Green growth and decoupling as legitimation strategies

How businesses manage the incompatibility of economic growth and corporate environmental sustainability

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Abstract

International organisations and global businesses aim to achieve green growth through the decoupling of economic growth and environmental impacts. However, increased evidence calls into question the approach of green growth, that has been adopted by international institutions such as the UN and the OECD. The current indication is that there is no significant decoupling taking place and substantial theoretical barriers remain for it to occur. From that basis I investigate how businesses use narratives related to decoupling and green growth to manage legitimacy while pursuing the conflicting goals of both economic growth and environmental sustainability. This is achieved through document analysis and thematic analysis of sustainability reports from 50 of the world's largest transnational corporations. The narratives are then analysed from the perspective of legitimacy theory. I identify seven narratives: *i) Businesses recognise the problems, ii) Action is being taken, iii) Goals have basis in science, iv) Technology and innovation provide the solutions, v) Businesses offer crucial benefits, vi) Businesses are at the hands of demand* and *vii) External action is needed*. These are then derived into strategies using legitimacy theory and two overarching themes are identified, the narratives mitigating businesses' negative ties to environmental impacts and communicate that businesses are conforming to societal expectations.

The narrative findings and legitimacy strategies show similarities with previous research, while the latter also makes new contributions to the field. The novel findings that have not been discussed in the context of sustainability reports previously are customer demand, external action from governments, and the emphasis on technology and innovation paving the way for green growth. Furthermore, businesses are shown to pay little attention to barriers towards green growth and the findings give clear indication that companies are currently dedicated to the sustainability approach of green growth despite the lack of scientific evidence.

Keywords

Sustainability reporting, legitimacy theory, decoupling, green growth.

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1 Introduction

As mankind's environmental impact on the planet has become indisputable (Steffen et al., 2015), the link between economic growth and said impact has gained increased focus. A well-established concept is that of 'decoupling', where the goal of continued economic growth is achieved without the presently correlated environmental cost - thus achieving green growth. In theory, it is a win-win situation, with humanity continuing to reap the rewards of growth but decreasing emissions, pollution and extraction of raw materials. The European Union (2000; 2011), Organisation for Economic Co-operation and Development (2011), World Bank (2012) and United Nations (von Weizsacker et al., 2014) have all in different ways adopted decoupling. Decoupling is even a key aspect of the Intergovernmental Panel on Climate Change's (IPCC) suggested pathways towards limiting global warming to 1.5°C, calling for leap-frogging development of new technologies, but also socio-technical changes (IPCC, 2018). With all this trust being put into decoupling, are we seeing any green growth?

While calls for limiting growth stretches back to at least the report "Limits to Growth" (Meadows et al., 1972), it has recently become increasingly evident that absolute decoupling is not taking place and perhaps is not achievable (Parrique et al., 2019). The term 'absolute decoupling' is used to describe when total resource impacts decrease alongside an increase in economic growth. 'Relative decoupling' is when there is improved environmental efficiency, but to a lesser extent than increased growth - not leading to absolute improvements. It was exemplified by economist Herman Daly (1991, p. 118):

> *"In 1969 a dollar's worth of GNP was produced with one-half the materials used to produce a dollar's worth of GNP in 1900, in constant dollars. Nevertheless, over the same period total materials by consumption increased by 400 percent."*

Hickel & Kallis (2019) found that global historical trends have evidence of relative decoupling, but not absolute decoupling of resource use from gross domestic product (GDP). They found that even under very optimistic conditions it was deemed unlikely even for high-income nations to achieve decoupling in line with pathways towards 1.5°C or 2°C global warming. The results indicate that growth cannot be combined with sufficiently mitigating climate change and ecological

damage, requiring new shifts in consumption and production. In 2019 the European Environmental Bureau (EEB) produced a report on decoupling, debunking it as a sole strategy for sustainability (Parrique et al., 2019). The report explicitly states that there "is no empirical evidence for [absolute and permanent] decoupling currently happening" (ibid., p.4).

The need for decreased environmental impacts and a new relationship between mankind and nature has been made evident by IPCC (2019) reports and holistic concepts such as the Planetary Boundaries (Steffen et al., 2015). These papers try to capture the impact mankind is having on the planet and address what needs to be done from a macro perspective. It is then translated in different forms to regional and national action. For example, in 2014 the European Union adopted directive 2014/95, which states that all public-interest companies with more than 500 employees must disclose information in regard to how they manage social and environmental challenges (European Commission, 2014). This kind of sustainability reporting (SR) has become an increasingly common practice (Blasco and King, 2017). However, many articles have criticised SR, arguing that companies do not "walk the sustainability talk", *i.e.* that they do not live up to their expressed ambitions or promises when it comes to sustainability (e.g. Boiral, 2013; Cho et al., 2015; Milne and Gray, 2013).

In studying SR, legitimacy theory has proven to provide useful perspective, especially for explaining how businesses manage their image (Tavares et al., 2018). Legitimacy theory is well-established in management theory and deals with organisations and their actions in relation to what is desirable and legitimate in a social system that consists of norms and values (Suddaby et al., 2017). Legitimacy theory suggests that organisations not only compete for resources and clients, but also deal with social pressures as non-conformity would risk their legitimacy and consequently, their access to markets and resources (Tavares et al., 2018). Businesses therefore need to have sustainable operations according to societal expectations yet also maintain growth as a legitimate economic actor. The conflict between these goals is made apparent by the critique of green growth, yet businesses are expected to achieve both – the question being how do they handle these incompatible expectations? In the field of SR, little has been said on how companies use narratives around decoupling and green growth as legitimation strategies. That will therefore be the topic of this thesis, which research question becomes:

How do businesses employ green growth and decoupling in their sustainability reporting to manage legitimacy problems resulting from the incompability of economic growth and corporate environmental sustainability?

The aim of the thesis is to contribute to the research field of sustainability reporting with empirical cases, specifically examining how companies through narratives relating to decoupling and green growth handle the competing goals of economic growth and environmental sustainability. Through document analysis of sustainability reports key narratives will be identified through coding, these shared stories will then be analysed from the perspective of legitimacy theory. The thesis will consider reports from some of the largest transnational companies (TNCs), identified as having major environmental impacts across a wide variety of sectors (Folke et al., 2019).

2 Theoretical background

The thesis will find its grounding in the concept of sustainability as well as in the research fields of decoupling and sustainability reporting (SR). I will provide a short definition for sustainability, followed by introductions of the two research fields and relevant findings. Furthermore, legitimacy theory will be presented and placed in the context of SR.

2.1 Sustainability reporting

It is possible that there are as many definitions of sustainable development as there are people attempting to define it, but a commonly adopted definition is that provided by the Brundtland report:

> *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development, 1988, p. 41)*

The Brundtland report outlines several central aspects in terms of fundamental needs and development, but perhaps most importantly makes the connection between human development and environmental impact. It considers sustainability to be both environmental protection and providing welfare to present and future generations. Several conceptualisations and descriptions have been introduced since the 1987 report, one of the most prevalent being the interconnected pillars of sustainability - encompassing economic, social and environmental sustainability (Purvis et al., 2019). While the different views on sustainability can create confusion, the joint central aspect is the critique of the economic status quo from a social and environmental perspective (ibid).

