon disclosure strategies?”).

7.5.4 Carbon disclosure strategy measurement

To answer the second sub-question RQ1b. (“What carbon disclosure strategies have been adopted from a corporate perspective?”), we take the aggregated scores from the three internal and three external management sections to form an overall disclosure score for internal practices and external practices. The overall disclosure scores provide the foundation to categorise the influence of carbon management practices on disclosure strategies of each company.

As the model shows four different carbon disclosure strategy types based on to which extent internal and external CMPs are applied, we distinguish whether the internal or external CMPs are applied to ‘greater extent’ or to a ‘lesser extent’. To measure the extent of each CMPs, we build an industry average from six management sections (see, e.g. Botosan 1997) based on the available data from the sample and use the aggregated scores to categorise the extent of the applied internal CMPs and external CMPs.

For instance, to categorise the extent of internal CMPs (i.e. to which degree climate change values are disseminated within the organisation), every company that is below the industry average, is considered to have implemented internal CMPs to a lesser extent, placing them either in symbolic or engaged type, depending on the external CMP scores. Every company that is above the industry average is considered to have implemented internal CMPs to greater extent, placing them either in the substantial or transparent type, depending on the external CMP scores. To
categorise the extent of external CMPs (i.e. to which degree stakeholder claims are given priority), every company that is below the industry average, is considered to have followed external CMPs to a lesser extent, placing them either in *symbolic* or *substantial* type, depending on the internal CMP scores. Every company that is above the industry average is considered to have followed external CMPs to greater extent, placing them either in the *engaged* or *transparent* type, depending on the external CMP scores.

7.6 Results

7.6.1 Descriptive statistics of CMPs

The sample is a composite of the applied carbon management practices of the 40 leading global logistics companies for the years 2012-2014. Table 7.2 presents a summary of the descriptive statistics for all applied carbon management practices and the aggregated data, including the mean, standard deviation, minimum and maximum.

<table>
<thead>
<tr>
<th>Sections</th>
<th>CMPs</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure and Accountability (SA#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSR/Sustainability Committee</td>
<td>120</td>
<td>0.09</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Responsible Body for Climate Change</td>
<td>120</td>
<td>0.64</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Exec Director for Sustainability</td>
<td>120</td>
<td>0.09</td>
<td>0.28</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Non-Exec Director for Sustainability</td>
<td>120</td>
<td>0.00</td>
<td>0.00</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Climate Change Mgmt Incentives</td>
<td>120</td>
<td>0.64</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Policies and Processes (PP#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate Change Initiatives/Policy</td>
<td>120</td>
<td>0.54</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Energy Efficiency Initiatives/Policy Emissions Reductions</td>
<td>120</td>
<td>0.77</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Initiatives/Policy</td>
<td>120</td>
<td>0.81</td>
<td>0.38</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Envr. Quality Initiatives/Policy</td>
<td>120</td>
<td>0.68</td>
<td>0.45</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Environmental SC Initiatives/Policy</td>
<td>120</td>
<td>0.45</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Climate Change Assessment (CA#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of regulatory CC opportunities</td>
<td>120</td>
<td>0.64</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Assessment of physical CC risk</td>
<td>120</td>
<td>0.66</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Assessment of physical CC opportunities</td>
<td>120</td>
<td>0.54</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
We focused on the key patterns that emerged from our analysis. Regarding the overall scores of CMPs, the internal CMPS with a score of 0.49 show that global logistics companies have in average implemented almost half of the studied practices. For the external CMPs with a score of 0.48, we can see a similar result, which means that global logistics companies have reacted to external pressures by adopting also almost half of the studied practices. While both internal and external scores are similar, differences in the management sections and specific CMPs can be observed. For external CMPs, for instance, stakeholder engagement (SE#) with a score of 0.55 has a bigger impact on the overall external CMPs score than verification and assurance (VA#) with score of 0.39. In this context, a closer look at the specific CMPs reveals that the overall score of verification and assurance (VA#) is heavily influenced by a low score for Scope 3 emissions and the lack of verification from a third party. The score of Stakeholder Engagement (SE#) is mainly driven by an engagement with policymakers (0.54), but even more being a signatory of the United
Nations Global Change agreement (0.81). Interestingly, only a minority of the global logistics companies use the GRI framework (0.09).

For internal CMPs, for instance, the structure and accountability (SA#) with a score of 0.38 has a lower impact on the overall internal CMPs than policies and processes (PP#) with a score of 0.65. The lower score in structure and accountability (SA#) stems from the low score for the executive and non-executive director for sustainability with a score of 0.09 and 0.00, respectively. The CMPs of Policies and Processes (PP#) have overall higher scores, but are mainly driven by emissions reductions initiatives (0.81) and energy efficiency policies (0.77). Moreover, the internal climate change assessment (CA#) within global logistics companies with a score of 0.44 shows that the majority of companies has assessed the risk and opportunities in CDP statements (all scores over 0.50), but failed to discuss these in their annual reports (with 0.26 for risks, and 0.01 for opportunities, respectively).

7.6.2 Categorisation of carbon disclosure strategies

The internal and external CMPs research design allows for a categorisation of the global logistics companies’ carbon disclosure strategies according to the extent of implemented or applied 26 CMPs in each company. Following the carbon disclosure model (see Fig. 1), we allocated the companies according to the specific internal and external CMPs into the four types Solid, Negligible, Intentional and Open. For each company, we calculated an aggregated internal score based on the 16 CMPs from the internal dimension as well as an aggregated score based on the 10 CMPs from the external dimension. These scores were compared to the industry index which allows a categorisation into the four different carbon disclosure types based on the extent of applied CMPs.

For instance, if a company has implemented internal CMPs to a lesser extent (i.e. their score is below industry average) and followed external CMPs to a lesser extent (i.e. their score is below industry average), the company will be placed in the Negligible type. In contrast, if a company has implemented internal CMPs to a greater extent (i.e. their score is above industry average) and followed external CMPs to a greater extent (i.e. their score is above industry average), the company will be placed in the Open type. The results are shown in Fig. 7.2, where we placed each company based on their respective internal and external CMPs score. Out of the 40 companies, 35 per cent (n=14) of the sample were allocated into the Negligible type, 15 per cent (n=6) were allocated into
the *Solid* type, 5 per cent (n=2) were allocated into the *Intentional* type, while the remaining 45 per cent (n=18) were allocated into the *Open* type.

![Figure 7.2 Summary of the global logistics companies’ carbon disclosure strategies](image)

The results show the 80 per cent of the studied global logistics companies follow either a transparent strategies or symbolic strategies in their carbon disclosure. In other words, the majority of companies which have implemented internal practices to a greater extent, have followed external practices also to a greater extent and vice versa, i.e., companies which have implemented internal practices to a lesser extent, have also drawn lesser attention to external practices. In contrast, only the remaining 20 per cent show a mix consisting of either a greater focus on internal practices than on external practices or a greater external engagement in conjunction with lesser emphasis on internal practices.

To understand the drivers behind the carbon disclosure strategies, we performed an analysis of the internal and external management sections per carbon disclosure type. The results can be found
in Table 7.3. The results show significant differences between the applied carbon management practices within global logistics companies. For instance, for companies with Open strategies, policies and procedures (PP#) are the main driver (with a score of 0.94) for the high score of internal CMPs, while stakeholder engagement (SE#) with a score of 0.79 and verification and assurance (VA#) with a score of 0.72 are the drivers within external CMPs. Companies with symbolic strategies show extreme weak results in external verification and assurance (VA#) with a score of 0.08, but have also low scores internally in the structure and accountability (SA#) as well as climate change assessment (CA#) with a score of 0.20 each.

<table>
<thead>
<tr>
<th>Management Sections</th>
<th>Negligible</th>
<th>Intentional</th>
<th>Solid</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Structure and Accountability (SA#)</td>
<td>0.20</td>
<td>0.50</td>
<td>0.50</td>
<td>0.47</td>
</tr>
<tr>
<td>Policies and Processes (PP#)</td>
<td>0.37</td>
<td>0.00</td>
<td>0.64</td>
<td>0.94</td>
</tr>
<tr>
<td>Climate Change Assessment (CA#)</td>
<td>0.20</td>
<td>0.67</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td><strong>Ind Avg</strong></td>
<td><strong>0.48</strong></td>
<td><strong>0.25</strong></td>
<td><strong>0.39</strong></td>
<td><strong>0.56</strong></td>
</tr>
<tr>
<td>Verification and Assurance (VA#)</td>
<td>0.08</td>
<td>0.33</td>
<td>0.17</td>
<td>0.72</td>
</tr>
<tr>
<td>Stakeholder Engagement (SE#)</td>
<td>0.29</td>
<td>0.50</td>
<td>0.50</td>
<td>0.79</td>
</tr>
<tr>
<td>Perception and Awareness (PA#)</td>
<td>0.28</td>
<td>0.84</td>
<td>0.52</td>
<td>0.68</td>
</tr>
<tr>
<td><strong>Ind Avg</strong></td>
<td><strong>0.49</strong></td>
<td><strong>0.21</strong></td>
<td><strong>0.55</strong></td>
<td><strong>0.39</strong></td>
</tr>
</tbody>
</table>

The categorisation into different carbon disclosure types and the subsequently analysis of the CMP drivers allows for a discussion and interesting insights into the mechanisms behind the strategies of global logistics companies.

**7.7 Discussion of results**

The results provide an interesting insight into the carbon disclosure strategies of global logistics companies. In order to gain a comprehensive understanding of both the impact of the specific CMPs and the associated type of carbon disclosure strategies within the global logistics industry,
the discussion will focus on how the extent of the dynamic interaction between internal and external practices influences carbon disclosure strategies. One of the key findings of this study is that 80 per cent (32 out of 40) of global logistics companies follow a consistent approach regarding the applied internal and external practices. In particular, 18 companies, who have implemented internal CMPs to greater extent are also externally engaged to greater extent, thus following an *Open* carbon disclosure approach. In contrast, 14 companies who have implemented CMPs to a lesser extent, are also less engaged externally, thus following a symbolic carbon disclosure approach. This is insofar interesting, as it shows that the majority of global logistics companies do not differentiate between internal and external practices, leaving almost no room for the other types of carbon disclosure strategies. It indicates that companies that follow a transparent approach, seem to have adopted a holistic carbon disclosure strategy that is consistent with internal and external actions. On the other hand, companies that follow a *Negligible* strategy, seem to follow an inconsistent approach in both external and internal activities, neglecting institutional and stakeholder pressures.

Global logistics companies representing the *Open* type have implemented energy and emission-reductions policies to greater extent with a high score of 0.94 in policies and procedures (PP#). According to Oberhofer and Dieplinger (2014), most carbon footprint reductions are linked directly to improving operational efficiency and fuel savings and internal carbon and energy-reducing initiatives are key drivers for operational excellence. From an external perspective, these companies engage actively with policy makers and non-profit organisations, represented by the high score of 0.79 in Stakeholder Engagement (SE#). Another indicator is the higher score in the section verification and assurance (VA#) with 0.72, which is line with the findings of Herzig and Schaltegger (2011), who found that transparent behaviour and full accountability is linked to the adoption of technical and industry procedures and official international guidelines (e.g. GRI).

In contrast, global logistics companies representing the *Negligible* type seem to have no consistent carbon disclosure strategy integrated in their organisation or their activities are not consistent with their strategic approach. Their overall low scores indicate that they face no or little perceived external pressures to follow or implement CMPs. This is in line with Hrasky (2011), who found that companies that follow a negligible or symbolic strategy don’t take corporate action, but rather use rhetorical statements designed to create an impression of environmental responsibility. In particular, our findings show that the companies in the *Negligible* type have
implemented policies and procedures (PP#) to a lesser extent (0.37), but have also neglected to establish formal oversight in their organisational structure.

The findings are also interesting from a theoretical view. The analysis indicates that the interaction is aligned between internal and external CMPs. For Open companies, the implementation of internal CMPs reflects the position of the sustainability logic as a core function and the company’s organisational culture of climate change values. At the same time, it seems these values are transferred to the external dimension where the high salience represents the company’s approach to give priority to stakeholder claims that go beyond market-driven initiatives, leading to transparency and full carbon disclosure.

