UiT The Arctic University of Norway

School of Business and Economics, Faculty of Biosciences, Fisheries and Economics

The Role of Internal Legitimacy in Shifting a Large Established Company Towards Sustainability

A Case Study of a Sustainable Transition Shift in the Oil and Gas Industry

Tahrir Jaber

A dissertation for the degree of Philosophiae Doctor – October 2022

Abstract

This thesis is motivated by the need to involve sustainability in the oil and gas industry. This thesis focuses on the sustainable transition in Equinor, the Norwegian oil and gas company. It looks, particularly, at a large established oil and gas company undergoing a sustainable change and how it performs its transition into sustainability. However, this transition poses challenges to a large established company like Equinor where, over 40 years, the petroleum activities were crucial for the country's economic growth and for funding the Norwegian welfare state. In addition, investing in renewable energy as a clean alternative source of energy requires Equinor to enhance its capabilities, knowledge and competencies outside its boundaries.

Legitimacy theory has been applied in this thesis and is considered to be an important mechanism for understanding how a large established company under sustainable change manages its new sustainable investments. However, existing research on sustainability is mainly focused on the role that sustainability plays in triggering new innovations, improving a company's image and enhancing competitive advantages, but does not necessarily involve how a sustainable transition is carried out in practice. Therefore, this thesis focuses mainly on internal legitimacy, in order to understand what is happening in a large established company undergoing a sustainable change. Thus, this motivates me to investigate the following overall research question '*What is the role internal legitimacy plays in shifting a large established company towards sustainability?'*

This thesis pursues two related objectives. From a practical perspective, it aims to shed light on the role of governments, managers and employees in developing a sustainable change in companies. From a theoretical perspective, it adds more theoretically based approaches and enables us to understand the strategic change process of introducing new sustainable activities in a large established company by using internal legitimacy theory. Consequently, this thesis contributes empirically to the literature of legitimacy, strategy and sustainability, and enables us to understand the role internal legitimacy plays in shifting a company's strategy towards sustainability.

These objectives are addressed through a cover essay and three research papers. The cover essay provides an overarching theoretical framework for the thesis, using the Scott and Suchman legitimacy theory which integrate the concepts of sustainability and strategy change. The cover essay consolidates the three individual research papers in a coherent manner and responds to the dissertation's overall research question. The empirical research is conducted within interpretivism and positivism perspectives research tradition, and follows a mixed methods approach that combines qualitative and quantitative research method designs. First, the qualitative data followed a semi-structured narrative approach collected over a three-year period. In addition, the secondary data were collected through Equinor's own documentation, such as company webpages, annual reports, sustainability reports, renewable energy reports, energy perspectives' reports, conferences and presentations. Second, the quantitative data were collected through a survey conducted between 2017-2019, resulting in 91 respondents who fully completed the survey.

The first research paper represents a qualitative case study and aims to respond to the lack of literature on the role internal legitimacy plays in developing a new sustainable strategy in a large established company. Thus, this paper synthesises previous literature on internal legitimacy and strategy change, advances our knowledge and forms new ideas about this complex phenomenon in order to understand the important role played by internal legitimacy

in creating a shift towards sustainability. It will thereby seek to explain how an oil and gas company strengthens its commitment to the environment and invests in clean alternative sources of energy (renewable energy) in order to develop an all-encompassing energy company. By employing the three types of legitimacy, moral, pragmatic and cognitive, this paper suggests that moral legitimacy plays an essential role in shaping a sustainable strategy shift to the company. This was related to the direct support from the Norwegian government, the board of directors and the top manager. Pragmatic legitimacy shows that most of the company's stakeholders are engaged in the new transition; however, the translation process of sustainable development will continue within the company until the sustainable transition is complete. Finally, cognitive legitimacy shows us that a majority of employees understand the relevance of this sustainable shift and accept it.

The second paper addresses a quantitative case study and aims to fill the gap in the literature concerning measuring sustainability in a large established company. This paper aims to make a methodological contribution to the research of internal legitimacy and strategy change by developing a valid measure of regulative, normative and cognitive pillars. Thus, this paper uses the three mentioned pillars as a lens to understand the factors that legitimise the adoption of new sustainable activities in Equinor. Accordingly, the key findings of this paper reveal that the Equinor case company employs a regulative and normative pillar that play an important role in building Equinor's internal legitimacy and framing its organisational identity. The regulative pillar is presented as the important carrier of shaping sustainable transition in the company, and the normative pillar plays an essential role in strengthening the sustainability transition. However, cognitive legitimacy was not supported in the study, and this reveals that it would need more time to be achieved so that everybody in the company understands and accepts the sustainable transition that is taking place in the company.

The third paper addresses a quantitative case study and aims to fill the lack of quantitative gap in the literature concerning internal legitimacy and sustainable innovation selection. This paper aims to make a methodological contribution by testing and validating a model that enables us to understand how a large established company selects its new sustainable activities. Thus, the three elements of legitimacy (regulative, normative and cognitive) are used as a tool to understand how people in a large established company make their sustainable choices. The key findings of this paper show that the regulative and normative pillars play essential roles in selecting renewable energy activities. However, the normative presents the strongest factor in all pillars. This means that employees play the most essential role in facilitating and implementing new sustainable ideas. Consequently, the results show that sustainability has been embedded in the company where the regulative and normative pillars present the potential carriers of the sustainable selection criteria.

Overall, this thesis advances new insights into the literature of organisational studies by understanding how employees in a large established company relate to sustainable challenges. Thus, this thesis advances new insights into the literature of internal legitimacy and strategy change by uncovering the 'How' and 'What' questions of the meaning of sustainable transition. First, the thesis explores how internal legitimacy is used to understand the introduction of a new strategy in a large established company. Second, it provides empirical evidence and shows what factors that build and manage internal legitimacy during strategy change. Third, it tests the data in a new setting by developing and testing both qualitative (interviews) and quantitative data (survey). Fourth, the thesis develops a conceptual framework that helps researchers understand how a sustainable shift can be implemented in large established companies. Finally, this thesis highlights similarities and disparities among Scott's and Suchman's division of

legitimacy theory. This is achieved through the three papers, considering that paper 1 aims to explore how internal legitimacy is used in a new setting, and paper 2 and 3 develop and test a survey in a new setting.

Acknowledgments

The road to my PhD has been an exceptional journey that has been a truly life-changing experience for me. This thesis would not have been possible to achieve without the support and guidance I received from many wonderful people whom I have had the good fortune to meet and get to know.

This dissertation would not have been possible without the support, guidance, encouragement and constant feedback of my main supervisor Professor Elin Merethe Oftedal. Thank you for believing in my abilities and for giving me the freedom to pursue my own thoughts and ideas. I deeply appreciate how you have been continuously encouraging and guiding me, and how you have always been so friendly and supportive of all of my efforts and struggles. Working under your supervision has been very enjoyable and I have learned a lot from you and I hope to continue moving in the right direction. I hope also to work with you again in the near future.

I am also grateful to my co-supervisors Professor Tobias Boström and Dr. Martin Srholec for their valuable guidance and considerable support to complete my thesis. Tobias, thanks for our early discussions about my PhD project and for enriching my background in renewable energy. Martin, thanks for taking the time to answer all my questions regarding my quantitative data. It has really helped me to understand the big picture and meet my research goals.

I would also like to thank my colleagues at the School of Business and Economics at UiT, The Arctic University of Norway. I would like to particularly thank Professor Lene Foss for her caring about us (PhD students), and for arranging many PhD seminars in order to get continuous feedback on our research papers. Thanks to my fellow PhD students whom I shared all my ups and downs with. I would also like to thank Dr. Mikko Moilanen for keeping his door 'always open' and for answering my never-ending questions with endless patience. I am grateful to my colleague Dr. Tine Degerstrøm Stenvold who has always been a major source of support when things would get a bit discouraging. Furthermore, I greatly appreciate the support received from my research group 'Research on Entrepreneurship Innovation and Sustainability' and for all the feedback I got on my research.

I am very thankful to The Nordic Research School in Innovation and Entrepreneurship (NORSI) and its former project coordinator Birte Marie Horn-Hanssen who arranged our PhD courses, annual conferences and seminars that helped achieve my goals.

It is important to note that this thesis could not have been written without Equinor, the company that allowed me to access various documents and resources. I would like to especially thank Natacha Blisson and Morten Mikkelsen for their amazing interest and support for my dissertation work. Thanks for being accessible, scheduling all the interviews and distributing my survey. I also must thank the many individuals I interviewed in the course of my research, in addition to the many individuals for their time in filling out my survey. Without their help, my analysis and understanding of the company would have been much less valuable.

This dissertation would not have been possible without the support and love of my friends and family. I would like to thank my old friends who provided happy distractions to rest my mind outside of my research. Thanks for believing in me and calling me 'Dr.' even before I earned the title. I am also grateful to my sisters and brother, who supported me emotionally, believed in me and wanted the best for me. I am forever indebted to my parents who gave me the opportunities and experiences that made me who I am today. It is their unconditional love, support and prayers that motivated me to reach my goal. I thank them for believing in me and for giving me the freedom to explore my own directions in life and seek my own destiny.

Finally, I sincerely thank my loving and supportive husband, Dr. Samer, and my two wonderful children, Lea and Adam. Samer, you have been a constant source of support and encouragement during the challenges of my PhD journey and life. I am so appreciative of your love, understanding and encouragement, and for taking up the whole responsibility of our family during my absence from home. I am truly thankful for having you in my life. To my lovely children, Lea and Adam who are the pride and joy of my life. You both have contributed substantially to this dissertation. Thank you for providing me with the requisite breaks from my dissertation and the motivation to finish my degree with expediency. I love you more than anything and I appreciate all your patience and support during mommy's PhD studies.

The past several years have not been an easy ride for all of us. Therefore, I dedicate this milestone to you Samer, Lea and Adam.

This thesis is only a beginning of my journey.

Tahrir

List of Appended Papers Included in the Thesis

Paper 1

Title: Energy companies in transition: seeking legitimacy or legitimation?

Authors: Tahrir Jaber and Elin M Oftedal

Status: Published as a book chapter in *Ice publishing*, 2019.

https://doi.org/10.1680/emsc.64256.187

Paper 2

Title: Legitimacy for Sustainability: A Case of a Strategy Change for An Oil and Gas Company

Authors: Tahrir Jaber and Elin M Oftedal

Status: Published in *Sustainability*, 2020. https://doi.org/10.3390/su12020525

Paper 3

Title: A Surge Toward a Sustainable Future: Organizational Change and Transformational Vision by an Oil and Gas Company

Author: Tahrir Jaber

Status: Published in *Journal of Contemporary Administration*, 2020.

https://doi.org/10.1590/1982-7849rac2021200031.en

Contributions

	Paper 1	**Paper 2**	**Paper 3**
Concept and idea	TJ	TJ	TJ
Study design and methods	TJ	TJ	TJ
Data gathering	TJ	TJ, EO	TJ, EO
Data analysis and interpretation	TJ, EO	TJ	TJ
Manuscript preparation	TJ	TJ	TJ
Critical revision of the intellectual content	EO	EO	EO

TJ = Tahrir Jaber
EO = Elin M. Oftedal

Table of Contents

List of Tables

List of Figures

Part I: COVER ESSAY

1 Introduction

1.1 Research Purpose and the Overall Question

The world has faced extreme environmental challenges over the last few decades such as pollution and climate change. These challenges affect our normal lives and firms are considered as the main cause of environmental problems (Bansal & Clelland, 2004). Especially, industries that represent the 'carbon majors'. These industries have long resisted crucial changes in spite of the environmental challenges it entails. In fact, it is strongly argued that the Oil and Gas (OG) industry played a major role in climate change, either direct through emissions or indirect through climate denial (Grasso, 2019).

Therefore, firms are pushed by governments, media and other stakeholders to develop in a more sustainable manner (Li et al., 2017). This is essential in order to reduce pollution and other negative environmental impacts and to create a sustainable development (Kemp & Pearson, 2008). Thus, the overarching inspiration of this thesis is to understand how does a large established company meet sustainability challenges? To answer this question, I would like to discuss it within a framework consisting of (1) a deeper understanding of sustainability including sustainable innovation (2) an understanding of a firm's strategic orientation and (3) legitimacy theory, by focusing on internal legitimacy theory.

There is an expanding amount of research in the field of sustainability and currently, the different concepts of sustainable development and sustainability are widespread among researchers (George et al., 2018). Studies on sustainability have mostly focused on the reason behind the adoption of sustainable activities in companies (Epstein, 2008; Frondel et al., 2008). Research on sustainability has also focused on management controls that shape the process of sustainability (Gond et al., 2012; Schaltegger & Wagner, 2006a). This has provided important insights into why sustainability has emerged, but they may not be fully able to explain how companies develop sustainability. In addition, we still know little about how established companies carry out sustainability in practice (Engert et al., 2016; Moldavska, 2017), how they manage possible sustainable initiatives (Engert et al., 2016; Schrettle et al., 2014) and how they legitimise their new technologies during an institutional change (Patala et al., 2019). Accordingly, the discourse around sustainability is associated with a strongly normative loading but has stalled at the point of articulating a process of governance.

As a result, there has been accusations of 'greenwashing' that shows several symbolic activities that make the business look good. For example, sustainability was presented as a marketing strategy (Azmat & Samaratunge, 2009), a tool for competitive advantage (Taherdangkoo et al., 2017), a tool for seeking society's acceptance (Kumar et al., 2012) or as a basic requirement to obtain legitimacy (Li et al., 2017). This makes companies' sustainable activities less effective, and companies are not showing their environmental awareness through solving environmental problems (Aragón-Correa et al., 2016). Moreover, it has been highlighted that studies on sustainability afford little attention to the institutional setting (Maletič et al., 2016; Roman, 2017) that is essential to understand how companies facilitate a real sustainable change. Thus, Crutzen et al. (2017) highlight that more research is needed to understand the factors involved in the decision to adopt sustainability in companies. Therefore, looking into the inner mechanisms of a company that responds to external pressure of becoming more sustainable can add to our overall understanding.

Sustainability and its related concerns is viewed as having a considerable impact on corporate strategies and activities (Dyllick & Muff, 2016). This means that sustainability is used as a tool to integrate new strategies into the overall business in order to trigger new technologies that might be inside or outside businesses' boundaries. A sustainable shift requires obtaining acceptance from a wider range of stakeholders such as the public and media, which is not the subject of this thesis (Idowu et al., 2013). This has been termed as a 'social license to operate' and is considered as a new name for legitimacy that means 'legitimating a company's action' (Gehman et al., 2017). As such, one can say that the advent of sustainability focus has forced large established companies towards processes to be legitimized by external stakeholders. However, changes in a company, must also meet stakeholders' acceptance internally. Therefore, in an attempt to understand how a large established company shifts its strategy towards sustainability, this thesis aims to use internal legitimacy theory.

Legitimacy theory provides useful explanations in understanding a company's functioning (Meyer & Scott, 1983). Sources of legitimacy and its actions may originate from inside and outside organisations (Ruef & Scott, 1998). Drori and Honig (2013) suggest an interdependent relationship between internal and external legitimacy. However, other researchers suggest that internal and external legitimacy are developed independently (Lu & Xu, 2006; Kostova & Zaheer, 1999). For example, internal legitimacy focuses on 'how things are done' in organisations (Drori & Honig, 2013), while external legitimacy focuses on external actors that look for positive signals related to organisations' potential or capabilities (Hannan & Freeman, 1984). However, this thesis focuses more on how a large established company would respond internally to external pressures (governments and other authorities such as Paris Agreement) and thus focuses on internal legitimacy. Internal legitimacy helps us understand how people in a large established company direct new actions that would be beneficial for their company (Drori & Honig, 2013). Thus, theory from legitimacy literature was used in this thesis as a lens to understand how a large established company shifts its strategy towards sustainability, and how internal actors work to achieve the company's sustainable goal.

Subsequently, literature of internal legitimacy seeks to advance our understanding of the role internal legitimacy plays in developing new sustainable practices in a large established company undergoing a sustainable change. In other words, internal legitimacy theory is integrated in this thesis in order to understand the sustainable shift a large established company is going through. Therefore, the thesis uses internal legitimacy theory by combining two interdependent scholars: Suchman (1995) and Scott (1995b, 2014), and contributes to existing organisational studies by exploring the following overall question:

'What is the role internal legitimacy plays in shifting a large established company's strategy towards sustainability?'

To answer this research question, the OG industry was used as an empirical focus in this thesis. OG industry are aware that their products are causing pollution that cause carbon dioxide to rise (Franta, 2018). Therefore, large established OG companies are responsible for reducing their carbon emissions and accelerating clean energy transition (IEA, 2020). Furthermore, the oil tax subsidies have been scaled down, thereby forcing established OG companies to reduce their new exploration of OG (NRK, 2021).

Currently, it is difficult to substitute OG for Renewable Energy (RE) industries and during this study, large established OG companies have gone through a remarkable change: from being celebrated as value and welfare creators towards being criticised as environment and climate destroyers. Today, we see that major OG players are working continuously on reducing their emissions, and making huge investments in developing clean practices such as RE. In addition, large established OG companies claim that they are changing their position from money-makers

to become part of the sustainable solution. Thus, they are put in a situation to be more responsible for finding new, environmentally-friendly solutions. Therefore, I found it interesting to focus on this industry. However, this thesis addresses a single case study (Equinor) that has gone through different stages to become a mixed-energy company.

This thesis aims to develop a conceptual framework based on three papers (one qualitative and two quantitative studies). However, before explaining how the three papers aim to answer the overall research question, section 1.2 provides the theoretical focus of this thesis and section 1.3 provides the motivation behind selecting the Norwegian OG industry as the empirical focus.

1.2 Theoretical Positioning

This section aims to identify the research gap that has inspired this dissertation's overall research question. It aims also to introduce the theoretical perspectives that are suitable for understanding the sustainable strategic shift towards sustainability a large established OG company is going through.

This thesis adopts Alvesson (2002); Alvesson and Berg (1992) approach of finding the research gap and constructing the research question. According to Alvesson (2002); Alvesson and Berg (1992), researchers are motivated to deal with (1) meaning and (2) symbolism to find a research gap. (1) Meaning refers to how an object is interpreted. It has also a particular reference to the sense that it demands to an expectation, 'a way of relating to things'. Alvesson and Jonsson (2022) claimed that organisations are constituted on high level of shared meanings and understandings of practices, objectives and technologies. Shared meanings are considered as 'communities of practices' where people think together (Pyrko et al., 2017). Thus, meanings in this thesis relates to the idea about sharedness which is acknowledged as 'a common way of relating in organisations' (Alvesson & Jonsson, 2022). However, in order to know how people in a company relate to its new sustainable activities for example, we have to look at sustainability as shared ideas, beliefs and behaviours that have become institutionalised in an organisational setting.

Therefore, a process of institutional change is essential to measure the degree of individuals' understanding and determine what is considered acceptable within an institution (Tost, 2011). For example, legitimacy theory is considered critical and as a necessary component of institutionalization and institutional research (Tost, 2011) because it helps us understand how interactions among individuals constitute social reality and guide institutional change (Reay et al., 2006; Zucker, 1977).

(2) According to symbolism, symbols are defined as '*objects, acts, relationships or linguistic formations that stand ambiguously for a multiplicity of meanings, evoke, emotions, and impel men to action*' (Cohen, 1974, p. 23). In addition, Alvesson and Berg (1992) indicate that a symbol is rich in meaning, however, understanding a symbol requires interpretations of its deeper meaning. This means, when thinking about a symbol, it is better to understand what it is not, or what it does not focus on (Alvesson, 2002). Thus, in this thesis it is important to understand what sustainability is and what it is not.

Companies face increasing pressure from stakeholders such as investors, customers and governments to disclose information about their environmental performance (Kim & Lyon, 2015; Marquis et al., 2016). Researchers such as Ashforth and Gibbs (1990); Meyer and Rowan (1977); Oliver (1991) believe that companies respond to external pressures with either symbolic or substantive actions. Symbolic actions occurs when a company enhance its image positively by misleading its stakeholders by its environmental commitment (Bebbington et al., 2008; Marquis & Qian, 2014). This shows that symbolic actions are managed with small

implementations, however, strategy and daily activities of the company remain unchanged (Truong et al., 2021). On the contrary, substantive actions, include changes in the strategy and daily activities of the company and shows its real environmental actions (Truong et al., 2021). A real environmental commitment can be achieved by truly communicate with stakeholders and aims to seek environmental, social and economic solutions Bocken et al. (2014); Dyllick et al. (2002).

This shows that some companies have their own internal environmental management guidelines, but they do not really work (Zhang et al., 2022). In fact, Lyon and Maxwell (2011) suggest that greenwashing occurs when there is a symbolic communication and no substantive actions on environmental issues. This is due to the fact that they engage in voluntary environmental projects, however, their environmental performance is not improved (Iatridis & Kesidou, 2018). However, sustainability takes the notion of 'green' into a deeper level. This includes embedding sustainability in a company's strategy and addresses a real movement towards our planet. This means companies must be socially and environmentally responsible, not only economically (Antunes et al., 2015).

As a result, based on meaning and symbolism, this thesis perceives sustainability as substantive actions that improve a company's social, environmental and economic performance, and not a case of 'greenwashing'. In addition, sustainability is shared meanings, that looks at how people inside a company accept new changes. To achieve this, a company is required to change its strategy towards a more sustainable focus. At the same time, changing a strategy in a company requires securing legitimacy from its internal stakeholders in order to align its identity with the desired future image (Bridwell-Mitchell & Mezias, 2012; Clark et al., 2010; Gioia et al., 2000). Therefore, in order to fill the research gap of this thesis and answer its research question, this thesis aims to use strategy literature to understand how external pressures are reflected in the company's internal strategy. In addition, as strategies have to be enforced by people, this thesis aims to look at how these changes are accepted among employees by using internal legitimacy.

Thus, the overarching theme for this thesis is to explore how sustainability is introduced in a large established company. Therefore, to answer this question, three generic concepts are relevant; corporate sustainability, strategy change and internal legitimacy, as shown in Figure 1.

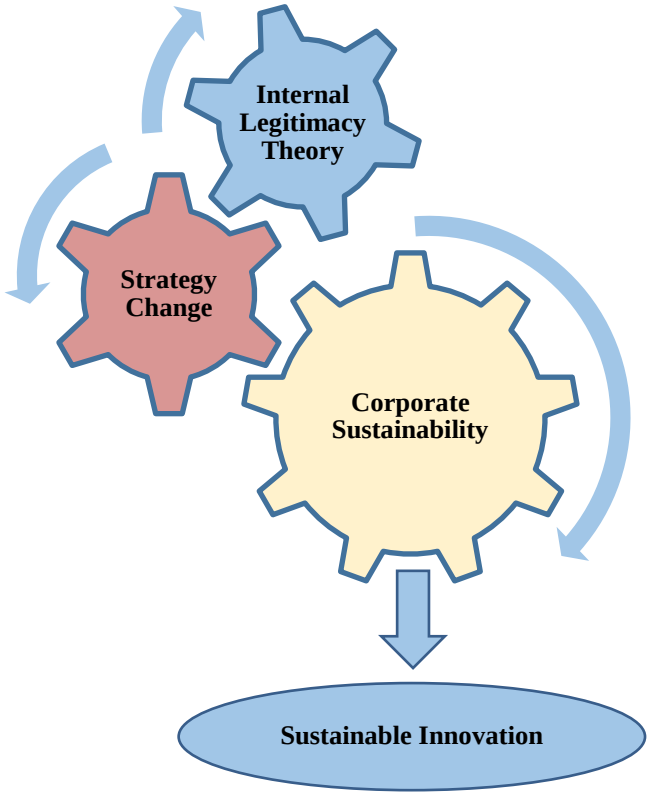


Figure 1. Theoretical framework positioning the dissertation and its theoretical foundations

The theoretical positioning of this thesis is complex, including the three concepts; sustainability, strategy and legitimacy. Sustainability has often been mentioned as a goal of companies, but measuring the degree to which organisations are being sustainable is not an easy task (Baumgartner & Rauter, 2017; Sandhawalia & Dalcher, 2015). Therefore, the term innovation is used in the research in order to study how new ideas are diffused and interpreted in companies (Katz, 1999; Terlaak & Gong, 2008). Thus, sustainable innovation in this thesis enables us to measure the degree of sustainability by evaluating the performance of its social and environmental support and its value beyond financial objectives.

However, developing new sustainable technologies, requires a company to change its strategy when responding to the new changes. Strategy change refers to all activities the company is required to do in order to develop new sustainable solutions and meet the company's sustainable goals. At the same time, a large established company is required to achieve its legitimacy when introducing new technologies (Deephouse & Suchman, 2008; Hargadon & Douglas, 2001). Therefore, internal legitimacy theory is used in this thesis because it helps us understand how a large established company functions and understand how a company shapes its structures in relation to the commitments of their participants (Meyer & Scott, 1983; Selznick, 1957).

More details about the theoretical focus will be explained in Chapter 2. However, before discussing the three papers, and how they answer the overall research question, section 1.3 provides the motivation behind selection of the OG industry as a sector.

1.3 Empirical Focus

The future for the OG industry has changed due to the growing demand for clean alternative resources, a fall in the oil prices and challenges on climate change. This has forced the world's largest OG companies to rethink their strategies and establish their own vision of sustainable development.

The energy transition from OG into RE represents a strategic opportunity for the largest players in the industry. Thus, large established companies from the OG sector entered the world of RE by investing in activities such as geothermal energy, algae for biofuel, bio-diesel and solar powered energy (Hartmann et al., 2020). However, due to the concerns regarding climate challenges and sustainability, RE is developing rapidly. In this context, large established OG companies are moving towards a low-carbon emission energy transition and play a major role in providing the world with mixed energy.

Thus, the climate challenges and energy transition that we face today enable us to raise critical questions about the future of OG companies. This increased my interest in studying how the OG industry meets these challenges. For the purpose of this thesis, the focus is on the Norwegian OG company Equinor (formerly known as Statoil) which intended to provide the world with needed energy. Equinor is the largest energy company in Norway and one of the largest offshore operators in the world. Equinor invested in RE activities, mainly in offshore floating wind turbines already in 2008 (Equinor, 2008). This was not a genuine clean transformation, but instead to enhance the company's public image. However, the company made ground-breaking changes in its strategy towards sustainability starting in year 2014 and until now. For example, Equinor invested 400 million NOK (the currency of Norway) in RE between 2014 and 2017 (Equinor, 2008). This led the company to rebrand its name from Statoil into Equinor in 2018 in order to support its transition towards clean energy (Gulowsen, 2018). In addition, Equinor focuses now on carbon neutral and has its plans to reduce its greenhouse gas emissions in Norway to near zero by 2050 (Adomaitis & Solsvik, 2020).

The Norwegian setting of the company is also important, because the Norwegian state is the largest shareholder of the company (owns 67% of the company). Norway has, since 1987, prioritised sustainability and made legislative changes to reduce the climate change effects of greenhouse gases, and is continuously working towards an ambitious global climate agreement to ensure environmental sustainability (Brundtland, 1987; KLD, 2014). This involved significant changes regarding environmental policy, where RE has been introduced as an alternative clean energy and is promoted as a climate change adaptation. At the same time, this is considered crucial for Norway's economic growth due to the petroleum activities that fund the Norwegian welfare state. This puts Norway in a situation to be committed to a low-carbon future and develop more sustainable energy in the world.

Norway has one of the strictest environmental regulations and is one of the first countries in the world to support the Paris Agreement (Ministry of Climate and Environment, 2020). Norway also has a commitment to sustainable development by cutting emissions both nationally and internationally (Ministry of Climate and Environment, 2020). In addition, Norway is working actively to ensure its sustainable goals (Ministry of Climate and Environment, 2020). This enables the Norwegian government to take tangible steps on sustainability in order to shift from OG dependency to a low-carbon and green innovation economy (Brewer, 2018). Therefore, the Norwegian context offers a rich case study for answering the questions raised in this thesis.

The low-carbon transition of large established OG companies remains nascent. Large established OG companies recognised the importance of this transition and began to take action around 2010 (Scott, 2018). Therefore, large established OG companies decided to achieve a low-carbon transition in different ways. For example, some OG companies decided to reduce their emissions by improving their energy efficiency, finding high-quality reserves, improving product quality and investing in carbon capture and storage technology (Lu et al., 2019). Other OG companies decided to invest money in new RE projects (Lu et al., 2019).

Researchers like Lu et al. (2019) consider RE as an opportunity to the industry and society and as the most efficient way to achieve a low-carbon transition. In addition, Geels (2018) highlights that established companies play an essential role in accelerating the development of new low-carbon transitions if they reorient their strategies. However, achieving a low-carbon transition, requires companies to make new technological and organisational changes in their business activities, make new investments and bring new skills (Foxon, 2013; Molcho & Shpitalni, 2006; Qin et al., 2018).

The next section describes the three papers that were developed to answer the main research question of this thesis.

1.4 Positioning of the Papers

This thesis builds on the literature of sustainability, internal legitimacy and strategy, seeking to advance our understanding of the strategic change that occurs in a large established company undergoing a sustainable shift. However, in order to answer the overall research question, three research papers are primarily addressed in this thesis. Each paper explores a specific research question relevant to inform the dissertation's overall topic. Common to all these papers is the extensive view of internal legitimacy and how it is seen as an essential catalyst for sustainable change within a large established company. This will help us overcome previous results regarding developing new sustainable actions and managing legitimacy in a large established company undergoing change. This research design responds, also, to the request for more qualitative and quantitative studies in sustainability and legitimacy (Binz et al., 2016; Kudratova et al., 2018).

The OG sector was chosen because of its specific challenges with balancing 'standard' activities with demands for improved sustainability. This is particularly important when considering diverse views of how the new way forward could be of interest to the company itself. A sequential mixed-methods research design (Creserwell & Clarck,2007; Creserwell & Clarck, 2011) is adopted in the thesis and combines both qualitative and quantitative research papers followed by a single case study of a large established OG company. The thesis identifies various qualitative and quantitative research gaps and contributes to the broader literature on strategy change and internal legitimacy, as will be described below.

Paper 1 addresses a qualitative research theme and builds, primarily, on the internal legitimacy theory of Suchman (1995) and its three analytical elements: moral, pragmatic and cognitive legitimacy. This paper uses qualitative data to explore how internal legitimacy is used to understand how and why a sustainable strategy is developed in a large established company undergoing a change. Thus, internal legitimacy theory by Suchman helps us understand how a large established company evaluates its activities, and explain what a company is doing and why. In addition, internal legitimacy helps us gain insights into the complex process of a sustainable transition, and how people inside a company understand, accept and act towards this new transition. This paper focuses on internal legitimacy, because securing legitimacy from internal stakeholders is essential during organisational change in order to align organisational identity with the desired future image (Bridwell-Mitchell & Mezias, 2012; Clark et al., 2010;

Gioia et al., 2000). In addition, this paper responds to the request for more qualitative empirical evidence on the integration of sustainability and how it is carried out in practice (Engert et al., 2016). To increase our understanding and fill this research gap, a qualitative approach enables us to delve deeper into the sustainable process and compare the three types of legitimacy in order to explore how key internal stakeholders view the sustainable shift.

Paper 2 addresses a quantitative research theme. It adopts the institutional theory of Scott (1995b, 2014) and it's three pillars: regulative, normative and cognitive. The institutional theory by Scott enables us to understand company's institutional culture and how it is shaped by general belief systems (Scott, 2003). Thus, this paper focuses on internal legitimacy that plays an important role in shaping the company's new strategic direction (sustainable transition in this paper) and refers to how people in the company direct these new actions (Drori & Honig, 2013). This paper responds to the request for more research on the individuals' level in companies, especially on the individuals' behaviours when experiencing a change outside the organisational context (Hoerndlein et al., 2012; Suddaby, 2010). Thus, in order to increase our understanding in this area, this paper employs quantitative empirical evidence, develops a measurement system for how a sustainable shift is viewed, understood and accepted by individuals (employees) and tests some correlations between the variables. This is achieved by measuring the direct relationship between the three institutional pillars and sustainable shift.

Paper 3 tests the theoretical model of this thesis. Thus, paper 3 employs a quantitative research theme, but it takes a step towards examining the employees' role in selecting innovative sustainable projects. This paper adopts the institutional theory of Scott (1995b, 2014) and its three pillars: regulative, normative and cognitive. By focusing on internal legitimacy, the institutional theory in this paper is used to understand how people in a large established company make their sustainable choices and perceive them as legitimate. This paper responds to the request for more quantitative research concerning sustainable project selection (Kudratova et al., 2018). Thus, in order to fill this research gap, this paper employs quantitative empirical evidence, tests a measurement system for how employees in a large established company select sustainable innovations and helps us understand how a sustainable culture is maintained. This is achieved by testing whether the three institutional pillars strengthen the effect of innovation selection on sustainable transition, in addition to testing the indirect relationship between the three institutional pillars and drivers/barriers on innovation selection.

As a result, this thesis contributes to the debate of sustainable shift by empirically testing theories about the role internal legitimacy plays in creating a social, environmental and economic performance. Table 1 presents an overview of the three papers, including the main relevant theories used in addition to their contribution to answering the overall research question.

Table 1. Brief overview of the three papers

Title of the Research Paper	Research Question	Theoretical Framework	Contribution to the Thesis	Research Design
Paper 1: Energy companies in transition: Seeking legitimacy or legitimation?	What is the role of legitimacy in creating a shift towards sustainable development?	Sustainability, internal legitimacy theory and strategy change	The paper explores how internal legitimacy is used to understand how internal stakeholders develop a new sustainable strategy in a large established company.	Qualitative
Paper 2: Legitimacy for sustainability: A case of a strategy change for an oil and gas company	How does an established company build internal legitimacy for investment in clean technologies under conditions of institutional change?	Sustainability, institutional theory and strategy change	The paper develops a model that explores how individuals (employees) direct their actions towards a sustainable shift in a large established company.	Quantitative
Paper 3: A surge towards a sustainable future: Organisational change and transformational vision by an oil and gas company	How does an established company manage its sustainable transition?	Sustainability, institutional theory, organisational change and innovation selection	The paper tests a model and suggests the factors that enable a large established company to select its new sustainable practices.	Quantitative

1.5 Structure of the Thesis

This thesis has two main parts. Part I provides a cover essay providing the overall introduction of the thesis and its research focus that was previously discussed. In addition, it outlines the overall theoretical foundation, the methodology of the dissertation including philosophical perspectives, methodological measurements, research design and data collection as well as brief summaries of the three research papers included in this thesis. Finally, it outlines the main findings and theoretical contributions, limitations and implications for future research and practical implications for policy makers and firms. Subsequently, Part II presents the three academic research papers, each connected to the overall theme of the thesis.