Businesses are an integral part of sustainable development, as they constitute large aspects of the socio-technical systems they operate in and have significant environmental impacts (e.g. Griffin and Heede, 2017). SR is a form of non-financial disclosure that informs stakeholders on how the company operates relating to social, economic, and environmental challenges. In the case of EU directive 2014/95, large companies must report on policies that are implemented relating to environmental protection, social responsibility and treatment of employees, human rights, anti-corruption and bribery as well as diversity on company boards (European Commission, 2014). In

a KPMG survey of the top 100 companies by revenue in 49 countries, around three quarters issued non-financial reports (Blasco and King, 2017).

As stakeholders have become increasingly interested in non-financial aspects of corporations, frameworks have been developed to meet the demand in a structured fashion. Of these frameworks, Global Reporting Initiative (GRI) is the most popular, with around two thirds of the KPMG survey sample using GRI standards (ibid.). It is a practice that is seeing increased use across all sectors, many companies including methods and tools such as the UN Sustainable Development Goals (SDGs) and Scientific-Based Targets (SBTs) (ibid.). In 2017, 67% of the world's largest companies had quantified targets for cutting carbon emissions (ibid.). For the countries that had seen the greatest increase in reporting rates between 2015 and 2017, KPMG analytics found that new regulation, stock exchange requirements and investor pressure were key drivers (ibid.). Contrasting findings have been made that suggest SR is pursued because it can compensate for poor environmental performance and reputation (Cho et al., 2012). Further reasons motivating sustainability reporting will be considered in the subsection reviewing legitimacy theory.

When GRI was introduced, the purpose of initiative was to offer businesses a concrete framework from which to evaluate their societal impacts, while increasing transparency and accountability (Dingwerth and Eichinger, 2010). However, much critique has been directed towards the current regime of SR. Research has indicated that SR fails to disclose negative events (Boiral, 2013), does not empower the users of the reports (Dingwerth and Eichinger, 2010), omits important aspects (Milne and Gray, 2013) and silences alternative views (Journeault et al., 2020). The critique is broad, touching both upon the theoretical frameworks and also how they are applied. Higgins et al. (2019) concluded that regulation perhaps should focus on what is reported instead of simply requiring reporting. Furthermore, Milne and Gray (2013) argued that SR limits considerations to an organisational level and misses out on ecological aspects. If SR is to fulfil its purpose, many of these critiques need to be addressed.

While this thesis is interested in how businesses rationalise their activities impact on the environment, it is noteworthy that very few companies seem to consider climate change a risk to their own operation, *i.e.* not making a link between activities and climate change in the opposite

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direction this thesis is considering. The KPMG survey found that 72% of the 4 900 surveyed companies did not acknowledge financial risk related to climate change (ibid.).

2.2 Decoupling & green growth

The coupling between economic growth and environmental impact, *i.e.* that more growth leads to more environmental impact, has been evident for quite some time (Meadows et al., 1972), and has led to the concepts of green growth and decoupling. To provide contrasting definitions of these concepts, it could be argued that decoupling is needed to achieve green growth. The latter is defined by the World Bank (2012, p.2) as:

> *"Green growth is growth that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards."*

Decoupling is how this growth is achieved. As the word implies, the aim is to achieve a separation between economic growth and environmental factors, for example carbon emissions. This decoupling can be relative or absolute. Whilst the former implies a decline in relative environmental impact due to increased resource efficiency it leads to a continued increase of both variables, meaning the environmental impact is still increasing but just at a slower pace (Parrique et al., 2019). The latter leads to both variables heading in the opposite directions - in this case less environmental impact with more economic growth (ibid.). Given that relative decoupling is not a solution for environmental sustainability, the real aim is absolute decoupling.

Decoupling has been criticised as a fantasy that obfuscates conflicting goals that perhaps can not be reconciled (Fletcher and Rammelt, 2017). It has also been argued that degrowth has a stronger normative justification than green growth, in part because while both ideals strive for preservation, green growth has shown to prioritise economic growth (Sandberg et al., 2019). Degrowth is founded on the premise that resource and emission limits make further growth unsustainable, the biggest challenge of the concept thus being how to form a socially sustainable society that "lives better with less" (Kallis, 2011). To achieve this, reformation of institutions and political and

cultural change is called upon to enable new policies regarding basic income, new forms of taxes and advertising control (ibid.).

Economic growth can be defined in several ways, one of the most prominent, but also criticised, is GDP. There are several variables correlated to environmental impact that can be used, such as resource use, which the European Environmental Bureau (EEB) divides into four categories: materials, energy, water, and land (Parrique et al., 2019). Besides these indicators, the direct environmental harm can also be used as the environmental variable, for example biodiversity loss and land-use change (ibid.). The EEB report further expands its considerations to both local and global scales as well as temporality, identifying whether changes are temporary or permanent (ibid.). Given the global nature of environmental issues such as climate change, it is arguably the global scale that is interesting. In terms of temporality, temporary changes are considered due to the possibility of "recoupling", i.e. the possibility that a temporary decoupling then reconnects to business-as-usual. Hickel and Kallis (2019) exemplify this with the energy production in China and USA, where both shifted towards less carbon emitting energy production which lowered emissions temporarily before recoupling emissions with economic growth.

Decoupling also must be placed in our current context, which is the urgency of environmental sustainability. The EEB report highlights that to reach a 90% reduction of emissions by 2050, an average intensity decline of 8% per year is necessary given expected growths of both populations and the economy. Between 1965 and 2015, the annual decline of carbon intensity has been 1%. Having established that there is no evidence for the necessary decoupling taking place, the EEB report evaluates whether green growth is theoretically possible and identifies seven barriers that makes it *"highly compromised, if not clearly unrealistic"*(Parrique et al., 2019, p. 55). The seven barriers are: *i) rising energy expenditures, ii) rebound effects, iii) problem shifting, iv) the underestimated impact of services, v) the limited potential of recycling, vi) insufficient and inappropriate technological change* and *vii) cost shifting*. Seeing as businesses might tell narratives that includes aspects of these barriers, they could provide useful perspective and will thus be expanded upon.

I.   *Rising energy expenditures* relates to availability of natural resources, specifically that when a resource is extracted the most accessible and cheap option is exploited first. This indicates that as remaining stocks are extracted, both cost and environmental impacts will go up. (ibid, pp.33-35)

II.   *Rebound effects* are effects that impact efficiency in direct or indirect fashion. For example, fuel combustion can become more efficient but with that there might follow more usage because it is now cheaper to drive - negating the environmental improvement. Rebound effects are highly complex and the evidence for typical magnitudes of rebound effects vary greatly in both micro and macro cases. (ibid, pp.36-39)

III.   *Problem shifting* has to do with system dynamics, specifically that solving one environmental problem might impact another one negatively or create new problems. The authors of the EEB report gives the example, amongst others, of electric cars which potentially decreases reliance on fossil fuels but increases pressure on extraction of certain critical raw materials. (ibid., p.40)

IV.   *The underestimated impact of services* has to do with a shift from products to a so-called "service economy", which is expected to have less impacts. However, several indications point to an underestimation of the impact that the service economy would have, such as the footprint of services and that it needs to exist on top of the traditional economy. (ibid., p.45)

V.   *The limited potential of recycling* is related to the concept of a circular economy, which instead of a linear system with waste diverts the residuals back into the system to enable new products - hence "closing the loop". However, recycling rates are only slowly increasing from low levels and recycling still requires a significant amount of energy and virgin materials. (ibid., pp.46-48)

VI.   *Insufficient and inappropriate technological change* has to do with the core of green growth, which is to innovate and let technological change enable decoupling. However, several existing technologies that could have enabled decoupling have had little impact.