On the other hand, the alignment between internal and external practices is also present in the Negligible type. Here, global logistics companies that have implemented internal CMPs to lesser extent, which indicates that the dominant market logic leads to a negligence of the sustainability logic and thus to little internal actions to integrate climate change values. It seems that the lack of climate change values within the organisation is also reflected in the external engagement, neglecting stakeholder claims for full disclosure. It could also be argued the lack of external activities has a direct impact on the internal initiatives in global logistics companies. In other words, unless global logistics companies communicate and engage with stakeholders in a consistent and credible manner, external audiences can assume that the company is not sufficiently engaged in internal activities.

7.8 Conclusion and limitations

Our analysis revealed interesting findings regarding the extent of applied carbon management practices and the associated categorisation of carbon disclosure strategies. One key finding is that within the global logistics industry, the majority of companies follow a consistent strategic approach regarding their internal and external carbon management practices, i.e. they either are engaged on both dimensions or in neither. We found that the key driver within internal CMPs are the companies’ policies and procedures, e.g. policies regarding emissions or energy reductions, while key driver within external CMPs include a high engagement with policy makers and NGOs. These findings extend prior work on structural change and describe the interaction between
internal and external pressures, which is key step towards a more detailed understanding of the mechanisms that influence carbon disclosure strategies.

Within the strategic carbon management and disclosure literature, we contribute to the stream of work in three ways. First, based on critical constructs drawn from institutional and stakeholder theory conceptualised, we decouple internal and external management practices to conceptualise a model of carbon disclosure strategies that proposes four ideal types, thus providing a theoretical foundation to examine the dynamic interaction between these practices and their influence on carbon disclosure. Second, we categorised the carbon disclosure strategies within the global logistics industry and analysed the key drivers of carbon management practices, thus providing empirical evidence within an organisational field regarding environmental and carbon disclosure strategies. As such, this study demonstrated that institutional as well as stakeholder theory provide, on different levels, a foundation to examine and understand the mechanisms through which internal and external carbon management practices influence carbon disclosure strategies.

However, there are certain limitations in our study that we hope will provide opportunities for future research. First, although our Bloomberg ESG dataset and the associated CDP data provide a sufficient overview about carbon management practices, it imposes certain limitations due to its relatively new dataset and the limited timeframe. Future research could include datasets that provide data over a longer period, thus providing the opportunity to examine if carbon disclosure strategies have changed and identify the drivers behind that change. Second, while this study establishes a clear distinction between internal and external practices to measure the impact within the global logistics industry, we acknowledge that the sample is limited and the results can be hardly generalised. We are thus cautious about making any casual claims. Third, we examined carbon management and disclosure practices through institutional and stakeholder lenses. Future research could include other theoretical lenses and constructs. For example, within the construct of institutional logics, we focused on the market logic and the sustainability logic, but companies face multiple pressures, the market and sustainability logic being only two of them.

Our research has also implications for practice: given increasingly high institutional pressures on global logistics companies to engage more in environmental activities, managers must make trade-offs when allocating their resources to carbon management and other climate change initiatives. By distinguishing between internal and external carbon management practices, our
paper generates a better understanding of the drivers behind carbon disclosure strategies in the global logistics industry.
Chapter 8 (Paper F): The interaction of internal and external pressures over time

Preamble:
This paper (Paper F), prepared for publication to *Meditari Accountancy Research*, addresses the limitation of Paper E and presents an empirical study that shows how carbon management practices and disclosure strategies have shifted over time, using the integrative model of four carbon disclosure strategy types from Paper D. To understand the shift of internal and external influences on carbon disclosure strategies over time, the study compared data between 2010 and 2015 from a merged Bloomberg ESG and CDP dataset that identified specific carbon management practices within global logistics companies. This allows conclusions to be drawn about the extent to which internal and external carbon management practices have changed, and if or how this leads to a shift in carbon disclosure strategies, answering the research questions:

*RQ5a. To what extent have internal and external pressures led to a change in carbon management practices?*

*RQ5b. To what extent have internal and external pressures led to a change in carbon disclosure strategies?*

The findings show overall shifts to more transparent corporate carbon disclosure strategies between 2010 and 2015, with an increase of applied carbon management practices in both internal and external actions, driven by internal practices. From a theoretical viewpoint, the study shows that companies have increasingly integrated climate change into their value systems, represented by a shift of the sustainability logic closer to the organisational core functions.
Has carbon disclosure become more transparent? An investigation of corporate carbon disclosure strategies between 2010 and 2015

Prepared for Publication to *Meditari Accountancy Research*

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David M. Herold and Ki-Hoon Lee designed the study. David M. Herold conducted the data analysis and led the drafting of the manuscript and both authors contributed to and/or have approved the final manuscript.

Conflict of Interest

Both authors have declared no conflict of interest.

Authors Signatures

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8.1 Abstract

**Purpose** - Companies are increasingly disclosing carbon related information due to institutional and stakeholder pressures. Existing research, however, is limited to categorise these pressures and their influences on corporate carbon disclosure strategies. In particular, literature to date is has not distinguished between different carbon disclosure strategies and how they may have changed over time. In response, this paper (1) proposes a framework that depicts four different carbon disclosure responses and strategies based on internal and external pressures and (2) subsequently analyses and compares corporate carbon disclosure strategies between 2010 and 2015.

**Design/methodology/approach** - Using a sample of 39 leading global logistics companies, we categorise carbon disclosure strategies based on the analysis of 25 applied carbon management practices from Bloomberg ESG and Carbon Disclosure Project (CDP) data. We compare the data between 2010 and 2015 to see if carbon management practices and the associated strategies have changed.

**Findings** - Our findings show overall shifts to more transparent corporate carbon disclosure strategies between 2010 and 2015 with an increase of applied carbon management practices in both internal and external actions. The main driver behind the shifts are internal drivers, in particular by an increase in climate change initiatives and policies.

**Practical Implications** - Our findings are useful for corporate stakeholders and policymakers trying to understand the drivers and implications of carbon disclosure practices.

**Originality/value** - Existing research is not only limited to distinguish between internal and external carbon management practices actions, but has also little knowledge how carbon disclosure strategies have evolved over time. This paper addresses this gap by examining the extent of implemented internal and external carbon disclosure management practices and their implications on disclosure strategies over time.

**Keywords**: carbon management practices, carbon disclosure strategy, institutional logics, stakeholder salience, logistics, strategic responses
8.2 Introduction

In the last two decades, growing institutional and stakeholder pressures to reduce carbon emissions have led to an increasing number of corporate engagement in voluntary climate change initiatives (de Villiers & Alexander 2014; Luo 2017; Welbeck 2017). In corporate circles, the response to these pressures by implementing various carbon management practices is increasingly regarded as a key strategic component for a company’s long-term sustainability (Adams & McNicholas 2007; Herold & Lee 2017a; Schaltegger & Csutora 2012). Existing research, however, found that companies implement carbon management practices in different ways and to different extents (Hrasky 2011; Kolk, Levy & Pinkse 2008; Lee 2011b; Massa, Farneti & Scappini 2015).

United Parcel Service (UPS), for example, formalises its internal carbon management strategy through five principles in its ‘Sustainability Report’ while also undertaking several external actions to communicate to key stakeholders and capital market participants, the objectives and outcomes of that strategy (UPS 2017). The strategy statements focus on transparency and reduction of carbon emissions and that the main goal of the climate change strategy is to gain a strategic advantage over its competitors. Through detailed reports and other disclosures, the company explains why this goal makes business sense, sets out intermediate targets and elaborates on specific carbon management practices that help to achieve them. In other words, UPS lays the foundation for internal transformation as well as external credibility. In contrast, Federal Express (FedEx), although also presenting and discussing an overall carbon reduction approach, has implemented carbon management practices to a different extent, reflecting a different strategy. For instance, Herold and Lee (2017b) found that FedEx follows a less transparent approach with e.g. not providing full disclosure of Scope 3 emissions or a lack of 3rd party verification for all carbon emissions.

Research links the difference in applied carbon management practices to the various multiple pressures, and current literature distinguishes between internal and external pressures and a company’s reaction to these pressures (Hawn & Ioannou 2016; Hrasky 2011; Kolk, Levy & Pinkse 2008). For instance, institutions such as Carbon Disclosure Project (CDP) put increasingly pressure on organisations to disclose their carbon related information and companies respond internally to these demands by integrating carbon management practices into
their operations, structures and processes (Borghei, Leung & Guthrie 2016; de Villiers, Naiker & Van Staden 2011; Lee 2012a). On the other hand, societal awareness of climate change has also risen and companies have implemented carbon management practices to mitigate the risk of potential stakeholders’ backlash and satisfy external audiences.

As such, companies take various internal and external actions and an important question arises regarding the relationship between them and how it affects the implementation of carbon management practices associated disclosure strategies. In particular, literature to date has not examined specific carbon management practices and how they may have changed over time; thus, the key issue of how a change of internal and external carbon management practices may lead to a change in carbon disclosure strategies remains underexplored.

Given this gap in the literature, we propose an integrative model that distinguishes between internal and external actions and is based on the underlying constructs within institutional and stakeholder theory. Existing literature claims that internal carbon management practices are influenced by the extent of dissemination of sustainability and climate change values within the organisation (Linnenluecke & Griffiths 2010), while external carbon management practices are influenced by the salience of stakeholders (Mitchell, Agle & Wood 1997). From a theoretical viewpoint, the extent of internal climate change actions reflects - from an institutional logics perspective - how central the sustainability logic is integrated into the company’s value system (Besharov & Smith 2014; Thornton & Ocasio 2008). The extent of external carbon management practices actions can be linked to stakeholder theory, in particular to extent carbon disclosure claims from stakeholders are given priority (Freeman 1983; Mitchell, Agle & Wood 1997). Based on the relative degree of the combined internal and external actions and partially applying the strategic responses from Oliver (1991), we propose four ideal types of carbon disclosure strategies: Acquiesce, Compromise, Avoid and Excellence. This integrative model provides a foundation to categorise carbon disclosure strategies based on the extent of applied carbon management practices. In order to understand the change and the influence on carbon disclosure strategies, a more detailed investigation of carbon management practices over time is required, which leads to two research questions:

RQ 4a: To what extent have internal and external pressures led to a change in carbon management practices?
RQ 4b: To what extent have internal and external pressures led to a change in carbon disclosure strategies?

In order to measure the carbon management practices and the associated disclosure strategy, we use a dataset from Bloomberg ESG terminals and the associated data from Carbon Disclosure Project (CDP) reports, which allows us to conduct a company comparison and categorisation over time. Our final sample includes 1950 observations for 39 global logistics companies and compares data between 2010 and 2015. Methodologically, we introduce a novel empirical analysis using 25 specific carbon management practices (CMPs) to calculate scores and to categorise carbon disclosure strategies according to the four types in the model.

This article makes three key contributions. First, we conceptualise a model of carbon disclosure behaviour that proposes four ideal types, thus providing an understanding of the dynamic interaction between internal and external management practices and their influence on carbon disclosure strategies. Second, using 25 specific carbon management practices (CMPs) from Bloomberg ESG and Carbon Disclosure Project (CDP) data, we construct a model to measure how CMPs have changed between 2010 and 2015. Third, empirically, we categorise carbon disclosure strategies and analyse how these strategies have changed over time, thereby advancing the literature on strategic carbon management and disclosure. Thus, this study presents a more nuanced empirical, as well as theoretical, understanding of the mechanisms through which internal and external carbon management practices influence carbon disclosure strategies.