2 Theoretical Foundation

This chapter presents an illustration of the theoretical context used to develop the dissertation's overall conceptual framework. As mentioned in section 1.2 the theoretical perspectives developed in this thesis aim to contribute to three distinct bodies of literature: sustainability, strategy and legitimacy.

To explore how a large established company develops its sustainable transition towards sustainable innovations, this chapter begins by explaining corporate sustainability in order to understand the difference between sustainability, sustainable development and corporate sustainability. It also explains the three elements of sustainability (environmental, social and economic) that companies should achieve. Furthermore, it discusses the literature reviews on sustainable transition, in addition to sustainable innovation and the different terms used in the literature. The chapter continues by introducing the importance of strategy change in shifting the company towards sustainability and how a sustainable transition occurs in large established companies. Then, the chapter explains internal legitimacy theory that enables us to understand the sustainable change that a large established company is going through and how it has been used in this thesis. Finally, this chapter combines the theoretical components together in a conceptual framework where the intended contributions of the dissertation are positioned.

2.1 Evolution of Corporate Sustainability

An intensive debate has been taking place among academics, consultants and decision makers to define a more humane and ethical business (Marrewijk, 2003). Marrewijk (2003) collected different concepts related to business and social ethics from previous research such as sustainable development, corporate citizenship, sustainable entrepreneurship, Triple Bottom Line, business ethics and Corporate Social Responsibility (CSR). In this section, I will pay more attention to the term corporate sustainability in order to deepen our knowledge in sustainability and understand how sustainability has been developed in academia.

The term corporate sustainability refers to the word 'sustainability' that is considered to be at least 300 years old and focused mainly on sustainable forestry management (Carlowitz, 2009; Warde, 2011). However, the evolution towards the term 'sustainability' in the academic fields has been slow, indicating the need for finding a concrete definition that allows companies to use when acting in a responsible way. For example, sustainability was first introduced in 1946 by Lady Eve Balfour in the sense of being able to retain the natural state in future generations (Pfeiffer, 1947). In addition, Aarseth et al. (2017) indicate that there are more than 100 definitions for sustainability. Table 2 shows some of these definitions and how they have been used in literature to describe sustainable development (Glavič & Lukman, 2007).

Table 2. Sustainability and its meaning in various research themes

Research Theme	Representative Article	Meaning of Sustainability
Environmental principles	(Glavič & Lukman, 2007; Wernick et al., 1996)	Source reduction (dematerialisation) is defined as 'the reduction of the quantities of materials needed to serve an economic function, or the decline over time in the mass of materials used in industrial end products.'
Environmental principles	(United States Environmental Protection Agency, 2019)	Recycling is defined as 'collecting and reprocessing a resource so it can be used again.'
Environmental principles	(Glavič & Lukman, 2007)	Reuse is defined as 'using waste as a raw material in a different process without any structural changes.'

Environmental principles	(Glavič & Lukman, 2007)	Repair means 'an improvement or complement of a product, in order to increase quality and usefulness before reuse; it decreases consumption, because the product's life is extended'.
Environmental principles	(Glavič & Lukman, 2007)	Remanufacturing is defined as 'substantial rebuilding or refurbishment of machines, mechanical devices, or other objects to bring them to a reusable or almost new state.'
Ethical investments	(Chen & Scott, 2020)	Socially responsible investment is 'an investment that is considered socially responsible due to the nature of the business the company conducts.'
Societal principles	(Glavič & Lukman, 2007)	Pollution control is 'an approach that is designed to reduce the impacts of pollutants that are produced, before they are released into the environment; this is accomplished by some type of treatment.'
Societal principles	(Bowen, 1953)	Corporate social responsibility is 'the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society.'
Sustainable System	(UNESCO, 2019)	Sustainable production is defined as 'the creation of goods and services using processes and systems that are non-polluting, that conserve and preserve energy and natural resources, that are economically viable, safe and healthy for workers and consumers, and that are socially and creatively rewarding.'
Sustainable System	(Glavič & Lukman, 2007)	Sustainable consumption is defined as 'finding workable solutions to social and environmental imbalances through more responsible behaviour by everyone.'
Sustainable Policy	(John, 2004)	Sustainability policy 'includes non-environmental aspects of providing more for future generations, such as encouraging more saving and hence capital investment to substitute for some degree of future environmental resource depletion.'
Social and Natural System	(Williams et al., 2017)	Sustainability is 'a systems-based concept and, environmentally at least, only begins to make any sense at the level of ecosystems and is probably difficult to really conceptualise at anything below planetary and species levels.'
System perspective	(Williams et al., 2017)	Sustainability is 'the ability of systems to persist, adapt, transform or transition in the face of constantly changing conditions.'

[1] The Difference between Sustainability and Sustainable Development

[1] Sustainability is a condition, and sustainable development is the process to achieve sustainability (Buchan et al., 2007)

Table 2 shows various definition of terms used by different authors to express their understanding of sustainability and its usages, such as recycling, remanufacturing, pollution control, sustainable consumption, etc. These terms have some similarities and differences, but it is difficult to separate one term from another (Glavič & Lukman, 2007). However, these terms introduce some connections between environmental protection, economic performance and social welfare, guided by a political will and ethical guidelines (Glavič & Lukman, 2007).

In the recent past, the term sustainability was incorporated into the concept of 'sustainable development' where sustainability is a condition and sustainable development is the process to achieve sustainability (Buchan et al., 2007). The term sustainable development was brought into prominence by the UN in a report known as the Brundtland commission and defined as '*the development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' (UN, 1987). This has increased awareness among countries and led them to approve the United Nations (UN) framework on climate change, which was later signed by 197 countries (UN Climate Change, 2021; Yusuf et al., 2013). Subsequently, to cope with climate challenges, the Paris agreement was adopted by world leaders in order to strengthen the global response to the threat of climate change (UN, 2017).

Furthermore, researchers introduced the terms 'strong and weak' sustainability in the literature. Strong sustainability states that natural capital is more important than man-made capital, which means that natural capital is non-substitutable (Dobson, 1998). Conversely, weak sustainability is based on the idea that man-made capital is more important than natural capital (Neumayer, 2003). This raises a question about whether sustainability and economic growth are compatible (Verburg & Wiegel, 1997). Researches such as Meadows et al. (1972) state that sustainability is necessary for economic growth and, therefore, 'Triple Bottom Line' concerns (environmental, social and economic impacts) are essential to perceive a sustainable development when developing innovations (WBCSD, 2002).

First, the **environmental** aspect of corporate sustainability refers to energy efficiency, pollution reduction, waste reduction and a decrease in the consumption of harmful and toxic materials (Gimenez et al., 2012; Roehrich et al., 2017). The primary activities that contribute to companies' footprint comprise production, transportation, recycling, manufacturing of new products and remanufacturing of current products (Kleindorfer et al., 2005). Therefore, companies have a responsibility for integrating environmental considerations into their culture and business agenda in order to reduce the footprint they leave behind (Christopher, 1999). Accordingly, companies can improve their environmental performance through pollution control (waste management), design environmentally-friendly products and use clean technologies (Rao, 2002; Zhu & Sarkis, 2004; Zhu et al., 2005)

Second, the **social** aspect of corporate sustainability deals with societal needs including human welfare, job creation, tax revenues in the community, employees' working conditions and the firm's reputation (Gimenez et al., 2012; Gladwin et al., 1995; Sancha et al., 2016; Steurer et al., 2005). Thus, the social aspect focuses on both internal communities such as employee safety and working conditions, and external ones such as the community's quality of life (Gimenez et al., 2012; Lozano, 2015). In addition, Gimenez et al. (2012) indicate that the social aspect of sustainability may lead to improve the company's reputation and indirectly to increase sales. Thus, companies can provide equitable opportunities, and encourage diversity within and outside the community in order to provide an accountable governance structure (Elkington, 1994).

Finally, the Triple Bottom Line concept suggests that companies need to link the social and environmental aspects to the positive financial gains (Gimenez et al., 2012). The **economic** aspect of corporate sustainability usually focuses on the company's sales and profit growth

(Zhou et al., 2014). However, it means that companies are required to benefit their internal and external stakeholders, in which companies maximise their economic growth by engaging in environmentally and socially responsible behaviour (Hörisch et al., 2014).

This thesis accepts the fact that corporate sustainability describes a company's sustainable contributions and its sustainable development that can help the company survive in the long-run (Schaltegger & Burritt, 2005). In addition, sustainable development is seen as actions that a company is actually doing to achieve sustainability, where sustainability is the overall goal that aims to achieve environmental, social and economic impacts. However, for the purpose of this thesis, the focus will be on the environmental impacts that focuses on providing clean sources of energy without harming the environment.

Sustainability is well developed in academic research; however, the use of the term 'sustainability' in companies reveals enormous variation. On one hand, sustainability seems to lend itself to enhance reputation, brand image and competitiveness (Herzig & Schaltegger, 2011). It has also been used as a marketing strategy (Azmat & Samaratunge, 2009) or a tool for competitive advantage (Taherdangkoo et al., 2017). This shows that companies fail to adopt sustainability, but instead they engage in social and environmental activities in order to seek society's acceptance (Kumar et al., 2012). These studies provide important insights into how sustainability makes the business look good, but they do not explain how companies develop a real, sustainable shift.

In fact, these studies gave rise to accusations of 'greenwashing', that is defined as '*concealing environmentally harmful actions with the rhetoric of environmental friendliness to entice and manipulate the consumer*' (Plec & Pettenger, 2012, p. 464). This means that a company misleads the public by intending to commit itself to environmentally friendly practices in order to promote unsustainable or environmentally unfriendly practices. In addition, the strategic decision behind greenwashing is to build a reputation that improves the value of the company when, in fact, this improved reputation is not deserved (Gregory, 2021).

On the other hand, some studies focused on integrating sustainability in management and business (Rusinko, 2010), while others focused on the firms' role in achieving sustainable development (Bansal, 2005; Dyllick & Hockerts, 2002; Hahn et al., 2015). Furthermore, Yanarella and Bartilow (2000) look at the government's role in developing action plans that push companies to contribute to sustainable development. In addition, a large share of sustainability studies focuses on understanding the role of managers and employees in introducing sustainability to companies (Andersson & Bateman, 2000; Engert et al., 2016; Ramus & Steger, 2000). This indicates that it is possible for companies to achieve sustainability; however, all stakeholders should work together towards a common vision for current and future generations, and economic profits should be balanced against environmental and social benefits (Stanikis, 2012).

Thus, companies must rethink their strategies and provide the world with sustainable actions in order to achieve their sustainable goals. However, 'being economic and being sustainable remain in conflict and at odds' (Hawken, 1994). Therefore, there is a need for a more in-depth research to understand the factors that facilitate the development of sustainability in companies (Taherdangkoo et al., 2017), how sustainability is carried out in practice (Andersson & Bateman, 2000; Engert et al., 2016; Moldavska, 2017; Ramus & Steger, 2000; Waddock & McIntosh, 2009) and how a sustainable strategy process is measured (Driessen et al., 2013; Engert et al., 2016; Kudratova et al., 2018; Markard et al., 2012).

In fact, transition towards sustainability in companies is complex due to the tensions that might arise when achieving environmental, social and economic impacts (Gao & Bansal, 2013; Hahn et al., 2015). This is due to the fact that companies are seeking to develop a 'business case for sustainability', which means creating financial success by incorporating social and environmental solutions (Schaltegger & Wagner, 2006b). At the same time, society at large expects companies to show environmental and social commitment, by creating jobs and developing products with environmental benefits (Dyllick & Hockerts, 2002; Gao & Bansal, 2013). Thus, the corporate sustainability approach should create mutual sustainability interests between all stakeholders and nature (Hörisch et al., 2014), where companies aim to improve their economic value by balancing between environmental and social impacts. More details about sustainable transition and how it can be achieved in companies are described next.

2.2 Sustainable Transition

A sustainable transition is defined by Markard et al. (2012, p. 956) as '*long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption*'. In addition, Elzen et al. (2011); Geels (2004) called this transition as 'socio-technical transition', because it involves alterations in the overall system, that entails technology, knowledge, policy, markets, consumer practices, infrastructure and culture. Thus, the process of transition unfolds three phases: (1) start-up which involves the emergence of alternative technologies, (2) acceleration that encompasses the diffusion of established technologies, and (3) stabilisation which describes the new, stable socio-technical configuration (Rotmans et al., 2001; Schot et al., 2016).

Integrating sustainable transition in companies is not an easy task, and there is profound disagreement between researchers on how to investigate such a transition (Geels, 2011). A transition involves comprehensive changes such as: technological, material, organisational, institutional, political, economic and socio-cultural (Markard et al., 2012). It also requires a wide range of actors and needs a long time to be achieved (50 years and more) (Markard et al., 2012). Furthermore, researchers argue that transition towards sustainability requires employees' support and commitment for corporate sustainability program to move toward a more sustainable future (Frandsen et al., 2013).

Previous research on sustainable transition focuses on the role of firms and organisations in the transition, but they often focus on how firms or actor-oriented perspective contribute to the sustainable transition (Bansal & Song, 2017; Sarasini & Linder, 2018). In addition, the topic of sustainable transition in the OG industry remains largely uncovered (Bouckaert et al., 2021). This means that research requires more studies in the micro level of organisations and especially in the OG sector. This thesis focuses on the micro level of a large established company and views sustainable transition as an introduction to a sustainable shift (RE innovations) in a large OG established company.

As shown above, established companies find it difficult to relate their environmental and social practices to tangible profits (Epstein & Roy, 2001). Therefore, there is a need for tools to effectively connect social and environmental impacts to profit (Epstein & Roy, 2001). In this regard, studies have proposed that the development of innovation is essential for achieving the economic impact (Bansal, 2005; Eccles et al., 2014; Hall & Vredenburg, 2003; Hall & Wagner, 2012; Klewitz & Hansen, 2014). In addition, they need to formulate a strategy for their new sustainable projects in order to adapt to the new changing environment (Mousavi & Bossink, 2017). This will be described in the following two sections.

2.3 Sustainable Innovation

Innovation and entrepreneurship are key sources of productivity, job creation, and economic growth. Researchers believe that entrepreneurial actions and innovations can be powerful mechanisms to meet social needs and societal challenges (Christensen et al., 2006; Porter & Kramer, 2011). Innovation has been defined in many different ways and Schumpeter is considered as one of the greatest economists who provided an early and much cited definition of innovation (Hanusch & Pyka, 2008). Schumpeter (1939) defined innovation as the '*setting up of a new production function*'.

Schumpeter's definition is very wide; however, many researchers agree that innovation is both a process and an outcome (Crossan & Apaydin, 2010). For the purpose of this thesis, innovation is defined as '*a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)*' (OECD, 2018). Thus, innovation is a practical implementation of knowledge, ideas or discoveries that lead to the introduction of a new product, production method or process that opens a new market (OECD, 2018). This definition breaks down innovation between product and process and by the degree of novelty. The degree of novelty includes incremental or radical innovations (Henderson & Clark, 1990). Incremental innovation refers to small improvements made to the existing product/process, whereas radical innovation refers to the development of new knowledge that aims to replace existing innovations (Gatignon et al., 2002).

Organisations play an important role in adopting resources, technologies and motivations to work towards more sustainable societies (Lozano et al., 2012). Companies develop innovations in order to grow, stay ahead of their competitors, meet customers' needs and contribute to economic growth. However, economic growth does not essentially lead to social progress. In fact, in many situations it leads to pollution, unsafe workplaces and poor working conditions (low salary, child labour, long working hours, etc.). Therefore, companies are experiencing increased environmental pressure, and the need for more technological innovations that drive a sustainable change is rising.

Innovations became an essential way to successfully contribute to sustainable development (Klewitz & Hansen, 2014). Sustainable innovation is considered as a term used to involve several approaches related to sustainability such as green, eco, environmental and responsible innovation (Franceschini et al., 2016; Schiederig et al., 2012). These terms have many similarities and minor differences as presented in Table 3.

Table 3. Selected definitions of terms related to innovation in sustainability contexts

Term	Definitions
Green Innovation	'Hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management' (Chen et al., 2006, p. 332).
Eco Innovation	'Changes to the production process that decrease the product's impact on the natural environment and/or increase intra-generational or inter-generational equity' (Blum-Kusterer & Hussain, 2001, p. 301)
Environmental Innovation	'The production, application or exploitation of a good, service, production process, organizational structure or management or business method that is novel to the firm or user and which results, throughout its life cycle, in a reduction of environmental

	risk, pollution and the negative impacts of resource use compared to relevant alternatives' (Kemp & Pearson, 2008, p. 7).
Responsible Innovation	'A transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)', where the word 'responsibility' 'presents conceptual and practical difficulties that are related to the future-oriented character of innovation itself' (Von Schomberg, 2013, p. 63).
Sustainable Innovation	'The development of new initiatives in an organisation to sustain, improve and renew the environmental, social and societal quality of its business processes and the products and services these business processes produce' (Bossink, 2013, p. 1).

As shown in Table 3, there are many different terms that link sustainability to innovation. For example, green innovation, eco innovation and environmental innovation seek to integrate environmental and economic improvements by reducing waste, preventing pollution and reducing environmental risk, but they ignore the importance of the social aspect (Schiederig et al., 2012) and, therefore, fail to provide a comprehensive view of sustainability from a business perspective. In addition, responsible innovation has its own focus that seeks to link research and innovation to societal actors (researchers, policy makers, business, citizens, etc.) in order to develop new technologies that provide some needs and benefits to the society. However, the term sustainable innovation is more general and can substitute the other terms. Therefore, for the purpose of this thesis, the term sustainable innovation is used because it aims to achieve the Triple Bottom Line impacts.

Thus, companies engage in sustainable innovation for economic, social or environmental purposes (Lubberink et al., 2017). Therefore, some scholars believe that sustainable innovations require radical improvements that tackle major environmental challenges such as climate change (Kennedy et al., 2017). Other researchers believe that sustainable innovations could also be obtained through incremental changes to existing products and services (Jeremy Hall & Wagner, 2012). This means that sustainable innovations can be achieved through radical or incremental improvements (Klewitz & Hansen, 2014). However, this thesis considers sustainable innovations regardless of their degree of novelty.

Sustainable innovation is more complex than traditional innovation; it requires new knowledge, skills, competence, regulatory framework and organisational and infrastructure requirements (Geels et al., 2008; Hall & Vredenburg, 2003). Researchers believe that complexity arises from the need for knowledge and the technologies required to achieve both environmental and social benefits (Adams et al., 2016; Ketata et al., 2015). Therefore, companies intend to shift their approach from internally focused R&D, to collaborating with other companies in order to achieve higher innovation results (Clarke & Roome, 1999). For example, companies collaborate with parties such as knowledge institutions (e.g. universities), suppliers, governmental bodies and consultancies in order to direct assistance and better deal with sustainable innovations (Seyedesmaeil et al., 2014).

As a result, companies need to innovate, develop and invest in new sustainable technologies in order to reduce the negative impacts of their traditional innovations, address social challenges and achieve long-term success (Islam et al., 2018; Mores et al., 2018; Schaltegger & Wagner, 2011). However, selecting a new sustainable innovative project is difficult, especially for large established companies in transition. Therefore, companies need to formulate a strategy that improves their sustainable performance (Mousavi & Bossink, 2017). In addition, they require

actors (stakeholders) to make some changes in the organisational structure, develop and implement new sustainable practices (Alrøe & Noe, 2016), as will be described next.

2.4 Strategy Change

Studies on sustainable transition have addressed the role of established companies in transferring important knowledge from academia into industry (Dolata, 2009). Others have focused on the importance of changing companies' business models that aim to reduce negative externals or create positive effects for the environment and society at large (Boons & Lüdeke-Freund, 2013; Hansen et al., 2009; Schaltegger et al., 2012). Meanwhile, others have focused on network and innovation strategies (Erlinghagen & Markard, 2012; Raven & Verbong, 2007; Van De Poel, 2000).

Large established companies are locked into existing routines and technologies and create mostly incremental improvements in their existing technologies (Geels, 2002; Hoogma et al., 2002). Therefore, research in sustainability transition studies has been limited to how large established companies can use their existing resources such as knowledge, capabilities, competence, networks, etc., in order to develop new, clean technologies (Boschma, 2017; Geels, 2014).

However, scholars such as Zhang et al. (2016) believe that companies are required to be willing to take a risk in order to face new competition, build their competences based on their research and development (R&D), develop and implement a strategy to overcome the new situation. The field of strategic management or strategy has been developed dramatically within the last two decades (Hoskisson et al., 1999). The evolution of strategy was studied through a dual pendulum between internal and external considerations, and between micro and macro considerations (Guerras-Martín et al., 2014). I will discuss the swing between internal and external modifications first and then move to micro and macro modifications.

Internal and External

During the early period of strategy development, a number of scholars made significant contributions to the field by swinging between internal considerations and external consideration (Hoskisson et al., 1999). However, the most significant works in the field of strategy were by Chandler (1962), Ansoff (1965) and Learned et al. (1965/1969). These works provided the foundations of strategic management field which emphasized the importance of company's internal capabilities and external opportunities (Rumelt et al., 1991).

Chandler (1962) studied how large companies develop new administrative structures to achieve growth, and how strategic change leads to structural change. According to this, Chandler's defined strategy as '*the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out the goals*', and defined structure as '*the design of organisation through which the enterprise is administered'* (Chandler, 1962, pp. 13-14). Thus, changes in strategy are primarily responses to opportunities created by changes in the external environment, such as technological innovation (Chandler, 1962). At the same time, this requires exploring new internal administrative structures by managers (Chandler, 1962).

Ansoff (1965, p. VIII) focused on the strategic decision and defined it as '*decisions on what kind of business the firm should seek to be in*'. Ansoff (1965) viewed strategy as the 'common thread' between product-market scope, growth vector (the changes that a firm makes in its product-market scope), competitive advantage and synergy. However, Learned et al. (1965/1969, p. 15) defined strategy as '*the pattern of objectives, purposes, or goals and major policies and plans for achieving these goals, stated in such a way as to define what business*

the company is in, or is to be in and the kind of company it is or is to be'. They also suggested four essential components of strategy: market opportunity, firm competence and resources, managers personal values and aspirations and obligations to segments of society (Learned et al., 1965/1969).

However, during the next development period of strategy, Porter (1980) made major significant contributions and provided a foundation for research on competitive dynamics (Five Forces Model) that shifted the attention externally toward industry. In addition, researchers such as Peng (2002); Peng et al.(2009) introduced new external aspects such as laws, traditions, culture of a region or a country in order to understand the relationship between environment and strategy.

Micro and macro

Over the last few years, more significant contributions came to the field of strategic management that has led to divide it to micro and macro areas (Guerras-Martín et al., 2014). Accordingly, micro level has influenced the recent development of strategic management through several streams of research related to individual actions, internal processes and the role and characteristics of managers (Molina-Azorín, 2014). For example, Bromiley (2005); Gavetti (2012); Powell (2011) developed behavioural strategy approach that merges cognitive and social psychology with strategy and practice. In addition, Blettner et al. (2012) focused on how leaders make decisions and influence company's strategy. Furthermore, Rumelt et al. (1994) focused on the success and failure of firms by studying institutional details and managerial actions. Felin and Foss (2005, p. 441) stated that 'organisations are made up of individuals, and there is no organisation without individuals', and they focused on structures, routines, capabilities, culture and institutions.

However, Hoskisson and Hitt (1990) claimed that research on micro level has been limited due to the fact that managers' motivations to change can be internal or external, and it is difficult to isolate governance mechanisms from firm behaviours. In addition, Barney (1991); Wernerfelt (1984) claimed that there is a missing piece of studying micro-foundation in strategy, which relates to the factors that contribute to the firm's competitive advantage. Therefore, other researchers contributed to the field of strategy by focusing on the macro level.

Thus, researchers have made significant contributions at macro level. Some works focused on firm, industry and corporate effects among others by analysing firm levels such as strategic groups, industries and locations (McGahan & Porter, 1997; Rumelt, 1991; Schmalensee, 1985). Other researchers such as Armstrong and Shimizu (2007); Crook et al. (2008); Newbert (2007) have examined the impact of specific resources on performance by analysing firm resources and organisational routines (not individual level).

Internal and external or micro and macro

Hoskisson et al. (1999) analysed the evolution of strategy by using the idea 'swings of a pendulum', however, they used two extreme alternatives: the attention to internal firm characteristics or the attention to the external environment (Molina-Azorín, 2014). In addition, Molina-Azorín (2014) noted that there is another extreme pendulum in which researchers can employ micro or macro levels. However, researchers recommended using an intermediate position that highlights the relevance need of integrating micro and macro, or internal and external because it provides a better understanding of the evolution of strategy (Guerras-Martín et al., 2014; Molina-Azorín, 2014). In addition, the two pendulums are considered valid, work simultaneously, are in continuous movement and sometimes one type can overlap the other one (Guerras-Martín et al., 2014).

Burgelman (2002) was one of the researchers who connected between micro and macro level of analysis when studying the evolution of company's strategy. Burgelman (2002) views strategy as *'the rational determination of a company's vital interests, the purposes that are essential to its continued survival as an institution and define it in relation to other organizations, and its objectives'*. In addition, Burgelman (1991, 2002) suggested that company's internal selection is linked strongly to strategy that aims to gain control over the company's destiny. This thesis takes Burgelman's model as an inspiration of a tool that helps us understand how a strategic process is seen in connection with the innovation selection mechanism. Burgelman (2002) has contributed to strategic management research by introducing a model called the rubber band model as shown in Figure 2.

The model illustrates the strategic process in a company and focuses on the internal and external forces that affect the company's future (Burgelman, 2002). Figure 2 shows that a strategy is viewed as dynamic forces that drive the company's evolution (Burgelman, 2002). The dynamic forces comprise: official corporate strategy, strategic action, competence and competitive advantage that affect the company's destiny and determine what will it take for the company to stay in control of its destiny (Burgelman, 2002). In addition, the internal selection mechanism is linked strongly to these dynamic forces as confirmed by Burgelman and Siegel (2008).

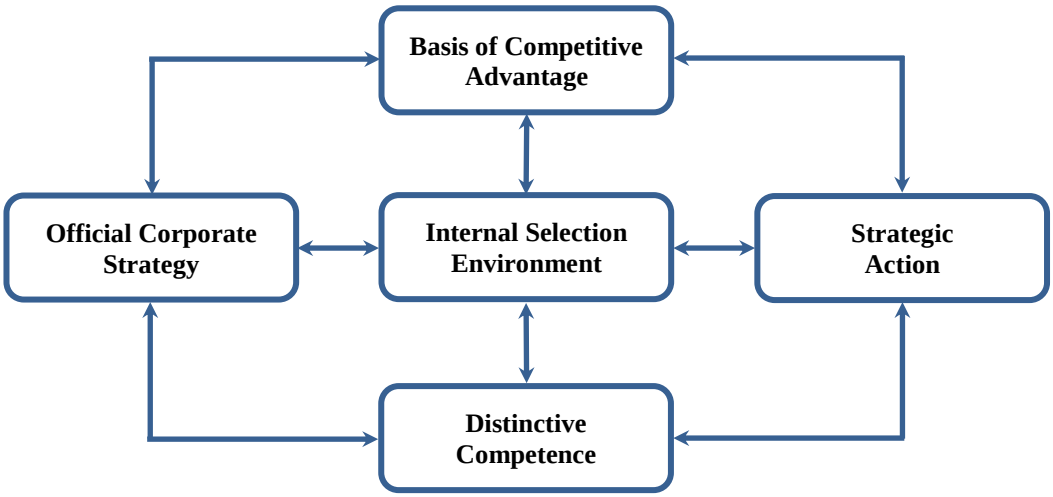


Figure 2. Rubber Band Model derived from Burgelman (2002)

Burgelman's model in Figure 2 considers the connections between the dynamic forces as rubber bands. This means, when a company meets a change, a tension will happen between strategic action and official corporate strategy, and between competence and competitive advantage (Burgelman, 2002). During periods of strategic alignment, the rubber bands are evenly stretched and the dynamic forces are in harmony (Burgelman, 2002). However, the dynamic forces tend to diverge over time (when a change occurs in the external environment) and the rubber bands get stretched unevenly and harmony turns into disharmony (Burgelman, 2002).

The divergence of the dynamic forces create a 'strategic dissonance' in the company (Burgelman, 2002). For example, if top management does nothing when facing new industry conditions, the company will die or diminish (Burgelman, 2002). However, if top management is ready to come up with a new strategy, then the company will enter a new era of profitable growth (Burgelman, 2002). The strategic dissonance is derived from a divergence between competitive advantage and distinctive competences, and between official corporate strategy and strategic action (Burgelman, 2002).

To explain the model, the divergence starts between competitive advantage and distinctive competences, and when a change occurs by external forces such as customers, competitors, suppliers, new entrants, substitutions and government regulations (Burgelman, 2002). These changes motivate the company to look at their distinctive competences, including the skills and routines needed to develop innovations with major commercial potential and which aim to meet the basis of competitive advantage in the industry (Burgelman, 2002). However, the first signals of the divergence between them are usually weak (Burgelman, 2002). It takes time to make significant changes; therefore, top management must watch the evolution of external forces carefully in order to deploy the company's competences toward new opportunities (Burgelman, 2002).

However, in order to make a change, a company requires a divergence between official corporate strategy and strategic action. Official corporate strategy involves top management's announcements about the company's strategy, and which deals with their beliefs about the company's past and future success (Burgelman, 2002). The top management's beliefs concern issues such as product-market domain, competences needed to achieve competitive advantage, financial needs and other objectives to shape the company's strategy (Burgelman, 2002). However, strategic action aims to do what the official corporate strategy aims to achieve (Burgelman, 2002). Thus, strategic action refers to 'what the company actually does', and includes all the actions that the company engages in (Burgelman, 2002). Strategic action also links competitive advantage and distinctive competencies in novel ways, which helps a company react to the changes from external forces (Burgelman, 2002).

According to the divergence between these two dynamic forces, sometimes strategic action leads the official corporate strategy, but it is most preferable that the official corporate strategy leads strategic action (Burgelman, 2002). However, when this happens, this means that the divergence of official corporate strategy and strategic action is often driven by actions taken by 'middle-level managers' (Burgelman, 2002). These actions often introduce new business opportunities that are outside the company's official corporate strategy, and carry potential danger (Burgelman, 2002). This warns top management and gives them an opportunity to recognise their strategic implications early (Burgelman, 2002). Thus, top management cannot prevent the rubber bands stretching unevenly between the dynamic forces. However, top management can create an internal selection environment 'a culture' that helps prevent the rubber band from snapping (Burgelman, 2002).

All of these dynamic forces constitute the internal selection environment of a company. Thus, the internal selection environment is achieved by re-establishing alignment between the dynamic forces in addition to the external pressure (Burgelman, 2002). This means when a change occurs in any of these dynamic forces, this leads to a change in the internal selection environment, which forces the company to find new direction and choose new activities in forms of innovations, ideas or processes.

The Burgelman model shows a useful tool used to understand the factors (dynamic forces) that force established companies to reshape their strategies (Burgelman, 2002). It also combines the positional approaches, formulation and implementation aspects of strategy (Burgelman, 2018). This is achieved through the internal selection environment that plays an essential role in maintaining alignment in the face of the other four forces (Burgelman, 2018). In addition, the internal selection environment views the company's strategic culture and includes the company's contextual elements such as personnel selection, organisation structure, planning systems, reward systems, corporate values and norms (Burgelman, 2018).

As a result, I accept the fact that Burgelman model provides a tool that is used to show how the dynamic forces operate during a change (Burgelman, 2002). However, Burgelman used historical data from one company in order to test and extend the application of his model (Burgelman & O'Neill, 2004). This shows that the model may not be representative of all companies, but it represents a '*hope that managers and organizations can learn from other managers and organizations*' (Burgelman & O'Neill, 2004, p. 153). In addition, the Burgelman model has not been well used, nor tested empirically in the literature. It has been used only as a tool to help a company find new ways to re-establish its strategy by looking at the internal and external factors. This provides an opportunity for researchers to extend the insights into contexts of research or practice (Burgelman & O'Neill, 2004). This also gives us an impression that Burgelman's model does not focus on understanding the overall view of the strategic process; for example, it does not explain how this process happens in practice, how dynamic forces lead to certain outcomes, who makes a decision to change and how employees accept the new strategy in the company.

This shows that Burgelman provided a framework with an opportunity to delve deeper into how the dynamic forces lead to different strategic direction. However, reshaping a strategy in a company is not an easy task because it needs effective implementation, and employees need to understand and accept this change (Tapera, 2014).Therefore, this thesis suggests adopting internal legitimacy theory, due to the fact that managing a new strategy, requires a company to achieve its legitimacy (Kuruppu et al., 2019). This means that a strategy is formally created by business policy (Zhao et al., 2017); however, legitimacy theory focuses on norms, values and beliefs that shape a company, and provides opportunities for a strategic change (Durand et al., 2013; Thornton et al., 2012). This provides a natural bridge between strategy and legitimacy theory (Zhao et al., 2017). Thus, integrating strategy into internal legitimacy theory enables us to enrich our understanding of how a company bridges or combines elements between its stakeholders and their perceptions (Kennedy & Fiss, 2013; Zhao et al., 2013) and shows us how actors react to different institutional pressures (Oliver, 1991). More details about the adoption of internal legitimacy theory in this thesis, will be discussed in the next section.

2.5 Legitimacy in Organisational Institutionalism

Today's market pushes companies to adopt social and environmental responsibilities within their strategies and management systems (Peng et al., 2019; Werbach, 2009). This pushes large established companies to develop their own activities in a more sustainable way, or to develop new sustainable activities and enter new markets. Therefore, it is important for large established companies undergoing complex transformation to build their own legitimacy when introducing new technologies (Deephouse & Suchman, 2008; Galaskiewicz, 1985; Hargadon & Douglas, 2001).

Established companies need resources and experiences from both internal and external stakeholders to create an initial base of legitimacy (Bitektine, 2011; Tolbert & Zucker, 1983; Zimmerman & Zeitz, 2002). However, securing legitimacy from internal stakeholders is essential during organisational change in order to address external concerns, increase wider public image and align organisational identity within the desired future image (Bridwell-Mitchell & Mezias, 2012; Clark et al., 2010; Gioia et al., 2000). In addition, the ability to achieve stakeholders' judgment of appropriateness is considered essential to the survival success of companies (Guerreiro, 2015; Lamin & Zaheer, 2012; Petkova, 2016). Furthermore, stakeholders' engagement is identified as an essential factor in implementing companies' sustainability visions (Hillman & Keim, 2001; Stubbs & Cocklin, 2008). This entails that both structural (organisation structure, policies and processes) and cultural (norms, values and attitudes) factors affect the success of stakeholder engagement (Stubbs & Cocklin, 2008).

However, legitimacy involves a process of 'justification', by which a company strives to justify itself to its actors or to the society at large (Maurer, 1971). Legitimacy theory also helps provide explanations for a company's existence and functioning (Meyer & Scott, 1983). According to this, legitimacy helps us understand the internal selection environment in companies undergoing a change.