The EEB report sees three reasons technological change is not contributing to decoupling: i) incorrect targeting of innovation on factors that does not reduce environmental impact, ii) it is of insufficient scale and fails to outcompete other less desirable technologies and iii) it is not fast enough. (ibid., pp.49-52)

VII.   *Cost shifting,* also called shifting of burdens, is the relocation of impacts, for example to countries with less regulation - the effect being that production and its impact is taking place in one part of the world, while the created value is consumed elsewhere. On a global scale this is exemplified by high-income countries outsourcing their impacts to low-consumption or developing countries. In the context of decoupling, this means that increased decoupling in one country is not an overall gain if it comes at the cost of increased coupling in another country, which are seemingly mostly the case when examples of local decoupling are provided. (ibid., pp.53-55)

2.3 Legitimacy Theory

Businesses must respond to societal pressure to be both successful, growing economic actors and sustainable, despite the increased evidence against that possibility. SR is a form of response to this pressure and legitimacy theory has proven a useful perspective from which to analyse how businesses are adapting SR. As noted by Suchman (1995), as institutional theory has expanded to consider more than technological or material aspects, organisational legitimacy has become a key factor around which much theoretical research has been centred. It serves to explain what cultural forces have influenced organisations, from which several streams of research regarding legitimacy have formed. Suchman defined it as:

''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.574).

In an attempt to bring clarity to the topic of legitimacy theory, Suddaby et al. (2017) reviewed the literature on legitimacy around three core questions - of which the first asked what legitimacy was. The review found that there had formed three schools of legitimacy theory: *i) legitimacy as*

property, ii) legitimacy as process and *iii) legitimacy as perception*. The first sees it as a resource that can be created by fitting attributes of an organisation to external expectations. The second sees it as a social construction that occurs through deliberate efforts. The third sees it as a form of evaluation and social judgment, being created between organisations and individuals in how they see and judge the actions of organisations.

The use of SR can be seen as a tool to gain legitimacy, creating favourable impressions of the organisation (Bansal and Clelland, 2004; Bebbington et al., 2008). A fundamental aspect of legitimacy theory is that no organisation has an inherent right to exist and that organisations need legitimacy to prove their place in society and gain access to resources (Deegan, 2002). Even when being faced with negative events related to environmental disaster, disclosure has been shown to be a useful tool in regaining legitimacy (Cho, 2009). Specific to sustainability reporting, it offers organisations a way to reduce information asymmetries and to convey their environmental performance. Given the increasing evidence against decoupling, legitimacy serves as a suitable theory to analyse how organisations handle the currently contradictory goals of increased economic growth and environmental sustainability.

Several studies have identified legitimacy strategies within sustainability reporting in a qualitative manner. For example, Castelló and Lozano (2011) found different types of rhetoric used to gain legitimacy in non-financial reports, Cho et al. (2010) found that organisations with worse environmental performance had more optimistic language and Hahn and Lülfs (2014) identified strategies organisation use to legitimise negative aspects in SR. However, no studies which was found in this literature review related it to decoupling and green growth, to which this thesis aims to contribute. When analysing how companies legitimise negative aspects in sustainability reporting, Hahn and Lülfs (2014) found six key legitimation strategies. Since it can be argued that the mounting evidence against green growth is a negative aspect for organisations, the six strategies could provide useful comparison to this thesis findings. The six strategies identified are:

I. *Marginalisation* - making negative aspects seem unimportant, too small to be important or irrelevant.
II. *Abstraction* - claiming that negative aspects are prevalent throughout the industry.

III.   *Indicating facts* - merely mentioning negative aspects without expanding further in terms of explanation or justification.

IV.   *Rationalisation* - focusing on purpose or benefits of the negative aspect as well as emphasising that negative aspects are normal or inevitable.

V.   *Authorisation* - legitimising negative aspects by referencing authorities, such as regulatory bodies or academic research.

VI.   *Corrective action* - imprecise or concrete measures that will prevent negative aspects in the future.

2.4 Review conclusion

Green growth and decoupling are concepts that have been adopted by international institutions such as the World Bank and the UN. In theory, it would lead to continued economic growth while decreasing environmental impacts. To contribute towards the pathways set forth by the IPCC, the decoupling needs to be permanent, absolute, global and take place at a sufficient rate. While there historically have been arguments against economic growth, a report by the EEB summarises all available evidence to conclude that there is no indication that sufficient decoupling is taking place. Furthermore, it is unlikely that green growth is possible, identifying seven barriers that provides a valuable framework for analysis in this thesis. The question thus arises, how do businesses handle the contradictory aims of economic growth and environmental sustainability?

Sustainability reporting has become an increasingly popular tool to communicate environmental performance to stakeholders. The current scientific consensus seems to be that while SR has potential to decrease information asymmetry between companies and external stakeholders by communicating environmental performance, there are many flaws with the current paradigm that need to be addressed. Legitimacy theory has been a useful tool in identifying and analysing how organisations use SR to manage legitimacy and handle contradictory aims. Several studies have used legitimacy theory in qualitative evaluations of SR, but none have done so in the context of decoupling and green growth. However, previous findings related to legitimation strategies can prove for useful comparison also in this new context.

3 Research design

In the following section, I present the research design of the thesis. Building upon the problematisation and theoretical background, this section will describe and motivate the underlying scientific perspective, method and data collection as well as including a discussion on validity and reliability of the sources.

3.1 Problem, purpose and contribution

The purpose of this thesis was to explore how companies manage legitimacy through the concepts of decoupling and green growth and handle the contradictory goals of economic growth and environmental sustainability. The research question that guided the thesis was:

> *How do businesses employ green growth and decoupling in their sustainability reporting to manage legitimacy problems resulting from the incompability of economic growth and corporate environmental sustainability?*

This is an area that has not been covered within the research field of sustainability reporting, the thesis to that extent contributing by shining novel light at a gap as well as building upon previous research with empirical cases. The findings will highlight what types of narratives businesses build to maintain legitimacy while pursuing the conflicting goals of economic growth and environmental sustainability.

3.2 Scientific perspective

An interpretative approach was used in this thesis in order to draw conclusions from observations and build upon existing theory surrounding SR and legitimacy theory (Bryman and Bell, 2013). Through the observations, in this case the sample of sustainability reports, the thesis identifies themes and patterns that can be used to create understanding relating to the research question. In short, theory will be formed from the observations. The process was largely iterative, as identified themes and patterns grew with the expanding document analysis, reports were revisited and recategorised - meaning data collection and analysis was alternated. This type of qualitative approach has an underlying premise which is interested in observing the world through the eyes of the beholder and is highly considerate of context and a continuous process (ibid., pp. 409-412). I

adopted an constructivist ontology, since it considers the social world as something that is maintained and developed by actors (ibid., p.391), making it suitable not only for a qualitative study but also analysis from the legitimacy perspective. Constructivism does not consider the social world as something external that cannot be influenced or controlled and culture something that is given in advance (ibid., p.43). Instead it suggests the opposite, that social phenomena and their meaning is something that social actors continuously create and give (ibid.).

Within this context, interpretivism was deemed the most suitable epistemology, given that it differentiates between observations within natural sciences and that of people, the premise being that social sciences needs to consider the subjective meaning of actions (ibid., p.38). This contrasts with positivism, which argues that the methods of natural science should always be applied and is more suitable for deductive approaches (ibid., p.36). Interpretivism was suitable as this thesis is largely interested in the reflections, motivations, meanings, and interpretations of social actors, striving to understand human reasoning.