8.3 Strategic internal and external responses

In response to institutional and stakeholder pressures, companies distinguish usually adopt two ways of actions: internally focused actions and externally focused actions (Hawn & Ioannou 2016). The former, internal actions, is related to internal structural change that involves the implementation appropriate organisational practices and corporate actions to develop organisational capabilities (Meyer & Rowan 1977). With regard to carbon disclosure, the set of internal practices may include the forming of a board-level sustainability committee or the
implementation of climate change policies or energy-reducing initiatives. The latter, external actions, is mainly related to communications and engagement activities to persuade stakeholders that the company’s operations are legitimate and the company is operating as an environmentally responsible citizen (Hörisch, Freeman & Schaltegger 2014; Hrasky 2011). With regard to carbon disclosure, the set of external practices may include the verification of the company’s emissions through a third party, engagement with business or investor organisations such as the Carbon Disclosure Project (CDP), the acknowledgement of industry guidelines (e.g. GRI) or signatories with international organisations (e.g. United Nations Global Compact).

Companies may take internal and external actions at the same time, e.g. while focusing on internal initiatives for structural change, they may seek to appease or satisfy immediate audiences and key stakeholders (Lee & Vachon 2016). Moreover, companies can choose their actions, i.e. a company may focus on one particular dimension and subsequently neglect others. However, this process is so far little understood with regards to carbon management practices and their implications on disclosure strategies. It may be that carbon disclosure strategies are driven by prior internal actions in combination with current external actions. As internal actions often dictate organisational changes, these actions may take relatively longer to materialize than externally focused and predominantly ceremonial actions (Hawn & Ioannou 2016). A good example is carbon reporting: the issuance of a carbon report can be considered as an external action a company takes to inform stakeholders about their internal actions taken in the prior year, assuming that it takes at least a year for these carbon practices to be implemented and actually have an impact (e.g. the implementation of energy-efficiency policies or climate change initiatives) (Herold & Lee 2017b). In other words, while external actions may report the beginning of internal carbon practices, external actions following a year of internal practices being implemented may in fact communicate progress or results that external audiences value more than simple communication of climate change engagement (Hawn & Ioannou 2016).

These dynamics of the relationship between internal and external represent a constant fight for power between management and stakeholders outside the company regarding the extent of carbon disclosure. Therefore, we argue that both internal and external actions are critical to determine the carbon disclosure strategies.
8.4 Carbon disclosure responses and strategies

Based on the discussion above, companies are thus capable to implement to broad range of internal and external carbon management practices to address institutional and stakeholder pressures. From a theoretical viewpoint, the extent of implemented internal carbon management practices can be related to the institutional logics perspective and the position of the so-called sustainability logic within the organisation (Herold & Lee 2017b). In other words, the extent of internal carbon management practices depend on how the sustainability logic can manifest itself as a core feature that is central to the organisational functioning, and is what Besharov and Smith (2014) call the ‘centrality’ of an institutional logic in the field. The positioning of sustainability logic, however, varies between companies, as the differences in carbon disclosure approaches indicate (CDP 2010d; Schaltegger & Csutora 2012). While some companies have integrated climate change into their policies to reduce carbon emissions, others are more restrictive in providing carbon-related information, and rely more on symbolic management strategy (Hrasky 2011). Thus, from a theoretical point, the relative position of the sustainability logic to the company core functions influences the extent of carbon disclosure and its applied internal carbon management practices, and may represent different carbon disclosure responses and strategies.

The extent of applied external carbon management practices can be linked to the degree to which managers give priority to competing stakeholders’ claims, representing the concept of stakeholder salience in stakeholder theory (Freeman 1983; Mitchell, Agle & Wood 1997). In a climate change context, the degree of salience depends on the extent to which stakeholders can hold companies accountable for carbon-related practices. As such, stakeholder salience is high when companies have implemented a transparent strategy with the aim of full disclosure, and lower when stakeholder pressure is uncoordinated or can be avoided without serious implications for the company’s legitimacy. Thus, from a theoretical point, the relative salience of stakeholders influences the extent of carbon disclosure and its applied external carbon management practices, and may represent different carbon disclosure strategies.

Based on the assumption of potential variation between internal and external actions, we combine these dimensions to propose four ideal types of carbon disclosure strategies. We integrate three strategies of Acquiescence, Compromise and Avoidance in our model that companies may enact in response to institutional and stakeholder pressures, as proposed by Oliver (1991).
However, to reflect the context of carbon disclosure, we extend that view by adding another strategy type called *Excellence* to illustrate internal and external actions that go beyond isomorphic pressures and market demands. Figure 8.1 depicts the four types, but it needs to be emphasised that internal and external actions are dynamic dimensions, and that carbon disclosure can therefore vary between the ideal types. Below, we describe each ideal type in our model and explain how it implies a distinct level of carbon disclosure.

![Figure 8.1: Carbon disclosure responses](image)

**Acquiescence**

Organisational acquiescence reflects to organisation’s conscious intent to conform to institutional pressures and its expectation that conformity will be self-serving to organisational interests (Oliver 1991). In the context of carbon disclosure, it is argued that related activities reflect the corporate actions taken by a company to achieve carbon-related accomplishments in order to reduce its carbon footprint in line with cost reductions (Hrasky 2011; Schaltegger & Hörisch 2015). Because companies have high internal pressures, the integration of climate change values is reflected in
organisational structures and is exhibited by top management and shared by organisational members (Linnenluecke & Griffiths 2010). Moreover, because these companies face low external pressures, there is no need for the company’s management to include demands from stakeholders for carbon disclosure beyond market-driven initiatives.

**Avoidance**

Avoidance is motivated by the desire to circumvent the conditions that make conforming behaviour necessary (Oliver 1991). With regard to carbon disclosure, it is argued this strategy can be related to reputation management, which Schaltegger and Burritt (2015) describe as a company’s focus on societal, political and media attention. Because these companies have a low internal pressures, carbon-related activities and their disclosure may be closely linked to the PR department to gain the support of the company’s most immediate audiences (Hrasky 2011). Moreover, because these companies face low external pressures, management may employ self-interested or narcissist behaviour, with claims of carbon-related achievements that are not accompanied by corporate action and reflects the use of rhetorical statements designed to create an impression of environmental responsibility (Schaltegger & Burritt 2015). As a result, companies have to deal with uncoordinated action from stakeholders and thus with little demand for full carbon disclosure, nor being pushed to implement any carbon-related initiatives that lead to a reduction of the carbon footprint.

**Compromise**

Compromise is employed in the spirit of conforming to and accommodating external rules and norms, but in contract to acquiescence, compliance is only partial and organisations are more active in promoting their own interests (Oliver 1991). In the context of carbon disclosure, we argue that these companies engage in consultations with well-organised stakeholders to discuss the company’s carbon-related practices mainly in order to maintain legitimacy. Due to the high external pressures, however, stakeholder will continually ask for accountability regarding carbon emissions, which may include requests to adopt technical international and industry procedures and to follow official international guidelines. But because these companies have a low internal
pressures, they will neglect organisational adaption strategies for climate change and react as little as possible to fulfil only the minimum and mandatory carbon disclosure requirements (Pålsson & Kovács 2014). Together, these factors result in a minimal engagement with the challenges arising from climate change.

**Excellence**

Excellence strategies with regard to carbon disclosure relies on the assumption that the climate change values and principles exhibited by top management will be shared widely and held by all organisational members, leading to a unity between organisational members that fosters a sense of identity and commitment to common corporate carbon-related goals and aspirations (Linnenluecke & Griffiths 2010). From a stakeholder perspective, the high external pressures reflect an approach aimed at making carbon information comparable by an active engagement to work on the standards and transparency of carbon-related activities in the logistics industry (UNEP/SustainAbility 2002). This may include the adoption of technical international and industry procedures and following official international guidelines (e.g. GRI) as well as engagement in public policy climate change activities, working directly with policy-makers, trade associations, research organisations and non-profit organisation (Herzig & Schaltegger 2011).

**8.5 Research design**

To address the research aim to (1) understand how carbon management practices and (2) carbon disclosure strategies have changed over time, the internal and external carbon management practices of companies needs to be examined. According to Beattie (2014) and Unerman (2000), disclosure indexes are a popular way to quantify the extent of disclosure. We adopt his approach and use a merged dataset from Bloomberg ESG terminals and Carbon Disclosure Project (CDP) reports that includes 26 specific carbon management practices (CMPs) that a company may have applied. To achieve reliability and validity of the data, we focus on a small sub-set of items (CMPs) as well as on inter-company differences in a specific industry (i.e., global logistics) and use an industry index to measure the disclosure level (Beattie, McInnes & Fearnley 2004; Botosan 1997). The analysis follows a two-step approach: First, we examine to what extent the internal and
external practices of each company are applied or implemented in the years 2010 and 2015. An analysis of these specific CMPs will allow us to understand the interaction between internal and external practices and how these practices have changed over time. This analysis subsequently provides the foundation for the second step: the categorisation of companies according to the carbon disclosure strategy model for the years 2010 and 2015, illustrating how strategies have changed in this timeframe.

The dataset were the most up-to-date data available, but reliable data was only available for the years from 2010 up to 2015. The complete dataset contained 1950 corporation-year observations of CMPs. The sample as well as a detailed description of the measurement of carbon management practices and disclosure strategies is given below.

### 8.5.1 Sample

The sample of the study focuses on global logistics companies, representing an own industry or an organisational field (Scott 1991), and thus providing homogeneous results that can be compared. The sample comprises the 50 world largest logistics companies in the year 2015, as measured by gross revenues (JOC 2015)³. Collectively, these 50 companies generated nearly US$230 billion in annual revenues. Corporate data of variables were retrieved from Bloomberg terminals, providing environmental, social and governance (ESG) information. In particular, Bloomberg provides ESG data for more than 9000 companies worldwide (Bloomberg 2016), including access to data from the Carbon Disclosure Project (CDP). The final sample of the study included 39 global logistics companies, as eleven companies were excluded from the sample because the carbon disclosure data was not sufficient for comparison within the global logistics industry.

### 8.5.2 Carbon disclosure variables

To measure the internal and external influences, we used 25 carbon management practices (CMPs) from the Bloomberg ESG and CDP dataset that may have been implemented by the global logistics

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³ Top 50 Global 3PL Companies, https://www.joc.com/special-topics/top-50-3pls
companies. Table 8.1 describes these CMPs in detail, and distinguishes between internal and external influences.