In addition, in order to achieve a sustainable change, a company must experience some institutional changes such as new rules, regulations, strategy, in addition to change stakeholders' behaviours. This is why legitimacy theory is used in this thesis. However, as noted earlier, this thesis focuses mainly on internal legitimacy which is the focus of this thesis, because an established company is responsible, internally, for shaping its strategic action, introducing its new sustainable technologies and framing their identity (Drori & Honig, 2013; Li & Tang, 2010). Consequently, internal legitimacy refers to how people direct the actions that would be beneficial for their companies (Drori & Honig, 2013).

However, in order to understand how legitimacy theory has been emerged in organisational theory, let us first define the terms 'institutionalisation' and 'new institutionalism'. On one hand, Selznick (1992) defines institutionalisation as '*the emergence of orderly, stable, social integrating patterns out of unstable, loosely organised, or narrowly technical activities*'. Thus, organisations are considered stable and integrated when they have a commitment to the society (Scott, 2014). On the other hand, new institutionalism has developed a sociological view of institutions in order to explain why and how an institution emerges in a certain way, by enhancing institutional economics with political outcomes (Powell & Dimaggio, 1991). Thus, the transformation from an organisation into an institution can be achieved through creating formal structures and rules (called regulatory) that aim to solve an environmental social problem (Selznick, 1992) in addition to the individuals who are committed to adapt to the new changes in the organisation (called normatory) (Selznick, 1992). In addition, researchers such as Scott (1995b, 2014) has made a crucial contribution in adapting new institutionalism by adding a shared belief system in institutionalisation (called cognitive).

This shows that legitimacy theory is a central concept in organisational institutionalism, however, research on legitimacy theory evolved slowly in social science (Deephouse & Suchman, 2008). The concept of legitimacy allows researchers to understand how organisations survive, how they behave and understand the relationship between organizational performance and organisational behaviour (Yüncü, 2020). The term legitimacy has been introduced into sociological theory and, thus, into organisation studies by Weber (Johnson et al.,2006; Ruef & Scott, 1998; Suchman, 1995). Weber discusses the importance of social practices being oriented to rules, and suggests that legitimacy can result from social norms and laws (Weber, 1946). Thus, Parsons (1956; 1960) applies Weber's ideas on legitimacy and views it as congruence of organisational values with social laws, norms and values.

This formulation was later adopted by many organisation theorists, and researchers have developed different typologies of legitimacy theory. These typologies overlap in many respects, but at some points, they may differ considerably from each other due to the theoretical contexts used, in addition to the object and method of analysis (Díez-de-Castro et al., 2018). Maurer (1971, p. 361) for example stated that '*legitimation is the process whereby an organization justifies to a peer or superordinate system its right to exist*'. In contrast, Pfeffer and his colleagues suggested that legitimacy is a source of evaluation, and focused more on cultural conformity rather than self-justification (Dowling & Pfeffer, 1975; Pfeffer, 1981; Pfeffer & Salancik, 1978). In this view, legitimacy is seen as a '*congruence between the social values associated with or implied by [organizational] activities and the norms of acceptable behaviour in the larger social system*' (Dowling & Pfeffer, 1975, p. 122).

However, Meyer and Scott (1983, p. 201) stated that '*Organizational legitimacy refers to ... the extent to which the array of established cultural accounts provide explanations for [an organisation's] existence, function, and jurisdiction, and lack or deny alternatives*'. This indicates that Meyer and Scott (1983) and Scott (1991) discussed legitimacy by connecting the organisation to its cultural environment and focused more on the cognitive rather than the evaluative side, which means that organisations are legitimate when they are understandable and acceptable rather than when they are desirable. Finally, Suchman (1995) adopted '*an inclusive, broad-based definition of legitimacy that incorporates both the evaluative and the cognitive dimensions and that explicitly acknowledges the role of the social audience in legitimation dynamics*'.

This shows that legitimacy theory is well developed in research, but there is still a lack of empirical research on the micro-level of legitimacy (Binz et al., 2016; Kishna et al., 2017), and it still demands more investigation on the topic related to institutional change (Imerman, 2018). In fact, connecting the micro-level to the macro-level remains disputed among social scientists such as Harper and Lewis (2012); Raub et al. (2011), and among organizational, management, and strategy scholars in particular (Felin et al., 2012). In addition, researchers know little about how large established companies carry out a sustainable action in practice (Engert et al., 2016; Moldavska, 2017), what role internal legitimacy plays in developing new sustainable strategy (Thomas & Lamm, 2012), how new initiatives are engaged (Hargadon & Douglas, 2001; Schrettle et al., 2014) and how large established companies undergoing change legitimise their new technologies (Patala et al., 2019).

Therefore, this thesis focuses on internal legitimacy theory by adopting Suchman (1995) and Scott (1995a) point of views, because my purpose is to take a picture of the status quo rather than expanding on each view. On one hand, Suchman (1995) focuses on the social basis of the term of legitimacy that represents the desirability of an entity depending on socially constructed system of norms, values, beliefs and definition. Thus, Suchman (1995) defines legitimacy as '*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) views legitimacy as '*how the organisation is built, how it is run, and simultaneously, how it is understood and evaluated*'. Thus, it is essential for companies during organisational change to secure their legitimacy from internal stakeholders in order to align organisational identity with the desired future image (Bridwell-Mitchell & Mezias, 2012; Clark et al., 2010; Gioia et al., 2000).

Suchman (1995) considers three types of legitimacy as moral, pragmatic and cognitive. First, moral legitimacy includes evaluation of an organisation and its activities (Aldrich & Fiol, 1994; Parsons, 1960), and asks whether a particular action, practice or a new business activity is '*the right thing to do'* Suchman (1995, p. 579). Second, pragmatic legitimacy '*rests on the self-interested calculations of an organization's most immediate audiences*' (Suchman, 1995, p. 578), and aims to achieve practical outcomes in its immediate environment. Pragmatic legitimacy involves the direct exchanges between an organisation and its audiences (Suchman, 1995). Third, cognitive legitimacy is based on cognition rather than evaluation (Aldrich & Fiol, 1994), involves knowledge or product acceptance and is considered as state of the art, where the highest level of cognitive legitimacy is '*taken-for-grantedness*' (Bitektine, 2011). Jepperson (1991, p. 147) noted that taken-for-grantedness '*is distinct from evaluation: one may subject a pattern to positive, negative, or no evaluation, and in each case (differently) take it for granted*'. In addition, Suchman (1995) considers cognitive legitimacy as '*the most subtle and the most powerful*' as well as the most difficult to obtain and manipulate.

On the other hand, Scott (1995a, 2003) focuses on the organisation's cultural environment that is shaped by general belief systems. In this regard, legitimacy is defined as a '*condition reflecting cultural alignment, normative support and consonance with relevant rules or laws*' (Scott, 1995a). Thus, legitimacy in this perspective offers explanations and interpretations for the social relations through which organisations gain legitimacy (Scott, 1995a). In addition, Scott (1995b) makes a decisive contribution to the legitimacy theory and proposes a broadly similar trichotomy using what he called the three pillars of legitimacy: regulative, normative and cultural-cognitive. Thus, using Scott's framework in this thesis is essential to understand company's culture and what makes its internal stakeholders to shift their conventional social norms and believes.

First, regulative pillar refers to '*the degree to which an organization complies with explicit regulative processes-rule setting, monitoring and sanctioning activities'* (Scott, 1995a, p. 42). it also enables the company to establish new laws and rules in order to influence future behaviour (Alexiou & Wiggins, 2019; Scott, 2014). Second, normative pillar is considered as informal values and norms (Scott, 1995a, p. 37). Whereas, values is defined as '*conceptions of the preferred or the desirable*' associated with '*standards to which existing structures or behaviours can be compared and assessed*', while norms contain the notions of '*how things should be done*' (Scott, 2001, pp. 54-55). Third, cognitive pillar refers to '*the spread of knowledge about a new venture'*, which can be estimating by measuring the level of public knowledge of it (Aldrich & Fiol, 1994, p. 648). Thus, it is seen as an evaluation or judgment that is required to determine the company's understandings and interpretations in a wider belief system and cultural frame (Dart, 2004; Munir, 2002; Scott, 2014). In other words, it measures the level of public knowledge of the new action (Aldrich & Fiol, 1994).

According to this, in this section provides a big picture-overview of legitimacy theory through revealing the divergences and convergences among Suchman's and Scott's typologies. This helps provide a better understanding of the general process of legitimacy theory, how it works and how fundamental arguments raised by Suchman and Scott. Each discipline embraces the concept of legitimacy through its own contextual elements, however, the two typologies by Suchman and Scott are found to be overlapping in many aspects. For instance, Suchman's (1995) moral legitimacy includes evaluating a company's activities and investigating whether it is doing the right thing. This means that moral legitimacy is responsible for evaluating the company's actions, reshaping its strategy and developing new policies and rules. In addition, Suchman's (1995) pragmatic legitimacy focuses on the direct exchanges between a company and its direct audiences. This means that pragmatic legitimacy is ensured when a company's internal stakeholders are engaged in the new action and are being able to facilitate this new action. However, Scott's (1995a) regulative pillar refers to the development of the formal laws and rules. This means that regulative pillar encompasses new strategies and policies in a company. While normative pillar refers to the informal values (common opinions that evaluate the existing situation) and norms (evaluation of how things should be done). This means that normative pillar is ensured when internal stakeholders evaluate a company's actions and are engaged in the new change. In this sense, Suchman's moral and pragmatic legitimacy and Scott's regulative and normative pillars are overlapping but focus on different perspectives, because they focus on evaluating a company's activities, developing new rules, strategies and policies, and engaging employees in a new change. However, cognitive legitimacy does not differ significantly from its uses in Suchman's and Scott's typology since both of them focus on company's acceptance and understanding of knowledge.

Therefore, in order to explore how internal legitimacy theory can be used to understand the sustainable shift that occurs in a large established company. In the first step, I chose to use Suchman's legitimacy theory in paper 1 as it represents a guiding approach of this thesis. This

helps understands how people act toward a company, how they understand it and how they accept its new actions. Suchman's theory was used in paper 1 because it works better with qualitative research, and it enables us to understand individuals' different viewpoints and personal explanations about what happens inside a company during a change. In the second step, I chose to use Scott's theory in paper 2 and 3 in order to develop and test a model. The institutional theory by Scott works better with quantitative research because it has already been measured and tested in previous studies such as Busenitz et al. (2000); Oftedal (2008); Oftedal et al. (2018); Åmo et al. (2006).

As a result, internal legitimacy theory helps me investigate how a large established company builds its internal legitimacy and understand who is responsible for introducing and developing a new sustainable change in the company. By this, this thesis contributes to the literature on organisational legitimacy by linking organisational legitimacy and strategy change, especially in the context of sustainability in the OG industry.

2.6 Summary of the Literature Review and the Research Purposes

The above thematic analysis has highlighted a set of imperatives for further research on sustainable transition in large established companies. As proposed by the overall research question '*What is the role internal legitimacy plays in shifting a large established company towards sustainability?'*, this thesis aims to develop knowledge on how internal legitimacy theory can be used in research to understand a sustainable shift a large established company is going through.

This section describes an illustration of the theoretical context I will be outlining in order to develop the overall conceptual framework later in this thesis. First of all, Figure 3 shows Burgelman model and its two levels of analysis; macro and micro levels. On the macro level, the Burgelman model shows how sustainable external pressure influences the rubber bands between the four dynamic forces to stretch during strategic change. However, on the micro level, the model shows how internal selection environment is created in the company.

Furthermore, the Burgelman model was the starting point of my thesis work. I used it to understand how a large established company shifts its ideas, knowledge, innovation, sustainability and direction towards a new agenda it selects. Thus, Figure 3 does not represent a research model, but it has rather been used as a theoretical context to demonstrate missing insights inside it. The missing insights are considered as a black box where we see that something is happening, but we don't know what it is and how it happens.

However, in order to develop and operationalise the overall conceptual framework, I must depart from my theoretical context, and focus on the methodological framework instead. Therefore, the methodology chapter and the description of its empirical case make several reflections on each level of Burgelman model as will be explained in details in the methodology chapter and conclusions chapters.

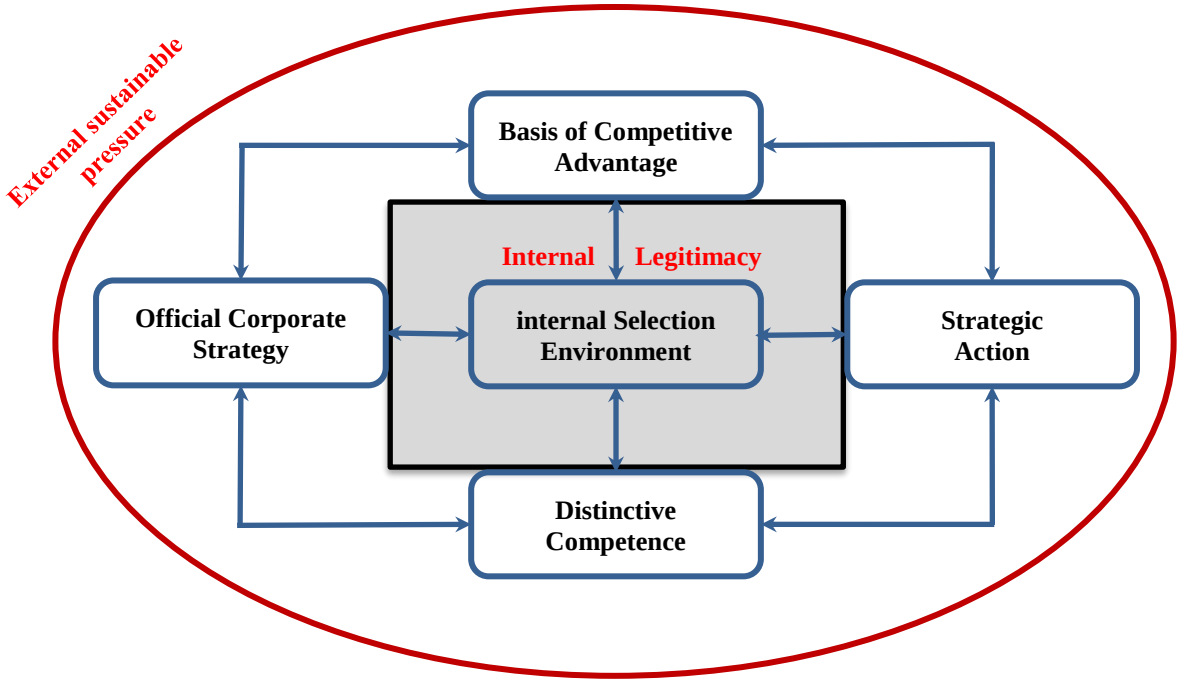


Figure 3. Illustration of how a theoretical context is used to develop the dissertation's conceptual framework

In the methodology chapter, I will first go through the initial layers of Burgelman model by studying what happens outside the model (macro level). Then, I will go inside the model and study the micro level of the model. However, this thesis uses internal legitimacy theory to understand what happens inside the model once the black box is opened, but first let us move to the methodology chapter in order to develop a model, measure its variables and test it.

3 Methodology and Research Design

This thesis advocates a single case study approach where qualitative and quantitative methods are chosen to answer the 'How' and 'What' questions. The 'How' question looks at, 'How is the sustainability phenomenon introduced?' Meanwhile, the 'What' question seeks to answer 'What initiatives are used to make a sustainable transition?'

This chapter discusses, first, the methodological stance of this thesis. Second, it describes the reason behind choosing a single case study and how this study evolved. Third, it discusses the methodological choices related to the case study. Fourth, it presents a broader description of Equinor as a single case study. Finally, it discusses issues of research quality such as validity, reliability and ethical consideration that relate to this thesis.

3.1 Philosophy of Science

Philosophy of science seeks to explain how knowledge (in the form of ideas or propositions) may represent theory through scientific methodology (Cruickshank, 2003; Rorty, 1994). Ontology and epistemology, for example, are central for philosophers of science to guide the way science is conducted. On one hand, ontology shows that there is a reality beyond our perspectives, beliefs, ideas, propositions, etc. (Cruickshank, 2003). In addition, Giddens views ontology as a critical attitude towards previous research in order to guide current research (Cruickshank, 2003). This means that ontology is concerned with existence and reality, where a phenomenon exists 'out there' and is independent of our knowledge of it (Easton, 2010; Sayer, 1992).

Epistemology, on the other hand, focuses on how people 'go on' within a 'form of life' (Cruickshank, 2003). This means that epistemology explains how people follow practical rules in different forms of life (Cruickshank, 2003). Rorty (1998) argues that epistemology has some concerns about the nature of knowledge, and one cannot accept the idea of 'making beliefs true'. Therefore, epistemology does not include human nature; rather, it requires obtaining knowledge to confirm a reality (Easton, 2010; Rutzou & Steinmetz, 2018).

In summary, ontology asks 'What is in the world?' and epistemology asks 'What can we know about the world and how should we obtain that knowledge?' (Johannesson & Perjons, 2014). However, in order to develop a deeper understanding of how sustainability is introduced in a large established OG company, and what initiatives are used to make a sustainable transition, this thesis adopts interpretivism and positivism perspectives from an epistemological point of view.

Interpretivism claims that the social world can be understood through grasping the purpose that people attach to their actions (Johannesson & Perjons, 2014). According to Bryman (2008, p. 13), interpretivism is defined as '*an epistemological position that requires the social scientist to grasp the subjective meaning of social action*'. In addition, Cronje (2012, p. 3) claims that '*interpretivists believe that the human experience of the world is subjective, and they have a concern to understand it as it is*'. Thus, interpretivists need to comprehend, interpret, understand and describe situation from their own orientation reference (Kankam, 2019).

Epistemologically, interpretivism claims that a social phenomenon is obtained by actions, experiences and meanings of people who create it (Johannesson & Perjons, 2014). Interpretivism relies heavily upon methods such as interviews and observations (Creswell, 2007). As stated by Bryman (2004, p. 266), interpretivism is '*concerned with words rather than numbers*', which emphasises that qualitative research has strong links with interpretivism.

Thus, interpretivism provides answers to 'How' question, builds knowledge through experience and explanations within a given culture through qualitative approaches (Thanh & Thanh, 2015). The interpretivist view in this thesis is relevant since it enables me to develop an in-depth understanding of internal legitimacy theory and how it can be used to identify and interpret individuals' (employees') understanding and acceptance of shifting a large established OG company towards a more sustainable future.

Furthermore, the goal of interpretivism is to uncover the meanings by understanding people behaviours and experiences of a social phenomenon (Daymon & Holloway, 2010). For example, the adoption of interpretivism in sustainability research should therefore emphasise understanding employees' experience of sustainability, individually or collectively, such as how they use, feel, think and understand sustainability in the company. In addition, the interpretivist view helps untangle how internal legitimacy is created and how it shapes a company's selection criteria. For example, an interpretivist approach enables us to understand different viewpoints and personal explanations about how and why sustainability emerges in a large established OG company, how the company evaluates its actions based on environmental pressures and how employees react to this change. This also enables us to understand employees' personal explanations about what happens inside a company during a change.

However, Johannesson and Perjons (2014) claim that interpretivism offers deep but unreliable knowledge, while positivism provides reliable but shallow knowledge. Thus, to find out something more general about the topic, I turned to positivism. In the interpretation of the qualitative interviews, there were patterns that could be explored. Positivism was originated by sociologist and philosopher Auguste Comte who attempted to accept knowledge that is based on sense, experience and positive verification (Johannesson & Perjons, 2014). Positivism is defined as '*self-governing, independent and objective existence of truth*' (Aliyu et al., 2014, p. 81). Positivists believe that knowledge is true if it was created by scientific methods (McGregor & Murnane, 2010). In addition, positivism in social science can be described as '*the view that the natural sciences should provide the model for proper research*' (Ryan, 2015, p. 418).

Epistemologically, positivism claims that understanding a phenomenon is obtained through observation and experimentation (Johannesson & Perjons, 2014). Positivism approach looks into the process of gathering data, observing regularities and extracting laws (Turner, 1992). Positivists researchers employ methodologies such as confirmatory analysis, nomothetic experiments, quantitative analysis, laboratory experiments and deduction (Aliyu et al., 2014). Thus, positivism is consistent with quantitative method that is based on measurable variables and the use of statistical mechanisms (Pashaeizad, 2009). In addition, positivism provides answers to 'What' question, and seeks to identify the causal effect between variables through quantitative approaches (Irshaidat, 2022).

Furthermore, the goal of positivism is to provide richer and more reliable results (Shanks, 2002). For example, the adoption of positivism in sustainability research should therefore emphasise the importance of testing hypotheses and verifying them through the use of statistical mechanism to prove their reality (in this case, whether internal legitimacy theory can be used to understand the sustainable shift in the company). Indeed, it was important for this thesis to know something more general about internal legitimacy. Therefore, it was relevant to find the causal relationships between different variables and measure the factors that make the company select its sustainable choices.

Thus, throughout my thesis, I went back and forth between the interpretivist view and the positivist view, seeing the quantitative data in light of the qualitative data and knowing that the concept of legitimacy is highly subjected to interpretations. Therefore, it has been suggested to combine interpretivism and positivism perspectives in order to overcome the mentioned

weaknesses (Johannesson & Perjons, 2014). According to this, paper 1 in this thesis applies interpretivism and focuses on the case study itself in order to generate and propose ideas of how sustainability has been introduced to the company, while paper 2 and 3 apply positivism and focus on a survey in order to collect empirical data, analyse it statistically, detect evidences and verify them.

In summary, this thesis is inspired by interpretivism and positivism due to its emphasis on explaining a social phenomenon and identifying empirical investigations in order to provide a deeper understanding of the phenomenon. Thus, interpretivism helps answer the 'How' question and obtain deeper knowldege on 'sustainability' by engaging more cloesly with Equinor's employees to understand their views and interpretations. In addition, positivsm helps answer the 'What' question by studying the nature of emplyees' behaviuors by using a survey in order to achieve valid results.

The previous mentioned philosophical assumptions help choose the appropriate methods and help design the research process, i.e., data collection and analysis (Saunders et al., 2009). Therefore, the knowledge created in this thesis is the result of using both theories and empirical data. This is achieved by employing an abductive research design that helps guide the empirical investigations and form specific theories in the field of sustainability and legitimacy theory. This will be discussed in detail in the next section.

3.2 Research Design

Good research design helps provide a plan of the study and explain how data are collected and analysed in order to answer its research question (Patton, 2002; Saunders et al., 2009). Saunders et al. (2009) developed a 'research onion' model that helps researchers select the most suitable research methodology and provide detailed knowledge about the research process. Figure 4 presents the research 'onion' model of this thesis and explains the layers of the onion that need to be 'peeled away' before coming to the main point of the thesis (Saunders et al. (2009).

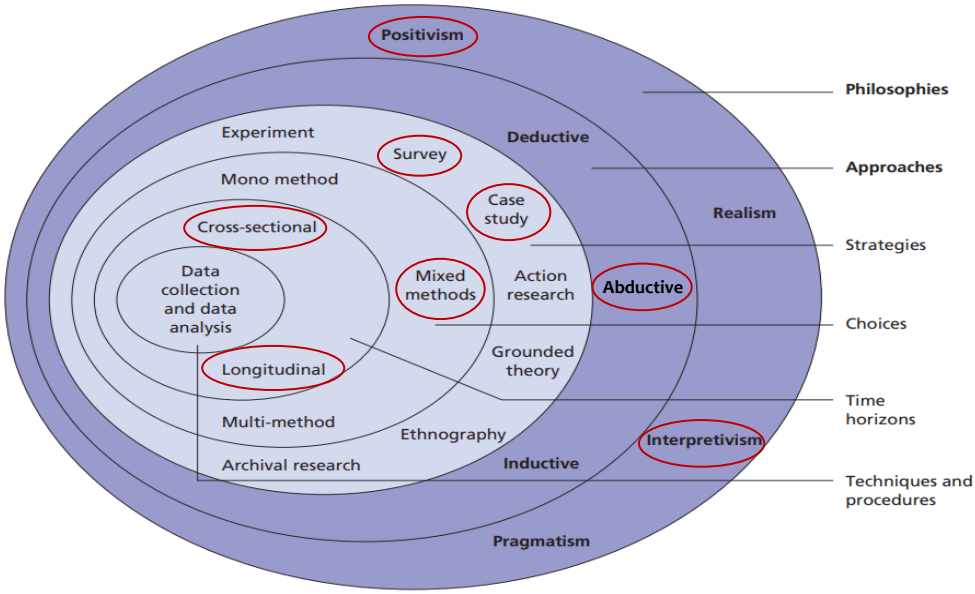


Figure 4. Diagrammatic presentation of a research onion model of this thesis as adopted from Saunders et al. (2009)

The **first** layer of the model 'research philosophy' explains the outside elements of the research onion model, which presents the philosophical views of the study (Saunders et al., 2009). The previous section presented a detailed analysis of the interpretivism/positivism approach related to this thesis. The **second** layer of the model 'research approach' involves the use of theory in order to help design the research project (Saunders et al., 2009). There are three types of reasoning that contribute to academic progress: deductive, inductive and abductive approaches, as shown in Figure 5.

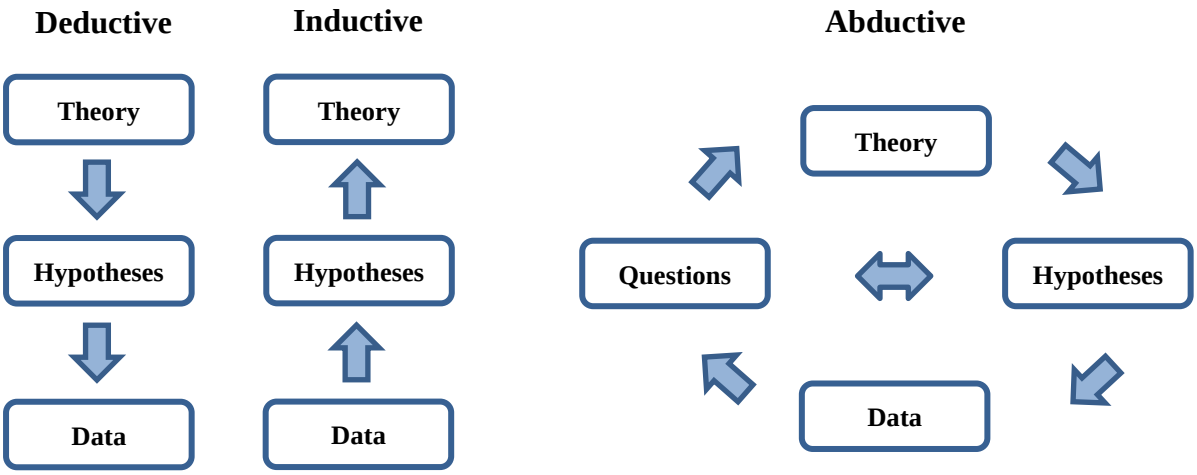


Figure 5. Difference between deductive, inductive and abductive approaches (Jacobsen, 2015, p. 35)

Figure 5 shows that the deductive approach aims to test existing theory empirically, enabling researchers to move from theory to a hypotheses test (Collis & Hussey, 2003; Saunders & Lewis, 2012). The inductive approach indicates theory-building and starts from a specific case or data to new theory/concept development (Saunders & Lewis, 2012; Saunders et al., 2009). However, it is almost impossible to relate only to a pure deductive or a pure inductive aspect (Jacobsen, 2015). This is due to the fact that theory comes usually from previous observations, at the same time, it is not reasonable to rely only on assumptions and observations to draw a conclusion (Jacobsen, 2015). Therefore, abductive reasoning is more preferred which combines between deductive and inductive reasoning. Thus, Figure 5 shows the abductive approach as a continuous problem-solving process, which combines both deductive and inductive approaches (Jacobsen, 2015).

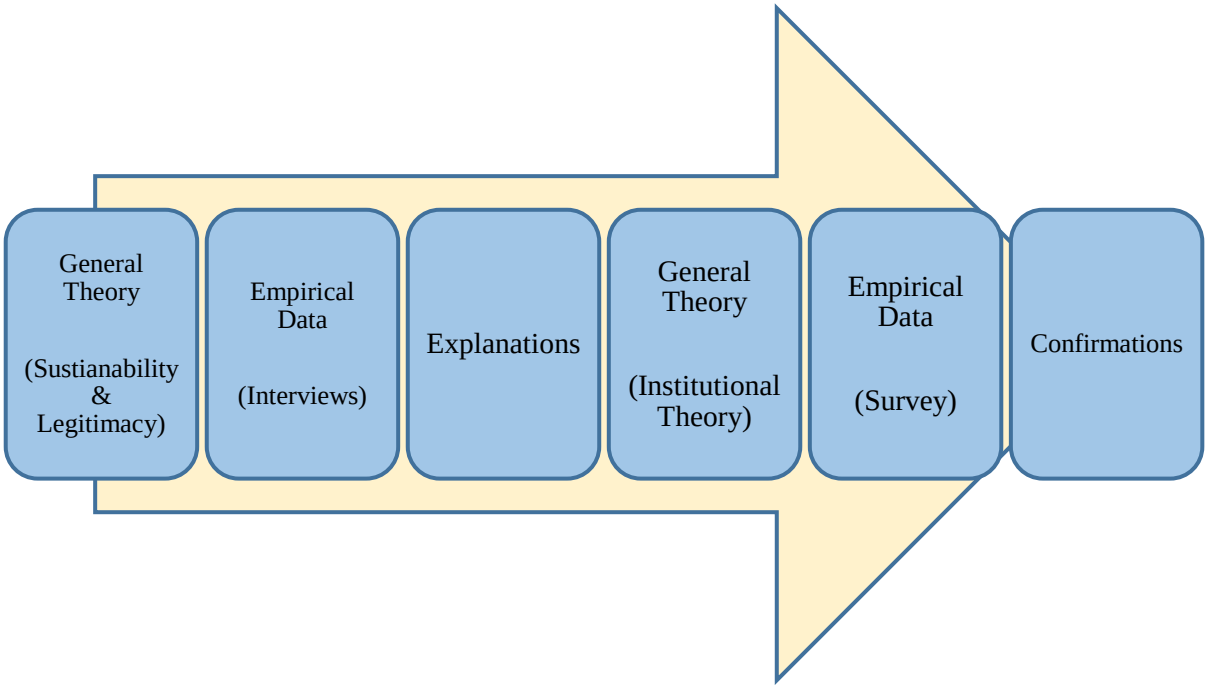


Figure 6. The abductive approach conducted in this thesis

This thesis is employed by an abductive approach. Figure 6 shows how I went back and forth between theoretical and empirical settings during the research process. Thus, the abductive reasoning in this thesis starts by reviewing existing literature on sustainability and legitimacy theory by Suchman, and subsequently draws insights from qualitative data to provide some inspirations. The content of the interview questions were driven from the literature on sustainability and legitimacy theory. However, to ensure that all important aspects related to the study was included, open-ended questions were asked during the interviews. This is essential to gain a general in-depth understanding of how Equinor company reshaped its strategy and shifted its focus towards sustainability. Through the interview material, I found some interesting links between internal legitiamcy and strategy, which will be further investigated. Thus, at this stage, it was important to quantify the qualitative data and test theories in order to draw conclusions and collects evidences. Therefore, I moved again to the thoery and reviewed literature on institutional theory by Sott in order to gain inspirations on how it has been used and measured in previous studies. Then, the work followed an emperical setting by developing a survey and a set of testable hypotheses. The survey questions were driven from institutioaanl theory and inspired by the work of previous researchers. This is essential in order to test a theory and confirm evidence that internal legitimacy theory can be used to understand a strategic shift that occurs in a large established company.

The **third** layer of the model indicates the 'research strategies'. Selecting the appropriate research style is guided by the research question and the objectives of the study, and helps identify the type of data collection and data analysis (Saunders et al., 2009). Each research strategy can be used for exploratory, descriptive and explanatory purposes (Yin, 2003). On one hand, paper 1 is conducted as an exploratory study. Exploratory research '*generates initial insights into the nature of an issue and develops questions to be investigated by more extensive studies'* (Marlow, 2005, p. 334). Furthermore, it helps discover '*what is happening; to seek new insights; to ask questions and to assess phenomena in a new light*' (Robson, 2002, p. 59). Thus, the exploratory approach on paper 1 helps narrow down and identify a research problem that has rarely been examined (the integration of sustainability in practice). In addition, the open-

ended interview questions help gather different feedback from employees and, thus, help understand what and how they are thinking in a certain way. This helps formulate the propositions that will guide the research study.

On the other hand, papers 2 and 3 are conducted using explanatory studies because they concern understanding the connections between variables and achieving an ultimate objective in quantitative research (Blaikie, 2003). For example, quantitative data were necessary in order to study the relationships between the three elements of internal legitimacy, sustainable transition, drivers/barriers of sustainability and innovation selection. Thus, a set of hypotheses were developed to provide a frame for the explanatory research in order to test a theory, understand the sustainability transition in depth, and investigate the factors that drive the company to invest in new sustainable innovations. In addition, these studies aim to give us evidence through the hypotheses tested.

The **fourth** layer of the model indicates the 'research choices' that address the nature of the study and the analytical techniques used (Saunders et al., 2009). Saunders et al. (2009) show different styles that could be adopted by researchers, where every style has its benefits and limitations. The methodological choice deployed in this thesis is mixed methods, which has characteristics of both qualitative and quantitative case studies. Thus, this thesis has been influenced to adopt a combination of a case study research and survey. A case study is defined as '*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence'* (Robson, 2002, p. 178). A case study strategy aims also to give researchers a richer understanding of a context than other strategies (Morris & Wood, 1991). However, the survey strategy allows researchers to collect a large amount of data that can be used to develop models of variables and suggest possible relationships between those variables (Saunders et al., 2009). More details about the methodological choices adopted in this thesis are shown in Table 4.