3.3 Method

I used document analysis to identify key narratives that are presented in section 4, these narratives were then analysed and discussed from the perspective of legitimacy theory in section 5. Document analysis is a systematic approach for evaluating documents, the data that is under examination can be interpreted in order to form understanding and elicit meaning (Bowen, 2009). Document analysis has been found to be an efficient, cost-effective method with many documents available that are unaffected by the research - however, there are challenges with insufficient detail and biased selectivity (Bowen, 2009). In this thesis the data used for the document analysis were sustainability reports from large TNCs, the sample of which will be described in the ensuing section.

The analysis usually involves "skimming (superficial examination), reading (thorough examination) and interpretation" and combines content analysis and thematic analysis (Bowen, 2009, p.32). Content analysis is organising the information in relation to the research question(s), where it can be suitable to in a first review identify the parts of the document that are relevant (ibid.). Thematic analysis is finding themes within the data by more detailed re-reading, a form of

pattern recognition (ibid.). A common approach here is that of coding based on typical characteristics, which helps identify narratives within the text. This thesis applied a method as outlined above, where codes were created after an initial content analysis and then iterated upon throughout the thematic analysis. The analysis excludes key performance indicators (KPIs) and other quantitative aspects of SRs, as these are to a large extent studied as a separate part of SRs (e.g. Hristov and Chirico, 2019) and this thesis is primarily concerned with qualitative communication.

3.4 Data collection

A trend stretching back to the 20th century is that of large TNCs constituting more of the global economy, with around 10% of the world's public companies generating 80% of profits (Wooldridge, 2016). Some of the largest TNCs across different sectors, have been found to be a major force that can influence critical functions of the biosphere (Folke et al., 2019). It has been indicated that 100 companies, including both state-owned enterprises and TNCs, are the source of 71% of global industrial greenhouse gas emissions since 1988 (Griffin and Heede, 2017). The overall indication of these aspects being that a large amount of revenue, and thus environmental impacts, are concentrated within a relatively small amount of companies. As noted by Folke et al. (2019), small- and medium-sized businesses are also important actors, but many of these are either represented in TNCs' supply chains or only serve domestic markets.

The United Nations produces a yearly report called the World Investment Report (WIR), which highlights trends in foreign direct investments on a global scale. As part of this report, the UN ranks the world's top 100 non-financial TNCs in order of foreign assets (United Nations Conference on Trade and Development, 2019). This list formed the sample of the thesis and from these companies the most recent sustainability reports (primarily 2019) were retrieved. Due to time limitations, the sample was limited to the top 50 companies. The complete list of TNCs is found in Appendix I.

The sample contained companies with a broad range of emissions, from TNCs that are "carbon major entities" that belong to a group of fossil fuel and cement producers responsible for a majority of historic CO_2 emissions (Heede, 2014) to IT and pharmaceutical companies with less direct emissions. While the sample could have been focused on "carbon major entities" as identified by

Heede (2014), a broader range of companies is more likely to capture a wider range of environmental issues and more aspects, *e.g.* how companies handle up- and downstream impacts. With these aspects in mind the WIR list was chosen. An initial screening of 5 carbon major entities in the WIR list indicated distinctly homogeneous reporting, which with the WIR list still will be represented in the findings of this report but complemented with other findings from different types of TNCs. Only for two companies could relevant reports not be found.

3.5 Reliability, validity & source critical consideration

In terms of source critical consideration, four criteria have been proposed to evaluate a document's quality: authenticity, credibility, representativeness, and meaningfulness (Bryman and Bell, 2013, p. 550). The first criterion is concerned with whether the material is real and has unambiguous origin, this was ascertained by retrieving the sustainability reports from the websites of the sampled companies. The second criterion is to ascertain that the material is without fault or distortions, with the critique aimed at SR in mind this is unlikely to be met. However, this thesis is also interested in distortions or other aspects that from a document quality viewpoint would be considered negative - distortions can for example be a tool for legitimation strategies. It could be argued that there is a disconnect between the messages of a company's SR and what internal beliefs and aims are. Again, as SR is an important communication tool to present environmental performance to stakeholders, these external messages are of particular interest from a legitimacy perspective as they help businesses maintain and generate legitimacy. Therefore, this criterion was not of key consideration to this thesis.

Regarding the third criterion, representativeness, the question is whether the material is typical of its type. All materials are sustainability reports and were to a large extent based on the GRI framework. Although there could be argued to be great flexibility in the framework and what constitutes a sustainability report, the key question here is whether all the documents are representative of what the companies wish to communicate regarding their environmental sustainability. While SR may not be all encompassing on this topic, they are seemingly a key tool in this communication. Lastly, meaningfulness is whether the material is clear and understandable, all reports from the sampled TLCs were written in English and considered to fulfil this criterion.

Qualitative research overall has been criticised for its lack of replicability, transparency, subjectivity, and generalisability (Bryman and Bell, 2013). Several translations of reliability and validity from quantitative to qualitative research have been made, one approach considering external reliability, internal reliability, internal validity, and external validity (ibid.). External reliability is to which extent a study can be replicated, while internal reliability is in regard to consensus and shared interpretations of co-authors. External validity is to which extent the results can be generalised to other contexts and environments, while internal validity is congruence between the data, results, and analysis.

Given that the documents are accessible publicly, the sampled company and research procedure is clarified there is no hindrance for replication and there is hence external reliability. However, there are of course challenges with a lone undergraduate student attempting to analyse a large sample of documents in a novel context, which does have implications for reliability as well as the internal validity. Furthermore, there can be a difference between what the coder/reader interprets and what the author meant (e.g. Bell et al., 2001). Lastly, TLCs are at an extreme end of the business spectrum which has implications for the external validity, the findings produced by this thesis are not necessarily applicable to small- or medium-sized enterprises.

4 Narratives businesses tell relating to decoupling and green growth

The document analysis resulted in the identification of 7 narratives the sampled corporations tell: *i)Businesses recognise the problems, ii) Action is being taken, iii) Goals have basis in science, iv) Technology and innovation provide the solutions, v) Businesses offer crucial benefits, vi) Businesses are at the hands of demand* and *vii) External action is needed*. The narratives are individually expanded upon in ensuing subsections and then interpreted with legitimacy theory in section 5. Quotes in section 4 and 5 are from sustainability reports from TNC companies unless cited otherwise, the complete list of TNCs sampled can be found in Appendix I, with further examples from the data in Appendix II. Most of the findings relate implicitly to decoupling and green growth, the paradigm being that businesses must achieve both growth and sustainability. In general, each narrative deals with either growth or environmental sustainability - rarely are both mentioned in unison to any larger extent. Narratives *i-iv* and *vii* address primarily environmental sustainability, while *v* and *vi* are in regards to growth.

4.1 Businesses recognise the problems

On a fundamental level of problem-solving, the problem must be understood in order for proper solutions to be developed. Businesses consistently communicate that they understand and recognise environmental sustainability issues, most prevalent being the issue of climate change. The problems identified are primarily in relation to the symptoms of environmental unsustainability, for example "Climate change remains one of the most critical global challenges facing humanity" (Vodafone Group Plc). However, businesses also address underlying reasons and challenges that drive environmental issues. Enel SpA recognises that "the rising population and economic growth generate impacts correlated with the scarcity of resources and management of water".