**Table 8.1: Carbon management practices (CMPs)**

<table>
<thead>
<tr>
<th>CMPs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTERNAL</strong></td>
<td></td>
</tr>
<tr>
<td>Accountability and Oversight (AO#)</td>
<td></td>
</tr>
<tr>
<td>CSR/Sustainability Committee</td>
<td>Indicates whether the company has a corporate social responsibility (CSR)/sustainability (or equivalent) committee that reports directly to the board.</td>
</tr>
<tr>
<td>Responsible Body for Climate Change</td>
<td>Indicates if a board committee or other executive body has overall responsibility for climate change.</td>
</tr>
<tr>
<td>Exec Director for Sustainability</td>
<td>Indicates whether there is an executive director on the board with responsibility for corporate social responsibility (CSR)/sustainability.</td>
</tr>
<tr>
<td>Non-Exec Director for Sustainability</td>
<td>Indicates whether there is a non-executive director on the board with responsibility for corporate social responsibility (CSR)/sustainability.</td>
</tr>
<tr>
<td>Climate Change Mgmt Incentives</td>
<td>Indicates whether the company provides incentives for individual management of climate change issues including attainment of GHG (Greenhouse Gas) targets.</td>
</tr>
<tr>
<td><strong>Initiatives and Policies (IP#)</strong></td>
<td></td>
</tr>
<tr>
<td>Climate Change Initiatives/Policy</td>
<td>Indicates whether the company has outlined its intention to help reduce global emissions of the Greenhouse Gases that cause climate change through its ongoing operations and/or the use of its products and services.</td>
</tr>
<tr>
<td>Energy Efficiency Initiatives/Policy</td>
<td>Indicates whether the company has implemented any initiatives to make its use of energy more efficient.</td>
</tr>
<tr>
<td>Emissions Reductions Initiatives/Policy</td>
<td>Indicates whether the company has implemented any initiatives to reduce its environmental emissions to air.</td>
</tr>
<tr>
<td>Envir. Quality Initiatives/Policy</td>
<td>Indicates whether the company has introduced any kind of environmental quality management and/or environmental management system to help reduce the environmental footprint of its operations.</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Environmental SC Initiatives/Policy</td>
<td>Indicates whether the company has implemented any initiatives to reduce the environmental footprint of its supply chain.</td>
</tr>
<tr>
<td><strong>Risks and Opportunities (RO#)</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment of regulatory CC opportunities</td>
<td>Indicates if the company considers itself exposed to potential climate change regulatory opportunity.</td>
</tr>
<tr>
<td>Assessment of physical CC risk</td>
<td>Indicates if the company considers itself exposed to climate change physical risk.</td>
</tr>
<tr>
<td>Assessment of physical CC opportunities</td>
<td>Indicates if the company considers itself exposed to potential climate change physical opportunity.</td>
</tr>
<tr>
<td>Assessment of other CC risk</td>
<td>Indicates if the company considers itself exposed to any other risk associated with climate change.</td>
</tr>
<tr>
<td>CC Risks discussion in Annual report</td>
<td>Indicates whether the Management Discussion and Analysis (MD&amp;A) or its equivalent risk section of company's annual report discusses business risks related to climate change.</td>
</tr>
<tr>
<td>CC Opportunities discussion in Annual report</td>
<td>Indicates whether the Management Discussion and Analysis (MD&amp;A) and its equivalent section of company's annual report discuss business opportunities related to climate change.</td>
</tr>
<tr>
<td><strong>EXTERNAL</strong></td>
<td></td>
</tr>
<tr>
<td>Emission Verification (EV#)</td>
<td></td>
</tr>
<tr>
<td>Verification/Assurance Scope 1 emissions</td>
<td>Percentage of scope 1 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td>Verification/Assurance Scope 2 emissions</td>
<td>Percentage of scope 2 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td>Verification/Assurance Scope 3 emissions</td>
<td>Percentage of scope 3 reported emissions which have been verified/assured.</td>
</tr>
<tr>
<td>Policy/data verification via 3rd party</td>
<td>Indicates whether the company's environmental policies and data were subject to an independent assessment for the reporting period.</td>
</tr>
<tr>
<td>External Engagement (EE#)</td>
<td></td>
</tr>
<tr>
<td>Engagement with policy makers</td>
<td>Indicates if the company engages with policymakers on possible responses to climate change including taxation, regulation and carbon trading.</td>
</tr>
<tr>
<td>Signatory of the UNGC</td>
<td>Indicates whether the company is a signatory of the United Nations Global Compact (UNGC).</td>
</tr>
</tbody>
</table>
Usage of GRI framework
Indicates whether the company has used the Global Reporting Initiative (GRI) framework for guidance in its public reporting, to varying degrees of compliance.

Engagement with CDP
Indicates whether the company has disclosed their carbon emissions to the Carbon Disclosure Project (CDP).

Industry Cooperation (IC#)

Extend of disclosure to Bloomberg
Proprietary Bloomberg score based on the extent of a company’s environmental disclosure as part of Environmental, Social and Governance (ESG) data.

Extend of disclosure to CDP
Reflects the comprehensiveness of a company's response in terms of the depth and breadth of its answers to the Carbon Disclosure Project (CDP) questionnaire

8.5.3 Measuring carbon management practices (CMPs)

In order to examine the carbon management practices, the 25 CMPs were grouped into six broader management sections to measure “the intensity of concern with each category” (Weber 1990, p.39), three covering the internal influences: ‘Accountability and Oversight (AO#)’, ‘Initiatives and Policies (IP#)’, ‘Risks and Opportunities (RO#)’, and three covering the external influences: ‘Emission Verification (EV#)’, ‘External Engagement (EE#)’, ‘Industry Cooperation (IC#)’ (see Table 1). These six broader management sections are also used to calculate scores from the associated CMPs to indicate a specific strategy type for the categorisation of the studied companies.

For each CMP, a score between 0 and 1 was awarded, as a wide range of CMPs in the dataset was analysed by using a ‘yes/no’ (or 1/0) scoring approach. Where necessary, we re-scaled the scoring ranges in the raw data to the of 0 to 1. In our analysis, we interpret a zero CMP score as the absence of that practice from the company’s overall carbon management strategy during the years the scores were assigned. The scores refer to the state of corporate management practices in 2010 and 2015. We interpret a non-zero as the presence of the practice within this timeframe, thus the more often a practice is applied in the timeframe, the higher the score. This makes the scoring ranges of the CMPs and management sections comparable and provides a solid foundation to answer the sub-question RQ1 (“To what extent have internal and external pressures led to a change in carbon management practices?”).
8.5.4 Carbon disclosure measurement

To answer the second research question RQ2 (“To what extent have internal and external pressures led to a change in carbon disclosure strategies?”), we take the aggregated scores from the three internal and three external management sections to form an overall disclosure score for internal practices and external practices. The overall disclosure scores provide the foundation to categorise the influence of carbon management practices on disclosure strategies of each company.

As the model shows four different carbon disclosure strategy types based on to which extent internal and external CMPs are applied, we distinguish whether the internal or external CMPs are applied to ‘greater extent’ or to a ‘lesser extent’. To measure the extent of each CMPs, we build an industry average from six management sections (see, e.g. Botosan 1997) based on the available data from the sample and use the aggregated scores to categorise the extent of the applied internal CMPs and external CMPs.

For instance, to categorise the extent of internal CMPs (i.e. to which degree climate change values are disseminated within the organisation), every company that is below the industry average, is considered to have implemented internal CMPs to a lesser extent, placing them either in Avoidance or Compromise type, depending on the external CMP scores. Every company that is above the industry average is considered to have implemented internal CMPs to greater extent, placing them either in Acquiescence or Excellence type, depending on the external CMP scores. To categorise the extent of external CMPs (i.e. to which degree stakeholder claims are given priority), every company that is below the industry average, is considered to have followed external CMPs to a lesser extent, placing them either in Avoidance or Acquiescence type, depending on the internal CMP scores. Every company that is above the industry average is considered to have followed external CMPs to greater extent, placing them either in the Compromise or Excellence type, depending on the external CMP scores.

8.6 Results

8.6.1 Descriptive statistics of CMPs

The sample is a composite of the applied carbon management practices of the 39 leading global logistics companies for the years 2010 and 2015. Table 2 presents a summary of the descriptive
statistics for all applied carbon management practices and the aggregated data, including the mean, standard deviation and the variance between 2010 and 2015.

**Table 8.2 Summary of descriptive statistics**

<table>
<thead>
<tr>
<th>SectionsCMPs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accountability and Oversight (AO#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSR/Sustainability Committee</td>
<td>0.03</td>
<td>0.16</td>
<td>0.28</td>
<td>0.06</td>
<td>0.05</td>
<td>0.11</td>
</tr>
<tr>
<td>Responsible Body for Climate Change</td>
<td>0.65</td>
<td>0.48</td>
<td>0.24</td>
<td>0.05</td>
<td>0.43</td>
<td>-0.41</td>
</tr>
<tr>
<td>Exec Director for Sustainability</td>
<td>0.08</td>
<td>0.28</td>
<td>0.11</td>
<td>0.03</td>
<td>0.31</td>
<td>0.04</td>
</tr>
<tr>
<td>Non-Exec Director for Sustainability</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Climate Change Mgmt Incentives</td>
<td>0.51</td>
<td>0.44</td>
<td>0.24</td>
<td>0.02</td>
<td>0.51</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Initiatives and Policies (IP#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate Change Initiatives/Policy</td>
<td>0.41</td>
<td>0.50</td>
<td>0.62</td>
<td>0.22</td>
<td>0.49</td>
<td>0.22</td>
</tr>
<tr>
<td>Energy Efficiency Initiatives/Policy</td>
<td>0.68</td>
<td>0.47</td>
<td>0.78</td>
<td>0.11</td>
<td>0.42</td>
<td>0.16</td>
</tr>
<tr>
<td>Emissions Reductions Initiatives/Policy</td>
<td>0.65</td>
<td>0.48</td>
<td>0.84</td>
<td>0.19</td>
<td>0.37</td>
<td>0.11</td>
</tr>
<tr>
<td>Envir. Quality Initiatives/Policy</td>
<td>0.68</td>
<td>0.47</td>
<td>0.70</td>
<td>0.03</td>
<td>0.46</td>
<td>0.01</td>
</tr>
<tr>
<td>Environmental SC Initiatives/Policy</td>
<td>0.40</td>
<td>0.50</td>
<td>0.57</td>
<td>0.16</td>
<td>0.50</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Risks and Opportunities (RO#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of regulatory CC opportunities</td>
<td>0.49</td>
<td>0.51</td>
<td>0.68</td>
<td>0.19</td>
<td>0.47</td>
<td>0.19</td>
</tr>
<tr>
<td>Assessment of physical CC risk</td>
<td>0.69</td>
<td>0.48</td>
<td>0.76</td>
<td>0.27</td>
<td>0.43</td>
<td>0.21</td>
</tr>
<tr>
<td>Assessment of physical CC opportunities</td>
<td>0.38</td>
<td>0.49</td>
<td>0.50</td>
<td>0.02</td>
<td>0.49</td>
<td>0.01</td>
</tr>
<tr>
<td>CC Risks discussion in Annual report</td>
<td>0.24</td>
<td>0.43</td>
<td>0.27</td>
<td>0.03</td>
<td>0.45</td>
<td>0.02</td>
</tr>
<tr>
<td>CC Opportunities discussion in Annual report</td>
<td>0.05</td>
<td>0.23</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.16</td>
<td>-0.06</td>
</tr>
<tr>
<td><strong>Internal CMPs</strong></td>
<td>0.42</td>
<td>0.24</td>
<td>0.52</td>
<td>0.21</td>
<td>0.10</td>
<td>-0.03</td>
</tr>
<tr>
<td><strong>Emission Verification (EV#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verification/Assurance Scope 1 emissions</td>
<td>0.31</td>
<td>0.46</td>
<td>0.53</td>
<td>0.23</td>
<td>0.49</td>
<td>0.17</td>
</tr>
<tr>
<td>Verification/Assurance Scope 2 emissions</td>
<td>0.30</td>
<td>0.46</td>
<td>0.49</td>
<td>0.19</td>
<td>0.49</td>
<td>0.08</td>
</tr>
<tr>
<td>Verification/Assurance Scope 3 emissions</td>
<td>0.09</td>
<td>0.28</td>
<td>0.32</td>
<td>0.23</td>
<td>0.46</td>
<td>0.05</td>
</tr>
<tr>
<td>Policy/data verification via 3rd party</td>
<td>0.24</td>
<td>0.43</td>
<td>0.35</td>
<td>0.11</td>
<td>0.48</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>External Engagement (EE#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement with policy makers</td>
<td>0.51</td>
<td>0.51</td>
<td>0.59</td>
<td>0.08</td>
<td>0.50</td>
<td>0.01</td>
</tr>
<tr>
<td>Signatory of the UNGC</td>
<td>0.73</td>
<td>0.65</td>
<td>0.27</td>
<td>-0.14</td>
<td>0.51</td>
<td>-0.46</td>
</tr>
<tr>
<td>Usage of GRI framework</td>
<td>0.03</td>
<td>0.16</td>
<td>0.68</td>
<td>0.11</td>
<td>0.28</td>
<td>0.05</td>
</tr>
<tr>
<td>Engagement with CDP</td>
<td>0.19</td>
<td>0.40</td>
<td>0.22</td>
<td>0.02</td>
<td>0.42</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Industry Cooperation (IC#)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extend of disclosure to Bloomberg</td>
<td>0.26</td>
<td>0.21</td>
<td>0.28</td>
<td>0.02</td>
<td>0.21</td>
<td>0.00</td>
</tr>
<tr>
<td>Extend of disclosure to CDP</td>
<td>0.54</td>
<td>0.38</td>
<td>0.63</td>
<td>0.05</td>
<td>0.43</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>External CMPs</strong></td>
<td>0.41</td>
<td>0.28</td>
<td>0.46</td>
<td>0.27</td>
<td>0.06</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Table 8.2 reveals interesting key patterns in CMPs and management section between 2010 and 2015. Regarding the overall scores of CMPs between 2010 and 2015, the implementation of internal CMPs has increased by 0.10 from 0.42 to 0.52. This change shows that companies have implemented more than half the of studied practices in 2015, representing an increase from 2010, where less than half of the studied practices were implemented.