Table 4. Overview of the research strategies

	Paper 1	Paper 2	Paper 3
Research Objective	Understanding how internal legitimacy is used to explain how a sustainable strategy shift is developed in a large established company.	Developing a model that helps explore how internal legitimacy is built in a large established company. In other words, exploring how internal employees frame organisational identity and shape its new strategic direction.	Testing a model that helps explore how internal legitimacy is used to suggest the factors that enable a large established company to select its sustainable innovative projects.
Research Strategy	Single case study	Survey	Survey
Data Sources	• Primary data: semi-structured narrative approach (9 individual in-depth interviews and 3 mini focus group interviews with two persons in each interview). • Secondary data: Annual reports, sustainability reports, RE reports and energy perspectives reports. In addition to data from conferences, presentations, news and internet documents.	91 responses (71 responses to an online questionnaire and 20 responses to a paper-based survey).	90 responses (70 responses to an online questionnaire and 20 responses to a paper-based survey).
Analysis Technique	Pattern matching analysis by coding in NVivo.	Structural Equation Modelling, multiple regression analysis by using SPSS and AMOS.	Structural Equation Modelling, multiple regression analysis by using SPSS and AMOS.
Validity and Reliability	• Developing interview guide based on internal legitimacy theory. • Triangulation applied by using primary and secondary data. • The coding process started with deductive analysis (based on theory), followed by an inductive approach (derived directly from data). • Data reduction process was followed to refine the data, develop propositions and test them.	• Developing and refining a large pool of items from institutional theory. • Reviewing the survey with colleagues and employees from Equinor. • Pretesting the survey with employees. • Applying exploratory factor analysis and confirmatory factor analysis to measure the validity and reliability of the survey. • Measuring the construct reliability, convergent validity and discriminant validity.	• Developing and refining a large pool of items from institutional theory. • Reviewing the survey with colleagues and employees from Equinor. • Pretesting the survey with employees. • Applying exploratory factor analysis and confirmatory factor analysis to measure the validity and reliability of the survey. • Measuring construct reliability, convergent validity and discriminant validity.

• I as a main author coded the data, and my supervisor Professor Elin M Oftedal read and approved the suggested codes. • Pattern-matching technique was used to compare our obtained results from past studies. • Asking our contact person for feedback on particular quotes used in the book chapter.	• Testing the model fit by some measures such as incremental fit index, root mean square error of approximation, goodness of fit index and fit indices in confirmatory factor analysis.	• Testing model fit by some measures such as incremental fit index, root mean square error of approximation, goodness of fit index and fit indices in confirmatory factor analysis.

The **fifth** layer of the research model indicates the 'time horizon' of the research. The time horizon depends on the period needed to complete the research (Saunders et al., 2009). This thesis was carried out using both a longitudinal qualitative study and cross-sectional quantitative studies. Paper 1 in this thesis indicates a longitudinal study that describes the incidence of a particular phenomenon (sustainable transition in Equinor) over a period of time (2014-2017). This study used both primary and secondary data. The primary data were collected through semi-structured interviews in order to better understand Equinor and its transition towards sustainability. However, secondary data were collected through Equinor's own documentation, such as annual reports, sustainability reports conferences, interviews, etc. Both types of data were analysed; however, the main reason of using secondary data was to support primary data and improve the quality of data collection. In addition, in this longitudinal study, two participants were repeatedly observed in order to emphasise any changes that might occur during the data collection period. Thus, the longitudinal study addresses the change and development of a particular phenomenon 'sustainable transition' in a particular company (Adams & Schvaneveldt, 1991; Bouma & Atkinson, 1995).

However, cross-sectional research employs a survey strategy and describes the incidence of a particular phenomenon at a particular time (Easterby-Smith et al., 2008; Saunders et al., 2009). Thus, the cross-sectional studies in papers 2 and 3 were conducted through a survey and collected data from Equinor's employees at a particular time between 2017 and 2019. These studies aim also to compare between different variables (such as regulative, normative, cognitive pillars, drivers, barriers, etc.) in order to examine the factors that help build Equinor's internal legitimacy and suggest the factors that help employees select sustainable innovation projects.

Finally, the **last** layer of the model indicates the 'techniques and procedures' used in data collection and data analysis in order to help researchers gather the most reliable and valid information (Saunders et al., 2009). More details about the analytical techniques adopted in this thesis can be seen in Table 4.

In summary, this thesis adopts the abductive research approach. The exploratory work from and interpretivist point of view starts quite broadly with the intend to enhance our understanding of the sustainable shift in a large established company. The literature on sustainability is first reviewed and included theoretical knowledge and views from previous studies. The literature review shows that previous studies focused on the reason behind integrating sustainability in large established companies with less focus on how sustainability is integrated in large established companies (how companies shift their strategies towards sustainability). The literature on internal legitimacy theory by Suchman is next reviewed, and a review suggested that there is a link between strategy change and internal legitimacy theory. Thus, the explorative study suggests using internal legitimacy in order to explore how internal legitimacy can be used to understand a strategic change in a large established company. Thus, a longitudinal case study design was chosen to focus on Suchman's three types of legitimacy in order to develop a real-life observation (Alvesson & Sköldberg, 1994). Thus, this study extends the use of internal legitimacy theory in a new setting which considered as theoretical development of this field. However, the explanatory work from a positivist point of view starts by reviewing institutional theory developed by Scott with the intend to make a comparison between Scott's and Suchman's point of views. The literature reviews are found to be overlapping in many aspects; however, Scott is found to be well measured in studies, and can be used to test theoretical assumptions and verify them through the use of quantitative data. Thus, the explanatory studies develop, measure and test the factors that enable a large established company builds its internal legitimacy and select its sustainable projects. This indicates a close link between the empirical and theoretical domains.

3.2.1 Choice and Evolution of the Case Study

A case study approach is generally used in research to understand complex and dynamic relations within single or multiple settings (Eisenhardt, 1989; Yin, 2014a). In addition, it is well suited to the interpretivism/positivism approaches that aims to obtain knowledge from people experience, meaning and actions by using qualitative and quantitative methods respectively (Johannesson & Perjons, 2014).

A case study research is chosen in this thesis in order to increase the understanding of a phenomenon and develop new knowledge. It also involves the collection of multiple sources of data. For example, it uses open-ended questions in the qualitative part of this thesis in order to help generate new insights (Suddaby et al., 2015). However, data from the survey in the quantitative part enable the definition of a social setting in a variety of settings in order to increase the generalizability of the results (Miles & Huberman, 1994). In addition, the case study approach provides a unique way of observing a phenomenon, collecting data, analysing information and reporting the results over a long period of time (Yin, 2014a).

Thus, this thesis explores a case study design in order to attain a rich understanding of a complex phenomenon under investigation (Yin, 2014d). Adopting a case study design also helps investigate the causes and relationships in detail over a long period of time (Eisenhardt & Graebner, 2007). In particular, a single case-study design is chosen in this thesis to critically test theoretical hypotheses/propositions in order to grasp the overall concept of sustainability transition in Equinor and how internal legitimacy drives Equinor to make this shift. In addition, a single case study design helps 'explore a real-life contemporary' study which allows observation of the case's themes and report of the results over a long period of time (Creswell, 2013). It also offers an opportunity to question old theories and explore new ones to better understand the subject (Dyer et al., 1991). Thus, a single case study helps explore the case, analyse the data and look at its subunits (Yin, 2003).

However, researchers argue that single case studies are sometimes seen as having limited research value due to misconceptions such as difficulties to generalise knowledge, difficulties to generate hypotheses and difficulties to summarise and develop general propositions and theories on the basis of specific case studies (Flyvbjerg, 2006). However, Flyvbjerg (2006) and Jacobsen et al. (2002) argue against these fallacies, claiming that a single case study can be a valuable method, dependent upon the case and how it is chosen. In addition, Flyvbjerg (2006) validates the quality of a single case study as it gives scope for researchers' own interpretations to produce 'context-dependent knowledge' that allows researchers to better understand the theoretical construction and provide rich sources of data. In addition, Beveridge (1951, quoted in Flyvbjerg, 2006) claims, '*more discoveries have arisen from intense observation than from statistics applied to large groups*'.

The next section will describe the single case study in this thesis 'Equinor', in which the initial layers of Burgelman model (macro level) are discussed. Accordingly, by looking at the macro level of the Burgelman model, Equinor shows that all the dynamic forces are in action due to the external sustainable pressure it faces. Therefore, it will not make any sense to try to measure any of them as will be discussed next.

3.2.2 Case Description – Equinor

The context of this thesis is Equinor, a Norwegian OG company. This context is relevant to this thesis, especially when studying what happens between the dynamic forces of Burgelman model. Thus, this section presents Equinor case study and shows how the divergence between the dynamic forces are in action. In addition, it shows how external sustainable pressure and oil crises led to this divergence.

Equinor is an international energy company and is mostly owned by the Norwegian State. Equinor is considered as the largest company in Norway with operations in more than 30 countries worldwide and has more than 20,000 employees (Equinor, 2021a). Equinor claims to have made efforts towards sustainability since 1990. According to Equinor's own reports, the carbon taxes in the 1990s motivated Equinor to work on achieving its sustainable business and reducing its carbon dioxide emissions, produced by its OG operations. In addition, Equinor was ranked as the most sustainable energy company and the fourth most sustainable corporation in the world regardless of industry in 2014 (Emisoft, 2020). Thus, the Equinor setting seems well suited as a case study in this thesis in order to understand the nature of sustainability in a large established OG company. This helps represent a significant contribution to knowledge, extend a theory and understand how certain conditions and underlying processes change over time (Yin, 2014c).

The history of Equinor is the history of the oil economy of Norway. The offshore oilfields in Norway were discovered in 1969, and contributed to raise Norway's economy dramatically (NBIM, 2019). Accordingly, the Norwegian State established Equinor (formerly Statoil) in 1972, which is considered as the engine of the Norwegian oil industry and plays an important role in funding the Norwegian welfare state (Hovland, 2017). In addition, the Norwegian parliament established the Government Pension Fund that aims to use the oil revenue responsibly by investing in foreign companies (NBIM, 2019). This means that Norway owns almost 1.5 of all shares in the world's listed company (NBIM, 2019). However, these activities are considered as weak sustainability since it is focusing more on man-made capital than natural capital (Neumayer, 2003).

Norway's climate policy has, since 1987, made legislative changes to reduce the climate change effects of greenhouse gases, and is working towards an ambitious global climate agreement to ensure environmental sustainability (Brundtland, 1987; KLD, 2014). In addition, Norway introduced its carbon taxes in the 1900s in order to force companies to reduce their carbon emissions (Finansdepartementet, 2020). However, in order to achieve climate and environmental targets, Norway was among the first countries who welcomed the Paris Agreement, and they had a goal to reduce Norway's carbon emissions by at least 40 percent compared to 1990 levels by 2030 (KLD, 2019). Therefore, the Norwegian government demands companies (including the companies they own) to be responsible, balance economic, social and environmental conditions and limit their greenhouse gas emission in order to contribute to long-term values within sustainability (Regjeringen, 2022). Furthermore, there is no direct relationship between the Norwegian State and the companies they own, and they can operate as efficiently as other private companies (Regjeringen, 2022). However, the Norwegian State as a board member can officially set up new goals and strategies (Regjeringen, 2022).

The growth of clean energy resources is accelerating more than ever before (IEA, 2022). This forced Equinor to make huge investments in RE, which is introduced as an alternative clean energy and is promoted as a climate change adaptation. This is posing new challenges for Equinor to be part of the low carbon transformation, and fulfil their purpose of turning natural resources into energy. Thus, Equinor has strengthened its commitment to sustainability by developing clean energy from RE and offering it at a lower cost, particularly since 2014, when

Eldar Sætre started as Equinor's new CEO and when the oil prices started to plummet. Thus, Equinor believes that they are committed to providing the world's energy needs in a responsible manner, and to introducing new business solutions.

All of these challenges motivated Equinor to position itself in the market, and engage its employees in their new RE projects. In addition, in 2018 the company rebranded their name from Statoil into Equinor in order to support their new strategy as a broad energy company. However, their sustainable strategy was to develop OG in an efficient and sustainable way and, at the same time, increase their investments in RE projects.

Furthermore, Equinor works continuously on accelerating the energy transition through innovations in RE activities. Therefore, they have partnered with different companies in order to achieve their goals. Equinor launched their initial RE development through offshore wind so they can transfer their skills/experiences from OG offshore activities into offshore wind energy projects. They developed their first offshore wind projects in the UK and invested in three projects: Sheringham Shoal that provides electricity to power 220,000 British homes, Dudgoen that is sufficient to power 410,000 UK homes and Hywind Scotland, the first floating wind farm that will provide electricity to 36,000 households (Equinor, 2021e). In addition Dogger Bank, the world's largest offshore wind farm, is expected to produce energy to power 4.5 million UK homes (Equinor, 2021b).

Equinor has also invested in developing two offshore wind projects in the US: Empire Wind that will power more than one million New York homes; and, Beacon Wind that will provide renewable power to over one million households in the Northeast (Equinor, 2021e). In addition there are offshore wind investment projects in Norway, Poland, Germany, Japan and South Korea (Equinor, 2021e). Furthermore, Equinor has invested in new solar projects and worked on developing new technologies in order to provide profitable growth opportunities (Equinor, 2021d). Their first step into the solar industry was in Brazil which now provides to around 200,000 households (Equinor, 2021d).

Equinor, as a single case, was chosen as a means to explore the phenomenon of sustainability and how Equinor as an OG company introduced and developed sustainability into its business. Figure 7 shows that Equinor claims that it developed its sustainable commitment already since 1990s; however, this commitment was made to produce the OG in a more sustainable way. In addition, the figure shows that in the period between 2008 and 2013 Equinor developed some operations in RE, but again this was to enhance its public image and gain better market access in Northern Norway (according to one interviewee). However, a real transition movement towards sustainability occurred after 2014 when Equinor's decision was to invest heavily in RE activities. Thus, through the research period, Equinor has gone through a major shift in focus from a pure OG company to becoming a mixed-energy-resource company. This marked a fundamental change for the company and precipitated to shift its name from Statoil to Equinor in 2018. Equinor is among the OG companies who believe that their business will be dominated by other alternative energies. Therefore, they considered the new sustainable transition in the world as an opportunity to enter a new market.

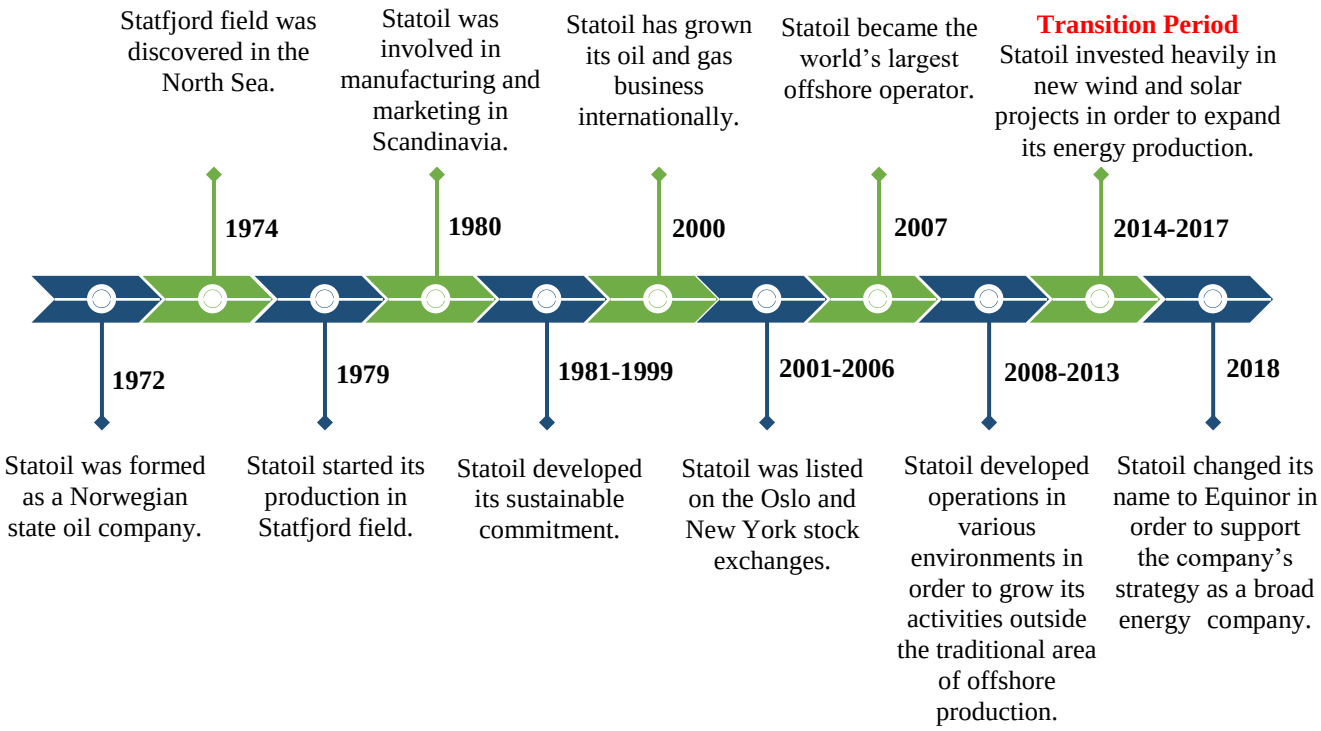


Figure 7. Equinor history timeline (Equinor, 2020)

In summary, the context of Equinor case study is well suited to study what happens outside the Burgelman model (how the four dynamic forces diverge). This section does not measure the dynamic force; however, it uses Equinor as a context to understand the divergence between the dynamic forces. (1) Equinor faced some external sustainable pressure such as governmental pressure and Paris Agreement, which led to a change in the official corporate strategy. (2) Another external pressure is the oil crises and the increasing demand for clean energy resources which caused the competitive advantage to diverge and that led to change the company's market positioning towards clean projects. (3) This led to some changes in the strategic action such the employment of a CEO (Eldar Sætre) and the decision to invest heavily in RE activities. (4) This also caused a change in the competence which encompass some challenges on how they engage their employees in the new change.

This shows that within this context I have built my study. However, I am focusing on the micro level, that explains what happens on the levels between these dynamic factors (internal selection environment), which discusses how internal legitimacy is formed and new selection criteria are shaped.

3.3 Data Collection and Data Analysis

A key strength of using a case study method involves using multiple sources for the data gathering process. A case study can combine different types of evidence such as archives, interviews, questionnaires and observations (Eisenhardt, 1989). This thesis shows the string that describes how the data have been collected and linked to answer the research question of this thesis. Thus, the empirical data for this thesis have been collected from Equinor as part of this PhD project.

This dissertation presents a mixed methods research design in the sense that it uses a qualitative approach in paper 1 and quantitative approach in papers 2 and 3 in order to address different research objectives. Paper 1 is primarily selected to advance our understanding of how internal legitimacy theory can be used to understand a new sustainable shift in an established company. Papers 2 and 3 are selected to make methodological contributions by developing, measuring and validating a survey. However, according to Creswell & Plano Clark (2007), Table 5 shows decisions made on data collection timing, weighting and data mixing that determine the type of mixed methods adopted in this thesis.

Table 5. Specification of mixed methods design adapted from Creswell & Plano Clark (2007)

Aspects	Description
Data collection timing	Data collection was performed sequentially by starting with qualitative and ending with quantitative.
Weighting	Primary weight/priority was given to the qualitative data where time and effort was spent to understand the company's sustainability transition.
Data mixing	Qualitative and quantitative data were connected during the phases of the PhD project.

Thus, this thesis indicates a research process of two phases, as shown in Figure 8. The first phase constructed qualitative data collected from interviewing several employees working at Equinor. The data were then analysed in order to understand the overall concept of sustainability transition in Equinor. Then a quantitative survey was developed as a second phase of the research process. Thus, this outlines the interpretation of the entire research process of this thesis. More details concerning the two phases will be discussed in the next sections.

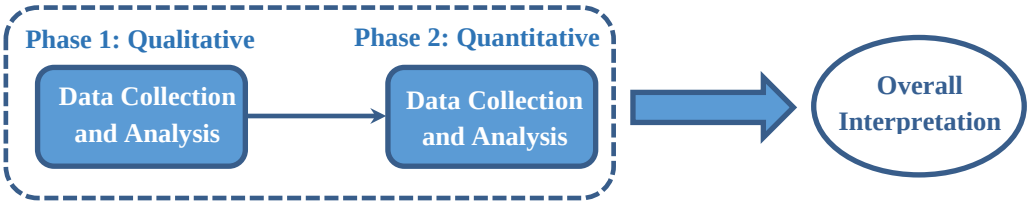


Figure 8. Sequential research, adapted from Creswell and Plano (2011)

3.3.1 The Qualitative Part of the Case Study

The qualitative case study indicates a semi-structured data collection strategy in order to provide better documentation of the evidence (Yin, 2014b). However, in order to enhance data credibility and gain a more complete and objective picture of the representative phenomenon (Yin, 2014b), secondary data through documentary sources were collected from Equinor. This approach is well suited to obtain an overview of the new situation that Equinor faced when it comes to developing new, clean alternative solutions. Figure 9 describes the research method used in the qualitative study.

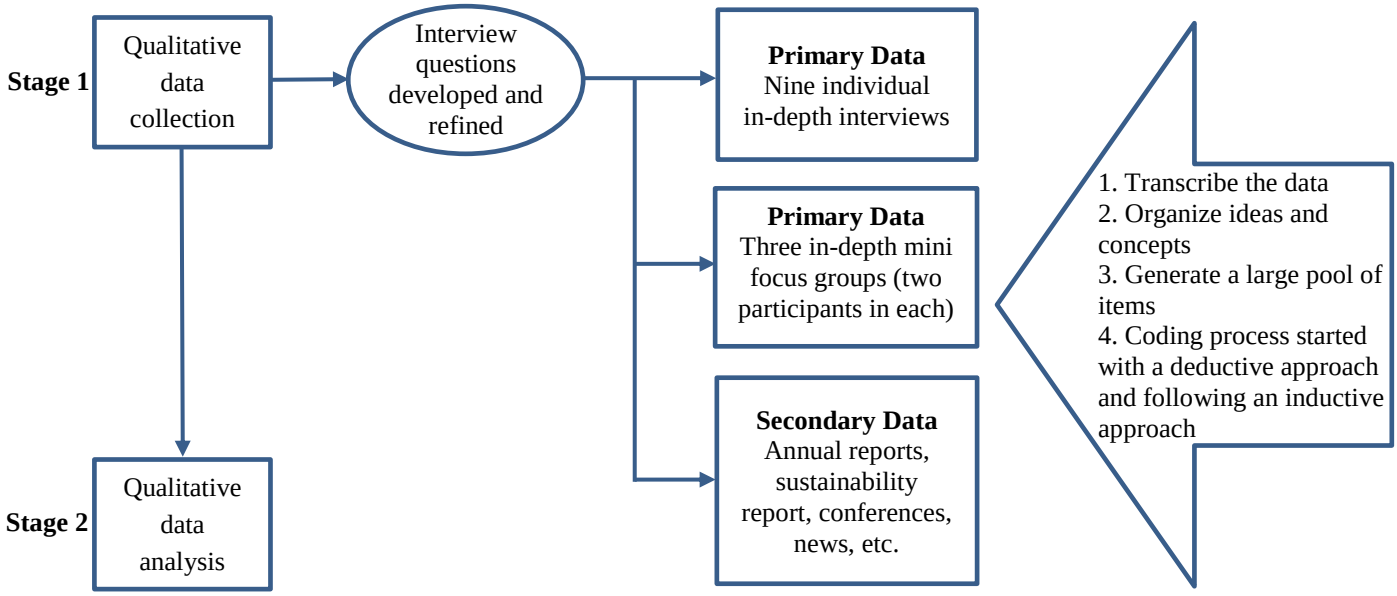


Figure 9. Flowchart illustrating the qualitative research process

Creswell (2007); Saunders (2012) suggest that a number of semi structured/in-depth interviews could be between 5 to 25 participants. At the same time, researchers should focus on understanding '*how questions – rather than how many*' and for understanding a phenomena (Pratt, 2009). In addition, several important factors that should be taken into consideration, such as quality of data and the amount of useful information obtained from each participant (Morse, 2000). Therefore, this qualitative paper relies not only on primary data but, also, on secondary data.

According to the primary data, a contact person was contacted by email and a meeting was arranged in Equinor's main office in Oslo in order to discuss the whole purpose of the study, the kind of data needed, how many interviews and the desired structure of the interviews (duration, questions to be asked, etc.). The contact person helped select 15 key persons to interview and arranged, in total, 12 interviews (nine in-depth individual interviews and three in-depth mini focus groups with two participants each). The key persons are consultants, project managers, economists, head of projects, advisers and engineers. Appendix A presents an overview of the 15 selected key persons, their positions and date of the interviews. However, secondary data were collected through documentary sources such as annual reports, sustainability reports, RE reports, energy perspectives reports, conferences, presentations and other resources such as news articles and interviews on local TV. The secondary data were coded and analysed in order to provide a comparison for the primary data.

Interviews with Equinor employees were collected over a three-year period and followed a narrative approach with minimum interruption by the interviewer in order to provide better documentation of the evidence (Yin, 2014b). Most interviews took place in Equinor's office in Oslo, with some interviews being conducted by video call (skype). In addition, the interview guide and a short description of the study were sent to the interviewees in advance. At the end of the interviews, the interviewees were asked if they had any questions or concerns, they would like to add.

The aim of the interviews was to obtain an insight into Equinor's transition towards sustainability. This is important in order to understand who is responsible for reshaping the company's strategy and how the sustainable transition is understood and accepted in the company. The interview questions were based on Suchman's types of legitimacy (moral, pragmatic and cognitive) and the nature of Equinor's sustainable transition. For instance, to probe Suchman's (1995, p. 579) moral legitimacy that asks about the 'right thing to do', questions such as 'How could RE count as a business case for engaging in environmental solution?' and 'What kind of benefits do Equinor and society gain from engaging in RE cases? (Tips: reduced costs, improve resources efficiency, reduce risk, legal liability etc)' were raised. Equinor as a large established company considers 'a right thing to do' as a business case that will reduce its costs as well as bring profit to the company. Thus, for moral legitimacy, the authors looked for statements indicating an acceptance of Equinor's responsibility to 'do the right thing'. For pragmatic legitimacy that 'rests on the self-interested calculations of an organization's most immediate audiences' (Suchman, 1995, p. 578), questions such as 'What kind of competence (employee background, managerial competence/charisma) do you have to support sustainable transition?' and 'Do you think engaging in RE practices is a right decision to make now? Why?' were raised. Thus, for pragmatic legitimacy, the authors looked for statements indicating an understanding of the sustainable shift and for a self-interest in translating a sustainability agenda into action. Meanwhile, for cognitive legitimacy that counts a company legitimate when it is understandable, rather than desirable (Suchman, 1995). Questions such as 'How did you find working in RE projects and making decisions compared with OG?' and 'How could RE cases be a potential source of competitive advantage?' were raised. Thus, for cognitive legitimacy, the authors looked for statements indicating the knowledge needed for a sustainable shift in order to understand whether Equinor's employees accept the purpose of Equinor's new sustainable strategy. More details about the questions asked during the interviews are given in Appendix B.

As part of the data analysis, all interviews were recorded and transcribed. In addition, Nvivo (a qualitative management tool) was used to build the main themes and code the data. However, in order to increase the overall quality of the coding process, the data were coded twice, and the co-author (my supervisor Professor Elin M. Oftedal) read and approved the suggested codes.

According to the coding process, the direct content analysis approach was used to code both primary and secondary data (secondary data was used to support the result from primary data) (Zhang & Wildemuth, 2009), by summarising the raw data into categories or themes (Patton, 2002). Thus, the initial broad coding step started with a deductive analysis based on internal legitimacy theory. As mentioned before, for moral legitimacy, the authors looked for statements indicating an acceptance of the company´s responsibility to 'do the right thing'. For pragmatic legitimacy, the authors looked for an understanding of the sustainable transition based on the self-interest of the organisation. Finally, for cognitive legitimacy, the authors looked for an endorsement of the knowledge needed for the sustainable transition.

For the second step of data analysis, following Zhang & Wildemuth (2009) and Hsieh and Shannon (2005), an inductive approach was used and involved identifying coding categories derived directly from the raw data in a 'line by line approach', where the authors looked at each sentence separately and allowed themes to emerge. Finally, a pattern-matching technique was used to compare the patterns obtained from this qualitative study with patterns from past studies, knowledge and theory (Gibbs, 2002; Yin, 1994). This is essential in order to examine the correctness of the developed propositions and to build explanations on whether and why the patterns matched or not (Almutairi et al., 2013).

However, it is important to note that there are some limitations concerning the validity and reliability of the data collected in the study. For example, the questions developed in the interview guide are suggestive where it includes questions that I considered important for the study. Therefore, some of the interviews were carried out as focus groups in order to provide an interesting discussion between the participants. In addition, my own understanding of legitimacy theory might have introduced some inaccuracies according to the form of questions developed. I might have some overlapping questions between the three types of legitimacy. Therefore, in the coding process I made sure to code the right statements under its related theme (moral, pragmatic and cognitive legitimacy). In addition, my contact person arranged the interviews and selected the participants of the study, which might lead to sample selection bias.

However, in order to improve the quality of the method employed in data collection and analysis, a data reduction process (triangulation) was followed to enable better comparison of the different types of data from both primary and secondary data (Miles, Huberman, & Saldana1994). This is important in order to gain a more complete and objective picture of the representative phenomenon (Yin, 2014b). In addition, in order to avoid the use of subjective conceptualisation and judgments, the quotes derived from the transcripts was sent to the contact person to obtain feedback and further reflections. As a result, this helped shift the main logical frame from exploring data using retroduction (refine and redevelop theory) to verifying theory through deduction (develop propositions and test them) (Van De Ven & Poole, 2002).

3.3.2 The Quantitative Part of the Case Study

The quantitative case studies in this thesis indicate a quantitative data collection strategy that offers valuable insights regarding institutional theory and sustainability transition. This section explains how the survey was developed and conducted between 2017-2019 in Equinor. This will help explain the empirical context of the two quantitative studies and describe and analyse the dataset. It also helps validate the model fit of the study and test the developed hypotheses. Figure 10 describes the research method used in collecting and analysing the quantitative studies.

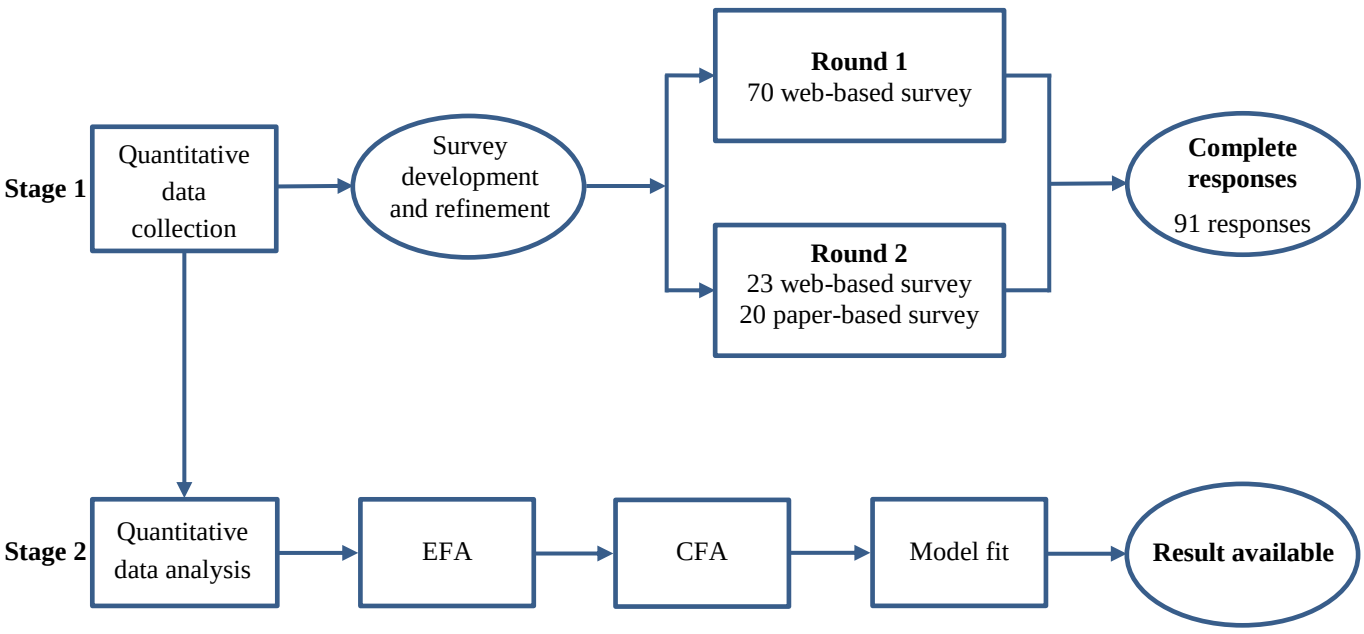


Figure 10. Flowchart illustrating the quantitative research process

The quantitative methodological approach in this thesis was adopted from MacKenzie et al. (2011). In the first step, three pre-existing questionnaires were reviewed in order to gain insights into how questions have been formulated. For example, UNIDO (2006) developed a questionnaire to gain a better understanding of CSR in companies, Ramirez and Nguyen (2010) developed a questionnaire in order to study the sustainable projects that are adopted by OG companies and Ronan (2009) developed a questionnaire that aims to assess medical companies' capacity for innovation. These questionnaires were not suitable for this thesis because they focused on the understanding of CSR in companies, companies' initiatives in introducing sustainable activities, documenting sustainable activities, innovation strategy and the innovation process, but did not provide questions related to legitimacy theory. Therefore, they were used as an inspiration to help develop a modified questionnaire. For example, some inspirations came from drivers/barriers to CSR, incentives to implement CSR, how top management evaluate sustainable projects, how employees are engaged in new innovative projects and how a company manages its new innovative projects.

In addition, institutional theory and its three pillars are well measured and tested in the entrepreneurship literature by Busenitz et al. (2000) and then by Oftedal (2008); Oftedal et al. (2018); Åmo et al. (2006). Busenitz et al. (2000) developed and validated a measure of institutional profile for the domain of entrepreneurship across countries based on Scott's institutional theory. The survey explores why entrepreneurs in one country may have a competitive advantage over entrepreneurs in other countries, and how countries contribute differently to levels and types of entrepreneurships. The survey developed by Busenitz was not suitable for my study since it focuses on country profile and not on a company profile. However, for the purpose of this thesis, I developed my own survey based on inspirations to Busenitz's measurements.

Therefore, a modified questionnaire was developed and refined where a large pool of items was derived from institutional theory, particularly from the three pillars of institutions (regulative, normative and cognitive) by Scott (1995b, 2014). The survey was then pre-tested with 12 experts: six academic experts and six employees from Equinor. Figure 11 shows illustrations of all the variables included in the survey, and the final version of the survey is shown in Appendix C. In addition, the survey used a seven-point Likert scale because it works better with educated samples (Weijters et al., 2010).