The recognition can be made as general problem statements as well as being placed in the context implications for humanity as a whole or the corporation specifically. Nestlé SA captures both aspects in one sentence: "We depend on forests, soil, oceans and the climate – not only for a sustainable supply of ingredients but also to maintain environmental conditions suitable for life". Here, the "we" could be interpreted both as the company or humanity in terms of dependency and maintaining environmental conditions.

4.2 Action is being taken

Having identified the problems, businesses tell the story of how they are addressing them. In sustainability reports, businesses share what improvements have been made and what targets have been set. The variation of the actions described is great, yet a clear trend being emission targets and reductions. These quantitative aspects are not necessarily placed into a context or related to external ambitions, merely stated - *e.g.* Total SA wants to "cut greenhouse gas emissions at our operated oil and gas facilities from 46 million tons of carbon dioxide equivalent (CO2e) in 2015 to less than 40 million tons in 2025". It was furthermore also prevalent that businesses communicated improvements that had basis in internal assessments, typically comparing suppliers to standards: "In 2018, Foxconn enrolled 43 new suppliers – 100 percent of which met our environmental management assessment standards" (Hon Hai Precision Industries).

Improvements can also be unquantified and broadly generalised, such as "This approach has helped us reduce the impact of our value chain in areas like emissions, energy use, water use, waste, material use, ecosystems, and use of non-depletable resources"(DowDuPont Inc). The narrative builds upon current trends in corporate sustainability, including initiatives and projects relating to circular economy, zero carbon footprint and renewable energy. What the narrative overall tells is that companies are improving and taking responsibility with the help of a wide range of tools.

4.3 Goals have basis in science

In the cases where environmental targets are placed into context, it is primarily through the external authority of Science-Based Targets (SBTs). SBTs is an initiative that has a formalised process for which organisations can develop emission goals based on the goals of the Paris Agreement. Businesses anchor their improvement stories in a grander setting, following the ambitions of committed nations. The integration of SBTs is communicated in slightly different ways, some corporations indicating that the process shows that already set targets are credible and others that the process was used to ensure that targets set were credible. In general, emphasis is put on scientific recognition: "These goals have been recognised as being based on science in accordance with the Science Based Targets initiative (SBTi)" (Iberdrola SA). The narrative builds a story of credible and trustworthy sustainability goals, indicating that businesses have serious ambitions and

are supporting global action on climate change. However, some businesses also build a narrative around the Paris Agreement without having committed to the SBTs initiative, for example Chevron Corporation, which merely expressed its sympathy for the issue, stating: "We share society's concerns as governments pursue the goals expressed in the Paris Agreement."

4.4 Technology and innovation provide the solutions

Delving into the ways that businesses will achieve their environmental targets, technology and innovation play key roles. Businesses build the narrative that technology and innovation are critical to decrease environmental impacts, while maintaining or even increasing growth. The technological solutions are not always placed in the context of growth, it was however common that economic benefits of technical solutions were presented. For example, new solutions presents an opportunity for companies to expand their portfolio and introduce new products: "Developing new products that reduce emissions and waste and improve energy efficiency both internally and for our customers" (Telefonica SA). While there are slight differences in the focus areas of different industries, there are several shared themes such as the circular economy (reducing waste, using recycled materials), new innovative materials, renewable energy, electrification, increased efficiency and life-cycle thinking.

In terms of industry trends, the petroleum industry put particular emphasis on the future potential of negative emissions through "natural climate solutions" and "carbon capture and storage", i.e. binding carbon dioxide from the atmosphere. BP Plc stating that "it's estimated that NCS could deliver around one third of the total GHG emissions reductions needed to meet the Paris goals by 2030, at a reasonable cost." The vehicle industry was, in terms of technology, largely focused on electrification: "In order to curb greenhouse gases, we believe that effective vehicle electrification is essential for the efficient use of energy..." (Toyota Motor Corporation).

4.5 Businesses offer crucial benefits

The extent to which businesses specify the environmental impacts their operations have vary. However, in contrast, most tell a positive narrative of the benefits their products, services and operations bring about. The narrative revolves around the contributions the company makes to society, building upon the narrative of action while expanding it to address other facets of

sustainability or societal needs. This can be communicated through generalisations, such as "Honda has addressed numerous issues by helping solve social issues through its business activities, giving consideration to the impacts on the environment and society" (Honda Motor Co Ltd), but also more specifically in how the business or it products enables the modern way of life, for instance "These are products that people rely on to live their lives, in their homes and businesses, and for transport" (Royal Dutch Shell plc).

Furthermore, the products and services themselves can offer benefits for the environment: "Some of our products and services already provide solutions for climate change, waste, water, air pollution, fires and biodiversity" (Telefonica SA). This is also reflected in the cases where businesses try to quantify non-economic aspects such as social impacts, Novartis AG only considering positive returns: "We are currently working on valuing the social return on investments at the intersection of community health and the local environment." Many businesses also specifically address the work opportunities it creates and its contributions to the economy, for example: "Iberdrola's growth has also entailed the creation of more stable and high-quality jobs within the company, with almost 3,500 new hires during the year" (Iberdrola SA).

4.6 Businesses are at the hands of demand

Rarely do businesses explicitly state that increased environmental impacts follow from increased growth, such as in the following manner: "Our GHG emissions are increasing every year due to production volume growth..." (Samsung Electronics Co., Ltd.). What is more common is the narrative of consumer demand being a key driver that businesses can do little about. This can be communicated directly, making the reasoning explicit: "The issue of demand is a tricky one and only partly within our control, since it's dictated by consumer habits and decisions. After all, they buy what they want to" (Total SA). It can also be told indirectly, growth being a given: "Over the next several decades, populations are projected to grow and the middle class will continue to expand – dynamics that will further the demand for energy" (Exxon Mobil Corporation).

The overall theme of the narrative being that while businesses are doing their best to be sustainable, there is only so much they can do – not necessarily placing burden on customers, but the more obscure forces of demand or demographic trends. It is common that the leading factor businesses

mention is population growth, not necessarily demand in and of itself. While in the case of demand businesses have an influence, it is much less the case for population growth. However, the narrative is not solely told in relation to overall consumption, it is also applied to product choices as exemplified by BMW AG:

> *"Effective climate protection cannot be achieved with bans. We will continue to offer our customers a wide range of drive technologies, where they can choose between different drive trains in all relevant vehicle segments – according to their mobility needs and desires. This gives our customers the 'Power of Choice'."*

In some cases demand and growth are even the solutions, as exemplified by Total SA: "For Total, the challenge is to control greenhouse gas emissions not by limiting growth, but by promoting economic development and energy access for those who don't have it".

4.7 External action is needed

Overall, the focus of actions was very much internal, with the occasional call for political and societal action. Interactions between external and internal action was observed throughout the sampled reports. Typically, it was done as a form call for united action, that organisations of all kinds must contribute towards sustainability. Bayer AG stated that the SDGs had not achieved sufficient progress, particularly in developing countries – "Industry must play a more active role in this regard." However, petroleum-centred businesses specifically told a narrative where external action needs to be taken to enable the biggest steps towards emission reductions. Most businesses in the petroleum industry advocated for carbon tax policies, one example provided by BP plc: "We plan to allocate more resources to advocate for well-designed policies, including carbon pricing. We believe this is the most efficient way to reduce GHG emissions…". The narrative also involved other forms of emission regulation or market-based solutions. Beyond the petroleum industry, car manufacturers also included narratives regarding politically enabled decarbonisation.