For the external CMPs with an overall increase from 0.41 to 0.46, we can see a similar result, which means that global logistics companies have reacted to external pressures by adopting more and almost half of the studied practices. While both internal and external overall scores have increased, differences in the management sections and specific CMPs can be observed. For external CMPs, for instance, Emission Verification (EV#) with an increase of 0.17 has the biggest impact on the overall external CMPs score. Surprisingly, External Engagement (EE#) decreased by 0.06 between 2010 and 2015, representing the only negative development in the management sections. A closer look at the specific CMPs in External Engagement (EE#) reveals that the overall score of is heavily influenced by a lower score in 2015 for the signatory of the UNGC. The score of Emission Verification (EV#) is mainly driven by an increase in verification for Scope 1 and Scope 3 data, with the biggest growth coming from verification of Scope 3 emissions. Interestingly, the usage of the GRI framework jumped from 0.03 in 2010 to 0.65 in 2015.

For internal CMPs, Initiatives and Policies (IP#) as well as internal Risks and Opportunities (RO#) are the biggest drivers for the overall internal CMPs scores. The higher score of 0.15 in Initiatives and Policies (IP#) stems mainly from an increase in Climate Change Initiatives/Policies (0.19 increase) and Environmental Supply Chain Initiatives/Policies (0.16 increase). Moreover, the internal Risks and Opportunities (RO#) within global logistics companies with an increase of 0.15 can be mainly attributed to the increase of 0.51 from 2010 to 2015 stemming from the Climate Change Opportunities discussion in Annual reports. From an Accountability and Oversight (AO#) perspective, the implementation of a CSR/Sustainability Committee (from 0.03 in 2010 to 0.38 in 2015) or the appointment of Non-Executive Director for Sustainability (from 0.00 in 2010 to 0.76 in 2015) are the main drivers behind the increase of 0.03 between 2010 and 2015.
8.6.2 Categorisation of carbon disclosure behaviour

The internal and external CMPs research design allows for a categorisation of the global logistics companies’ carbon disclosure strategies according to which extent the 25 CMPs are implemented or applied in each company. Following the carbon disclosure model presented in this paper (see Fig. 1), we allocated the companies according the specific internal and external CMPs into the four types Acquiescence, Compromise, Avoidance and Excellence. For each company, we calculated an aggregated internal score based on the 15 CMPs from the internal dimension as well as an aggregated score based on the 10 CMPs from the external dimension. These scores were compared to the industry index which represents the average scores of each CMP from the global logistics companies studied in this paper and allow a categorisation into the four different carbon disclosure types based on the extent of applied CMPs. For instance, if a company has implemented internal CMPs to a lesser extent (i.e. their score is below industry average) and followed external CMPs to a lesser extent (i.e. their score is below industry average), the company will be placed in the Avoidance type. In contrast, if a company has implemented internal CMPs to a greater extent (i.e. their score is above industry average) and followed external CMPs to a greater extent (i.e. their score is above industry average), the company will be placed in the Excellence type.

The results are shown in Fig. 2, where we placed each company based on their respective internal and external CMPs score, once with scores from 2010, and once with the scores from 2015. This gives us the opportunity to analyse the movement within the strategies. In 2010, out of 39 companies, 15 companies (38 per cent) were allocated into the Avoidance type, while 17 companies (44 per cent) were allocated into the Excellence type, representing more than 80 per cent of all companies. In 2015, however, only 10 companies (26 per cent) were allocated into the Avoidance type, while 16 companies (41 per cent) were allocated into the Excellence type, representing shift in strategies over time.
The results show an overall shift to more transparent behaviour, with most companies changing their disclosure strategies from the Avoidance type to the Acquiescence type. In other words, the majority of the shift stems from an implementation of more internal CMPs within the global logistics industry. Interestingly, only one company has reduced the extent of their internal practices, changing from the Excellence type to the Compromise type. From an external perspective, we can only observe an exchange of companies, from the Excellence type to the Acquiescence type and vice versa.

In order to understand the drivers behind these shifts of carbon disclosure strategies, we performed an analysis of the management sections of the companies that shifted their position between 2010 and 2015. In particular, we looked at two drivers: First, we identified ‘positive drivers’ within companies who changed their internal and external carbon practices from a ‘lesser extent’ to a ‘greater extend’, and second, ‘negative drivers’ for companies who changed their internal and external carbon practices from a ‘greater extend’ to a ‘lesser extent’. The results can be found in Table 3.
The results present a good overview about the drivers behind the shifts in carbon disclosure strategies. For example, Table 3 reveals that main driver for a positive effect in strategies is related to an increase of carbon management practices in the Initiatives and Policies (IP#) section (the score increased from 0.29 to 0.69). Both remaining internal management sections show also an increase between 2010 and 2015, with the Risks and Opportunities (RO#) having a stronger increase (from 0.29 to 0.64) than Accountability and Oversight (AO#) (from 0.29 to 0.43). The internal score of these companies in 2015 (with an average of 0.59) have put these companies above the industry average, thus leading to a positive shift from an internal CMPs perspective. But although we can see an improvement in external CMPs, the increase is not sufficient to put these companies above industry average in 2015.

For the external negative shifts, Table 3 reveals that the main driver is the Industry Cooperation (IC#) section with a score decrease from 0.84 to 0.62, followed by Emission Verification (EV#) with a decrease from 0.52 to 0.49. Interestingly, from an internal perspective, these companies have improved their overall internal score from 0.47 to 0.51, but the overall increase of the industry average from 0.42 to 0.52 offsets these improvements, leading to no change in the internal section. The shifts in categorization and the associated analysis of the management sections and CMPs
allows for a discussion and insights into the mechanisms behind the strategies and responses of global logistics companies.

8.7 Discussion of results

The results provide an interesting insight into the carbon disclosure strategies of global logistics companies. In order to gain a comprehensive understanding of both the impact of the specific CMPs and the associated type of carbon disclosure strategies within the global logistics industry, the discussion will focus on how the extent of the dynamic interaction between internal and external practices has influenced carbon disclosure strategies over time.

One of the key findings of this study is that an overall shift to a more transparent behaviour between 2010 and 2015 can be observed, driven by internal CMPs. Five companies out of 39 (13 per cent), who have implemented internal and external CMPs to a lesser extent in 2010, have implemented internal CMPs to greater extent in 2015, thus changing their disclosure strategies from the Avoidance type to the Acquiescence type. It seems that the move from the Avoidance type to the Acquiescence type is a first step to a more transparent behaviour and indicates that these companies have faced an increase in internal pressures to implement internal CMPs. The increase in internal CMPs is mainly driven by an increase in Initiatives and Policies (IP#). Interestingly, the majority of companies still follows an Excellence approach (from 17 companies in 2010 to 16 companies in 2015). This is insofar interesting, as it shows that the majority of global logistics companies seem to have adopted a holistic carbon disclosure strategy that is consistent with internal and external actions.

The findings are also interesting from a theoretical view. For the majority of companies in the Excellence type, the implementation of internal CMPs reflects the position of the sustainability logic as a core function and the company’s organisational culture of climate change values. At the same time, it seems these values are transferred to the external dimension where the high salience represents the company’s approach to give priority to stakeholder claims that go beyond market-driven initiatives, leading to transparency and full carbon disclosure. Looking at the overall shifts, the trend between 2010 and 2015 seems positive, with six companies shifting to category where CMPs are implemented to a ‘greater extent’, while only two companies shift to categories where CMPs are applied to a ‘lesser extent’.
Moreover, the overall averages of internal and external CMPs between 2010 and 2015 have increased, from 0.42 to 0.52 for internal CMPs and from 0.41 to 0.46 for external CMPs. These shifts indicate that not only the sustainability logic is more integrated into global logistics companies and takes a place closer to the core function within the organisation, but also that the companies are increasingly confronted with salient stakeholders who apply pressure for more transparency. The main driver behind the internal shifts is an increase in applied carbon management practice in Initiatives and Policies (IP#), while the driver for external improvements is related to Industry Cooperation (IC#) and Emission Verification (EV#).

8.8 Conclusion and limitations

To gain a more nuanced understanding of how internal and external carbon management practices influence carbon disclosure strategies, it is critical to investigate the variety of organisational responses that companies adopt, rather than treat carbon disclosure as a monolithic construct. In a carbon disclosure context, however, existing research has to date not only omitted to distinguish between internal and external actions, but it also limited to describe how carbon disclosure strategies have evolved over time. We address this gap by examining the extent of implemented internal and external carbon disclosure management practices and the associated disclosure strategies, using a data from Bloomberg ESG and the Carbon Disclosure Project (CDP).

Our analysis showed an overall shift to a more transparent behaviour between 2010 and 2015, with an increase of applied carbon management practices in both internal and external actions, representing a change in carbon disclosure strategies. The majority in shifts can be related to internal actions, driven by an increase in applied carbon management practices in Initiatives and Policies (IP#). The main driver behind the internal shifts is an increase in applied carbon management practice in Initiatives and Policies (IP#), while the driver for external improvements is related to Industry Cooperation (IC#) and Emission Verification (EV#). This indicates that internal drivers seem to be stronger than external, thus, from a theoretical perspective, companies see the sustainability logic closer to the core function within the organisation. As such, these findings contribute to prior research on structural change and provide a step towards a more detailed understanding of the mechanisms that influence carbon disclosure strategies.
In particular, this paper contributes in three ways. First, we have conceptualised a model of carbon disclosure responses that proposes four ideal types, thus providing an understanding of the dynamic interaction between internal and external actions and their influence on carbon disclosure strategies. Second, methodologically, using 25 specific carbon management practices (CMPs) from Bloomberg ESG and Carbon Disclosure Project (CDP) data, we constructed a model to measure how CMPs have changed between 2010 and 2015. Third, empirically, we categorised carbon disclosure strategies and analyse how these strategies have changed over time. We thereby advance the literature on strategic carbon management and disclosure and present a more empirical and theoretical understanding of the dynamics between internal and external actions over time.

However, these findings have to be reviewed in the light of its limitations. First, the Bloomberg ESG and the associated CDP dataset is relatively new, therefore only an examination between 2010 and 2015 could take place. Future research could look at longer periods and use complementing datasets to provide a more holistic picture. Second, the sample size is limited, we are therefore cautious about making general claims. Third, although we used valid constructs from institutional and stakeholder theory to build our model, future research could use complementary theoretical lenses to enhance the understanding about carbon disclosure from another perspective. Future research could also examine how carbon disclosure strategies influence carbon emissions or how carbon disclosure impacts financial performance.
Chapter 9: Discussion and conclusion

9.1 Introduction

In Chapters 3, 4, 5, 6 and 7 the findings of the six papers that formed the core of this thesis were presented, and this chapter outlines how these papers address the research questions. Starting with a brief review, Section 9.2 revisits the research purpose and design. A discussion of the results that address all research questions follows in Section 9.3. Next, Sections 9.4 and 9.5 outline the theoretical and practical contributions of this thesis, followed by research limitations in Section 9.6, the conclusion in Section 9.7 and implications and future research in Section 9.8.