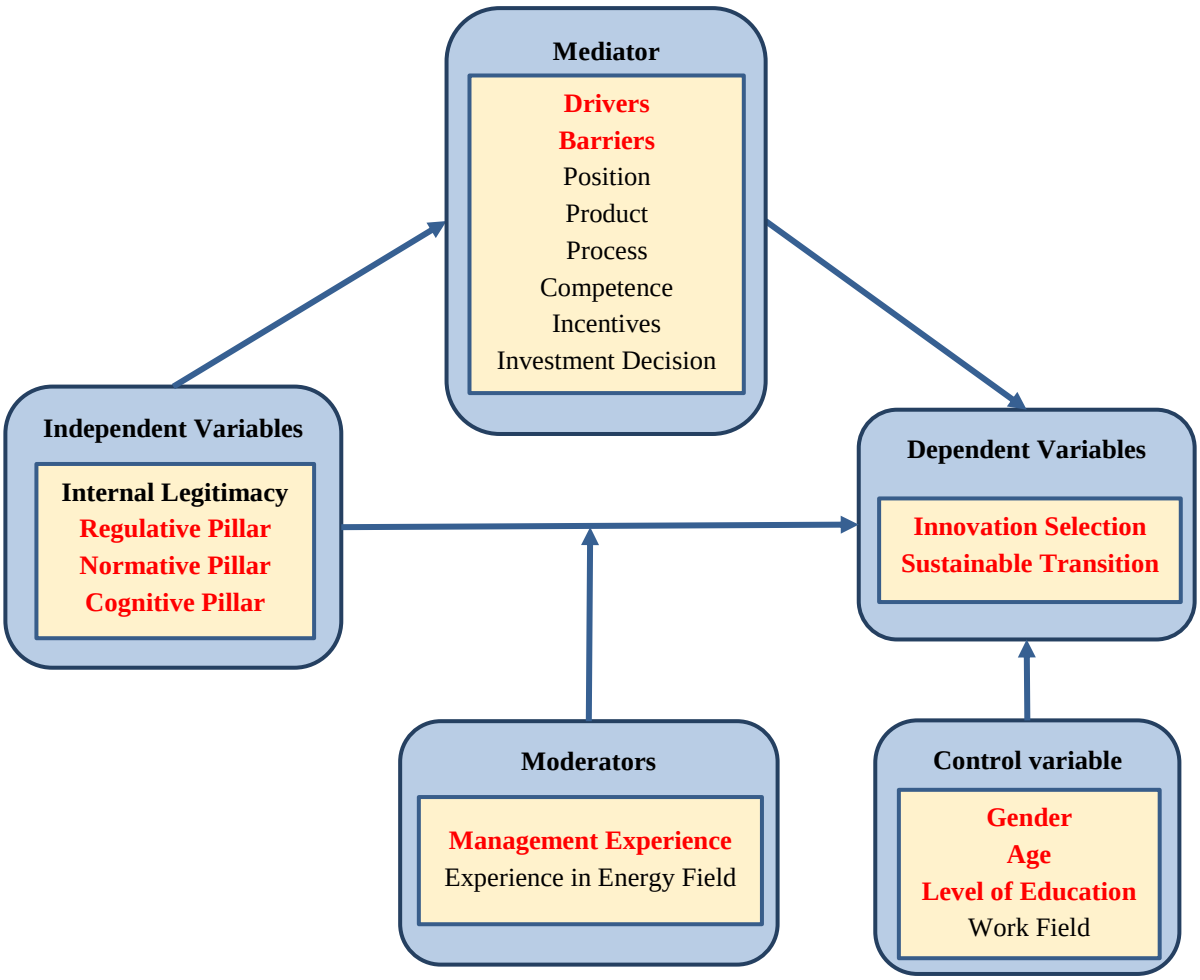


Figure 11. Illustrations of how the variables have been developed in the survey

Figure 11 shows all the variables included in the survey; however, the **bold red text** shows the variables that have been used in paper 2 and 3. Figure 11 assumes that the causality occurs between the three independent variables (pillars of legitimacy) and the two dependent variables (innovation selection and sustainable transition). This shows that the three pillars might influence innovation selection and sustainable transition (the focus of the thesis) and the other way around which is beyond the scope of the thesis. Furthermore, in order to understand the reason behind the causal process or how other variables could justify/facilitate a relationship between independent and dependent variables, I assumed to add some mediator variables. The mediators used in this thesis are drivers and barriers. In addition, I assumed to add a moderator to test whether it changes the strength or direction between independent and dependent variables. The suggested moderator variable used in this thesis is management experience.

The mentioned variables have been used in paper 2 and 3. The major goal of paper 2 is to develop and empirically validate a survey for measuring how employees build company's internal legitimacy. Therefore, the model measures the direct relationship between the independent variables (pillars of legitimacy) and the dependent variable (sustainable transition). However, the major goal of paper 3 is to test a model and suggest the factors that enable a large established company to select its new sustainable practices. Therefore, the model measures and tests the three pillars' effect of innovation selection on sustainable transition, in addition to measure the indirect effect between three pillars of legitimacy and drivers/barriers on innovation selection. Finally, it tests whether management experience strengthens/dampens the effect of the three pillars of legitimacy on sustainable innovation/sustainable transition.

Scale development procedure

To begin operationally defining the items used in the survey, a large pool of items were generated as potential measures for each of the three pillars (DeVellis, 1991) and inspired by the work of Busenitz et al. (2000). For the regulative pillar, five items were generated that focused on measuring the new laws, rules, regulations and policies in the institution (Busenitz et al., 2000; Scott, 2014). Thus, for the regulative pillar, I looked for questions that focused on management policies, laws or rules supporting new sustainable business, management role in making a sustainable company and indirect government support for the company's (through incentives). Thus, for measuring a regulative pillar, questions such as 'X company has policies to enhance its sustainable development practice' and 'there are incentives for sustainable activities at the company' were asked. The intent of the regulative pillar was to measure the institutional arrangements that help Equinor's new direction as a whole.

The normative pillar consisted of five items and focused on measuring the informal values and norms within the institution (Busenitz et al., 2000; Scott, 2014). Thus, for the normative pillar, I looked for questions that focused on individuals' (employees') attitudes and beliefs towards sustainability. Thus, for measuring a normative pillar, questions such as 'individual initiatives towards sustainability are respected in my unit' and 'operating sustainability is a goal in my unit' were asked. The intent of normative pillar was to bind employees' expectations with the company's new sustainable goals. Finally, the cognitive pillar included four items and focused on measuring employees' understandings, interpretations, knowledge and skills of a new action (sustainable shift in this case) (Busenitz et al., 2000; Dart, 2004; Munir, 2002; Scott, 2014). Thus, for the cognitive pillar, I looked for questions that describe the employees' awareness of sustainability and their understanding of sustainability. Thus, for measuring a cognitive pillar, questions such as 'my unit has a good understanding of sustainability' and 'my unit builds knowledge on becoming more sustainable' were asked. The intent of cognitive pillar was to understand whether the sustainable shift is accepted and respected in the company.

According to the sustainable transition, four items were generated and inspired by the work of Ramirez and Nguyen (2010). The sustainable transition requires measuring the company's intention towards developing sustainability. Thus, for sustainable transition, I looked for questions that describe the company's intention towards introducing sustainability. Thus, for measuring sustainable transition, questions such as 'X company has established environmental targets to introduce a shift toward sustainability' and 'sustainability will become considerably more important to X company in the future' were asked. However, for the innovation selection, seven items were generated and inspired by the work of Ronan (2009). The innovation selection requires measuring the decision criteria for selecting a new innovative project. Thus, for innovation selection, I looked for questions that describe the factors that should be considered when selecting a sustainable project, such as 'the project should be within our core strategy', 'it should be covered by our competence' and 'it should be represent an interesting market'. Finally, according to the mediators, ten items were generated for drivers, and seven items were generated for barriers. The questions were inspired by the work of UNIDO (2006). Drivers require measuring the factors that motivate the company to shift towards sustainability, such as 'use of new technology', 'development of new technology', 'customer expectation' etc. Barriers require measuring the factors that hinder the company to move toward sustainability, such as 'lack of financial fund', 'lack of competence and capabilities', 'lack of employee motivation' etc.

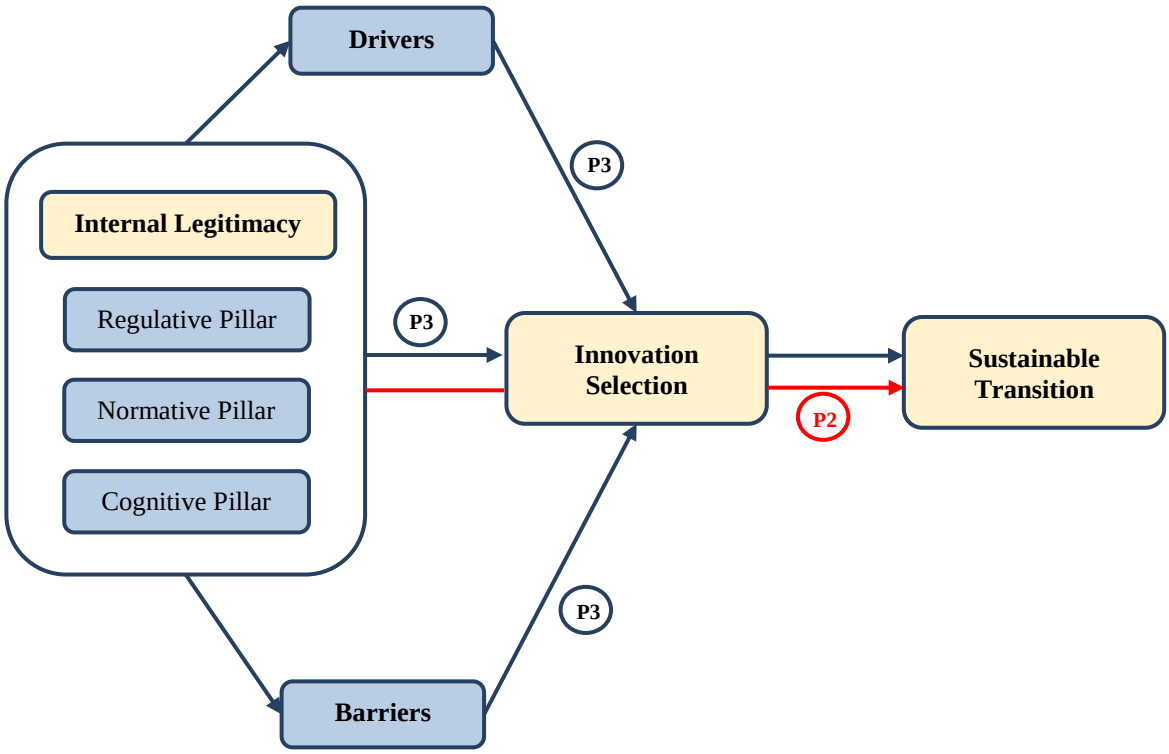


Figure 12. Conceptual framework, contribution of quantitative papers in answering the overall research question

This thesis has many different variables. Therefore, as shown in Figure 12 paper 2 started the analysis by testing the direct relationship between the three pillars of legitimacy and sustainable transition. Thus, the analysis started by regrouping the mentioned variables into a limited set of items by using Exploratory Factor Analysis (EFA) in order to better understand the relationships and patterns between variables (Yong & Pearce, 2013). The extracted factors consisted of regulative 2&3, normative 1,2,3&4, cognitive 1,3&4 and sustainable transition 1&2. Thus, Cronbach's alphas confirmed an internal-consistency coefficient for the regulatory pillar (0.88), normative pillar (0.87), cognitive pillar (0.93), and sustainable transition (0.69). In addition, in order to verify the extracted factors, Confirmatory Factor Analysis (CFA) was applied. A decision was then made to drop normative pillar 1 due to low loadings between variables (below 0.7). Thus, the final survey instrument consisted of 10 items: two items for the regulative pillar, three items for the normative pillar, three items for the cognitive pillar and two items for the sustainable transition as shown in Appendix C (numbers are displayed in **bold red text**).

In addition, a formula provided by Gaskin (2018) was used to measure reliability (CR), convergent validity (AVE) and discriminant validity (MSV) in order to validate the scales. The results show that all the measures met the threshold suggested by Hair et al. (2013). This shows excellent reliability (CR > 0.7), reasonable convergent validity (AVE > 0.5) and strong discriminant validity (MSV < AVE) as shown in Table 6. In addition, the convergent validity was compared to external measures by a study published by Hoerndlein et al. (2012). The mentioned study studied the rate actors' influences on adopting green innovations outside their organisational context. The results show that our regulative pillar (0.79) correlated positively to their regulative pillar (0.82), our normative pillar (0.76) correlated positively to their normative pillar (0.65) and our cognitive pillar (0.83) correlated positively to their cognitive pillar (0.68).

Table 6. Reliability and Validity results for paper 2

	CR	AVE	MSV	MaxR (H)	Regulative	Cognitive	Normative	Transition
Regulative	0.881	0.787	0.461	0.882	0.887			
Cognitive	0.935	0.829	0.677	0.963	0.524	0.910		
Normative	0.904	0.759	0.677	0.914	0.587	0.823	0.871	
Transition	0.714	0.556	0.461	0.724	0.679	0.603	0.589	0.746

The analysis continued in paper 3 by adding another dependent variable (innovation selection) and two mediators (drivers and barriers) as shown in Figure 12. The CFA was then applied and items that had loadings below 0.7 were dropped from the model. This presented a reduced model of 19 items; regulative 2&3, normative 2,3&4, cognitive 1,3&4 and sustainable transition 1&2, innovation selection 1,2,3&4, drivers 6&7 and barriers 2,3&4 as shown in Appendix C (numbers are displayed in **bold red text**). In addition, reliability and validity were measured as shown in Table 7. The results show excellent reliability (CR > 0.7). However, the convergent validity show a reasonable result, in which the results show that all the measures meet the threshold suggested by Hair et al. (2013) (AVE > 0.5) except 'innovation selection'. However, Malhotra and Dash (2011) argue that AVE is very strict and reliability can be established through CR alone (which has been achieved). Finally, the discriminant validity was supported in the test because all the measures meet the threshold (MSV < AVE). The results show that the model was validated empirically. More details about Cook's distance analysis and multicollinearity test can be seen in paper 2 and 3.

Table 7. Reliability and Validity results for paper 3

	CR	AVE	MSV	MaxR(H)	Barriers	Normative	Regulative	Cognitive	Transition	Drivers	Selection
Barriers	0.789	0.555	0.106	0.790	0.745						
Normative	0.903	0.757	0.689	0.914	0.156	0.870					
Regulative	0.881	0.788	0.448	0.891	0.296	0.583	0.888				
Cognitive	0.935	0.829	0.689	0.964	0.011	0.830	0.531	0.910			
Transition	0.713	0.554	0.448	0.719	0.128	0.590	0.669	0.607	0.744		
Drivers	0.828	0.708	0.127	0.863	0.061	0.092	0.357	0.163	0.259	0.841	
Selection	0.740	**0.417**	0.113	0.742	0.325	0.297	0.336	0.000	0.282	0.028	0.645

The survey was conducted using self-administered web survey (SurveyMonkey). A web-based survey is considered more appropriate and provides participants with more flexibility than regular surveys such as mail and phone surveys (Saunders et al., 2009). In addition, a paper-based survey was sent to 20 participants who preferred to fill out the survey in this way. Furthermore, a short introduction about the study and a definition of sustainability and sustainable innovation were provided which might be interpreted differently by respondents. Then, a personalised email invitation was sent to my contact person in Equinor with a link to the online survey. The email and the survey were administered in two languages Norwegian and English because Equinor is an international company and has Norwegian and non-Norwegian speakers. Thus, my contact person distributed the survey through Equinor's internal network due to Equinor's regulations and policies towards such surveys and studies. However, the survey was distributed with a target population who have proper knowledge on sustainability and are engaged in Equinor's sustainable shift. The respondents were mainly project managers, engineers, consultants, business developers, leaders, advisers and project coordinators as shown in Figure 13. This group was chosen from a larger population because RE is considered as a new sustainable transition in the company, and the data was collected during Equinor's sustainable transition period toward sustainability. Therefore, it would be practically impossible to send the survey to every employee in the company. Thus, focusing on a particular group assists in managing their feedback on the new, clean energy projects.

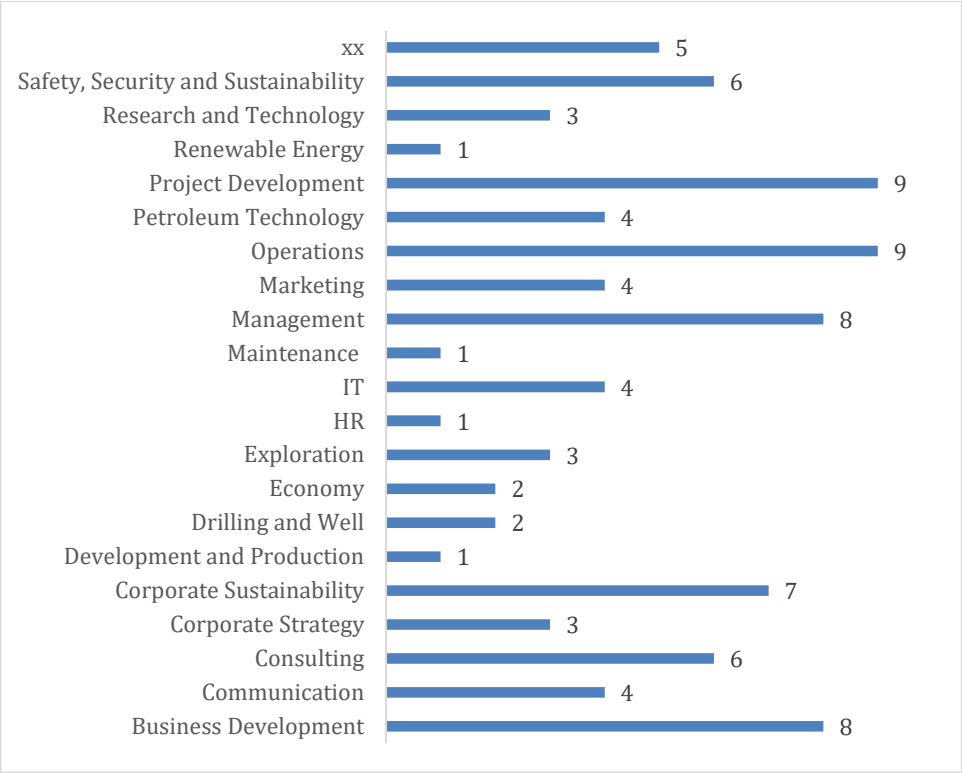


Figure 13. Survey respondents indicates their field of work

During the survey period between 2017 and 2019, a total of 113 respondents participated in the survey, where about 91 respondents completed the survey, as shown in Figure 10. The first round of data collection was in 2017 where the survey was distributed through the company's internal network. One reminder followed up the original email after three weeks. At this stage, 70 participants had filled out the survey, whereas only 53 participants who fully completed the survey. The completion rate was not defined at this stage, because we did not know how many employees received the survey. Therefore, in the second round of data collection between 2018 and 2019, I intended to change the strategy and distribute the survey through our network, and under the supervision of Equinor. At this stage, 43 participants received the survey, whereas 38 participants fully completed the survey. The completion rate was very high, because a direct communication was made with the employees. The survey data are available through the UiT Open Research Data (Jaber & Oftedal, 2019).

The survey left us with 91 complete responses, which is considered small. A small sample size could result in high bias, low coverage (Hox & Maas, 2001), or improper solutions such as negative variance estimates (Wang & Wang, 2012). Therefore, researchers recommend a sample size of 100-150, in general, to avoid these problems (Anderson & Gerbing, 1988). A larger sample size is obviously more representative, but only if the population is heterogeneous (Fowler & Lapp, 2019), that I could not achieve since I focused on a particular group. In addition, participating in the survey is voluntary.

In addition, measuring the three pillars of legitimacy was not an easy process, since it focuses on employees' behaviours and understanding the new sustainable shift in the company. First, in order to measure the three pillars, the survey used the language to describe what belongs to each pillar. However, the language will not perfectly describe what exists in the real world, which brings some degree of error. Second, other errors might arise when participants think that one answer is preferable to another. For example, a question such as 'your company has policies to enhance its sustainable development practices', participants would feel more

comfortable answering honestly. However, asking a question such as 'in my unit, we believe that we have a personal responsibility/commitment toward society/the environment', participants would feel more comfortable when they present themselves in a positive way. Third, other errors happen if participants respond without fully understanding the question/answer. Therefore, to cope these challenges, the survey was presented in both languages English and Norwegian, and it started with important and interesting questions. Furthermore, I decided to shorten the survey after the small sample I got from the first round of data collection, and I managed to collect more data.

Finally, the results from the two quantitative papers might have some sampling bias. For example, there was a time difference between collecting the data in round 1 and round 2, which might lead to sampling bias. In addition, the employees who are not working with projects related to sustainability were excluded from the data sample during the research studies. Therefore, in order to avoid any bias results, the qualitative study was essential in this thesis so as to support the result from quantitative studies. In addition, model fit, internal and external validity were tested in the quantitative studies.

However, to analyse the data obtained via the survey, the Statistical Package for Social Science (SPSS) was used to perform the Exploratory Factor Analysis (EFA) test that aims to regroup the variables into a limited set of items so that relationships and patterns between variables could be easily interpreted and understood (Yong & Pearce, 2013). In addition, software and Analysis of Moment Structures (AMOS) was used to perform a Confirmatory Factor Analysis (CFA) measure to verify the factor structure that was extracted from the EFA (Gallagher & Brown, 2013). The CFA measure is essential to check the overall goodness of fit in the model and test the developed hypotheses. The final task in the data analysis was to validate the reliability and stability of the model. This was measured by using a formula provided by Gaskin (2018) that calculates the construct reliability (CR), average variance extracted (AVE) and Maximum Shared Variance (MSV).

3.3.3 Research Quality Concerns

This chapter presented the thesis's overall research methodology. In this regard, it presented the mixed method approach with the interpretivism/positivism perspective designs, where findings are presented through three research papers. However, the methodology part has a number of limitations and areas of improvements. First, the objective of empirical completeness led to the desire to collect as many data sources as possible. Therefore, too much time and effort spent on collecting and analysing qualitative data from Equinor in forms of interviews and secondary documents. The credibility of this research relates to the trustworthiness of the combination of primary data (interviews) and secondary data (documents from Equinor). While the resulting database contains a large amount of data on a range of areas, the primary data (interviews) is considered as insufficient (small) for a large company like Equinor. Second, I interviewed key persons in different positions such as consultants, project managers, economists, head of projects, advisers and engineers, which added multiple voices to the research. However, my contact person from Equinor was responsible for selecting the key persons, which might have yielded biased results. Third, all data coding was mainly coded by me, my co-author approved the suggested codes. Thus, the empirical data can be influenced by my own understanding, subjective biases, errors and inaccuracies. Fourth, all data were mainly embedded in Norway and in one large established company, which makes it unclear to generalise to other contexts. Thus, further research in this area is needed.

Fifth, according to the quantitative data, the first round of data collection was conducted in 2017, where my contact person distributed my survey through Equinor's internal network. The contact person distributed the survey twice in a form of a self-administered web survey. At this round, I got only 53 responses who completely filled out the survey. Equinor company believed that this is a volunteer survey and my contact person refused to distribute the link for the third time. Therefore, a second round of data collection conducted between 2018 and 2019. This was challenging, because the aim was to distribute the data through my/co-author network and under the supervision of Equinor. At the same time, it might lead to some sampling bias due to collecting the data in two different periods. In addition, Equinor's policy made it difficult for me to collect the required data by my own. Thus, the sample size of the data is considered small for a large established company like Equinor. Sixth, the survey was distributed with a target population who work at sustainability unit, renewable energy unit, innovation and strategy unit. These people have proper knowledge on the sustainable transition that is occurring in Equinor. Thus, this might lead to selection bias due to choosing the participants that share similar characteristics and actions.

Finally, this thesis focused on one company in one region, therefore, my hope is that other researchers can take the advantage of the collected data and extend the database that has been developed so far. I believe that the questions from the qualitative part, in addition to the quantitative data provide an opportunity to exploit the database for other uses. In addition, this thesis is built upon the assumption that this case is unique as it is partly owned by the Norwegian government. Therefore, I believe that the transferability and generalisability of the findings should not be rejected when other researchers conduct comparative studies.

3.4 Ethical Considerations

Ethical considerations are important in research and several ethical guidelines have been developed to establish the validity of research. Ethical guidelines support the collaboration between researchers and groups and ensure people can trust researchers. This thesis follows the ethical guidelines developed by the Norwegian National Committee for Research Ethics (NESH) in social science and humanities (NESH, 2016) in addition to the ethical guidelines by Lewis (2003). Consequently, the NESH guidelines present two categories that are related to human subjects and research community and will be discussed next.

Ethical considerations related to human subjects

The development of this thesis involved several interviews, telephone calls and email communications with many employees, in addition to the participants who filled out the questionnaire. This generated ethical considerations regarding who has been affected by the results obtained. Thus, the human subjects who are most likely to have been affected by this research are the Equinor employees who provided the empirical foundations of this thesis. Several ethical considerations have been considered in this thesis to avoid negative consequences (Lewis, 2003; NESH, 2016). First, I sent two documents to Equinor describing the aim of the two empirical studies (one qualitative study and two quantitative studies) and how the information would be collected and used later in the study. Second, I signed an agreement with Equinor enabling me to gather, use and publish the collected data. Third, all the participants (interviewees and employees who participated in the survey) were informed that participation was voluntary and everything would be published anonymously. Fourth, all the participants were informed of the use of the data and that only the researchers involved in the project would have access to the personal information in the collected data. Fifth, in order to guarantee the ethical presentation of the results, namely in the qualitative research, I sent quotes used in the study to my contact person, asking him to identify misleading information which

was dropped from the study. Finally, I agreed with my contact person to publish the data from the questionnaire online anonymously.

Ethical considerations related to the research community

This thesis also followed several ethical obligations related to the research community. First, each paper involved in this thesis presented the methods in detail to help other researchers understand and follow my steps. Second, all the empirical papers were presented at academic conferences or arranged meetings with colleagues in order to gain valuable feedback from a community of professional scholars. Third, the three papers went through a peer review process before being published. This is considered as an ethical strength according to NESH (2016). Fourth, I made sure to cite all previous works, ideas and findings mentioned in the three papers. This gives readers a clear idea of the analysis I made in preparing the studies and confirms that this work was not presented as my own. Fifth, I acknowledged all the people involved in the studies such as colleagues and friends who gave me feedback and suggestions on my papers. Finally, I disclosed the funding received from the publication fund of UiT, The Arctic University of Norway.

4 Introduction to the Individual Papers

This chapter presents brief summaries of the three research papers included in this thesis. Each summary outlines the research question, theoretical frameworks, methods and contributions and key findings.

The three research papers included in this dissertation respond to the gaps and contribute to the literature as shown in Table 8. The three papers are positioned in the literature of legitimacy and draw directly on the legitimacy concept by Suchman and Scott. Suchman's theory was used in the qualitative study in order to understand how internal legitimacy theory can be used to understand what happens in a large established company during a change. However, Scott's theory was used in the quantitative studies in order to develop and test a model that explores how internal legitimacy is built in a large established company and how the company select its sustainable practices. Therefore, each paper focuses on specific aspects as covered in the overall theoretical framework. Thus, all research papers analyse the sustainability and internal legitimacy theory from a particular perspective, as described in Table 8.

Table 8. Overview of the papers and their role in answering the overall research question

Paper	Research question	Level of analysis	Theory	Gaps	Contributions
Paper 1: Energy companies in transition: Seeking legitimacy or legitimation?	What is the role of legitimacy in creating a shift towards sustainable development?	Organisational	• Sustainability • Internal Legitimacy • Strategy change	• Limited literature on the role internal legitimacy plays in developing a new sustainable strategy. • Limited qualitative evidence/studies on internal legitimacy and sustainability.	• Provides a comprehensive understanding of the role internal legitimacy plays in creating a sustainable shift in a large established company. • Answers calls for more qualitative studies of established companies undergoing sustainable change by developing theoretical propositions. • Recommendation of using legitimacy theory in order to understand how sustainability is carried out in practice.
Paper 2: Legitimacy for sustainability: A case of a strategy change for an Oil and Gas company	How does an established company build internal legitimacy for investment in clean technologies under conditions of institutional change?	Individual	• Sustainability • Institutional theory • Strategy change	• There is a need to study sustainability when it makes substantial changes in the company. • Limited quantitative studies on how to measure sustainability in large established companies.	• Make a methodological contribution to the research of sustainability and internal legitimacy through a questionnaire. • Develop a theoretical model that measures the factors that influence a large established company to build its internal legitimacy (internal identity). • The theoretical model and the survey can be applied in different research contexts, industries and companies.
Paper 3: A surge toward a sustainable future: Organisational change and transformational vision by an Oil and Gas company	How does an established company manage its sustainable transition?	Individual	• Sustainability • Institutional theory • Organisational Change • Innovation Selection	• Lack of quantitative studies concerning sustainability project selection. • Little effort has been made concerning sustainable transition initiatives in management studies.	• Make a methodological contribution to the research of sustainable innovation selection and internal legitimacy through a questionnaire. • Test a theoretical model that helps us measure the factors that enable a large established company to select its sustainable innovative projects. • The theoretical model and the survey can be applied in different research contexts, industries and companies.

Paper 1: Energy companies in transition: Seeking legitimacy or legitimation? Published as a book chapter in '*Energy and mobility in smart cities*'

Introduction: The discussion throughout this paper emphasises that smart cities aim to use energy that 'meet the needs of the city and its citizens' and be 'clean and sustainable' (Calvillo et al., 2013; Pellicer et al., 2013). Thus, to achieve sustainability, this requires government, citizens, business and non-government institutions to make a change (Albino et al., 2015; Vanolo, 2014). Smart 'communities' are seen as the most essential driver of smart city development, for instance, they provide access to new technologies and services (Hughes & Spray, 2002; Yigitcanlar et al., 2018). Equinor is part of the Norwegian 'community', and has placed a significant amount of investment in different types of RE projects such as wind and solar (Equinor, 2021c). Therefore, this paper uses Equinor as a single case study in order to investigate how Equinor strengthens its commitment to the environment and creates a shift towards sustainability. Previous studies have focused on creating sustainable cities and smart cities through strategies and development projects (Giffinger et al., 2007; Vallance et al., 2012). However, the evolution of sustainable smart cities remains under-studied and needs more empirical research (Kitchin, 2015). Thus, this paper aims to answer the research question 'What is the role of legitimacy in creating a shift towards sustainable development?'

Theory: This paper adopts the three analytical elements of legitimacy theory by Suchman (1995): moral, pragmatic and cognitive, in order to understand how Equinor reshapes its strategy toward sustainability. Moral legitimacy includes evaluation of a company and its new business goals (Aldrich & Fiol, 1994; Parsons, 1960), and enables the company to determine whether their business goals are 'the right thing to do' (Bloodgood et al., 2017). Pragmatic legitimacy addresses the self-interested calculation of a company's direct stakeholder (Suchman, 1995). Cognitive legitimacy involves either support or acceptance of a company's actions based on some 'taken-for-granted' cultural accounts (Bloodgood et al., 2017).

Method: The paper conducts a qualitative single case study from the OG sector because they face specific challenges with demands for improving their sustainability. 12 interviews with Equinor employees collected over a three-year period and followed a semi-structured narrative approach (Yin, 2014b). This approach enabled us to delve deeper into the legitimacy process, where three main elements of legitimacy were compared. In addition, secondary data were collected through Equinor's documentation, such as webpages, annual reports, sustainability reports, etc. **Analysis**: The data were coded first with a deductive analysis based on legitimacy theory, and then followed by an inductive approach based on our raw data. A pattern-matching technique was used as a final stage to compare the patterns of results obtained from our study with patterns from past studies, knowledge and theory (Gibbs, 2002).

Contributions to the thesis and key findings: This paper uses internal legitimacy theory in order to explore how a sustainable transition occurs in a large established company. This is essential because large established company needs to establish its internal legitimacy for their new strategy (Du et al., 2007; Yoon et al., 2006). In the context of the overall thesis, this paper offers a qualitative approach that complements the largely quantitative focus in the other two papers. Furthermore, the paper draws attention to the role of moral legitimacy in reshaping the company's strategy towards sustainability. This was related to the direct support from the Norwegian government, the board of directors and the employment of a CEO who is interested in investing heavily in RE. Pragmatic legitimacy showed us the different views of the employees, whereas many employees perceive a new sustainable transition as a business opportunity. However, the translation process of sustainable development will continue within the company until the sustainable transition is complete. Cognitive legitimacy showed us that the majority of employees understand and accept the company's shift towards sustainability,

because they understand the changing market and believe in their competence to provide citizens with RE products that have social, environmental and economic benefits.

Paper 2: Legitimacy for Sustainability: A case of a strategy change for an oil and gas company. Published in '*Sustainability'*

Introduction: Compared to the previous paper, this paper focuses on how employees translate new sustainable activities into a benefit for the company. Previous studies indicate that individuals play an important role in the company; however, their role is almost missing, especially when the change is outside the organisational context (Hoerndlein et al., 2012; Suddaby, 2010). For companies like Equinor that chose to develop new sustainable technologies outside their core business, this requires them to build their internal legitimacy (Deephouse & Suchman, 2008; Hargadon & Douglas, 2001). Therefore, this paper builds on work done on legitimacy and creates a measure of a company's internal legitimacy of sustainability and aims to answer this research question 'How does an established company build internal legitimacy for investment in clean technologies under conditions of institutional change?'

Theory: This paper adopts the institutional theory and its three pillars (regulative, normative, cognitive) by Scott (1995a), in order to understand the factors that enable Equinor's employees to legitimise the new sustainable activities, internally. The regulative pillar consists of rules and laws regulated by government or other authorities that force a company to support new business (Scott, 2014; Díez de Castro et al., 2015; Scott, 1995a). The normative pillar involves values and norms regulated by individuals who introduce, evaluate, select and implement the company's new action (Díez-de-Castro et al., 2018; Munir, 2002). The cognitive pillar deals with the company's understanding and interpretations in a wider belief system and cultural frame (Dart, 2004; Munir, 2002; Scott, 2014).

Method: This paper employs a quantitative single case study and draws on a survey conducted between 2017–2019 at Equinor. A web-based survey was developed and distributed among people in Equinor who have specific knowledge of sustainability. In addition, this paper develops four hypotheses and a model of an OG company profile by applying the three institutional pillars.
Analysis: After undertaking data screening, the results left us with a dataset of 91 responses. However, to test the developed hypotheses and validate a model fit, the paper uses multiple regression analysis by using AMOS (Software Analysis of Moment Structures).