5 Discussion

In this section, the findings are discussed from the perspective of legitimacy theory and how they inform the research question. Furthermore, the findings and legitimacy analysis are related to previous research. Finally, the thesis contributions are discussed.

The findings are mainly about implications and narratives indirectly related to green growth and decoupling. While mentions of sustainable growth or green growth was plentiful in the sample, it was rare for businesses to make their approach to this growth explicit. Ergo, it is rather the whole of the findings that lend robustness to the conclusions of how businesses apply green growth and decoupling to manage their legitimacy, than the individual parts by themselves. However, businesses explicitly and implicitly address that they need to achieve both growth and sustainability in order to be seen as legitimate. Implicitly in the narratives told, explicitly through quotes such as this example from Honda Motor Co Ltd: "In order to achieve both the creation of growth opportunities for the Company and a sustainable society, Honda has set striving to be 'a company that society wants to exist' as its direction for the 21st century."

5.1 The narratives as legitimacy strategies

From the perspective of legitimacy, businesses manage a wide range of aspects through the narratives. Table 1 contains a summary of the narratives, each represented with an example from the data and its correlated strategy. To an extent, the strategies are related to businesses conformity to societal expectation. Through the narrative of businesses *recognising the problems,* they show that they are in agreement with societal belief, indicating that they share the concern regarding environmental impacts and accordingly fit into said society. Furthermore, merely recognising the problems can help businesses be perceived to be committed to environmental sustainability. In the narrative of *taking action,* businesses manage legitimacy by showing that they are also working towards solving the problems and are taking responsibility. By *taking action*, businesses furthermore indicate that they consider the problems to be important enough to be addressed. To place these actions into a context that further helps companies manage legitimacy, the *goals of corporations are related to science and authorities*. This lends validity to businesses' goals, seemingly providing objectivity and indicating sufficiency. However, there are also plenty of targets and actions that are not placed into context. An insightful reflection on the topic of action

and relevant context was provided by Exxon Mobil Corporation's 'External Sustainability Advisory Panel' that made the following comment:

> *"However, assessing whether the level of... R&D investments in lower-carbon technologies is at an adequate scale, given the magnitude of the societal risk and the size of the company, requires additional context and data in ExxonMobil's disclosures."*

It is indeed challenging to evaluate a company's sustainability activities when the reports include insufficient data, a possibly conscious choice to decrease the risk of unfavourable results. The narrative *technology and innovation provide the solutions* also manages the perception and validity of businesses actions, as this narrative indicates that companies have specific ideas on how to solve the problem and through it achieve decoupling. The group of strategies mentioned above are connected through the theme of businesses conforming to societal expectations.

Table 1. Overview of narratives and legitimacy strategies employed in relation to decoupling and green growth. Further examples from data can be found in Appendix II.

Narrative	Example from data	Legitimacy strategy
Businesses recognise the problems	"Climate change remains one of the most critical global challenges facing humanity." (Vodafone Group Plc)	By recognising problems, businesses show they agree with societal beliefs.
Action is being taken	"We want to improve our passenger cars' total lifecycle carbon footprint by 30% compared to 2015 by as early as 2025." (Volkswagen Group)	To manage legitimacy, businesses build narratives of improvement and taking responsibility.
Goals have basis in science	"To ensure that our targets are in line with the goal of the Paris Agreement... we have joined the Science Based Targets initiative." (Bayer AG)	Referencing authority to gain validation that the business is pursuing sufficient goals.
Technology and innovation provide the solutions	"Our own global footprint is becoming more energy efficient and less wasteful every day as we put digital technology to work..." (DowDuPont Inc)	Further validation is given to businesses' approaches by indicating that their specific solutions lead to improvements.

Businesses offer crucial benefits	"By providing the energy to heat and light homes and for transport and industry, BP supports economic growth and the improvements in quality of life this brings." (BP plc)	By rationalising around the benefits the businesses provide, they justify their operations and the correlated negative impacts.
Businesses are at the hands of demand	"The issue of demand is a tricky one and only partly within our control, since it's dictated by consumer habits and decisions. After all, they buy what they want to." (Total SA)	In shifting the focus to customers, businesses shift part of the blame and manage legitimacy by decreasing their responsibility for the problems.
External action is needed	"We believe that smart policies from governments, such as applying a cost to emissions through measures such as carbon-pricing mechanisms… are the best ways to reach solutions and drive progress." (Royal Dutch Shell plc)	Similar as above, but with shifting the burden to lawmakers and politicians.

There is also a theme of mitigation in the legitimacy strategies. While not always making explicit that business operations have negative environmental impacts, they nevertheless employ strategies to mitigate their part in the problems and impacts. By focusing on the narrative that *businesses offer crucial benefits*, companies shift the spotlight to positive aspects of their operations. It acts as a form of rationalisation for the negative impacts the business has, justifying the impacts while also implying that the business fulfils positive aspects that society expects of it - more growth providing more work opportunities and meeting demand. If the narrative of problem recognition argues for why environmental sustainability is needed, then this narrative of benefits is the equivalent for economic growth. Demand is also incorporated in another strategy, through the narrative that *businesses are at the hands of demand* they minimise the part they play, the growth and its correlated impacts taking place regardless. The less businesses can be perceived not to be a driver of environmental issues, the less their legitimacy is at risk. This appears to be the case also for the narrative that *external action is needed*, which as well works to minimise the part businesses play in the solution and thus the risk businesses carry by not addressing it sufficiently. There are degrees

of overlap in the themes of societal expectations and mitigation. Technology and innovation can also be seen as a mitigation strategy, as there is less cause for concern if businesses have a clear idea of how to approach the challenges.

5.2 Comparison of narratives and strategies to earlier research

The legitimacy strategies discussed above bear some similarity to the six strategies identified by Hahn and Lülfs (2014) in relation to negative events in SR. While their marginalisation was to make negative aspects seem unimportant or small, the marginalisation I found had more to do with the ties companies have to negative environmental impact - rather than the impact itself. Their identified strategy of "indicating facts" bears some similarity to the narrative that businesses recognise the problems and are taking action, merely mentioning that action is being taken can increase the perception of responsibility, even though the action is not placed in context. I also found aspects of rationalisation and authorisation, the former in the narrative that corporations provide benefits and the latter in SBTs. Furthermore, the identified narratives are in line with previous research that has identified themes in corporate sustainability rhetoric (Castelló and Lozano, 2011). While there are similarities with previous research, I have made specific findings related to green growth and decoupling. These specifics relate to customer demand, external action from governments, and technology and innovation paving the way for green growth.

Aspects related to the barriers towards green growth identified by Parrique et al. (2019) were also prevalent in the sampled sustainability reports, mostly through concepts such as the circular economy and servicification. However, little consideration was seemingly placed on any of the barriers, businesses for instance placing high expectations on the potential of recycling while only occasionally recognising its current limitations and only seeing opportunities with new services. The narrative of solutions through technology and innovation is in direct conflict with barrier *vi) insufficient and inappropriate technological change*. Overall, businesses had little to no consideration for any of the barriers, particularly those that are related to complex, large scale system dynamics: *ii) rebound effects, iii) problem shifting* and *vii) cost shifting.* This could indicate a multitude of things related to companies' communication and sustainability activities, for example that businesses still must consider their actions in a larger scope. It does however reflect an sort of optimism, which given TNCs above-average impact and the findings of Cho et al. (2010)

that organisations with worse environmental performance had more optimistic language is congruent.