9.2 Research purpose and design

The research was designed to empirically examine the influences of institutional and stakeholder pressures on carbon management practices and associated carbon disclosure strategies. More specifically, the research investigates how both pressures influence the extent of disclosure in the context of the global logistics industry, thereby providing insights into the mechanisms behind the adoption of carbon disclosure and the effectiveness of carbon management practices. To accomplish this, a six paper, mixed-method research design was employed. Paper A utilised a systematic literature review to qualitatively evaluate the extent to which relevant carbon management practices were applied in the global logistics industry. Subsequent to identifying that carbon disclosure research was highly under-represented, Papers B and C were developed, where similarities and differences in carbon reporting and disclosure were examined through an institutional lens, using case studies from global logistics companies. Paper D complemented the institutional perspective by integrating stakeholder theory into institutional theory, leading to an integrative model depicting four types of carbon disclosure strategies in the global logistics industry, based on the extent of institutional and stakeholder pressures. Papers E and F applied the model developed in Paper D by empirically categorising carbon disclosure strategies and investigating how these strategies have changed over time, using 26 specific carbon management practices from Bloomberg ESG and CDP data. The results of the six studies and how they address the research questions of this thesis is outlined in the next section.
9.3. Addressing the research questions

The following sections outline how each of the four research questions has been answered by this thesis and theorises the implications in a broader conceptual context. In addition to this discussion, Section 9.4 highlights the theoretical contributions that arise from the answers to the four research questions.

9.3.1 Research question 1

To clarify the extent to which carbon management practices have been implemented in the global logistics industry (RQ1), a systematic literature review of the current evidence base was conducted. The review was based on 66 papers published from 2000 to 2015 in international peer-reviewed journals. The papers were analysed according to the key topics in carbon management: carbon strategy, carbon risk assessment, carbon target setting, carbon reduction initiatives and carbon performance and reporting. The results of the systematic literature review showed limited application of carbon management practices in the logistics industry.

From a carbon strategy perspective, the literature revealed that most research is driven by competitive advantage articles, while actions regarding internal management and the adoption of new technologies seems to be underrepresented. Most authors acknowledge that the purpose of having a carbon strategy is to shift the attention of short-term thinking towards the long-term interests of the company in alignment with climate strategies, thus to develop and establish a solid carbon policy and provide oversight for its implementation (Colicchia et al. 2013; Maas, Schuster & Hartmann 2014; Zailani, Amran & Jumadi 2011b). Carbon risk assessment can be distinguished into regulatory, physical and other climate change risks and opportunities (CDP 2016), with current literature discussing product and supply chain risks, but focusing on regulatory and policy risks.

Carbon target setting in the global logistics industry showed limited application, however, some of the articles provide a solid overview and cover the main areas to address when setting targets. While some authors focused on different approaches in logistics operations in setting targets regarding the reduction of carbon emissions (McKinnon & Piecyk 2012), others discussed carbon
setting in a more general way and focused on environmental performance management systems (EPMS) (e.g., Björklund & Forslund 2013; Tsoulfas & Pappis 2008). In contrast to the rather limited application of overall carbon management practices, the subject of carbon reduction initiatives was the most discussed topic in the literature, addressed by means of empirical, analytical and conceptual approaches. Overall, almost half of the papers (31 of 66) mention carbon reduction initiatives, with transport management and logistics systems design being the most popular topics, followed modal choice and electric vehicles.

From a carbon disclosure perspective, most papers have been written only recently and have emphasized the need to examine carbon performance improvement opportunities to realize economic benefits by reducing carbon emissions. Interestingly, only few papers mentioned specific disclosure tools and, in particular, carbon disclosure specifically addressing logistics and transportation companies was highly under-researched and was identified as the greatest opportunity for further research. As a consequence, carbon disclosure was selected, and an institutional lens was chosen, to investigate the extent of carbon management practices and their influences on disclosure strategies.

**9.3.2 Research question 2**

To understand how the sustainability logic and its emergence influences carbon disclosure behaviour and strategies (RQ2), a qualitative case-study approach was used to examine the similarities and differences in carbon reporting and disclosure. This study comprised Papers B and C. In Paper B, a comparative dual case study was used to examine the cases of FedEx and UPS, using a combined carbon dataset from sustainability reports and Carbon Disclosure Project (CDP) reports. Paper C adds another company (DHL) to the case study, using an interpretative content analysis approach to the statements and declarations of DHL, FedEx and UPS in their reports of the Carbon Disclosure Project (CDP).

From a theoretical viewpoint, Paper B focused on the emergence of the sustainability logic while Paper C investigated the influences of competing logics (‘market’ vs ‘sustainability’) on carbon disclosure. The emergence of carbon disclosure can be seen as a reaction to close a legitimacy gap which is a result of the heightened societal interests in global warming, reflecting the concern about climate change (Kolk, 2008). As both papers argue, companies close this gap
by following either a pragmatic or moral ‘legitimacy-rationale’ which affects how and when to adopt climate change practices. Ansari et al. (2013) found in the context of climate change that some actors begin to voluntary adopt climate change activities when specific corporate actions are proposed, while others only react to pressures, even at the expense of their initial preferences. They used the example of the G-77 and the EU’s acceptance of market instruments which isolated environmental groups, that then felt forced to abandon their resistance to market instruments and join the coalition backing the Kyoto agreement to gain pragmatic legitimacy. For example, in contrast, the United States sought moral legitimacy by calling to ensure a viable planet for future generations, thereby driving change and contributing to the emergence of carbon disclosure practices.

In the literature, organisational change and the emergence of logics can be linked to the role of institutional entrepreneurs (DiMaggio, 1988). Institutional entrepreneurs attempt to transform organisational norms and structures by a “political process that reflects the power and interests of organized actors” (Maguire, Hardy & Lawrence, 2004, p.658). But even powerful institutional entrepreneurs cannot simply introduce new organisational practices within companies. Institutional entrepreneurs have to lobby for change and create and build legitimacy in the organisational field to get approval from other actors for organisational action (Beckert, 1999). Castel and Friedberg (2010) speak about ‘change-entrepreneurs’ as being able to reinforce or undermine certain institutions in the field:

“Successful reformers or change entrepreneurs are not simply ‘destroyers of institutions’. . . and they do not simply operate ‘outside of institutional norms’. . . Reality is more ambiguous: Successful reformers may destroy some institutions, and they may disregard some institutional norms, but they do so by using (and thus strengthening) existing institutions or other institutional norms and more importantly by turning around old repertoires to make them produce new results” (Castel & Friedberg, 2010, p. 325).

Castel and Friedberg (2010) add that, “change is never something that just happens. There is nothing predetermined about it; it is not the automatic product of the progress of society” (p. 326). Instead, shifts in institutional logics are carefully coordinated by social actors, inside or
outside of the organisation, with different institutional beliefs or worldviews (Greenwood, Suddaby & Hinings, 2002).

In the case of global warming, change entrepreneurs were able to define global warming as an environmental issue and established a ‘crisis awareness’ about the issue. For instance, Al Gore’s influential documentary and book, An Inconvenient Truth, framed these issues in terms of moral convictions: “We all want the same thing: for our children and the generations after them to inherit a clean and beautiful planet capable of supporting a healthy human civilization” (Gore, 2006, p.278). Raising awareness about the climate change ‘crisis’ made people to not only view global warming as a real threat, but also to change their perception of their own activities that contribute to global warming (Ansari, Wijen & Gray, 2013). As a consequence, climate change awareness increased on many levels, diffusing it to a higher level of public and political attention. This heightened societal interest reflected a large-scale convergence around climate change, and subsequently led to the emergence of the sustainability logic. Paper B discussed this development and provided an initial step to understand the emergence of climate change awareness and the sustainability logic in a global logistics context.

Paper C focused on and discussed the influence of competing logics and provided a theoretical framework to classify the different levels of their influences on carbon disclosure. In particular, Paper C discussed the influence of the coexisting, but competing logics (e.g. Lander, Koene & Linssen 2013; Pache & Santos 2013; Styhre 2011) between the ‘market’ and ‘sustainability’ logic, which reflect different ‘values and beliefs’ within global logistics companies. Competing logics can be linked to the institutional complexity within the organisational field, which is characterised by stakeholders who ‘fight’ for the influence of their preferred logic. Competing logics have a direct influence on carbon disclosure behaviour and the disclosure strategies of companies. Hrasky (2011) and Kim, Bach and Clelland (2007) distinguish between a symbolic management approach and a substantial management approach. Symbolic behaviour in carbon disclosure may be rhetorical statements designed to create an impression of sustainable or environmental responsibility, which is not necessarily accompanied by corporate action (Hrasky 2011; Kim, Bach & Clelland 2007), while substantial behaviour reflects action taken by a company to achieve carbon related accomplishments such as reducing its carbon footprint (Hrasky 2011).
An examination of these different carbon disclosure approaches and their underlying logics revealed significant differences in Papers B and C. The analysis showed that corporate carbon disclosure practices are either dominated by a market logic, emphasizing a symbolic approach, or by a sustainability logic, following a more substantial approach. As such, this thesis also contributes to the organisational literature that describes how companies react to the various actors in the field and extends prior studies that have examined how companies react to external stakeholders (e.g., Mitchell, Agle & Wood 1997; Oliver 1991), particularly within the domain of environmental performance and corporate sustainability management (e.g., Lee 2011a; Lee & Vachon 2016; Schaltegger & Csutora 2012; Schaltegger & Hörisch 2015).

9.3.3 Research question 3

Despite providing insights into the complexities of carbon reporting behaviour through Papers B and C, the focus on institutional logics provides only limited insight into the conditions under which these different outcomes arise. This limitation led to the development of conceptual Paper D, which integrates stakeholder theory into institutional theory. Paper D thereby complements the institutional dimension with a stakeholder dimension, answering the research question on how the interaction between institutional and stakeholder pressures influence carbon disclosure strategies. The paper uses constructs from institutional and stakeholder theory to build an integrative model that depicts four types of carbon disclosure strategies in the global logistics industry, based on the extent of institutional and stakeholder pressures. To examine the extent of institutional pressures, the paper introduces the concept of ‘logics centrality’, representing the position of the sustainability logic, that is, to what extent climate change values are internally integrated into a company’s value system. To examine stakeholder pressures, the paper follows the concept of stakeholder salience, that is, to what extent external stakeholder claims are given priority. As such, Paper D provides insights into how stakeholder pressures and institutional logics interact, thereby advancing existing research by exploring how organisations are impacted by both firm-level agency and field-level pressures.

Existing research has focused mainly on logics at the field level (e.g., Kostova, Roth & Dacin 2008; Luo, Wang & Zhang 2017), but it is critical to understand the ways in which logics manifest within organisations and are influenced at a firm-level (e.g., Oliver 1991; Reid & Toffel
In particular, clarifying how institutional and stakeholder pressures relate to one another at a firm-level is vital in order to gain a richer understanding of how internal and external influences have an impact on companies’ strategies (Hawn & Ioannou 2016). By using the constructs of logics centrality and stakeholder salience as key dimensions throughout this research, the four carbon disclosure strategy types provide a conceptual apparatus for developing deeper insights. The framework suggests that, as scholars, we can better understand institutional and stakeholder pressures in companies by clarifying the heterogeneity of their manifestations.

Our analysis expands this view and connects the dynamics at the field level with those practices occurring within organisations and among their members on the firm-level. This analysis therefore engages in cross-level theorising which can provide insights, but is often absent at institutional and stakeholder levels in discussions within the current literature. For example, our framework shows how stakeholder salience is shaped not only by the nature of professional institutions within a field but also by their organisational practices, such as industry guidelines (e.g., GRI) which affect the practices that are applied, and the salience they carry which influences the companies’ behaviour. Our analysis of variation in logics centrality, on the other hand, clarifies how institutional logics are informed by practices and action at the organisational level. For example, the framework demonstrates that while field-level actors influence centrality, this dimension may also be influenced by an organisation’s mission and strategy and the relative power of organisational members who ‘fight’ for their preferred logics, reflecting also the influence that these logics have over the members’ behaviour. In addition, the framework shows how organisations can exercise agency, creating a mission and a strategy that may lead to shifts and influence the resource availability within the organisation by implementing specific carbon management practices. In this way, this thesis links research on competing logics in companies to broader conversations in institutional theory that explore how organisations are influenced by both structure and agency (e.g., Delbridge & Edwards 2013; Greenwood et al. 2010).