Contributions to the thesis and key findings: This paper aims to make a methodological contribution by developing a valid measure of the three institutional pillars. Thus, this paper develops and empirically validates a survey for measuring the institutional profile of an OG company. This indicates that internal legitimacy theory can be used to understand the employees' role in framing organisational identity in order to shape its strategic direction. In the context of the overall thesis, this paper provides a more comprehensive overview of the literature and contributes to a richer understanding of legitimacy. Thus, this paper indicates that regulative and normative pillars have significant and positive effects on sustainable transition, while the cognitive pillar has an insignificant effect as shown in Table 9. This reveals that Equinor employs regulative and normative legitimacy to justify their transition towards sustainability. This means that employees consider their management team as the initial supporter for sustainability. At the same time, the results show that employees have a self-interest to shift the company towards a new sustainable market.

Table 9. Regression Weights [b]

			Estimate	S.E.	C.R.	P
Transition	<—	Regulative	0.342	0.102	3.358	***
Transition	<—	Normative	0.264	0.097	2.717	0.007 **
Transition	<—	Cognitive	0.169	0.145	1.164	0.244

[b]. *** $P < 0.001$, ** $P < 0.01$.

Paper 3: A Surge Toward a Sustainable Future: Organisational change and transformational vision by an oil and gas company. Published in '*Journal of Contemporary Administration'*

Introduction: This paper follows paper 2, but aims to understand the factors that enable a large established company under sustainable change to select its new sustainable activities. Previous studies found that sustainability transition requires several actors and interests to develop sustainability in companies (Markard et al., 2012). In addition, Frandsen et al. (2013) show that sustainability adoption occurs when employees support the company's efforts to move toward a more sustainable future. Therefore, this paper fills the lack of quantitative studies concerning innovative project selection issues (Kudratova et al., 2018), and aims to answer the research question 'How does an established company manage its sustainable transition?'

Theory: This paper also adopts the institutional theory and its three pillars as described in paper 2, in addition to theories such as organisational change and innovation selection. Researchers like Tushman and O'Reilly (2002) indicate that organisations are required to change and respond quickly to market change when new modes of innovation demand it. This requires organisations to shape their structures in relation to commitments of their participants and external parities (Selznick, 1957). In addition, the internal selection mechanism deals with the overall corporate strategy, competition, competence and strategic action (Burgelman & Siegel, 2008). Thus, institutional theory and innovation selection are used in this paper in order to examine the role of legitimacy in selecting new sustainable projects.

Method & Analysis: This paper applies the same methodological procedure and survey as described in paper 2.

Contributions to the thesis and key findings: This paper aims to make a methodological contribution by empirically testing and validating a survey instrument for studying innovation selection criteria toward sustainability in a large established OG company as shown in Figure 14. In the context of the overall thesis, this paper extends the literature on sustainability and institutional theory by taking into account a more complete range of understanding of the innovation selection criteria and what factors affect employees to make a selection decision. As shown in Table 10, the results show that regulative and normative pillars (H1a and H1b) have a statistically significant effect and strengthen the effect of innovation selection on sustainable transition, while the cognitive pillar (H1c) shows a statistically significant but negative effect. This might be due the to the addition of the two mediating variables (drivers/barriers). Thus, the regulative and normative pillars play an essential role in selecting sustainable projects. The normative pillar presents the strongest factor in all pillars, due to the fact that this paper focuses on selecting innovative sustainable projects rather than on shaping its new strategic direction. This shows that employees play a key role in selecting new sustainable projects and introducing them to the top management team. The regulative pillar indicates that employees believe in their management team and their contribution of shifting the company from OG into a mixed-energy company. In addition, the results in Table 10 show that the addition of the two mediating variables drivers H2 and barrier H3 have not been supported in this study. Finally, the moderation variable (management experience) shows different results on different pillars as shown in Figure 15. However, by focusing on the normative pillar (H4b and H4e), as it shows the strongest effect on innovation selection, it shows that employees who have management experience have a self-interest to shift the company toward sustainability, and they are willing to introduce new sustainable activities to the top management team.

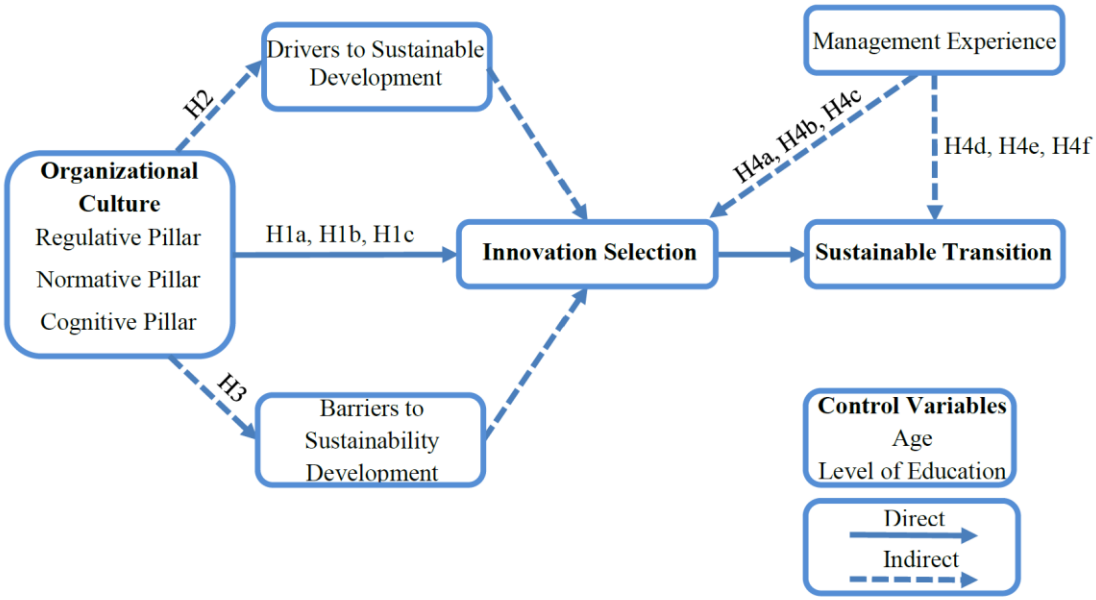
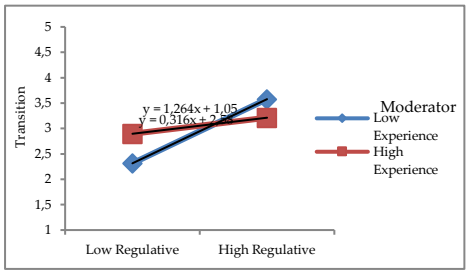


Figure 14. Methodological Framework derived from paper 3

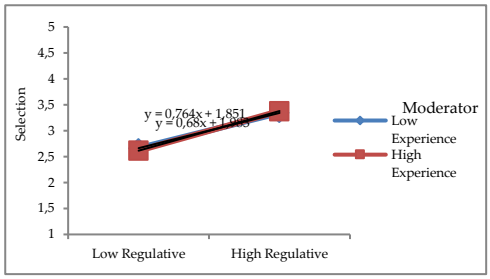
Table 10. The direct/indirect effects of the model[a]

	Direct/indirect path	Unstandardized estimate	Lower	Upper	p-value	Standardized estimate
H2	Normative --> Drivers --> Selection	-0.011	-0.090	0.020	0.429	-0.016
H3	Normative --> Barriers --> Selection	0.032	-0.001	0.091	0.112	0.047
H1b	Normative --> Selection --> Transition	0.234	0.104	0.401	0.001	0.223***
H2	Cognitive --> Drivers --> Selection	0.012	-0.027	0.073	0.523	0.027
H3	Cognitive --> Barriers --> Selection	-0.034	-0.081	0.003	0.131	-0.076
H1c	Cognitive --> Selection --> Transition	-0.202	-0.301	-0.101	0.001	-0.296***
H2	Regulative --> Drivers --> Selection	0.007	-0.010	0.054	0.348	0.011
H3	Regulative --> Barriers --> Selection	0.042	-0.001	0.100	0.105	0.063
H1a	Regulative --> Selection --> Transition	0.161	0.067	0.301	0.001	0.158***

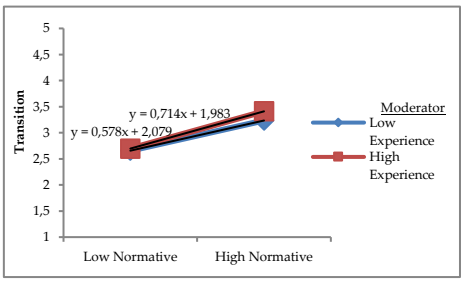
Note. a. *** p < 0.001, ** P < 0.01, * P < 0.05, ┼ P < 0.1.



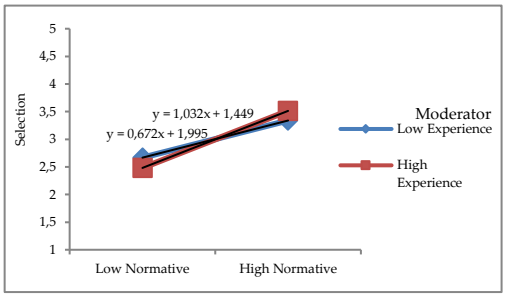
H4a: Experience dampens the positive relationship between Regulative and Transition.



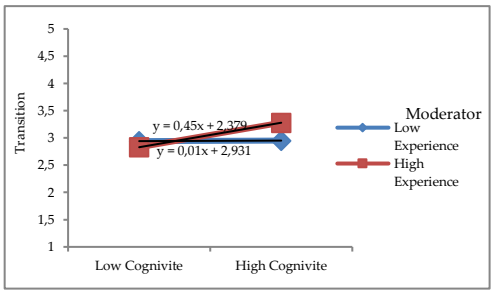
H4d: Experience strengthens the positive relationship between Regulative and Selection.



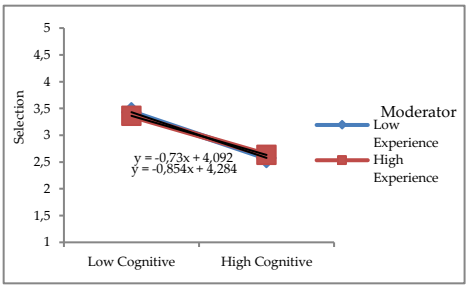
H4b: Experience strengthens the positive relationship between Normative and transition.



H4e: Experience strengthens the positive relationship between Normative and Selection.



H4c: Experience strengthens the positive relationship between Cognitive and Transition.



H4f: Experience dampens the negative relationship between Cognitive and Selection.

Figure 15. Figures derived from the moderator effect test

5 Conclusions and Implications

The current shift in the global energy system is changing the energy industry market. This pushes the growth of the electrification market and creates a global competition in the energy sector (World Energy Council, 2019). Therefore, large established companies are expected to take responsibility for reproducing their own technologies in a sustainable way, but not expected to engage in new sustainable innovations outside their own routines (Geels, 2002; Hoogma et al., 2002). OG companies are, thus, expected to pursue incremental improvements in their own technologies. This is due to the fact that OG companies have their own market in the energy system and their competences, capabilities and routines are related to the extraction of hydrocarbons (Hess, 2014). Thus, developing clean energy such as RE technologies is expected to be happening by small start-up firms and not by large established companies (Hockerts & Wüstenhagen, 2010).

However, recent studies have showed that several large OG companies are expanding their investments in RE and taking an essential role in developing new clean technologies (Apajalahti et al., 2018; Wesseling et al., 2015). According to this, several researchers are studying the sustainable transition in large established companies. For example, a recent study about sustainability transition developed by Mäkitie (2020) shows the importance of resource redeployment (market-specific vs. general-purpose resources, technological vs. organisational resources) in explaining how large established companies contribute to accelerate sustainability transitions. Furthermore, Mäkitie et al. (2018) argue that technology, actors and networks play an important role in shifting large established OG companies towards clean markets such as the offshore wind market. Steen and Weaver (2017) have studied the engagement of large established energy companies through diversification to new energy markets. Späth et al. (2016) address the role key actors play in facing the challenges of sustainable mobility. In addition, Smink (2015) investigates the difficulties that might face fossil fuels companies to move away from their products.

This reveals that existing studies in the field of sustainable transition have paid insufficient attention to understand the strategic process of introducing new sustainable activities in large established companies. For instance, Turnheim and Sovacool (2020) call attention to richer studies in various areas such as types of actors required to make a sustainable change, actors' strategies to achieve a sustainable change, actors strategic positioning and resources needed to support that change. In addition, Zahraie et al. (2016) ask for more research on how large established companies carry out sustainable technologies in practice, and how a company's different actors reshapes their strategy in order to change their business environment.

Considering the lack of the literature in this area, this thesis aims to fill the gap by answering the dissertation's overall research question: '*What is the role internal legitimacy plays in shifting a large established company towards sustainability?*' Thus, by using internal legitimacy theory, this thesis extends the literature on internal legitimacy and strategy change by understanding the use of internal legitimacy theory qualitatively, and develop and test a model quantitatively.

This final chapter summarises the whole thesis and is organised in three parts. First, it begins by summarising the main findings and theoretical contributions derived from the three research papers. The discussion focuses on the linkages and interactions between the papers, and how they contribute to the overall research question and the theoretical implications developed from the papers. It also presents the dissertation's overall conceptual model based. Second, it presents the major limitations and important areas for further research. Finally, it addresses some practical implications for policy makers and firms.

5.1 Key Findings and Theoretical Development

Adding to the debate of the role of large established companies in innovative spheres. Researchers have accepted the Brundtland definition of sustainability and achieved an 'authoritative status' (Baker, 2006, p. 17). However, Barr (2008) argues that Brundtland's definition has a 'technocentric' focus and is, thus, emphasising a 'human-centred' nature (Moffatt, 1996). This means that it falls within the weak paradigm of sustainability (Davies, 2013). Conversely, researchers such as Dobson (1996); Dryzek (1997) take sustainability as a precondition for human life which recognises environmental limits (strong approach). Therefore, 'a middle of the road approach' is necessary in order to make progress towards sustainability (Davies, 2013). This means that people at the weak paradigm must understand that technological solutions may not always be available, while those at the strong paradigm must understand that we, as humans, have an essential role on earth (Davies, 2013).

However, 'the middle road approach' is complex because it aims to link humanity and nature and meet a common ground (Davies, 2013). Therefore, in order to bring the two ways closer together, a minimum requirement for sustainability is essential, which is 'ecosystem resilience and basic human needs' (Hediger, 1999, p. 1120). Hediger (1999, p. 1121) argues that reconciling weak and strong sustainability requires a link between economic perspective and natural capital. Therefore, achieving the goal of sustainability is feasible if these two elements are fulfilled.

This thesis showed an example of 'the middle road approach', and explored the role of internal legitimacy in developing a transition towards sustainability in a large established OG company. In addition, this thesis developed three empirical papers, in which each of them addressed different aspect of research question. (1) Paper 1 helps strengthen the link between internal legitimacy and strategy. (2) Ppaper 2 and 3 help develop the concept of internal legitimacy as will be shown next.

Developing the 'How' approach for understanding Sustainability

Understanding the concept of sustainability within the context of a company setting is not straightforward. In this thesis, I discuss several aspects of sustainability and focus on substantive sustainable actions rather than symbolic actions that a company makes. Furthermore, measuring the degree of such substantive activities in companies is similarly challenging (Baumgartner & Rauter, 2017; Sandhawalia & Dalcher, 2015).

A contribution from this work may therefore be the way that how sustainability in a company is discussed, understood and operationalised. For example, changing the selection criteria towards a more sustainable focus in a company requires a change in a company's deep level and therefore including 'innovation selection' and 'sustainable transition' in this thesis is essential. The term innovation selection was used in this thesis in order to measure the decision criteria for selecting a new sustainable innovative project. These criteria are based on the three triple bottom line concerns (environmental, social and economic impacts), in addition to other criteria such as, interesting market, using competence covered by the company's competence, etc. However, sustainable transition was used in this thesis in order to measure the company's intention towards integrating sustainability in its agenda. For example, measuring a company's intention to develop new sustainable and environmental goals. Thus, the internal selection criteria in this thesis includes company's intention to move towards a sustainable focus, and their decision for selecting sustainable projects.

However, these changes require a company to develop a new strategy that meets a company's sustainable goals. In addition, securing legitimacy from internal stakeholders is essential during organisational change (Bridwell-Mitchell & Mezias, 2012; Clark et al., 2010; Gioia et al., 2000).

Therefore, this thesis uses internal legitimacy theory in order to help understand how a company functions and understand how a company shapes its structures in relation to the commitments of their participants (Meyer & Scott, 1983; Selznick, 1957). The next section shows the link between legitimacy and strategy.

Strengthening the link between legitimacy and Strategy

The literature review presented in chapter 2 revealed that existing studies in the field of sustainability have paid insufficient attention on how established companies curry out sustainability in practice (Engert et al., 2016; Moldavska, 2017). The empirical analysis conducted in the appended papers found a link between internal legitimacy and strategy. This link enables us to understand how internal actors react to institutional pressures and reshape the company's strategy. This section aims to show how the empirical findings from the appended papers fill the gap founded in previous studies and answer the dissertation's overall research question.

Legitimacy theory is well developed in research, however, research on internal legitimacy still remains 'underexplored and undertheorized' (Sapir, 2020). Thus, responding to the request for more qualitative studies on internal legitimacy (Binz et al., 2016; Kishna et al., 2017), I decided to start my research by a qualitative study related to Suchman (1995) legitimacy theory and its three analytical elements; moral, pragmatic and cognitive. Qualitative data is considered essential in understanding internal legitimacy because internal legitimacy depends particularly on organisational storytelling and the narrative structure through which these stories are expressed (Carter, 2013; Golant & Sillince, 2007).

The semi-structured narrative interviews enabled me to gain a deeper understanding of Equinor sustainable transition process and how its employees relate to sustainable challenges. Thus, the findings suggest that Equinor's strategic change towards sustainability was driven by moral and pragmatic legitimacy. First, moral legitimacy is responsible for reshaping the company's strategy towards sustainability. This was related to the support from the Norwegian government, board of directors and the employment of a CEO. Second, pragmatic legitimacy shows that most employees consider a sustainable transition as a good business opportunity.

Having explored that moral and pragmatic legitimacy can provide a comprehensive understanding of the role internal legitimacy plays in creating a sustainable shift in a large established company, the next task was to test the relationship between internal legitimacy and strategy. Therefore, two quantitative studies addressed the gap identified in the literature by providing quantitative evidence. However, as mentioned in chapter 2 that Suchman's moral and pragmatic legitimacy and Scott's regulative and normative pillars are overlapping, in which they focus on evaluating a company's activities, developing new rules, strategies and policies, and engaging employees in a new change. Thus, I chose to use Scott (1995a, 2014) and its three pillars ; regulative, normative an cognitive in my quantitative studies, because they are well measured in previous studies.

Responding to the request for more quantitative studies on the individual's behaviour, especially when a change is outside the company's context (Hoerndlein et al., 2012; Kudratova et al., 2018). The two quantitative studies fill the gap by developing and validating a model that helps us understand the factors that enable a large established company to build its internal legitimacy and select its new sustainable practices.

The findings show that the evolutions of a sustainable strategy in Equinor company is employed by regulative and normative pillars. First, regulative pillar plays an important role in reshaping the company's new strategic direction. In this regard, the management team is considered the initial supporter for sustainability, is responsible for adopting sustainable commitment and establishing new policies that aim to enhance a sustainable transition in the company. Second, the normative pillar plays the most essential role in strengthening and facilitating new sustainable activities in the company.

As a result, the three studies suggested that internal legitimacy theory enables us to understand the strategic shift in a large established company. The regulative pillar in this thesis claim that formal rules and laws have a powerful strength to reshape the company's strategy. In addition, normative pillar claims that employees play an important role in strengthening and facilitating new sustainable innovative projects in the comapny. This shows that the company's employees accept the sustainable strategic change in the company, and see it as the way toward future opportunities. However, cognitive pillar claims that it has almost zero effect on the dependent variables. Which means that employees may be in search of new knowledge related to sustainability. This raises a question: how employees facilitate and strengthen a new sustainable shift in the company at the same time they are in search of new knowledge. This might be understood as people in the company have their own social beliefs and norms that make them select what is considered 'correct'. This gives us an impression that the employees do not want to be associated with something considered 'negative', and therefore they decided to be part of this change.

Developing the Concept of Internal Legitimacy

This thesis fills a gap in the literature and aims contribute to the literature of legitimacy, strategy and sustainability by developing and validating a model that helps researchers understand the role that internal legitimacy plays in shifting a large established company towards sustainability as shown in Figure 16. The papers helped develop this conceptual framework by developing and testing the use of internal legitimacy theory in understanding internal selection criteria of a large established company. First, paper 1 is used as a guiding approach for the quantitative papers. Second, paper 2 measured and tested the direct relationship between the three pillars of legitimacy and sustainable transition. This was essential to develop and empirically validate a survey instrument for measuring how a large established OG company build its legitimacy. Third, paper 3 added more variables that aimed to develop and empirically validate the overall conceptual model.

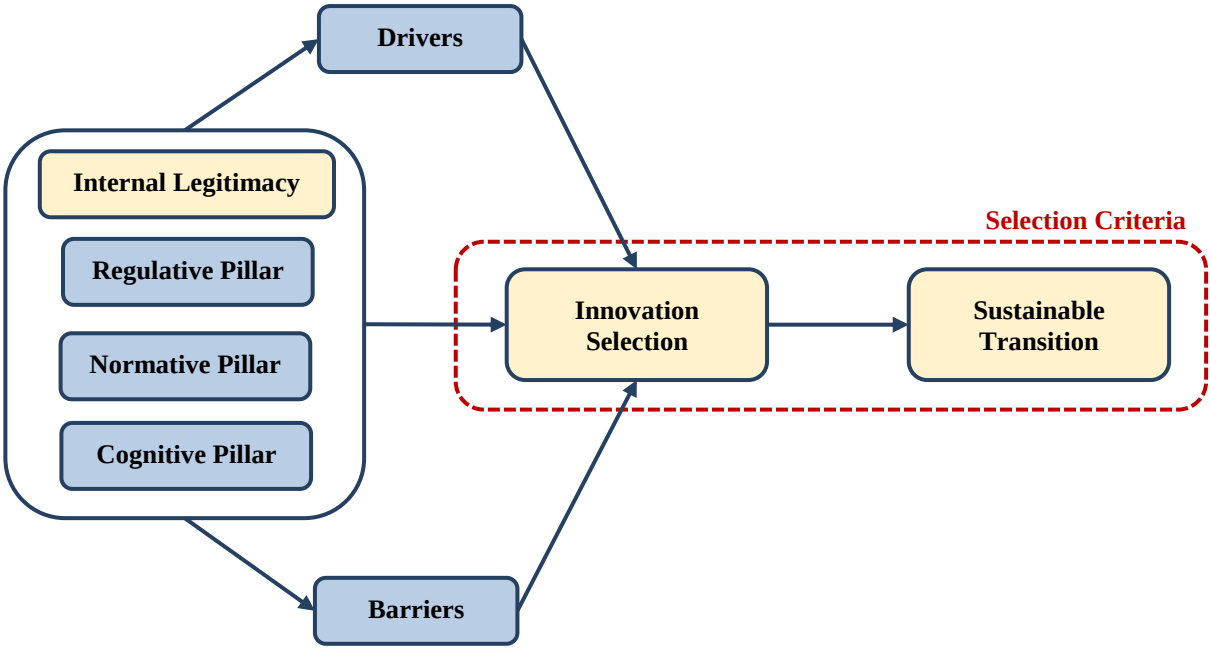


Figure 16. Dissertation's overall conceptual framework

Figure 16 shows that institutional theory and its three pillars provide a deeper understanding of how a large established company reshape its strategy and make its internal selection choices. As explained before, the fundamental transformation process towards sustainability is considered as 'sustainable transition'. In addition, the 'innovation selection' is used in the model in order to measure the degree of sustainability which represents the decisions made before developing a new sustainable innovative project. Thus, the internal selection criteria in the company are measured by sustainable transition and innovation selection. According to this, Figure 16 shows that sustainable transition (dependent variable) depends jointly on innovation selection (another dependent variable) and the three pillars of institutions (independent variable). In addition, drivers/barriers are mediators.

In this respect, the findings indicate that regulative legitimacy encompasses new strategies and policies to the company. This result supports the arguments of Deegan (2014) who confirmed that regulative legitimacy is essential to ensure the survival of the company. The findings also indicate that regulative and normative pillars play an important role in legitimising the new activities in the company. These results support the findings by Drori and Honig (2013) who indicate that regulative and normative legitimacy play an essential role in framing organisational identity and shaping its strategic change. In addition, the findings indicate that the normative pillar plays an important role in strengthening and facilitating new direction in the company, and selecting and implementing new activities. These results support the finding by Palazzo and Scherer (2006) who indicate that normative legitimacy is engaged in by different stakeholders to help ensure access to resources and markets, and leads to the continuity of the company. However, the cognitive pillar was not well supported. This leads us to believe that cognitive legitimacy requires more time to be achieved so that everyone in the company understands and accepts a company's change. In fact cognitive legitimacy is difficult to achieve and this was also found in other studies such as Oftedal et al. (2018). This result was also supported by previous studies which view cognitive legitimacy as a visible symbol of legitimacy that is difficult to assess since it aims to consider acceptance by outside parties (Idowu et al., 2013). In addition, Laïfi and Josserand (2016) argue that cognitive legitimacy would be automatically achieved when regulative and normative legitimacy are legitimised in

the company. Finally, drivers and barriers were not supported neither. This shows that this case company itself was responsible for reshaping the company's strategy, and there was little or no evidence that drivers/barriers have any effect on the company's selection criteria. This might be due to the reason that this case company is partly owned by the state, and the government plays an important role in reshaping the company towards sustainability.

As a result, these findings suggest that internal legitimacy might be useful to understand how a large established company shifts its strategy. As such, the findings of this thesis may be carefully start opening the 'black box' of the inner dynamics leading to shift in internal selection criteria. This is illustrated in Figure 17 in order to better understand what happens inside the micro level once the black box is opened.

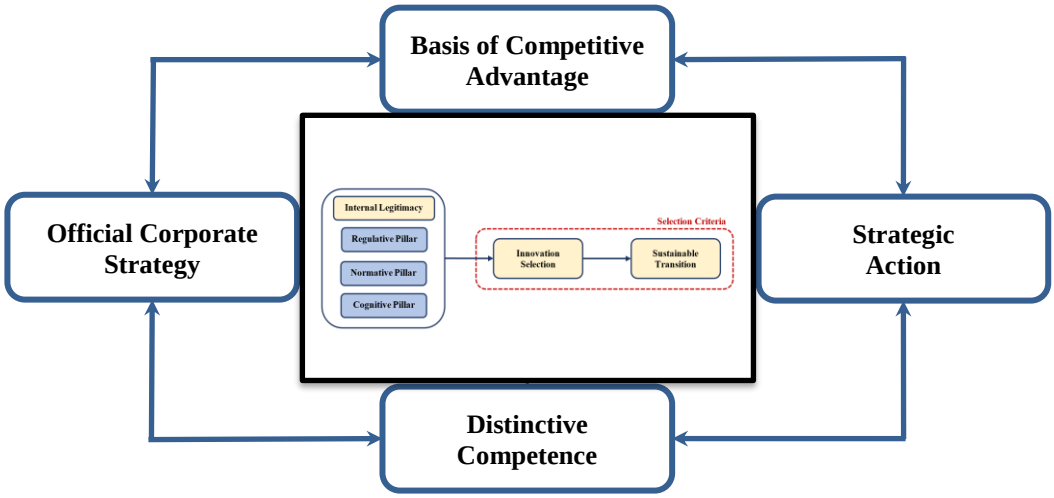


Figure 17. Illustration suggesting how internal legitimacy can be used once the black box is opened

As suggested by the results of this thesis, internal legitimacy theory might play an important role in understanding a sustainable shift that occurs in a large established company. An interpretation of this may be that, on one hand, the regulative pillar enables researchers to understand how official corporate strategy works. Thus, the regulative pillar enables researchers to understand how a company evaluate its activities and its new business goals (Aldrich & Fiol, 1994; Parsons, 1960), and establish new laws and rules in order to influence future behaviour (Alexiou & Wiggins, 2019; Scott, 2014). On the other hand, normative legitimacy enables researchers to understand how strategic action works. Thus, the normative pillar enables researchers to understand how a company's internal stakeholders introduce, evaluate, select, accept and implement the company's new actions (Dart, 2004; Díez-de-Castro et al., 2018; Munir, 2002).

According to this, this thesis makes some theoretical and methodological contributions into the field of organisational studies particularly in legitimacy theory, strategy and sustainability. First, this thesis supports the debate that large OG companies started to expand their activities and invest in new sustainable activities that are outside their core business e.g., RE activities. Second, this thesis strengthens the link between strategy and internal legitimacy. Thus, it provides empirical evidence (interviews and survey) for using internal legitimacy theory as a tool to understand how a new strategy (e.g., sustainable strategy) is implemented in a large established company. In addition, this thesis developed a questionnaire and tested it to explore how a sustainable shift is introduced and managed in a large established company. Finally, this thesis contributed mainly to the internal legitimacy and help extending the literature by developing a conceptual model, as presented in Figure 16. The conceptual model suggests, in

the first step, using internal legitimacy theory as a tool to understand any strategic shift that occurs in large established companies. In addition, in the second step, it helps understand how large established companies undergoing change make its internal selection choices. In addition, this thesis supported the results from previous studies that regulative and normative pillars encompass new choices in a large established company under a change.

5.2 Limitations and Implications for Future Research

This dissertation has several limitations which enables potential avenues for further research on organisation studies, mainly on large established companies undergoing change. First, the dissertation is primarily based on a single case study from the specific context of the OG industry. Focusing on a single OG company as an empirical setting limits the generalizability of its findings. Therefore, to increase the ability of generalizing the findings, further research concerning other cultures, regions, companies, industries and research contexts is needed, to better understand the complex relationship between sustainability and legitimacy.

Second, this thesis is based on a part-government-owned company in Norway, a country that is committed to work within EU sustainable principles. In this way, the government's opinion weighs heavily when selecting a new CEO. This shows us a top-down approach where the government, board of directors and managers were responsible to reshape the company's strategy towards a more sustainable focus. In addition, the Norwegian government supports companies it owns, such as Equinor, to be sustainable. This makes it easier for the Norwegian government to shift the company towards a sustainable transition and drive social, environmental and economic growth through strategies and policies. State-owned companies are also obliged to report their activities and how they work to achieve sustainability. This makes state-owned companies more engaged in sustainability. However, the situation is different within non-state-owned companies because they have different goals and objectives that are related to public value. Thus, private companies might find it difficult to change, develop or use new sustainable technologies. In addition, driving private companies towards sustainability requires financial resources and time which delay the change in such companies. Accordingly, Thus, Equinor as a case study of this thesis may allow for method bias that employs regulative and normative legitimacy. Therefore, case studies from private-owned companies are needed to assess the validity of the findings.

Third, for the purpose of this thesis, I focused only on internal legitimacy in order to understand how choices are made in a large established company. However, further research can also be made on external legitimacy in order to know how their actions are perceived by the wider public.

Fourth, this thesis investigated the factors that led Equinor to develop new sustainable regimes outside their boundaries by investing in RE. However, Equinor works continuously on improving the efficiency of their OG production, by capturing and storing carbon underground. Thus, measuring the actual impact of their innovative sustainable actions on their core business was not the focus of this study. Therefore, further research can measure the factors that lead large established companies to introduce sustainable innovations within their core business.

Fifth, this thesis adopted a single case study design in order to understand how new sustainable innovations are legitimised in the company. However, the empirical data are considered small when comparing the large population of actors in a company like Equinor. In addition, the data were collected from a specific population group, which might be a reason that almost similar answers were obtained. Therefore, future research should test the findings of this thesis in a larger sample in order to generalise the findings to a wider population.

Sixth, the two quantitative papers drew upon cross-sectional data that were not appropriate for studying sustainable changes over time. However, the main reason behind selecting cross-sectional data was the time limitation, in addition to the probable inability of Equinor to distribute the survey over three years. This might be solved by future researchers who are interested to better understand Equinor's engagement in sustainability over a long time period and, mainly, after the new investment in solar energy.

Seventh, this thesis also has some theoretical limitations. By focusing on the particular theoretical concept of legitimacy, I may overemphasise some mechanisms, or fail to recognise other mechanisms that are useful for understanding a change in an established company. Thus, there is a need for further research using other theoretical concepts related to introducing sustainable changes into established companies.

Eighth, some of the results were considered non-significant. For example, drivers/barriers were not supported by the result. This might be due to the reason that this is a unique case owned mostly by the Norwegian State, and the sustainable shift was seen as an extension of the government's policy toward a low-carbon future. Thus, drivers/barriers did not have any effect on their decision towards shifting the company into a more sustainable focus. Therefore, further research concerting other companies and industries is needed to test the measurement on a larger dataset.

Finally, as a PhD student I faced some difficulties during collecting my qualitative and quantitative data. The combination of qualitative and quantitative data collection is suitable for this case study because it enabled me to understand what occurs within Equinor during a sustainable change. On one hand, the qualitative part provided me with rich in-depth information and added valuable insights to understand the topic. However, the qualitative data collection is time consuming. I had to travel to Oslo several times to make the interviews, whereas each interview lasts between one and one and a half hour. In addition, transcribing one hour interview can easily take 7 hours of work.

On the other hand, collecting quantitative data was not easier neither in my case, especially when the case is a large established company. It was difficult to let people fill out the survey, since it is voluntary to participate in such surveys. In addition, it was not easy to collect the data without Equinor's permission and supervision. Furthermore, quantitative data analysis was a challenge, because I had to learn data analysis from scratch in order to analyse my data. However, despite all the challenges faced during my PhD study, I consider the data collection part satisfying because it enabled be to answer the thesis's overall research question. However, some foreseen difficulties could be prevented by new PhD students such as, collecting data from small and medium size companies instead of focusing on large established companies would be easier, including more than one case study in order to increase the amount of data collected, focusing on quantitative data collection because it requires less time to collect and analyse compared to the qualitative one, and collaborating with other researchers/colleagues who can help analyse quantitative data would save so much time during PhD studies.

5.3 Implications for Practice and Policy

This thesis contributes to organisational studies by investigating the complexity of legitimacy for an established company undergoing change by demonstrating its role in shifting the company towards sustainability. The findings provide a measurement tool for researchers to study organisations undergoing change. In addition, the findings can inform firms and policy makers about their roles in engaging in introducing sustainability to companies and, thus, reducing companies' carbon emissions, as will be shown next.

Implications for Policy Makers

The Norwegian government stipulates strict rules for protecting the environment. Norway had already introduced carbon dioxide taxes in 1991 as a step to limit carbon emissions in order to achieve its long-term sustainable agenda (KLD, 2014). This led the Norwegian government, as the main shareholder of Equinor, to include sustainability into the core of Equinor's business, and invest in RE activities as a step towards a sustainable future. The case study of this thesis highlights the key role of government in promoting sustainable development. Therefore, the findings of this thesis provide important messages to policy makers in order to overcome the environmental challenges that we face today.