5.3 Contributions

Through this thesis I have has contributed with novel findings in the field of SR, providing new insight into how TNCs build narratives and manage legitimacy through decoupling and green growth. Even though the scientific paradigm is shifting on green growth, the business paradigm is still very much dedicated to the achievement of both economic growth and environmental sustainability. The findings make evident that corporations are locked in on a path with increasingly weak scientific support, which in their defence has been backed by some of the world's largest global organisations. If the legitimation strategies were scaled away from SR, the improbability of green growth might become evident even in case-specific contexts, which would support the conclusion by Higgins et al. (2019) that regulation perhaps should focus on what is reported instead of simply requiring reporting. From a larger perspective, the findings and previous research could be argued to suggest that the prevailing discussion of corporate sustainability talk versus walk is secondary to the approach global corporations are taking to sustainability. If corporate sustainability talk leads to walk or if it is the other way around seems of minor importance when the definition of the walk lacks scientific support.

6 Conclusions

The purpose was to identify narratives and legitimacy strategies related to the concepts of decoupling and green growth, as means to handle the contradictory goals of economic growth and environmental sustainability. I identified seven narratives: *i) Businesses recognise the problems, ii) Action is being taken, iii) Goals have basis in science, iv) Technology and innovation provide the solutions, v) Businesses offer crucial benefits, vi) Businesses are at the hands of demand* and *vii) External action is needed*. The narratives reflect the paradigm that businesses can achieve both growth and sustainability. Most of the narratives specifically address environmental sustainability, fewer being concerned with growth - rarely were growth and environmental sustainability approached in unison to any greater extent. I then analysed the narratives from the perspective of legitimacy theory and derived the narratives into strategies that are applied by businesses to manage legitimacy both as an economic actor and as a societal entity with environmental responsibility. Two overarching themes were found, the strategies mainly serving to communicate that businesses are acting in line with societal expectations and to mitigate businesses' negative ties to environmental impacts.

The narratives are in line with previous corporate SR research, while the strategy analysis from a legitimacy perspective shares similarities with previous findings while also expanding the field. The novel findings concerning green growth and decoupling are in relation to customer demand, external action from governments, and the emphasis on technology and innovation paving the way for green growth. In terms of barriers towards green growth, businesses paid little to no attention to them, which was especially the case for barriers related to system dynamics, such as recoil effects. The novel findings provide new insight into how companies manage legitimacy through green growth and decoupling, as well as giving clear indication that companies are bound to the sustainability approach of green growth despite the lack of scientific evidence. Further research into the area of business administration and green growth could benefit from a data sample consisting of interviews, an approach which might lend to deeper reasonings around green growth and the very real possibility that it is not achievable. Furthermore, a different document data sample could provide insight into differences between regions and types of organisations (*e.g.* state-owned in contrast to privately-owned).

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8 Appendix

Appendix I - List of sampled TNCs

Based on World Investment Report 2019, annex table 19: The world's top 50 non-financial MNEs,

ranked by foreign assets, 2018.

Company	Country	Industry	Notes
Royal Dutch Shell plc	United Kingdom	Mining, quarrying and petroleum	GRI: Core
Toyota Motor Corporation	Japan	Motor Vehicles	
BP plc	United Kingdom	Petroleum Refining and Related Industries	GRI: Core
Softbank Group Corp	Japan	Telecommunications	
Total SA	France	Petroleum Refining and Related Industries	Publishes a "climate report" alongside an integrated report.
Volkswagen Group	Germany	Motor Vehicles	GRI: Core
British American Tobacco PLC	United Kingdom	Tobacco	Produces both a "Sustainability strategy report" and an "ESG Report" according to GRI Standards.
Chevron Corporation	United States	Petroleum Refining and Related Industries	Only 2018 report available.
Daimler AG	Germany	Motor Vehicles	Only 2018 report available.
Exxon Mobil Corporation	United States	Petroleum Refining and Related Industries	Only 2018 report available. Follows an industry framework.
Anheuser-Busch InBev NV	Belgium	Food & beverages	Only has a subsection on

			sustainability in its annual report.
Apple Computer Inc	United States	Computer Equipment	Environmental Responsibility Report 2019
CK Hutchison Holdings Limited	Hong Kong, China	Retail Trade	A relevant report was not found.
Honda Motor Co Ltd	Japan	Motor Vehicles	Uses GRI content index.
Vodafone Group Plc	United Kingdom	Telecommunications	GRI Standards
General Electric Co	United States	Industrial and Commercial Machinery	A relevant report was not found.
Siemens AG	Germany	Industrial and Commercial Machinery	GRI Standards
Enel SpA	Italy	Electricity, gas and water	GRI Standards
DowDuPont Inc	United States	Rubber and Miscellaneous Plastic Products	GRI: Core. Only 2018 report available.
Nissan Motor Co Ltd	Japan	Motor Vehicles	GRI: Core
Iberdrola SA	Spain	Electricity, gas and water	GRI Standards
Nestlé SA	Switzerland	Food & beverages	Publicizes a "Creating Shared Value" report according to GRI Standards.
BMW AG	Germany	Motor Vehicles	GRI Standards
Bayer AG	Germany	Pharmaceuticals	GRI: Core
Johnson & Johnson	United States	Pharmaceuticals	GRI: Core

Amazon.com, Inc	United States	E-Commerce	
Microsoft Corporation	United States	Computer and Data Processing	GRI Standards
Deutsche Telekom AG	Germany	Telecommunications	GRI Standards. Only 2018 report available.
Glencore PLC	Switzerland	Mining, quarrying and petroleum	GRI Standards. Only 2018 report available.
EDF SA	France	Electricity, gas and water	
Hon Hai Precision Industries	Taiwan Province of China	Electronic components	GRI Standards. Publicises a report through its trade name Foxconn. Only 2018 report available.
Eni SpA	Italy	Petroleum Refining and Related Industries	GRI: Core. Only 2018 report available.
Takeda Pharmaceutical Company Limited	Japan	Pharmaceuticals	GRI Standards.
Telefonica SA	Spain	Telecommunications	GRI Standards.
Rio Tinto PLC	United Kingdom	Mining, quarrying and petroleum	
Medtronic plc	Ireland	Instruments and related products	GRI: Core
Fiat Chrysler Automobiles (FCA)	United Kingdom	Motor Vehicles	GRI: Comprehensive. Only 2018 report available.
Mitsui & Co Ltd	Japan	Wholesale Metals and Minerals	GRI: Core
Samsung Electronics Co., Ltd.	Korea, Republic of	Communications equipment	GRI: Core

China COSCO Shipping Corp Ltd	China	Transport and storage	GRI: Core. Only 2018 report available.
Novartis AG	Switzerland	Pharmaceuticals	GRI: Core
Nippon Telegraph & Telephone Corporation	Japan	Telecommunications	GRI: Core
Ford Motor Company	United States	Motor Vehicles	GRI Content Index
ArcelorMittal	Luxembourg	Metals and metal products	GRI Standards in integrated report. Only 2018 report available.
Tencent Holdings Limited	China	Computer and Data Processing	Has an ESG Report subsecion in its 2019 annual report.
Linde PLC	United Kingdom	Chemicals and Allied Products	GRI: Core. Only 2018 report available.
Pfizer Inc	United States	Pharmaceuticals	Uses a GRI Content Index in its annual review.
Allergan PLC	Ireland	Pharmaceuticals	GRI: Core.
BASF SE	Germany	Chemicals and Allied Products	GRI: Comprehensive
Airbus SE	France	Aircraft	Has an online GRI Content Index with material both on different web pages and in different documents, most of the information seemingly being included in the annual report which was used in this case. Only 2018 report available.