9.3.4 Research question 4
To clarify internal and external influences on carbon disclosure, it is critical to examine the variety of strategic responses that companies adopt. However, many studies that investigate
internal and external influences on organisations do not theoretically differentiate between specific types of strategies. Instead, most of these studies create categories based on datasets rather than presenting categories that are theoretically grounded. As a response, Paper D is an attempt to advance the literature in this critical aspect by drawing from and extending the literature on institutional logics and stakeholder salience, arguing for a theoretical distinction between internal and external pressures and theorising about how this interaction influences carbon disclosure strategies. Paper D thereby contributes by shedding light on the link between internal and external pressures and their impact on carbon disclosure strategies.

Papers E and F used the conceptual model in Paper D to empirically investigate the influence of internal and external pressures on carbon disclosure strategies in the global logistics industry. Both papers used datasets from Bloomberg ESG and CDP to examine the extent of applied carbon management practices within global logistics companies and their influence on associated disclosure strategies. In particular, both papers make several contributions. Firstly, by examining specific internal and external carbon management practices, both papers identify the most important practices that have an impact on carbon disclosure behaviour. Secondly, by categorising each company’s carbon disclosure strategy according to the model in Paper D, both papers provide an indication about the ‘true’ carbon position of the global logistics company with regard to carbon disclosure. Thirdly, by investigating how carbon disclosure strategies have changed over time, Paper F provides insights into an overall trend and whether carbon disclosure strategies have shifted to more transparent behaviour and what practices drove that change.

Thus, Papers E and F integrate prior work on structural change and provide a more detailed clarification of the mechanisms behind carbon management practices and associated disclosure strategies in a global logistics context. There are several bodies of literature related to institutionalism and salience that are useful in providing insights into how organisations make sense of their complex institutional environments, how they position themselves or how agency takes place. This includes work on institutional entrepreneurship (e.g., Ansari, Wijen & Gray 2013; Thornton & Ocasio 2008), discourse and rhetorical strategies (Kostova, Roth & Dacin 2008; Suddaby & Greenwood 2005) and institutional complexity and agency (e.g., Luo, Wang & Zhang 2017; Reid & Toffel 2009). The framework in Paper D suggests that in this particular case, the role of external stakeholders may create a level of shared understanding of what comprises the internal rule system and suggests it includes a negotiated political process in which
salience come into play, since different strategies would reflect the interests of different actors. As such, the influences of stakeholders are critical in understanding institutional settings.

Our findings show that the majority of global logistics companies have aligned their institutional settings with the salience of their stakeholders. Most of the companies have implemented internal and external carbon management practices to a greater extent, reflecting a strong link between those dimensions. However, this is also true for companies with less engagement, that is, companies which have implemented internal practices to a lesser extent have often also implemented practices targeted at external audiences to a lesser extent. As a result, it can be assumed that companies with a lack of alignment between internal and external practices are likely to be perceived as lacking accountability towards either internal or external audiences. From an external perspective, unless these companies communicate or engage with stakeholders in a consistent and credible manner, external stakeholders may assume that the company is not sufficiently engaging in carbon reducing activities. From an internal perspective, as long as the engagement with external stakeholders is not reflected in the company’s policies and strategy, internal actors may assume that the company only rhetorically pursues carbon reductions and the company thus loses credibility internally.

9.4 Contributions to theory

Limited research has examined the difference in organisational responses regarding carbon disclosure practices and strategies, in particular in the context of the global logistics industry. Existing research in this area often lacks a theoretical underpinning (Doda et al. 2016) and typically focuses on the ecological or economic effects (Busch & Hoffmann 2011; Giannarakis, Zafeiriou & Sariannidis 2017; Luo & Tang 2014). In rare cases, where carbon disclosure strategies are discussed, they are limited to a single theory, that is, mostly legitimacy theory (Hrasky 2011; Luo 2017). Legitimacy theory (e.g., Suchman, 1995) offers an explanation of the motivating factors for carbon disclosure and illustrates how environmental disclosure can be used to maintain the implicit social contract between a company and society. If this contract is broken, the company may be subject to increased scrutiny. This is especially relevant for a topic such as climate change, which is a subject of intense public debate. However, legitimacy theory mainly explains the output of corporate carbon disclosure, while stakeholder theory and
institutional theory build a bridge to the preceding process, because it also explains the potential influence of powerful stakeholders on carbon management (Hahn, 2015). Consequently, this research advances the theoretical foundations to empirically examine and categorise carbon disclosure strategies in the global logistics industry, and determines how companies respond differently to institutional and stakeholder pressures. This research therefore extends carbon disclosure research by providing a more detailed conceptual approach, not only to how to examine internal and external pressures, but also to build a model to categorise specific corporate carbon disclosure strategies. Essentially, the thesis builds on research showing the need for, and potential value of, the application of both institutional and stakeholder theory in the context of the global logistics industry. In so doing, this research addresses the need for additional research investigating the extent of climate change activities and contributes to the understanding of whether carbon disclosure is an effective tool in mitigating global warming from a corporate perspective.

From an institutional logics perspective, the presence of carbon disclosure may be attributed to the emergence of the sustainability logic within the global logistics industry. Institutional logics represent an alternative way to conceive and structure both the world and the organisational practices in which the world can operate. As such, institutional logics form social reality: “Institutional logics [focus] . . . the attention of organisational actors on a limited set of issues and solutions that are consistent with the prevailing logic” (Thornton 2002, p. 83).

Further, Thornton (2002) argues that organisational change is anchored in a perceived mismatch between strategy or structure within an organisation and ‘the prevailing logic’: “When an organisation’s strategy and structure are in conflict with the prevailing institutional logic, the organisation is less legitimate and competitive and thus more subject to change pressures” (p. 83). Similarly, Reay and Hinings (2009) emphasise that the logics are “[i]mportant in understanding institutional change because a change in the field’s dominant logic is fundamental to conceptualisations of institutional change” (p. 629). Reay and Hinings (2009) also propose a recursive perspective on institutions, where logics influence actors’ actions that reinforce or – in contrast – undermine the institutional logic: “Institutional logics are the organising principles that shape the behavior of field participants. Because they refer to a set of belief systems and associated practices, they define the content and meaning of institutions” (p.631). In that perspective, a change in logics is closely linked to organisational change more broadly.
As such, this thesis shows not only how institutional logics influence organisational practices, but also how a change or a convergence of carbon management practices changes institutional logics and evolves within the field. Former studies showed the replacement of one logic with another (Thornton 2004), others describe a blending process in which elements of multiple logics are combined into a new one (Stark 1996), and still others reveal an assimilation process in which elements of one logic are subsumed within those of another (Murray 2010). Thus, this research expands this literature by providing an understanding how the conflicting logics of market and sustainability are influenced by carbon disclosure practices, and also by presenting a more detailed conceptual foundation in Paper C, which links the different carbon disclosure strategies to the underlying logics that drive carbon disclosure approaches.

This thesis also addresses the limitation of institutional theory to classify stakeholder influences at a firm-level. In particular, this research provides a conceptual model that integrates stakeholder theory into institutional theory to measure and categorise carbon disclosure strategies. As such, it provides an understanding of the interaction between institutional and stakeholder pressures, or, in other words, a theoretical foundation on which to define the relationships between these dimensions. This thesis posited that these relationships involve differences in logics centrality, the degree to which the sustainability logic can manifest itself as central to the organisational functioning, and stakeholder salience, the degree to which stakeholder claims are given priority.

As a consequence, this conceptual framework contributes to the literature more broadly by accounting for the relationship between logics and agency as they affect the nature of multiple pressures within companies. It thereby shifts research from focusing on whether companies are influenced by institutional and stakeholder pressures to understanding variation in how they do so. This thesis does that by clarifying how embedded factors at multiple levels affect the two key dimensions of logics centrality and stakeholder salience. As Thornton and Ocasio (2008, p. 120) suggest, “work on institutional logics is inherently cross-level, highlighting the interplay between individuals, organisations, and institutions”. Yet empirical studies tend to focus on one level or another, emphasizing individual agency (e.g., Creed, DeJordy & Lok 2010; Lok 2010), internal organisational dynamics (e.g., Battilana & Dorado 2010; Jarzabkowski, Matthiesen & Van de Ven 2009), or dynamics at the field and societal levels (e.g., Dunn & Jones 2010; Reay & Hinings 2005a).

249
To address this limitation, the findings in Papers E and F go beyond the neo-institutional premise that a company’s behaviour (or strategy) is static and determined by well-defined fields, instead arguing that the different carbon disclosure strategies depend on evolving social environments that consist of continuous internal and external processes based on shared and conflicting logics and role of agency. In other words, this thesis expands the institutional view and connects the dynamics at the field level with those practices occurring within organisations and among their members at the firm-level, thereby engaging in cross-level theorising which can provide insights, but is often absent in discussions on the current literature at institutional and stakeholder levels. In summary, by taking into consideration the complexity of factors at the field-, firm- and the individual level within organisations, our analysis recognises the institutional constraints on organisations and their members, while also pointing to practices which, through stakeholder salience and agency, can influence organisational practices within organisations.

9.5 Contributions to practice

This thesis provides utility for sustainability practitioners through the investigation of the extent of applied carbon management practices and their implications for carbon disclosure strategies in the context of global logistics companies. This knowledge is essential for the development of future carbon disclosure policies and strategies, and is therefore impactful for sustainability managers and investors working in the global logistics industry. In particular, the findings in this thesis not only present valuable findings that indicate the extent - or the lack - of carbon management practices in global logistics companies, but also present two frameworks that explain the multiple influences on carbon disclosure processes and strategies.

The first framework in Paper C clarifies the different stages that lead to an either symbolic or substantial carbon disclosure approach, thereby indicating that a change at the firm-level can only occur when the underlying logics at the field-level shift. Papers B and C show that the role of the prevailing or dominating logic is the crucial factor that shapes carbon disclosure behaviour within global logistics companies (Schaltegger & Hörisch 2015). Thus, from a managerial perspective, a change in carbon disclosure to, for example, a more transparent approach can only occur through a greater integration of the sustainability logic within the organisation. However,
the integration of sustainability logic usually requires organisational change, that is, the logic needs to manifest itself in the organisation through organisational practices or structural changes (Scott 2013). From a practical point view, Papers B and C demonstrate that a change at the firm-level needs to be supported by adequate policies and resources. In addition, the findings of Papers B and C provide detailed insights into the strengths and weaknesses of carbon disclosure practices.

The second framework presents a conceptual model that allows the categorisation of carbon disclosure strategies, thereby providing an understanding of the different corporate carbon disclosure positions. This thesis therefore addresses the inherent uncertainty associated with carbon related information and provides clarity about a company’s true carbon position. The comprehensive research process (Papers D, E and F) combines the valid constructs from two perspectives and thus presents a more innovative form of research than simply focusing on one single theory, a theory which continues to dominate carbon disclosure research (Doda et al. 2016; Giannarakis, Zafeiriou & Sariannidis 2017; Hahn, Reimsbach & Schiemann 2015; Hrasky 2011; Luo 2017; Luo & Tang 2014). Through the identification of four specific carbon disclosure strategies based on internal and external influences (Paper D), global logistics companies could be categorised and allocated (Paper E), and drivers behind shifts to more transparent behaviour could be identified (Paper F). For sustainability managers and policymakers these findings are helpful, since understanding how the extent of carbon disclosure influences carbon disclosure strategies and their effectiveness allows management to better identify which practices should be targeted. Even more importantly, how a more effective carbon disclosure design can be developed. In addition, this framework can be extended to a broad range of other environmental contexts in order to address greater audiences.

9.6 Limitations

This research consists of six studies with different research approaches and methods. Each method has its own limitations and possible flaws. This research has attempted to minimise the imperfections of its methods by using a combination of methods, thereby allowing for triangulation and validation. However, it is particularly important that the limitations of this research are acknowledged. Firstly, a summary of the limitations of each of the six papers in this
thesis is provided. Following this, the overall limitations, which are not specific to a particular study of the research are outlined.

The systematic literature review presented in Paper A focused on carbon management practices in the logistics and transportation sector, retrieving journal articles from 2000 to 2015. The results of this literature review have important limitations. Firstly, due its specific focus on only carbon management practices in a logistics context, articles that have addressed similar issues in the broader context of green supply chain management might have been neglected. Moreover, the literature review comprised only articles from management journals, thus manuscripts that looked at this issue from an environmental science perspective have been excluded. Finally, the review’s evidence base was limited to articles published in peer-reviewed journals in English, hence excluding government and industry reports.

The studies in Paper B and Paper C, which employed a qualitative case study approach comparing carbon reports between logistics companies, investigated the emergence of phenomena with a high level of detail, thus “capturing the uniqueness of events” (Yin, 2011, p. 14). From a methodological point of view, however, the key limitation of qualitative research lies in its inability to generalise the findings from the study sample to the entire population. Using interpretative content analysis is inherently a narrative as it relies on reported information reflective of corporate actions and intent. In addition, the geographical area in Paper B is limited to the United States, and while Paper C addresses the limitations by adding and including a German logistics company into the sample, the geographical area is restricted to developed countries. Another limitation of Paper C is that the data stems from one source only, the CDP reports, so an inclusion of reports from other sources might be useful in validating the findings.

A limitation of Paper D, which introduced a conceptual framework to categorise carbon disclosure strategies based on institutional and stakeholder pressures, may stem from the purely theoretical approach, that is, that the model is too simplified and does not take into account the complexity of various influences at different levels. Similarly, it could be argued that the model does not reflect the ‘real world’ and needs to be ‘tested’. As such, the key limitation of Paper D is the limited focus on two constructs from institutional theory, i.e. ‘logics centrality’, and from stakeholder theory, i.e. ‘stakeholder salience’. It needs to be acknowledged that various other constructs that exist in both theories may have been neglected. Moreover, the focus on
institutional theory and stakeholder theory may also limit the conceptual approaches how carbon disclosure strategies could be examined.

Papers E and F, which empirically examined the carbon management practices and disclosure strategies through datasets from Bloomberg ESG and CDP, also face certain limitations. In both papers, a relatively new dataset with a limited timeframe was used to examine the interaction between internal and external influences. The dataset comprised only data from Bloomberg ESG terminals and the associated CDP data, thus restricting the scope of study to a single source. Another limitation of the analysis of Paper E and F is the time factor. Bloomberg ESG data and the associated CDP data started building databases from 2010 only, which limits the completeness of the data to this timeframe. Consequently, the results should be interpreted with caution, as it cannot be concluded whether the relationship between internal and external is stable or if it might vary over time. Another restriction is the rather small sample size, which focused on global logistics companies only, thereby limiting the ability of the study to make causal claims.

Moreover, there are also limitations which are applicable to all of the papers and findings in this thesis. First, the focus lies purely on the global logistics industry. Carbon disclosure practices and strategies are used and applied in various industry contexts, transportation and logistics are only one area. What is more, although Paper D presents a strategic conceptual framework that may be extended to other industries, the emphasis on global logistics companies limits the possibilities for disseminating the research to greater audiences.

Furthermore, the theoretical emphasis of this research focuses mainly on an institutional context, where mainly the construct of institutional logics was used to examine carbon management and disclosure practices. Within the construct of institutional logics, this research focused on the market logic and the sustainability logic, but companies face multiple pressures, the market and sustainability logic being only two of them. This approach may be seen as an approach to simplify the contextual understanding and reduce complexity, thereby limiting the significance of the research findings.

While outside of the scope of this thesis, an investigation into other performance factors pertinent to carbon disclosure strategies could have been examined. The thesis briefly touches upon the factors of carbon emissions performance as well as the link to financial performance.
An investigation of carbon disclosure practices and their relation to carbon emissions and financial performance may offer further insight into the dynamics behind the adoption of carbon disclosure strategies.

9.7 Conclusion

Climate change is a major environmental issue of concern for the global community and companies are increasingly under pressure to reduce their carbon emissions output. This is particularly true for the global logistics industry, which accounts for 5.5 per cent of global carbon emissions. As a consequence, global logistics companies have not only implemented multiple carbon management practices, but have adopted various carbon disclosure methods as tools to promote their activities and engagement. However, the application of carbon management practices and their implications for carbon disclosure strategies have received limited research attention, in particular in a global logistics context.

By employing a six study, mixed-method research, this thesis demonstrated how institutional and stakeholder pressures influence carbon management practices and associated carbon disclosure strategies. More specifically, the research investigated how both pressures influence the extent of disclosure in the context of the global logistics industry. In so doing, the thesis provided insight into the mechanisms behind the adoption of carbon disclosure and effectiveness of carbon management practices, using institutional and stakeholder lenses.

The thesis provided insight into the emergence of the sustainability logic, reflecting the concern about climate change. The emergence can be attributed to the role of institutional entrepreneurs, who lobbied for change and created legitimacy in the organisational field and increased climate change awareness. The heightened societal interest reflected a large-scale convergence around climate change, diffusing the sustainability logic to a higher level of public and political attention. The research discussed this development and provided an initial step to understand the emergence of climate change awareness and the sustainability logic in a global logistics context.

In addition, the thesis investigated the influence of underlying competing logics and provided a theoretical framework to classify the different levels of their influences on carbon disclosure. In particular, the role of competing ‘market’ and ‘sustainability’ logics, which reflect institutional
complexity within the organisational field, is discussed. The findings revealed significant differences and showed that corporate carbon disclosure practices are either dominated by a market logic, emphasising a symbolic approach, or by a sustainability logic, following a more substantial approach. These findings extend prior studies that have examined how companies react to external stakeholders, particularly within the domain of environmental performance and corporate sustainability management, and contribute to the organisational literature that describes how companies react to the various actors in the field.

The research also addresses the limitations of existing research that focused mainly on logics at the field level by integrating stakeholder theory into institutional theory in order to demonstrate how logics manifest within organisations and how they are influenced at a firm-level. The thesis thereby complements the institutional dimension with a stakeholder dimension, providing insight on how the interaction between institutional and stakeholder pressures influence carbon disclosure strategies. In particular, clarifying how institutional and stakeholder pressures relate to one another at a firm-level is vital in order to gain a richer understanding of how internal and external influences have an impact on companies’ strategies.

By using the constructs of logics centrality and stakeholder salience as key dimensions throughout this research, the thesis provides a conceptual apparatus of four carbon disclosure strategy types, clarifying the heterogeneity of their manifestations. As such, this thesis links research on competing logics in companies to broader conversations in institutional theory that explore how organisations are influenced by both structure and agency. In particular, the thesis extends prior work on structural change and provides a more detailed clarification of the mechanisms behind carbon management practices and associated disclosure strategies in a global logistics context.

In more general terms, the research presented answers calls for additional research investigating the extent of climate change activities, thereby contributing to the understanding of whether carbon disclosure is an effective tool in mitigating global warming from a corporate perspective. By discussing and empirically investigating carbon management practices and disclosure strategies, this thesis shows how a more rigorous application of institutional and stakeholder theory contributes to the development of deeper and more concrete audience insights. In particular, the thesis advances the theoretical foundations by providing a more detailed
conceptual approach, not only to how to examine internal and external pressures, but also by providing a model to categorise specific corporate carbon disclosure strategies. In so doing, the thesis shows the value of the application of both institutional and stakeholder theories in the context of the global logistics industry.

9.8 Implications and future research

The research findings have several implications for theory and practice. From a theoretical point of view, the thesis builds on research implying the need for, and potential value of, the application of both institutional and stakeholder theory in the context of the global logistics industry. In so doing, this research addresses the need for additional research investigating the extent of climate change activities and contributes to the understanding of whether carbon disclosure is an effective tool in mitigating global warming from a corporate perspective. The research findings advance the theoretical foundations to empirically examine and categorise carbon disclosure strategies in the global logistics industry, and determines how differently companies respond to institutional and stakeholder pressures. Therefore, this research extends carbon disclosure literature by providing a more detailed conceptual approach, not only to how to examine internal and external pressures, but also to build a model to categorise specific corporate carbon disclosure strategies.

In particular, this research uses constructs from institutional and stakeholder theory, i.e. logics centrality and stakeholder salience, to build an integrative model that depicts four types of carbon disclosure strategies in the global logistics industry, based on the extent of institutional and stakeholder pressures. As such, the research provides insights into how stakeholder pressures and institutional logics interact, thereby connecting the dynamics at the field level with those practices occurring within organisations and among their members on the firm-level. This analysis therefore engages in cross-level theorising which provide insights, but is often absent at institutional and stakeholder levels in discussions within existing research.

The findings show that the majority of global logistics companies have aligned their institutional settings with the salience of their stakeholders. Most of the companies have implemented internal and external carbon management practices to a greater extent, reflecting a strong link between those dimensions. As such, this thesis shows not only how institutional logics influence
organisational practices, but also how a change or a convergence of carbon management practices changes institutional logics and evolves within the field. Thus, this research expands this literature by providing an understanding how conflicting logics are influenced by carbon disclosure practices, thereby shifting research from focusing on whether companies are influenced by institutional and stakeholder pressures to understanding variation in how they do so.

The thesis also has implications for sustainability practitioners through the investigation of the extent of applied carbon management practices and their impact on carbon disclosure strategies in the context of global logistics companies. This knowledge is essential for the development of future carbon disclosure policies and strategies, and is therefore relevant for sustainability managers and investors working in the global logistics industry. The research findings in this thesis not only present valuable findings that indicate the extent - or their lack - of carbon management practices in global logistics companies, but also present two frameworks that explain the multiple influences on carbon disclosure processes and strategies. Practitioners can use the first framework (in Paper C) to understand that the role of the prevailing or dominating logic is the crucial factor that shapes carbon disclosure behaviour within global logistics companies. The framework clarifies the different stages that lead to an either symbolic or substantial carbon disclosure approach, thereby indicating that a change at the firm-level can only occur through a shift of the underlying logics at the field-level. From a practical point of view, this thesis demonstrates that a change at the firm-level needs to be supported by adequate policies and resources.

Furthermore, the thesis provides detailed insights into the strengths and weaknesses of carbon disclosure practices in the global logistics industry, thereby helping to clarify the inherent uncertainty associated with carbon related information and providing clarity about a company’s true carbon position. The thesis’ comprehensive and streamlined research process combines the valid constructs from two perspectives and identifies four specific carbon disclosure strategies based on internal and external influences, allocates and categorises global logistics companies, and identifies drivers behind shifts to more transparent behaviour. For sustainability managers and policymakers these findings are helpful, since understanding how the extent of carbon disclosure influences carbon disclosure strategies and their effectiveness allows management to
better identify which practices should be targeted, or even more importantly, how a more effective carbon disclosure design can be developed.

Overall, the broader potential implications of the various strategies provide a strong opportunity for future research. The framework presented in Paper D may be extended to a broad range of other environmental contexts and industries in order to address larger audiences. While the findings may not be directly transferrable from one industry to the next, the framework demonstrates in general how the interaction between internal and external pressures influences decisions for carbon management practices and disclosure strategies within, across and outside the global logistics boundary. The thesis may thus provide decision makers with a starting point for discussion on how future carbon management practices and disclosure strategies should be shaped and framed. In addition, and within other industries, future research could adapt the framework and ‘test’ it in a broader sustainability disclosure context.

Future research could also investigate the dynamics behind internal and external carbon management practices. More specifically, the central issue is whether internal management practices of carbon issues are the driver of external management practices or whether this relationship is the other way around. Interviews with relevant managers and key actors may provide insight into the decision-making process that lead to the adoption and implementation of specific carbon management practices.

Researchers could also investigate the ecological and economic effects of particular carbon disclosure strategies. From a financial aspect, future research could examine how different carbon disclosure strategies are linked to different financial outcomes what specific factors deliver the best financial performance. From an ecological viewpoint, it would be interesting to examine how different carbon disclosure strategies have an impact on the actual carbon emissions output and what drivers and barriers can be identified that have the largest impact on emissions performance. These studies may offer further developmental insights into carbon management practices and disclosure strategies and further investigation is therefore warranted.
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