Appendix II - Narrative examples from data

Narrative	Examples from data
Businesses recognize the problems	"We depend on forests, soil, oceans and the climate – not only for a sustainable supply of ingredients but also to maintain environmental conditions suitable for life. Yet, globally, resources are being used in an unsustainable manner. Indeed, if the whole world consumed at the same rate as the richest countries, we would need between three and five Earths to sustain consumption (Global Footprint Network)." (Nestlé SA) "Climate change remains one of the most critical global challenges facing humanity." (Vodafone Group Plc) "Nevertheless, the progress made with the Sustainable Development Goals so far is insufficient and does not reach enough people, particularly in developing countries. Industry must play a more active role in this regard." (Bayer AG)
Action is being taken	"...the energy consumption per vehicle produced increased by approximately 9% compared with last year (from 5.60 to 6.09 GJ), but still recorded a decrease of 17% compared with 2010 (from 7.36 to 6.09 GJ)." (FCA) "We have set a goal to cut greenhouse gas emissions at our operated oil and gas facilities1 from 46 million tons of carbon dioxide equivalent (CO2e) in 2015 to less than 40 million tons in 2025" (Total SA) "We want to improve our passenger cars' total lifecycle carbon footprint by 30% compared to 2015 by as early as 2025." (Volkswagen Group) "We have committed to reducing our greenhouse gas emissions by 50% and to purchasing 100% of the electricity we use from renewable sources by 2025" (Vodafone Group Plc) "This approach has helped us reduce the impact of our value chain in areas like emissions, energy use, water use, waste, material use, ecosystems, and use of non-depletable resources." (DowDuPont Inc)

	"In 2018, Foxconn enrolled 43 new suppliers – 100 percent of which met our environmental management assessment standards." (Hon Hai Precision Industries)
	"In the medium term Eni aims to achieve the net zero carbon footprint on direct emissions of upstream activities valued on an equity basis by 2030, increasing the efficiency of its upstream activities, reducing GHG emissions and developing forestry conservation projects." (Eni SpA)
Goals have basis in science	"These goals have been recognised as being based on science in accordance with the Science Based Targets initiative (SBTi)." (Nestlé SA)
	"In addition, as part of the Science Based Targets initiative, we have joined other vehicle manufacturers in supporting a method for establishing adequate company-specific targets for global value chain CO2 emissions." (BMW AG)
	"To ensure that our targets are in line with the goal of the Paris Agreement to limit global warming to 1.5 degrees Celsius, or well below 2 degrees Celsius, we have joined the Science Based Targets initiative." (Bayer AG)
Technology and innovation provide the solutions	"We are also developing complementary approaches like carbon capture and storage and nature-based solutions to manage the difficult-to-avoid emissions" (Royal Dutch Shell plc)
	"In order to curb greenhouse gases, we believe that effective vehicle electrification is essential for the efficient use of energy..." (Toyota Motor Corporation)
	"We are committed to pursuing innovations that improve our environmental performance and reduce the potential environmental impacts of our operations." (Chevron Corporation)
	"A major step towards reducing CO_2 emissions from road traffic is the systematic electrification of our entire range of cars." (Daimler AG)
	"Since we announced, in 2017, our ambitious goal to one day make our

	products using only recycled and renewable materials..." (Apple Computer Inc) "Our own global footprint is becoming more energy efficient and less wasteful every day as we put digital technology to work in all our systems and supply chain, finding new ways to do more with less" (DowDuPont Inc) "In early 2019, we accelerated actions to tackle plastic waste and make good on our ambition to make 100% of our packaging recyclable or reusable by 2025."(Nestlé SA) "Developing new products that reduce emissions and waste and improve energy efficiency both internally and for our customers." (Telefonica SA) "We are reducing the life cycle impact of our products through packaging and circular economy initiatives." (Medtronic plc)
Businesses offer crucial benefits	"We have reduced our footprint on the environment whilst promoting digitalisation as a key tool for addressing the main environmental challenges. Some of our products and services already provide solutions for climate change, waste, water, air pollution, fires and biodiversity." (Telefonica SA) "We work with partners to establish methodologies to measure the total impact of our business activities. For example, we are currently working on valuing the social return on investments at the intersection of community health and the local environment." (Novartis AG) "The second area we focus on is to help shape a more sustainable energy future. That is why we are taking action to provide lower-carbon products to help customers reduce their emissions. These are products that people rely on to live their lives, in their homes and businesses, and for transport" (Royal Dutch Shell plc) "By providing the energy to heat and light homes and for transport and industry, BP supports economic growth and the improvements in quality

	of life this brings. We aim to do this in ways that support sustainable development and the energy transition." (BP plc) "Honda has addressed numerous issues by helping solve social issues through its business activities, giving consideration to the impacts on the environment and society" (Honda Motor Co Ltd) "The aim is to improve the prosperity and quality of life for all people, while keeping within the limits of the planet." (Siemens AG) "Iberdrola's growth has also entailed the creation of more stable and high-quality jobs within the company, with almost 3,500 new hires during the year, 99% of the workforce having fixed contracts, and numerous measures of support for work/life reconciliation and gender equality." (Iberdrola SA)
Businesses are at the hands of demand	"Our GHG emissions are increasing every year due to production volume growth" (Samsung Electronics Co., Ltd.) "The rising standard of living of a growing global population is likely to continue to drive demand for energy for years to come. The world will need to find a way to meet this growing demand, while transitioning to a lower carbon energy system to counter climate change." (Royal Dutch Shell plc) "The move toward this new mix — a combination of gas, low-carbon electricity and oil — needs to happen at a pace that is compatible with consumer demand and with development in the countries where we market our products. We need to strike the right balance between urgency and acceptability. Our customers are asking us to help reduce global greenhouse gas emissions while continuing to meet rising energy demand driven by economic and demographic growth." (Total SA) "The issue of demand is a tricky one and only partly within our control, since it's dictated by consumer habits and decisions. After all, they buy what they want to." (Total SA) "Over the next several decades, populations are projected to grow and the

	middle class will continue to expand – dynamics that will further the demand for energy. Meeting this demand will require significant investment and new production in the energy sector. Increased demand for energy will also impact emission levels…" (Exxon Mobil Corporation) "These are ambitious targets for our business, as business growth and our customers' growing data usage is resulting in increased energy demand." (Vodafone Group Plc) "Effective climate protection cannot be achieved with bans. We will continue to offer our customers a wide range of drive technologies, where they can choose between different drive trains in all relevant vehicle segments – according to their mobility needs and desires. This gives our customers the "Power of Choice"." (BMW AG)
External action is needed	"We plan to allocate more resources to advocate for well-designed policies, including carbon pricing. We believe this is the most efficient way to reduce GHG emissions…" (BP plc) "Decarbonization in the energy and transportation sector is strongly dependent on the political environment." (Volkswagen Group) "We believe that smart policies from governments, such as applying a cost to emissions through measures such as carbon-pricing mechanisms, supported by effective steps to reduce emissions from businesses including ours and from wider society, are the best ways to reach solutions and drive progress" (Royal Dutch Shell plc) "In our discussions with governments, we actively advocate for carbon pricing, an essential step, particularly if the world is to switch from coal to natural gas for power generation" (Total SA) "We also support market-based approaches to reduce greenhouse gas emissions, including further regulation of methane emissions and a carbon tax" (Exxon Mobil Corporation)