First, this dissertation shows a top-down approach where the board of directors, owners and managers reshaped the company's strategy and were responsible for introducing sustainable change in the company. These findings provide a general indication across countries that policy makers can advance the growth of new sustainable industries to the country. In this regard, the overarching policy implication from this dissertation is the need to develop and implement supporting plans that force companies to reduce their carbon emissions, such as the Norwegian carbon dioxide taxes.

Second, there is a need for policy makers to offer some facilities to companies in order to encourage them to invest in clean energy. For example, by supporting companies to collaborate with national and international energy companies and other research institutions. This can be achieved by supporting network initiatives and providing platforms that facilitate interactions between companies and policy makers. Furthermore, collaboration between companies enables them to ensure common understanding about the competence and knowledge needed, and share goals, risks, responsibility and costs.

Third, policy makers should create a sustainable plan, enhance more investments in clean energy and scale up private sector investment in clean energy. This provides social and environmental benefits in addition to what the private sector can capture itself. This is also important for developed countries to contribute to emission reduction in developing countries by providing clean energy to citizens. It also helps create job opportunities and the growth of countries' future economies.

Fourth, this thesis showed that Equinor made its first RE investment in the UK because the government of the UK gave subsidies for RE projects. Therefore, it is extremely important for policy makers to adopt regulations and incentives that reward companies for operating clean activities such as subsidies and reduced taxes, etc. Thus, policy makers play an essential role in providing economic incentives and developing clean alternative sources of energy.

Implications for Practice Firms

Today, we are shifting towards a more sustainable world and we need more national and international sustainable efforts. Companies must listen to external audiences and realise the responsibility they have when it comes to running their business in a sustainable way. Therefore, companies are required to understand when and how to develop a sustainable strategy, and how to manage and organise their business in a sustainable way. However, based on the results of this thesis, this section sends a clear message to established companies that helps them overcome the environmental challenges that we face today.

First, based on the interviews of paper 1, Equinor started its first RE project within offshore wind. Equinor decided to develop offshore floating wind turbines in order to use their existing OG offshore skills and competences. Therefore, this thesis recommends that established

companies should use their internal resources and develop innovative sustainable solutions that are related to their competences and skills. This helps involve existing employees to contribute to achieve the sustainable goals and find innovative ways to solve problems. In addition, this helps manage the sustainable shift in the company and achieve sustainable objectives when dealing with new environmental, social and economic issues.

Second, the interviews show, also, that Equinor engages its internal stakeholders in the sustainable process that is taking place in the company. Employees are invited to introduce any sustainable projects to the top management team. This thesis strongly advises established companies to engage with internal stakeholders in their sustainable development process. In this regard, employees will have a personal stake in the company and its success, and this enables them to contribute more. In addition, involving employees in a new sustainable development process, creates an opportunity for employees to share ideas, work toward a common sustainable goal and, thus, find that their contributions are valued.

Finally, this dissertation strongly encourages companies to collaborate. This is essential for established companies undergoing change in order to solve new problems and access new suppliers and customers. Partnerships give companies several advantages such as sharing risk and cost, and saving resources (through access to new skills, knowledge and experience that are necessary to successfully develop the new sustainable technology). Based on the interviews of the paper, this case study shows us two types of collaboration: first, create partnership agreements with companies that have relevant knowledge to the desired sustainable technology. Second, develop an innovative challenge arena where outside institutions (large or small companies) can submit a proposal that aims to solve a specific problem. In this regard, an established company can collaborate with a definite company or connect with outside institutions that can help find solutions and develop innovations to concrete business challenges.

References

Adams, G., & Schvaneveldt, J. (1991). *Understanding Research Methods* (2nd ed.). New York: Longman.

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. (2016). Sustainability-oriented Innovation: A Systematic Review. *International Journal of Management Reviews, 18*(2), 180-205. doi: 10.1111/ijmr.12068

Adomaitis, N., & Solsvik, T. (2020). Energy group Equinor aims for net zero emissions by 2050. Retrieved 20 October 2022, from https://www.reuters.com/article/us-equinor-ceo-idUSKBN27I0G4

Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology, 22*(1), 3-21. doi: 10.1080/10630732.2014.942092

Aldrich, H. E., & Fiol, C. M. (1994). Fools Rush in? The Institutional Context of Industry Creation. *The Academy of Management Review, 19*(4), 645-670. doi: 10.2307/258740

Alexiou, K., & Wiggins, J. (2019). Measuring individual legitimacy perceptions: Scale development and validation. *Strategic Organization, 17*(4), 470-496. doi: 10.1177/1476127018772862

Aliyu, A. A., Bello, M. U., Kasim, R., & Martin, D. (2014). Positivist and Non-Positivist Paradigm in Social Science Research: Conflicting Paradigms or Perfect Partners? *Journal of management and sustainability, 4*(3), 79-79. doi: 10.5539/jms.v4n3p79

Almutairi, A., Gardner, G., & McCarthy, A. (2013). Practical Guidance for the Use of a Pattern-Matching Technique in Case-Study Research: A Case Presentation. *Nursing and Health Sciences 16*(2), 239-244. doi: 10.1111/nhs.12096

Alrøe, H. F., & Noe, E. (2016). Sustainability assessment and complementarity. *Ecology and Society, 21*(1), 30.

Alvesson, M. (2002). *Understanding organizational culture*. London: SAGE.

Alvesson, M., & Berg, P. O. (1992). *Corporate Culture and Organizational Symbolism : An Overview* (Vol. v.34). Berlin: De Gruyter.

Alvesson, M., & Jonsson, A. (2022). Organizational Dischronization: On Meaning and Meaninglessness, Sensemaking and Nonsensemaking. *Journal of management studies, 59*(3), 724-754. doi: 10.1111/joms.12790

Alvesson, M., & Sköldberg, K. (1994). *Tolkning och reflektion : vetenskapsfilosofi och kvalitativ metod*. Lund: Studentlitteratur.

Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological bulletin, 103*(3), 411-423. doi: 10.1037/0033-2909.103.3.411

Andersson, L. M., & Bateman, T. S. (2000). Individual Environmental Initiative: Championing Natural Environmental Issues in US Business Organizations. . *Academy of Management Journal, 43*(4), 548.

Ansoff, H. I. (1965). *Corporate strategy : an analytic approach to business policy for growth and expansion*. New York: McGraw-Hill.

Antunes, D., Santos, A., & Hurtado, A. (2015). The communication of the LCA: the need for guidelines to avoid greenwashing. *Espacios, 36*(5), 1.

Apajalahti, E.-L., Temmes, A., & Lempiälä, T. (2018). Incumbent organisations shaping emerging technological fields: cases of solar photovoltaic and electric vehicle charging. *Technology Analysis & Strategic Management, 30*(1), 44-57. doi: 10.1080/09537325.2017.1285397

Aragón-Correa, J. A., Marcus, A., & Hurtado-Torres, N. (2016). THE NATURAL ENVIRONMENTAL STRATEGIES OF INTERNATIONAL FIRMS: OLD CONTROVERSIES AND NEW EVIDENCE ON PERFORMANCE AND

DISCLOSURE. *Academy of Management perspectives, 30*(1), 24-39. doi: 10.5465/amp.2014.0043
Armstrong, C. E., & Shimizu, K. (2007). A Review of Approaches to Empirical Research on the Resource-Based View of the Firm†. *Journal of Management, 33*(6), 959-986. doi: 10.1177/0149206307307645
Ashforth, B. E., & Gibbs, B. W. (1990). The Double-Edge of Organizational Legitimation. *Organization science (Providence, R.I.), 1*(2), 177-194. doi: 10.1287/orsc.1.2.177
Azmat, F., & Samaratunge, R. (2009). Responsible Entrepreneurship in Developing Countries: Understanding the Realities and Complexities. *Journal of Business Ethics, 90*(3), 437-452. doi: 10.1007/s10551-009-0054-8
Baker, S. (2006). *Sustainable Development*. Abingdon: Routledge.
Bansal, P. (2005). Evolving sustainably: a longitudinal study of corporate sustainable development. *Strat. Mgmt. J, 26*(3), 197-218. doi: 10.1002/smj.441
Bansal, P., & Clelland. (2004). Talking Trash: Legitimacy, Impression Management, and Unsystematic Risk in the Context of the Natural Environment. *Academy of Management journal, 47*(1), 93-103. doi: 10.2307/20159562
Bansal, T., & Song, H.-C. (2017). Similar But Not the Same: Differentiating Corporate Sustainability from Corporate Responsibility. *Academy of Management Annals, 11*, 105-149. doi: 10.5465/annals.2015.0095
Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*, 99 –120.
Barr, S. (2008). *Environment and society : sustainability, policy and the citizen*. Aldershot, England, Burlington, VT: Ashgate.
Baumgartner, R. J., & Rauter, R. (2017). Strategic perspectives of corporate sustainability management to develop a sustainable organization. *Journal of Cleaner Production, 140*, 81-92. doi: https://doi.org/10.1016/j.jclepro.2016.04.146
Bebbington, J., Larrinaga, C., & Moneva, J. M. (2008). Corporate social reporting and reputation risk management. *Accounting, auditing, & accountability, 21*(3), 337-361. doi: 10.1108/09513570810863932
Beveridge, W. I. B. (1951). *The Art of Scientific Investigation*: London: William Heinemann.
Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016). The thorny road to technology legitimation - Institutional work for potable water reuse in California. *Technological Forecasting and Social Change, 103*(Supplement C), 249-263. doi: https://doi.org/10.1016/j.techfore.2015.10.005
Bitektine, A. (2011). Toward a Theory of Social Judgments of Organizations: The Case of Legitimacy, Reputation, and Status. *Academy of Management Review, 36*(1), 151-179. doi: 10.5465/amr.2009.0382
Blaikie, N. W. H. (2003). *Analyzing quantitative data : from description to explanation*
Blettner, D. P., Chaddad, F. R., & Bettis, R. A. (2012). The CEO Performance Effect: Statistical Issues and a Complex Fit Perspective. *Strat. Mgmt. J, 33*(8), 986-999. doi: 10.1002/smj.1949
Bloodgood, J., Hornsby, J., Rutherford, M., & McFarland, R. (2017). The role of network density and betweenness centrality in diffusing new venture legitimacy: an epidemiological approach. *International Entrepreneurship and Management Journal, 13*(2), 525-552. doi: 10.1007/s11365-016-0412-9
Blum-Kusterer, M., & Hussain, S. S. (2001). Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry. *Bus. Strat. Env, 10*(5), 300-316. doi: 10.1002/bse.300

Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production, 65*, 42-56. doi: https://doi.org/10.1016/j.jclepro.2013.11.039

Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production, 45*, 9-19. doi: https://doi.org/10.1016/j.jclepro.2012.07.007

Boschma, R. (2017). Relatedness as driver of regional diversification: a research agenda. *Regional studies, 51*(3), 351-364. doi: 10.1080/00343404.2016.1254767

Bossink, B. (2013). *Eco-innovation and sustainability management*. New York: Routledge.

Bouckaert, S., Pales, A. F., McGlade, C., Remme, U., Wanner, B., Varro, L., . . . Spencer, T. (2021). Net Zero by 2050: A Roadmap for the Global Energy Sector.

Bouma, G., & Atkinson, G. (1995). *A handbook of social science research: A comprehensive and practical guide for students* (2nd ed.). Oxford: Oxford University Press.

Bowen, H. R. (1953). *Social Responsibilities of the Businessman*. New York: Harper.

Brewer, S. (2018). Norway taking tangible steps on sustainability. Retrieved 19 July 2020, from https://www.linkedin.com/pulse/norway-taking-tangible-steps-sustainability-stuart-brewer/

Bridwell-Mitchell, E. N., & Mezias, S. J. (2012). The Quest for Cognitive Legitimacy: Organizational Identity Crafting and Internal Stakeholder Support. *Journal of Change Management, 12*(2), 189-207. doi: 10.1080/14697017.2011.645053

Bromiley, P. (2005). *The behavioral foundations of strategic management*. Malden, Mass: Blackwell Publ.

Brundtland, G. H. (1987). Report of the World Commission on Environment and Development: Our Common Future

Bryman, A. (2004). *Social research methods* (2nd ed.). New York: Oxford University Press.

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford, England: Oxford university press.

Buchan, G. D., Spellerberg, I. F., & Blum, W. E. H. (2007). Education for sustainability: Developing a postgraduate‐level subject with an international perspective. *International journal of sustainability in higher education, 8*(1), 4-15. doi: 10.1108/14676370710717553

Burgelman, R. A. (1991). Intraorganizational Ecology of Strategy Making and Organizational Adaptation: Theory and Field Research. *Organization Science, 2*(3), 239-262.

Burgelman, R. A. (2002). *Strategy is destiny : how strategy-making shapes a company's future*. New York: Free Press.

Burgelman, R. A. (2018). Concept of Strategy and Organizational Evolution (pp. 323-332). London: London: Palgrave Macmillan UK.

Burgelman, R. A., & O'Neill, H. M. (2004). Strategy Is Destiny: How Strategy-Making Shapes a Company's Future (Vol. 49, pp. 151-153). ITHACA: ITHACA: Cornell University Samuel Curtis Johnson Graduate School of Management.

Burgelman, R. A., & Siegel, R. E. (2008). Cutting the Strategy Diamond in High-Technology Ventures. *California Management Review, 50*(3), 140-167. doi: 10.2307/41166449

Busenitz, L. W., Gómez, C., & Spencer, J. W. (2000). Country Institutional Profiles: Unlocking Entrepreneurial Phenomena. *The Academy of Management Journal, 43*(5), 994-1003. doi: 10.2307/1556423

Calvillo, C. F., Sánchez, A., & Villar, J. (2013, 20-23 Oct. 2013). *Distributed energy generation in smart cities.* Paper presented at the 2013 International Conference on Renewable Energy Research and Applications (ICRERA).

Carlowitz, H. C. v. (2009). Sylvicultura Oeconomica. Hausswirthliche Nachricht und Naturmäßige Anweisung zur Wilden Baum-Zucht, Reprint der zweiten Auflage von 1732. *Verlag Kessel, Leipzig*.
Carter, C. (2013). The Age of Strategy: Strategy, Organizations and Society. *Business history, 55*(7), 1047-1057. doi: 10.1080/00076791.2013.838030
Chandler, A. D. (1962). *Strategy and structure : chapters in the history of the industrial enterprise*. Cambridge, Mass: M.I.T. Press.
Chen, J., & Scott, G. (2020). Socially Responsible Investment (SRI). Retrieved 28 April 2020, from https://www.investopedia.com/terms/s/sri.asp
Chen, Y.-S., Lai, S.-B., & Wen, C.-T. (2006). The Influence of Green Innovation Performance on Corporate Advantage in Taiwan. *Journal of Business Ethics, 67*(4), 331-339.
Christensen, C. M., Baumann, H., Ruggles, R., & Sadtler, T. M. (2006). Disruptive Innovation of Social Change. *Harvard Business Review, 94*(101).
Christopher, O. B. (1999). Sustainable production – a new paradigm for a new millennium. *International journal of production economics, 60*(1), 1-7. doi: 10.1016/S0925-5273(98)00126-1
Clark, S. M., Gioia, D. A., Ketchen, D. J., & Thomas, J. B. (2010). Transitional Identity as a Facilitator of Organizational Identity Change during a Merger. *Administrative Science Quarterly, 55*(3), 397-438. doi: 10.2189/asqu.2010.55.3.397
Clarke, S., & Roome, N. (1999). Sustainable business: learning – action networks as organizational assets. *Business strategy and the environment, 8*(5), 296-310. doi: 10.1002/(SICI)1099-0836(199909/10)8:5<296::AID-BSE212>3.3.CO

2-E

Cohen, A. (1974). *Two-dimensional man : an essay on the anthropology of power and symbolism in complex society*. London: Routledge & Kegan Paul.
Collis, J., & Hussey, R. (2003). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students* (2nd ed.). Basingstoke: Palgrave Macmillan.
Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches, 2nd ed*. Thousand Oaks, CA, US: Sage Publications, Inc.
Creswell, J. W. (2013). Qualitative Inquiry and Research Design: Choosing Among Five Approaches, third edition (Book Review) (pp. 89-89).
Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, Calif: Sage.
Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed. ed.). Los Angeles: Sage.
Cronje, J. (2012). What Is This Thing Called "Design" in Instructional Design Research?—The ABC Instant Research Question Generator *Media in Education* (pp. 15-28): Springer
Crook, T. R., Ketchen Jr, D. J., Combs, J. G., & Todd, S. Y. (2008). Strategic resources and performance: a meta-analysis. *Strat. Mgmt. J, 29*(11), 1141-1154. doi: 10.1002/smj.703
Crossan, M. M., & Apaydin, M. (2010). A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of management studies, 47*(6), 1154-1191. doi: 10.1111/j.1467-6486.2009.00880.x
Cruickshank, J. (2003). *Realism and Sociology: Anti-Foundationalism, Ontology and Social Research* Routledge Ltd.

Crutzen, N., Zvezdov, D., & Schaltegger, S. (2017). Sustainability and management control. Exploring and theorizing control patterns in large European firms. *Journal of Cleaner Production, 143*, 1291-1301. doi: https://doi.org/10.1016/j.jclepro.2016.11.135
Cruz-Suárez, A., Prado-Román, C., & Díez-Martín, F. (2014). Por qué se institucionalizan las organizaciones. *Revista Europea de Dirección y Economía de la Empresa, 23*(1), 22-30.
Dart, R. (2004). The legitimacy of social enterprise. *Nonprofit Management and Leadership, 14*(4), 411-424. doi: 10.1002/nml.43
Davies, G. R. (2013). Appraising weak and strong sustainability: searching for a middle ground. *Consilience*(10). doi: 10.7916/consilience.v0i10.4635
Daymon, C., & Holloway, I. (2010). *Qualitative research methods in public relations and marketing communications*: Routledge.
Deegan, C. (2014). An overview of legitimacy theory as applied within the social and environmental accounting literature. In J. Bebbington, J. Unerman & B. O'Dwyer (Eds.), *Sustainability accounting and accountability* (Second edition ed., pp. 248-272). London: Routledge, Taylor & Francis Group
Deephouse, D. L., & Suchman, M. (2008). Legitimacy in organizational institutionalism. In R. Greenwood, C. Oliver, K. Sahlin & R. Suddaby (Eds.), *The Sage handbook of organizational institutionalism* (pp. 49-77). London: SAGE Publications
DeVellis, R. F. (1991). *Scale development : theory and applications* (Vol. 26). Newbury Park, Calif: Sage.
Díez-de-Castro, E., Peris-Ortiz, M., & Díez-Martín, F. (2018). Criteria for Evaluating the Organizational Legitimacy: A Typology for Legitimacy Jungle. In E. Díez-De-Castro & M. Peris-Ortiz (Eds.), *Organizational Legitimacy: Challenges and Opportunities for Businesses and Institutions* (pp. 1-21). Cham: Springer International Publishing
Díez de Castro, E. P., Díez Martín, F. d. A., & Vázquez Sánchez, A. E. (2015). Antecedentes de la institucionalización de las organizaciones. *Cuadernos de Gestión, 15 (1), 15-38.*
Dobson, A. (1996). Environmental Sustainabilities: an analysis and a typology. *Environmental Politics, 5*, 401-428.
Dobson, A. (1998). *Justice and the environment : conceptions of environmental sustainability and theories of distributive justice*
Dolata, U. (2009). Technological innovations and sectoral change: Transformative capacity, adaptability, patterns of change: An analytical framework. *Research Policy, 38*(6), 1066-1076. doi: https://doi.org/10.1016/j.respol.2009.03.006
Dowling, J., & Pfeffer, J. (1975). Organizational Legitimacy: Social Values and Organizational Behavior. *The Pacific Sociological Review, 18*(1), 122-136.
Driessen, P. H., Hillebrand, B., Kok, R. A. W., & Verhallen, T. M. M. (2013). Green New Product Development: The Pivotal Role of Product Greenness. *IEEE transactions on engineering management, 60*(2), 315-326. doi: 10.1109/TEM.2013.2246792
Drori, I., & Honig, B. (2013). A Process Model of Internal and External Legitimacy. *Organization Studies, 34*(3), 345-376. doi: 10.1177/0170840612467153
Dryzek, J. (1997). *The Politics of the Earth*. Oxford: Oxford University Press.
Du, S., Bhattacharya, C. B., & Sen, S. (2007). Reaping relational rewards from corporate social responsibility: The role of competitive positioning. *International Journal of Research in Marketing, 24*(3), 224-241. doi: https://doi.org/10.1016/j.ijresmar.2007.01.001
Durand, R., Szostak, B., Jourdan, J., & Thornton, P. (2013). Institutional logics as strategic resources. In M. Lounsbury (Ed.), *Research in the Sociology of Organization* (pp. 165–201). Bingley, UK

Emerald
Dyer, W., Wilkins, A., & Eisenhardt, K. (1991). Better Stories, Not Better Constructs, to Generate Better Theory: A Rejoinder to Eisenhardt; Better Stories and Better Constructs: The Case for Rigor and Comparative Logic. *Academy of Management. The Academy of Management Review, 16*(3), 613. doi: 10.2307/258920
Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Bus. Strat. Env, 11*(2), 130-141. doi: 10.1002/bse.323
Dyllick, T., Hockerts, K., Halme, D. M., Park, J., & Chiu, P. A. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment, 11*(2), 130-141. doi: 10.1002/bse.323
Dyllick, T., & Muff, K. (2016). Clarifying the Meaning of Sustainable Business:Introducing a Typology From Business-as-Usual to True Business Sustainability. *Organization & Environment, 29*(2), 156-174. doi: 10.1177/1086026615575176
Easterby-Smith, M., Thorpe, R., Jackson, P. R., & Lowe, A. (2008). *Management research* (3rd ed. ed.). London: Sage publications
Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management, 39*(1), 118-128. doi: https://doi.org/10.1016/j.indmarman.2008.06.004
Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management science, 60*(11), 2835-2857. doi: 10.1287/mnsc.2014.1984
Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review, 14*(4), 532-550. doi: 10.2307/258557
Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building from Cases: Opportunities and Challenges. *The Academy of Management Journal, 50*(1), 25-32. doi: 10.2307/20159839
Elkington, J. (1994). Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development. *California management review, 36*(2), 90-100. doi: 10.2307/41165746
Elzen, B., Geels, F. W., Leeuwis, C., & van Mierlo, B. (2011). Normative contestation in transitions 'in the making': Animal welfare concerns and system innovation in pig husbandry. *Research policy, 40*(2), 263-275. doi: 10.1016/j.respol.2010.09.018
Emisoft. (2020). Empowering Greater Environmental Performance Retrieved 13 February 2020, from https://www.emisoft.com/client-stories/equinor/
Engert, S., Rauter, R., & Baumgartner, R. J. (2016). Exploring the integration of corporate sustainability into strategic management: a literature review. *Journal of Cleaner Production, 112*, 2833-2850. doi: https://doi.org/10.1016/j.jclepro.2015.08.031
Epstein, M. J. (2008). Implementing corporate sustainability: measuring and managing social and environmental impacts. *Strategic Finance, 28*(7), 24-31.
Epstein, M. J., & Roy, M.-J. (2001). Sustainability in Action: Identifying and Measuring the Key Performance Drivers. *Long range planning, 34*(5), 585-604. doi: 10.1016/S0024-6301(01)00084-X
Equinor. (2008). StatoilHydro to build first full scale offshore floating wind turbine. Retrieved 15.02.2019, from https://www.equinor.com/en/news/archive/2008/05/22/hywindfullscale.html
Equinor. (2020). Our history in brief. 20 August 2020, from https://www.equinor.com/en/about-us/our-history/our-history-in-brief.html
Equinor. (2021a). About us. Retrieved 23 September 2021, from https://www.equinor.com/en/media-centre.html#about-us

Equinor. (2021b). Equinor wins opportunity to develop the world's largest offshore wind farm. Retrieved 19 January 2021, from https://www.equinor.com/en/news/2019-09-19-doggerbank.html
Equinor. (2021c). Renewables and low-carbon. Retrieved 12 October 2021, from https://www.equinor.com/en/what-we-do/renewables.html
Equinor. (2021d). Solar energy in Equinor. Retrieved 19 January 2021, from https://www.equinor.com/en/what-we-do/solar.html
Equinor. (2021e). We're determined to be a global offshore wind energy major. Here's how. Retrieved 19 january 2021, from https://www.equinor.com/en/what-we-do/wind.html#uk-wind
Erlinghagen, S., & Markard, J. (2012). Smart grids and the transformation of the electricity sector: ICT firms as potential catalysts for sectoral change. *Energy Policy, 51*, 895-906. doi: https://doi.org/10.1016/j.enpol.2012.09.045
Felin, T., & Foss, N. J. (2005). Strategic organization: A field in search of micro-foundations (Vol. 3, pp. 441-455): Sage Publications London, Thousand Oaks, CA and New Delhi.
Felin, T., Foss, N. J., Heimeriks, K. H., & Madsen, T. L. (2012). Microfoundations of Routines and Capabilities: Individuals, Processes, and Structure. *Journal of management studies, 49*(8), 1351-1374. doi: 10.1111/j.1467-6486.2012.01052.x
Finansdepartementet. (2020). CO2-avgiften. Retrieved 15 December 2021, from https://www.regjeringen.no/no/tema/okonomi-og-budsjett/skatter-og-avgifter/veibruksavgift-pa-drivstoff/co2-avgiften/id2603484/
Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *12*(2), 219-245. doi: 10.1177/1077800405284363.
Fowler, S. B., & Lapp, V. (2019). Sample size in quantitative research: Sample size will affect the significance of your research. *American nurse today, 14*(5), 61.
Foxon, T. J. (2013). Transition pathways for a UK low carbon electricity future. *Energy Policy, 52*, 10-24. doi: https://doi.org/10.1016/j.enpol.2012.04.001
Franceschini, S., Faria, L. G. D., & Jurowetzki, R. (2016). Unveiling scientific communities about sustainability and innovation. A bibliometric journey around sustainable terms. *Journal of cleaner production, 127*, 72-83. doi: 10.1016/j.jclepro.2016.03.142
Frandsen, S., Morsing, M., & Vallentin, S. (2013). Adopting sustainability in the organization: Managing processes of productive loose coupling towards internal legitimacy. *32*(3), 236-246. doi: 10.1108/02621711311318265
Franta, B. (2018). Early oil industry knowledge of CO2 and global warming. *Nature climate change, 8*(12), 1024-1025. doi: 10.1038/s41558-018-0349-9
Frondel, M., Horbach, J., & Rennings, K. (2008). What triggers environmental management and innovation? Empirical evidence for Germany. *Ecological Economics, 66*(1), 153-160. doi: https://doi.org/10.1016/j.ecolecon.2007.08.016
Galaskiewicz, J. (1985). Interorganizational Relations. *Annu. Rev. Sociol., 11*(1), 281-304. doi: 10.1146/annurev.so.11.080185.001433
Gallagher, M. W., & Brown, T. A. (2013). Introduction to Confirmatory Factor Analysis and Structural Equation Modeling. In T. Teo (Ed.), *Handbook of Quantitative Methods for Educational Research* (pp. 289-314). Rotterdam: SensePublishers
Gao, J., & Bansal, P. (2013). Instrumental and Integrative Logics in Business Sustainability. *Journal of business ethics, 112*(2), 241-255. doi: 10.1007/s10551-012-1245-2
Gaskin, J. (2018). Excel StatTools. Retrieved 20.08.2018, from http://statwiki.kolobkreations.com/index.php?title=Main_Page
Gatignon, H., Tushman, M. L., Smith, W., & Anderson, P. (2002). A Structural Approach to Assessing Innovation: Construct Development of Innovation Locus, Type, and

Characteristics. *Management science, 48*(9), 1103-1122. doi: 10.1287/mnsc.48.9.1103.174
Gavetti, G. (2012). PERSPECTIVE—Toward a Behavioral Theory of Strategy. *Organization science (Providence, R.I.), 23*(1), 267-285. doi: 10.1287/orsc.1110.0644
Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy, 31*(8), 1257-1274. doi: 10.1016/S0048-7333(02)00062-8
Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy, 33*(6), 897-920. doi: https://doi.org/10.1016/j.respol.2004.01.015
Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions, 1*(1), 24-40. doi: https://doi.org/10.1016/j.eist.2011.02.002
Geels, F. W. (2014). Reconceptualising the co-evolution of firms-in-industries and their environments: Developing an inter-disciplinary Triple Embeddedness Framework. *Research policy, 43*(2), 261-277. doi: 10.1016/j.respol.2013.10.006
Geels, F. W. (2018). Disruption and low-carbon system transformation: Progress and new challenges in socio-technical transitions research and the Multi-Level Perspective. *Energy Research & Social Science, 37*, 224-231. doi: https://doi.org/10.1016/j.erss.2017.10.010
Geels, F. W., Hekkert, M. P., & Jacobsson, S. (2008). The dynamics of sustainable innovation journeys. *Technology analysis & strategic management, 20*(5), 521-536. doi: 10.1080/09537320802292982
Gehman, J., Lefsrud, L. M., & Fast, S. (2017). Social license to operate: Legitimacy by another name? *Canadian Public Administration, 60*(2), 293-317. doi: 10.1111/capa.12218
George, R. A., Siti-Nabiha, A. K., & Jalaludin, D. (2018). Sustainability institutionalisation: A mechanistic approach to control change. *Journal of Cleaner Production, 205*, 36-48. doi: https://doi.org/10.1016/j.jclepro.2018.09.095
Gibbs, G. (2002). *Qualitative data analysis : explorations with NVivo*. Buckingham: Open University Press.
Giffinger, R., Fertner, C., Kalasek, R., & Milanovic, N. P. (2007). Smart cities - Ranking of European medium-sized cities. Retrieved 09.02.2019, from www.smartcities.eu
Gimenez, C., Sierra, V., & Rodon, J. (2012). Sustainable operations: Their impact on the triple bottom line. *International Journal of Production Economics, 140*(1), 149-159. doi: https://doi.org/10.1016/j.ijpe.2012.01.035
Gioia, D. A., Schultz, M., & Corley, K. G. (2000). Organizational Identity, Image, and Adaptive Instability. *The Academy of Management Review, 25*(1), 63-81. doi: 10.2307/259263
Gladwin, T. N., Kennelly, J. J., & Krause, T. S. (1995). Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *The Academy of Management review, 20*(4), 874-907. doi: 10.2307/258959
Glavič, P., & Lukman, R. (2007). Review of sustainability terms and their definitions. *Journal of Cleaner Production, 15*(18), 1875-1885. doi: https://doi.org/10.1016/j.jclepro.2006.12.006
Golant, B. D., & Sillince, J. A. A. (2007). The Constitution of Organizational Legitimacy: A Narrative Perspective. *Organization studies, 28*(8), 1149-1167. doi: 10.1177/0170840607075671

Gond, J.-P., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: Theorizing the integration of strategy and sustainability. *Management Accounting Research, 23*(3), 205-223. doi: https://doi.org/10.1016/j.mar.2012.06.003
Grasso, M. (2019). Oily politics: A critical assessment of the oil and gas industry's contribution to climate change. *Energy research & social science, 50*, 106-115. doi: 10.1016/j.erss.2018.11.017
Gregory, R. P. (2021). When is greenwashing an easy fix? *Journal of Sustainable Finance & Investment*, 1-24. doi: 10.1080/20430795.2021.1907091
Guerras-Martín, L. Á., Madhok, A., & Montoro-Sánchez, Á. (2014). The evolution of strategic management research: Recent trends and current directions. *BRQ Business Research Quarterly, 17*(2), 69-76. doi: https://doi.org/10.1016/j.brq.2014.03.001
Guerreiro, A. (2015). Impact of IS/IT investments on firm performance: Does stakeholder orientation matter? (pp. 100-110).
Gulowsen, T. (2018). Call me Equinor': Statoil changes name. Retrieved 20 October 2022, from https://www.thelocal.no/20180516/call-me-equinor-statoil-changes-name/
Hahn, T., Pinkse, J., Preuss, L., & Figge, F. (2015). Tensions in Corporate Sustainability: Towards an Integrative Framework. *Journal of business ethics, 127*(2), 297-316. doi: 10.1007/s10551-014-2047-5
Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate Data Analysis: Pearson New International Edition*. Harlow: Harlow, United Kingdom: Pearson Education Limited.
Hall, J., & Vredenburg, H. (2003). The challenges of innovating for sustainable development. *MIT Sloan management review, 45*(1), 61-68.
Hall, J., & Wagner, M. (2012). Integrating Sustainability into Firms' Processes: Performance Effects and the Moderating Role of Business Models and Innovation: Integrating Sustainability into Firms' Processes. *Business strategy and the environment, 21*(3), 183-196. doi: 10.1002/bse.728
Hannan, M. T., & Freeman, J. (1984). Structural Inertia and Organizational Change. *American sociological review, 49*(2), 149-164. doi: 10.2307/2095567
Hansen, E., Große-Dunker, F., & Reichwald, R. (2009). Sustainability innovation cube. A framework to evaluate sustainability-oriented innovations. *International Journal of Innovation Management, 13*(4), 683-713.
Hanusch, H., & Pyka, A. (2008). Elgar companion to neo-Schumpeterian economics (Vol. 23). Portland: Portland: Ringgold, Inc.
Hargadon, A. B., & Douglas, Y. (2001). When Innovations Meet Institutions: Edison and the Design of the Electric Light. *Administrative Science Quarterly, 46*(3), 476-501. doi: 10.2307/3094872
Harper, D. A., & Lewis, P. (2012). New perspectives on emergence in economics. *Journal of economic behavior & organization, 82*(2-3), 329-337. doi: 10.1016/j.jebo.2012.02.004
Hartmann, J., Inkpen, A. C., & Ramaswamy, K. (2020). Different shades of green: Global oil and gas companies and renewable energy. *Journal of International Business Studies*. doi: 10.1057/s41267-020-00326-w
Hawken, P. (1994). *The Ecology of commerce : a declaration of sustainability* (Repr. ed.). New York: HarperCollins.
Hediger, W. (1999). Reconciling "weak" and "strong" sustainability. *International Journal of Social Economics, 26*(7/8/9), 1120-1144.
Henderson, R. M., & Clark, K. B. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative science quarterly, 35*(1), 9-30. doi: 10.2307/2393549

Herzig, C., & Schaltegger, S. (2011). Corporate Sustainability Reporting. In J. Godemann & G. Michelsen (Eds.), *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundation* (pp. 151-169). Dordrecht: Springer Netherlands

Hess, D. J. (2014). Sustainability transitions: A political coalition perspective. *Research Policy, 43*(2), 278-283. doi: https://doi.org/10.1016/j.respol.2013.10.008

Hillman, A. J., & Keim, G. D. (2001). Shareholder Value, Stakeholder Management, and Social Issues: What's the Bottom Line? *Strategic management journal, 22*(2), 125-139.

Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids — Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing, 25*(5), 481-492. doi: https://doi.org/10.1016/j.jbusvent.2009.07.005

Hoerndlein, C., Benlian, A., & Hess, T. (2012, Date of Conference (16-19 December 2012)). *Institutional Influences in Individual-Level Innovation Adoption Outside Organizational Contexts: A Scale Development Study.* Paper presented at the Thirty Third International Conference on Information Systems, Orlando, FL, USA 2012.

Hoogma, R., Kemp, R., Schot, J., & Truffer, B. (2002). *Experimenting for Sustainable Transport: The Approach of Strategic Niche Management* (1 ed.). London: London: Routledge.

Hoskisson, R. E., & Hitt, M. A. (1990). Antecedents and Performance Outcomes of Diversification: A Review and Critique of Theoretical Perspectives. *Journal of Management, 16*(2), 461-509. doi: 10.1177/014920639001600210

Hoskisson, R. E., Wan, W. P., Yiu, D., & Hitt, M. A. (1999). Theory and research in strategic management: Swings of a pendulum. *Journal of management, 25*(3), 417-456.

Hovland, K. M. (2017). Så viktig er Statoil for norsk økonomi. Retrieved 14 desember 2021, from https://e24.no/boers-og-finans/i/ddA2aA/saa-viktig-er-statoil-for-norsk-oekonomi

Hox, J. J., & Maas, C. J. M. (2001). The Accuracy of Multilevel Structural Equation Modeling With Pseudobalanced Groups and Small Samples. *Structural equation modeling, 8*(2), 157-174. doi: 10.1207/S15328007SEM0802_1

Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *15*(9), 1277-1288. doi: 10.1177/1049732305276687

Hughes, C., & Spray, R. (2002). Smart communities and smart growth - Maximising benefits for the corporation. *Journal of Corporate Real Estate, 4*(3), 207-214. doi: doi:10.1108/14630010210811831

Hörisch, J., Freeman, R. E., & Schaltegger, S. (2014). Applying Stakeholder Theory in Sustainability Management: Links, Similarities, Dissimilarities, and a Conceptual Framework. *Organization & environment, 27*(4), 328-346. doi: 10.1177/1086026614535786

Iatridis, K., & Kesidou, E. (2018). What Drives Substantive Versus Symbolic Implementation of ISO 14001 in a Time of Economic Crisis? Insights from Greek Manufacturing Companies. *Journal of business ethics, 148*(4), 859-877. doi: 10.1007/s10551-016-3019-8

Idowu, S. O., Capaldi, N., Zu, L., Gupta, A. D., & SpringerLink. (2013). Encyclopedia of Corporate Social Responsibility. Berlin, Heidelberg: Springer Berlin Heidelberg Imprint: Springer.

IEA. (2020). IEA's Oil and Gas Industry in Energy Transitions report. Retrieved from https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions

IEA. (2022). Renewable electricity growth is accelerating faster than ever worldwide, supporting the emergence of the new global energy economy. Retrieved 13 October

2022, from https://www.iea.org/news/renewable-electricity-growth-is-accelerating-faster-than-ever-worldwide-supporting-the-emergence-of-the-new-global-energy-economy
Imerman, D. (2018). Contested Legitimacy and Institutional Change: Unpacking the Dynamics of Institutional Legitimacy. *International Studies Review, 20*(1), 74-100. doi: 10.1093/isr/vix039
Irshaidat, R. (2022). Interpretivism vs. Positivism in Political Marketing Research. *Journal of political marketing, 21*(2), 126-160. doi: 10.1080/15377857.2019.1624286
Islam, M., Hossain Ashrafee, T., & Mia, L. (2018). Role of strategic alliance and innovation on organizational sustainability. *Benchmarking: An International Journal, 25*(5), 1581-1596. doi: 10.1108/BIJ-12-2016-0188
Jaber, T., & Oftedal, E. M. (2019). *Quantitative data: A case of an oil and gas company under a sustainable change* [Survey-based data]. Retrieved from: https://doi.org/10.18710/HLYZIB
Jacobsen, D. I. (2015). Metode - en pragmatisk tilnærming. *Hvordan gjennomføre undersøkelser? Innføring i samfunnsvitenskapelig metode* (3. utg. ed.). Oslo: Cappelen Damm akademisk
Jacobsen, D. I., Sandin, G., & Hellström, C. (2002). Vad, hur och varför: om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen (pp. 120-142). Lund: Studentlitteratur AB
Jepperson, R. L. (1991). Institutions, institutional effects, and institutionalism. In I. W. W. P.-e. P. J. D. (Eds.) (Ed.), *The new institutionalism in organizational analysis* (pp. 143-163). Chicago: University of Chicago Press
Johannesson, P., & Perjons, E. (2014). *An Introduction to Design Science* (1st 2014. ed.). Cham: Springer International Publishing : Imprint: Springer.
John, C. V. P. (2004). Sustainability Policy and Environmental Policy. *The Scandinavian Journal of Economics, 106*(2), 339-359.
Johnson, C., Dowd, T. J., & Ridgeway, C. L. (2006). Legitimacy as a Social Process. *Annual review of sociology, 32*(1), 53-78. doi: 10.1146/annurev.soc.32.061604.123101
Kankam, P. K. (2019). The use of paradigms in information research. *Library & Information Science Research, 41*(2), 85-92. doi: https://doi.org/10.1016/j.lisr.2019.04.003
Katz, E. (1999). Theorizing Diffusion: Tarde and Sorokin Revisited. *The ANNALS of the American Academy of Political and Social Science, 566*(1), 144-155. doi: 10.1177/000271629956600112
Kemp, R., & Pearson, P. (2008). MEI project about measuring eco-innovation. *Final report.* .
Kennedy, M. T., & Fiss, P. C. (2013). An Ontological Turn in Categories Research: From Standards of Legitimacy to Evidence of Actuality. *Journal of Management Studies, 50*(6), 1138-1154. doi: 10.1111/joms.12031
Kennedy, S., Whiteman, G., & van den Ende, J. (2017). Radical Innovation for Sustainability: The Power of Strategy and Open Innovation. *Long range planning, 50*(6), 712-725. doi: 10.1016/j.lrp.2016.05.004
Ketata, I., Sofka, W., & Grimpe, C. (2015). The role of internal capabilities and firms' environment for sustainable innovation: evidence for Germany. *R&D Manage, 45*(1), 60-75. doi: 10.1111/radm.12052
Kim, E.-H., & Lyon, T. P. (2015). Greenwash vs. Brownwash: Exaggeration and Undue Modesty in Corporate Sustainability Disclosure. *Organization science (Providence, R.I.), 26*(3), 705-723. doi: 10.1287/orsc.2014.0949
Kishna, M., Niesten, E., Negro, S., & Hekkert, M. P. (2017). The role of alliances in creating legitimacy of sustainable technologies: A study on the field of bio-plastics. *Journal of*

Cleaner Production, 155(Part 2), 7-16. doi: https://doi.org/10.1016/j.jclepro.2016.06.089
Kitchin, R. (2015). Making sense of smart cities: addressing present shortcomings. *Cambridge Journal of Regions, Economy and Society, 8*(1), 131-136. doi: 10.1093/cjres/rsu027
Kleindorfer, P. R., Singhal, K., & Van Wassenhove, L. N. (2005). Sustainable Operations Management. *Production and operations management, 14*(4), 482-492. doi: 10.1111/j.1937-5956.2005.tb00235.x
Klewitz, J., & Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: a systematic review. *Journal of cleaner production, 65*, 57-75. doi: 10.1016/j.jclepro.2013.07.017
Kostova, T., & Zaheer, S. (1999). Organizational legitimacy under conditions of complexity: The case of the multinational enterprise. *The Academy of Management review, 24*(1), 64-81. doi: 10.5465/amr.1999.1580441
Kudratova, S., Huang, X., & Zhou, X. (2018). Sustainable project selection: Optimal project selection considering sustainability under reinvestment strategy. *Journal of Cleaner Production, 203*, 469-481. doi: https://doi.org/10.1016/j.jclepro.2018.08.259
Kumar, V., Rahman, Z., Kazmi, A. A., & Goyal, P. (2012). Evolution of Sustainability as Marketing Strategy: Beginning of New Era. *Procedia - Social and Behavioral Sciences, 37*(Supplement C), 482-489. doi: https://doi.org/10.1016/j.sbspro.2012.03.313
Kuruppu, S. C., Milne, M. J., & Tilt, C. A. (2019). Gaining, maintaining and repairing organisational legitimacy When to report and when not to report. *ACCOUNTING AUDITING & ACCOUNTABILITY JOURNAL, 32*(7), 2062-2087. doi: 10.1108/AAAJ-03-2013-1282
Laïfi, A., & Josserand, E. (2016). Legitimation in practice: A new digital publishing business model. *Journal of Business Research, 69*(7), 2343-2352. doi: https://doi.org/10.1016/j.jbusres.2015.10.003
Lamin, A., & Zaheer, S. (2012). Wall Street vs. Main Street: Firm Strategies for Defending Legitimacy and Their Impact on Different Stakeholders. *Organization Science, 23*(1), 47-66. doi: 10.1287/orsc.1100.0631
Learned, E. P., Christensen, C. R., Andrews, K. R., & Guth, W. D. (1965/1969). *Business Policy: Text and Cases* (Vol. Richard D. Irwin). Homewood, IL.
Lewis, J. (2003). Design issues. In J. Lewis & J. Ritchic (Eds.), *Qualitative rescarch practice* (pp. 47-76). SAGE, London
Li, D., Zheng, M., Cao, C., Chen, X., Ren, S., & Huang, M. (2017). The impact of legitimacy pressure and corporate profitability on green innovation: Evidence from China top 100. *Journal of Cleaner Production, 141*, 41-49. doi: https://doi.org/10.1016/j.jclepro.2016.08.123
Li, J., & Tang, Y. (2010). CEO hubris and firm risk taking in China: the moderating role of managerial discretion.(chief executive officers)(Report). *Academy of Management Journal, 53*(1), 45. doi: 10.5465/AMJ.2010.48036912
Lozano, E., Barrera, P., Tonn, C., Nieto, M., Sartor, T., & Sosa, M. A. (2012). The effect of the diterpene 5-epi-icetexone on the cell cycle of Trypanosoma cruzi. *Parasitology International, 61*(2), 275-279. doi: 10.1016/j.parint.2011.11.001
Lozano, R. (2015). A holistic perspective on corporate sustainability drivers. *Corporate Social Responsibility and Environmental Management, 22*(1), 32-44. doi: https://doi.org/10.1002/csr.1325
Lu, H., Guo, L., & Zhang, Y. (2019). Oil and gas companies' low-carbon emission transition to integrated energy companies. *Science of The Total Environment, 686*, 1202-1209. doi: https://doi.org/10.1016/j.scitotenv.2019.06.014

Lu, J. W., & Xu, D. (2006). Growth and Survival of International Joint Ventures: An External-Internal Legitimacy Perspective. *Journal of management, 32*(3), 426-448. doi: 10.1177/0149206305281399
Lubberink, R., Blok, V., Van Ophem, J., & Omta, O. (2017). Lessons for Responsible Innovation in the Business Context: A Systematic Literature Review of Responsible, Social and Sustainable Innovation Practices. *Sustainability, 9*(5), 721.
Lyon, T. P., & Maxwell, J. W. (2011). Greenwash: Corporate Environmental Disclosure under Threat of Audit. *Journal of economics & management strategy, 20*(1), 3-41. doi: 10.1111/j.1530-9134.2010.00282.x
MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct Measurement and Validation Procedures in MIS and Behavioral Research: Integrating New and Existing Techniques. *MIS Quarterly, 35*(2), 293-334. doi: 10.2307/23044045
Maletič, M., Maletič, D., & Gomišček, B. (2016). The impact of sustainability exploration and sustainability exploitation practices on the organisational performance: a cross-country comparison. *Journal of Cleaner Production, 138*, 158-169. doi: https://doi.org/10.1016/j.jclepro.2016.02.132
Malhotra, N. K., & Dash, S. (2011). *Marketing Research an Applied Orientation*. London: Pearson Publishing.
Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy, 41*(6), 955-967. doi: https://doi.org/10.1016/j.respol.2012.02.013
Marlow, C. R. (2005). *Research Methods for Generalist Social Work*. New York: Thomson Brooks/Cole.
Marquis, C., & Qian, C. (2014). Corporate Social Responsibility Reporting in China: Symbol or Substance? *Organization science (Providence, R.I.), 25*(1), 127-148. doi: 10.1287/orsc.2013.0837
Marquis, C., Toffel, M. W., & Zhou, Y. (2016). Scrutiny, Norms, and Selective Disclosure: A Global Study of Greenwashing. *Organization science (Providence, R.I.), 27*(2), 483-504. doi: 10.1287/orsc.2015.1039
Marrewijk, M. V. (2003). Concepts and Definitions of CSR and Corporate Sustainability: Between Agency and Communion. *Journal of Business Ethics, 44*(2/3), 95-105.
Maurer, J. G. (1971). *Readings in organization theory: Open-system approaches*: Random House (NY).
McGahan, A. M., & Porter, M. E. (1997). How Much Does Industry Matter, Really? *Strategic Management Journal, 18*, 15-30.
McGregor, S. L. T., & Murnane, J. A. (2010). Paradigm, methodology and method: intellectual integrity in consumer scholarship. *International journal of consumer studies, 34*(4), 419-427. doi: 10.1111/j.1470-6431.2010.00883.x
Meadows, D. H., Meadows, D. L., Randers, J., & III, B. (1972). *The Limits to Growth*. London: Universe Books.
Meyer, J. W., & Rowan, B. (1977). Institutionalized Organizations: Formal Structure as Myth and Ceremony. *The American journal of sociology, 83*(2), 340-363. doi: 10.1086/226550
Meyer, J. W., & Scott, W. R. (1983). Centralization and the legitimacy problems of local government. In J. W. Meyer (Ed.), *Organizational environments: Ritual and rationality* (pp. 199-215). Beverly Hills, CA: Sage
Meyer, J. W., & Scott, W. R. (1983). *Organizational environments : ritual and rationality*. Beverly Hills, Calif: Sage.
Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis : an expanded sourcebook* (2nd ed. ed.). Thousand Oaks, Calif: Sage.

Miles, M. B., Huberman, M. A., & Saldana, J. (1994). Qualitative data analysis (pp. 267). Thousand Oaks, CA: Sage Publications

Ministry of Climate and Environment. (2020). Norway steps up 2030 climate goal to at least 50 % towards 55 %. Retrieved 19 July 2020, from https://www.regjeringen.no/en/aktuelt/norge-forsterker-klimamalet-for-2030-til-minst-50-prosent-og-opp-mot-55-prosent/id2689679/

Moffatt, I. (1996). *Sustainable Development: Principles, analysis and policies*. London: Parthenon.

Molcho, G., & Shpitalni, M. (2006). A business-oriented approach to the product life cycle *Innovation in Life Cycle Engineering and Sustainable Development* (1st ed. 2006. ed.). Dordrecht: Springer Netherlands : Imprint: Springer

Moldavska, A. (2017). Defining Organizational Context for Corporate Sustainability Assessment: Cross-Disciplinary Approach. *Sustainability, 9*(12), 2365.

Molina-Azorín, J. F. (2014). Microfoundations of strategic management: Toward micro–macro research in the resource-based theory. *BRQ Business Research Quarterly, 17*(2), 102-114.

Mores, G. d. V., Finocchio, C. P. S., Barichello, R., & Pedrozo, E. A. (2018). Sustainability and innovation in the Brazilian supply chain of green plastic. *Journal of Cleaner Production, 177*, 12-18. doi: https://doi.org/10.1016/j.jclepro.2017.12.138

Morris, T., & Wood, S. (1991). Testing the Survey Method: Continuity and Change in British Industrial Relations. *Work Employment & Society, 5*(2), 259-282. doi: 10.1177/0950017091005002007

Morse, J. M. (2000). Determining Sample Size. *Qualitative Health Research, 10*(1), 3-5. doi: 10.1177/104973200129118183

Mousavi, S., & Bossink, B. A. G. (2017). Firms' capabilities for sustainable innovation: The case of biofuel for aviation. *Journal of Cleaner Production, 167*, 1263-1275. doi: https://doi.org/10.1016/j.jclepro.2017.07.146

Munir, K. A. (2002). Being Different: How Normative and Cognitive Aspects of Institutional Environments Influence Technology Transfer. *Human Relations, 55*(12), 1403-1428. doi: 10.1177/001872602128782204

Mäkitie, T. (2020). Corporate entrepreneurship and sustainability transitions: resource redeployment of oil and gas industry firms in floating wind power. *Technology Analysis & Strategic Management, 32*(4), 474-488. doi: 10.1080/09537325.2019.1668553

Mäkitie, T., Andersen, A. D., Hanson, J., Normann, H. E., & Thune, T. M. (2018). Established sectors expediting clean technology industries? The Norwegian oil and gas sector's influence on offshore wind power. *Journal of cleaner production, 177*, 813-823. doi: 10.1016/j.jclepro.2017.12.209

NESH. (2016). *Forskningsetiske retningslinjer for samfunnsvitenskap, humaniora, juss og teologi* Retrieved from https://www.etikkom.no/globalassets/documents/publikasjoner-som-pdf/60125_fek_retningslinjer_nesh_digital.pdf

Neumayer, E. (2003). *Weak versus strong sustainability : exploring the limits of two opposing paradigms* (2nd ed.). Cheltenham: Edward Elgar.

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. *Strat. Mgmt. J, 28*(2), 121-146. doi: 10.1002/smj.573

Norges Bank Investment Management (NBIM). (2019). About the fund. Retrieved 14 December 2021, from https://www.nbim.no/en/the-fund/about-the-fund/

Norwegian Ministry of Climate and Environment (KLD). (2014). Norway's Sixth National communication, Under the Framework Convention on Climate change Retrieved from https://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6_nor_resubmission.pdf
Norwegian Ministry of Climate and Environment (KLD). (2019). Norway's National Plan related to the Decision of the EEA Joint Committee Retrieved from https://www.regjeringen.no/contentassets/4e0b25a4c30140cfb14a40f54e7622c8/national-plan-2030_version19_desember.pdf
NRK. (2021). Regjeringen foreslår store endringer for olje- og gassvirksomheten. 1 Desember 2021, from https://www.nrk.no/norge/regjeringen-foreslar-store-endringer-for-olje--og-gassvirksomheten-1.15631525
OECD. (2018). The Measurement of Scientific, Technological and Innovation Activities. Oslo Manual 2018 Guidelines for Collecting, Reporting and Using Data on Innovation Retrieved from https://www.oecd-ilibrary.org/docserver/9789264304604-en.pdf?expires=1600685105&id=id&accname=guest&checksum=C28568091F97C4047CBD0458626B32C0
Oftedal, E. M. (2008). *Legitimacy for creative destruction : a structure-agent perspective of entrepreneurship.* (no. 18-2008), Handelshøgskolen i Bodø, Bodø.
Oftedal, E. M., Iakovleva, T. A., & Foss, L. (2018). University context matter: An institutional perspective on entrepreneurial intentions of students. *Education + Training, 60*(7/8), 873-890. doi: doi:10.1108/ET-06-2016-0098
Oliver, C. (1991). Strategic Responses to Institutional Processes. *The Academy of Management review, 16*(1), 145-179. doi: 10.2307/258610
Palazzo, G., & Scherer, A. G. (2006). Corporate Legitimacy as Deliberation: A Communicative Framework. *Journal of Business Ethics, 66*(1), 71-88. doi: 10.1007/s10551-006-9044-2
Parsons, T. (1956). SUGGESTIONS FOR A SOCIOLOGICAL APPROACH TO THE THEORY OF ORGANIZATIONS. *Administrative science quarterly, 1*(1), 63-85.
Parsons, T. (1960). Structure and Process in Modern Societies. *American Journal of Sociology, 66*(1). doi: https://doi.org/10.1086/222828
Pashaeizad, H. (2009). A glance at the characteristics of mixed methods and importance of its applications in LIS researches. In A. Katsirikou & C. H. Skiadas (Eds.), *Qualitative and quantitative methods in libraries* (pp. 6-19). Singapore, China: World Scientific.
Patala, S., Korpivaara, I., Jalkala, A., Kuitunen, A., & Soppe, B. (2019). Legitimacy Under Institutional Change: How incumbents appropriate clean rhetoric for dirty technologies. *Organization Studies, 40*(3), 395-419. doi: 10.1177/0170840617736938
Patton, M. Q. (2002). *Qualitative research & evaluation methods*. California: Sage,Thousand Oaks.
Pellicer, S., Santa, G., Bleda, A. L., Maestre, R., Jara, A. J., & Skarmeta, A. G. (2013, 3-5 July 2013). *A Global Perspective of Smart Cities: A Survey.* Paper presented at the 2013 Seventh International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing.
Peng, M. W. (2002). Towards an institution-based view of business strategy. *Asia Pacific Journal of Management, 19*(2), 251-267.
Peng, M. W., Sun, S. L., Pinkham, B., & Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. *Academy of management perspectives, 23*(3), 63-81.
Peng, Y., Li, J., & Yi, J. (2019). International Oil Companies' Low-Carbon Strategies: Confronting the Challenges and Opportunities of Global Energy Transition. *IOP Conference Series: Earth and Environmental Science, 237*. doi: https://iopscience.iop.org/article/10.1088/1755-1315/237/4/042038

Petkova, A. P. (2016). Standing Out or Blending In? The Formation of New Firms' Legitimacy and Reputation under Different Levels of Market Uncertainty. *Corporate Reputation Review, 19*(1), 22-34. doi: 10.1057/crr.2015.24
Pfeffer, J. (1981). Management as symbolic action: The creation and maintenance of organizational paradigms. *Research in organizational behavior, 13*, 1-52.
Pfeffer, J., & Salancik, G. R. (1978). *The External Control of Organizations: A Resource Dependence Perspective.* New York: Harper & Row.
Pfeiffer, E. (1947). *Soil Fertility - Renewal and Preservation (Biodynamic Farming and Gardening)*: Lanthorn Press, Sussex, UK, Introduction by Lady Eve Balfour.
Plec, E., & Pettenger, M. (2012). Greenwashing Consumption: The Didactic Framing of ExxonMobil's Energy Solutions. *Environmental Communication, 6*(4), 459-476. doi: 10.1080/17524032.2012.720270
Porter, M. (1980). *Competitive strategy : techniques for analyzing industries and competitors*. New York: Free Press.
Porter, M. E., & Kramer, M. R. (2011). The Big Idea: Creating Shared Value. *Harvard Business Review*, 62-77.
Powell, T. C., Lovallo, D., & Fox, C. R. (2011). Behavioral strategy. *Strategic Management Journal, 32*(13), 1369-1386.
Powell, W. W., & Dimaggio, P. J. (1991). Introduction. In W. W. Powell & P. J. Dimaggio (Eds.), *The New Institutionalism in Organizational Analysis*: Chicago: University of Chicago Press
Pratt, M. G. (2009). FOR THE LACK OF A BOILERPLATE: TIPS ON WRITING UP (AND REVIEWING) QUALITATIVE RESEARCH. *Academy of Management journal, 52*(5), 856-862. doi: 10.5465/AMJ.2009.44632557
Pyrko, I., Dörfler, V., & Eden, C. (2017). Thinking together: What makes Communities of Practice work? *Hum Relat, 70*(4), 389-409. doi: 10.1177/0018726716661040
Qin, Y., Tong, F., Yang, G., & Mauzerall, D. L. (2018). Challenges of using natural gas as a carbon mitigation option in China. *Energy Policy, 117*, 457-462. doi: https://doi.org/10.1016/j.enpol.2018.03.004
Ramirez, D., & Nguyen, T. H. (2010). Appendix 3: Questionnaire on sustainable project procurement management practices in Oil & Gas projects. *The Integration of Corporate Social Responsibility (environmental aspect) into Project Procurement Management; A Study of the Oil & Gas Industry.* Retrieved 18 February 2015, from http://www.diva-portal.org/smash/get/diva2:399359/fulltext02
Ramus, C. A., & Steger, U. (2000). The Roles of Supervisory Support Behaviors and Environmental Policy in Employee "Ecoinitiatives" at Leading-Edge European Companies. *The Academy of Management Journal, 43*(4), 605-626.
Rao, P. (2002). Greening the supply chain: a new initiative in South East Asia. *International journal of operations & production management, 22*(6), 632-655. doi: 10.1108/01443570210427668
Raub, W., Buskens, V., & Van Assen, M. A. L. M. (2011). Micro-Macro Links and Microfoundations in Sociology. *The Journal of mathematical sociology, 35*(1-3), 1-25. doi: 10.1080/0022250X.2010.532263
Raven, R., & Verbong, G. (2007). Multi-Regime Interactions in the Dutch Energy Sector: The Case of Combined Heat and Power Technologies in the Netherlands 1970–2000. *Technology Analysis & Strategic Management, 19*(4), 491-507. doi: 10.1080/09537320701403441
Reay, T., Golden-Biddle, K., & Germann, K. (2006). Legitimizing a New Role: Small Wins and Microprocesses of Change. *Academy of Management journal, 49*(5), 977-998. doi: 10.5465/AMJ.2006.22798178

Regjeringen. (2022). Statens direkte eierskap i selskaper — Bærekraftig verdiskaping. Retrieved 28 January 2022, from https://www.regjeringen.no/no/dokumenter/meld.-st.-8-20192020/id2678758/?ch=4
Robson, C. (2002). *Real world research : a resource for social scientists and practitioner-researchers* (2nd ed. ed.). Oxford: Blackwell.
Roehrich, J. K., Hoejmose, S. U., & Overland, V. (2017). Driving green supply chain management performance through supplier selection and value internalisation. *International journal of operations & production management, 37*(4), 489-509. doi: 10.1108/IJOPM-09-2015-0566
Roman, A. V. (2017). Institutionalizing sustainability: A structural equation model of sustainable procurement in US public agencies. *Journal of Cleaner Production, 143*, 1048-1059. doi: https://doi.org/10.1016/j.jclepro.2016.12.014
Ronan, D. (2009). Appendix 2 Innovation Audit Questionnaire. *A study of innovation measurement and innovation management at Irish medical device SME's.* Retrieved 16 October 2015, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.876.8127&rep=rep1&type=pdf
Rorty, R. (1994). *Philosophy and the mirror of nature*: Oxford: Blackwell.
Rorty, R. (1998). *Philosophical papers : Vol. 3 : Truth and progress* (Vol. Vol. 3). Cambridge: Cambridge University Press.
Rotmans, J., Kemp, R., & van Asselt, M. (2001). More evolution than revolution: transition management in public policy. *Foresight, 3*(1), 15-31. doi: 10.1108/14636680110803003
Ruef, M., & Scott, W. R. (1998). A Multidimensional Model of Organizational Legitimacy: Hospital Survival in Changing Institutional Environments. *Administrative science quarterly, 43*(4), 877-904. doi: 10.2307/2393619
Rumelt, R. P. (1991). How much does industry matter? *Strat. Mgmt. J, 12*(3), 167-185. doi: 10.1002/smj.4250120302
Rumelt, R. P., Schendel, D., & Teece, D. J. (1991). Strategic management and economics. *Strategic management journal, 12*(S2), 5-29.
Rumelt, R. P., Schendel, D., & Teece, D. J. (1994). *Fundamental issues in strategy : a research agenda*. Boston, Mass: Harvard Business School Press.
Rusinko, C. A. (2010). Integrating Sustainability in Management and Business Education: A Matrix Approach. *Academy of Management Learning & Education, 9*(3), 507-519. doi: doi.org/10.5465/amle.9.3.zqr507
Rutzou, T., & Steinmetz, G. (2018). *Critical Realism, History, and Philosophy in the Social Sciences*. Bingley: Bingley: Emerald Publishing Limited.
Ryan, P. (2015). Positivism: paradigm or culture? *Policy Studies, 36*(4), 417-433. doi: 10.1080/01442872.2015.1073246
Sancha, C., Gimenez, C., & Sierra, V. (2016). Achieving a socially responsible supply chain through assessment and collaboration. *Journal of Cleaner Production, 112*, 1934-1947. doi: https://doi.org/10.1016/j.jclepro.2015.04.137
Sandhawalia, B. S., & Dalcher, D. (2015). Dynamic Knowledge Support Model for Decision-Making and Sustainable Growth: An Empirical Study. *Group Decision and Negotiation, 24*(5), 803-823. doi: 10.1007/s10726-014-9413-7
Sapir, A. (2020). Contested internal legitimacy: the emergence of organized academic entrepreneurship. *Journal of management history (2006), 26*(1), 1-18. doi: 10.1108/JMH-11-2018-0063

Sarasini, S., & Linder, M. (2018). Integrating a business model perspective into transition theory: The example of new mobility services. *Environmental innovation and societal transitions, 27*(3), 16-31. doi: 10.1016/j.eist.2017.09.004
Saunders, M. (2012). Choosing research participants. In G. Symons & C. Cassell (Eds.), *The Practice of Qualitative Organizational Research: Core Methods and Current Challenges* (pp. 37-55). London SAge
Saunders, M., & Lewis, P. (2012). *Research methods for business students* (6th ed.). Harlow: Pearson.
Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed.): Essex: Pearson Education.
Sayer, A. (1992). *Method in Social Science: A Realist Approach*: London: Routledge.
Schaltegger, S., & Burritt, R. (2005). In H. Folmer & T. Tietenberg (Eds.), *The International Yearbook of Environmental and Resource Economics 2005/2006. A Survey of Current Issues.* (pp. 185-222): Cheltenham: Edward Elgar
Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation & Sustainable Development, 6*(2), 95-119.
Schaltegger, S., & Wagner, M. (2006a). Managing Sustainability Performance Measurement and Reporting in an Integrated Manner. Sustainability Accounting as the Link between the Sustainability Balanced Scorecard and Sustainability Reporting. In S. Schaltegger, M. Bennett & R. Burritt (Eds.), *Sustainability Accounting and Reporting* (pp. 681-697). Dordrecht: Springer Netherlands
Schaltegger, S., & Wagner, M. (2006b). *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance* (1 ed.). Saltaire: Saltaire: Routledge.
Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Bus. Strat. Env, 20*(4), 222-237. doi: 10.1002/bse.682
Schiederig, T., Tietze, F., & Herstatt, C. (2012). Green innovation in technology and innovation management - an exploratory literature review. *R&D Manage, 42*(2), 180-192. doi: 10.1111/j.1467-9310.2011.00672.x
Schmalensee, R. (1985). Do Markets Differ Much? *The American Economic Review, 75*(3), 341-351.
Schot, J., Kanger, L., & Verbong, G. (2016). The roles of users in shaping transitions to new energy systems. *Nature Energy, 1*, 16054. doi: 10.1038/nenergy.2016.54
Schrettle, S., Hinz, A., Scherrer-Rathje, M., & Friedli, T. (2014). Turning sustainability into action: Explaining firms' sustainability efforts and their impact on firm performance. *Int. J. Prod. Econ., 147*(PART A), 73-84. doi: 10.1016/j.ijpe.2013.02.030
Schumpeter, J. A. (1939). *Business cycles: a theoretical, historical, and statistical analysis of the capitalist process*. New York: McGraw-Hill.
Scott, M. (2018). Oil Majors Have Started Their Low-carbon Journey, But Progress is Painfully Slow. Retrieved 14 July 2020, from https://www.forbes.com/sites/mikescott/2018/11/14/oil-majors-have-started-their-low-carbon-journey-but-progress-is-painfully-slow/#48773ee44209
Scott, W. R. (1991). Unpacking institutional arguments. In P. J. DiMaggio & W. W. Powell (Eds.), *The New institutionalism in organizational analysis* (pp. 164-182). Chicago: University of Chicago Press
Scott, W. R. (1995a). *Institutions and organizations*. Thousand Oaks, Calif.: Sage.
Scott, W. R. (1995b). Institutions and Organizations. Ideas, Interests and Identities. *M@n@gement, 17*(2), 136. doi: 10.3917/mana.172.0136

Scott, W. R. (2001). *Institutions and Organizations* (2nd ed.). Thousand Oaks, CA: Sage.
Scott, W. R. (2003). *Organizations : rational, natural, and open systems* (5th ed.). Upper Saddle River, N.J: Prentice Hall Pearson Education International.
Scott, W. R. (2014). *Institutions and Organizations: Ideas, Interests, and Identities* (4th ed. ed.). Thousand Oaks, CA, USA: Sage.
Selznick, P. (1957). *Leadership in Administration*. New York: Harper & Row.
Selznick, P. (1992). *The moral commonwealth : social theory and the promise of community*. Berkeley, Calif: University of California Press.
Seyedesmaeil, M., Bart, B., & Mario van, V. (2014). Knowledge capabilities for sustainable innovation: a systematic review (pp. 1). Manchester: Manchester: The International Society for Professional Innovation Management (ISPIM).
Shanks, G. (2002). Guidelines for Conducting Positivist Case Study Research in Information Systems. *AJIS : Australian journal of information systems, 10*(1). doi: 10.3127/ajis.v10i1.448
Smink, M. M. (2015). Incumbents and institutions in sustainability transitions. (Doctoral dissertation, Utrecht University).
Späth, P., Rohracher, H., & Radecki, A. v. (2016). Incumbent actors as niche agents: The german car industry and the taming of the "Stuttgart E-Mobility Region". doi: 10.3390/su8030252
Stanikis, J. K. (2012). Sustainable consumption and production: how to make it possible. *Clean technologies and environmental policy, 14*(6), 1015-1022. doi: 10.1007/s10098-012-0535-9
Steen, M., & Weaver, T. (2017). Incumbents' diversification and cross-sectorial energy industry dynamics. *Research Policy, 46*(6), 1071-1086. doi: https://doi.org/10.1016/j.respol.2017.04.001
Steurer, R., Langer, M. E., Konrad, A., & Martinuzzi, A. (2005). Corporations, Stakeholders and Sustainable Development I: A Theoretical Exploration of Business-Society Relations. *Journal of business ethics, 61*(3), 263-281. doi: 10.1007/s10551-005-7054-0
Stubbs, W., & Cocklin, C. (2008). Conceptualizing a "Sustainability Business Model". *Organization & Environment, 21*(2), 103-127. doi: 10.1177/1086026608318042
Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *Academy of Management Review, 20*(3), 571-610. doi: 10.2307/258788
Suddaby, R. (2010). Challenges for Institutional Theory. *Journal of Management Inquiry, 19*(1), 14-20. doi: 10.1177/1056492609347564
Suddaby, R., Bruton, G. D., & Si, S. X. (2015). Entrepreneurship through a qualitative lens: Insights on the construction and/or discovery of entrepreneurial opportunity. *Journal of Business Venturing, 30*(1), 1-10. doi: https://doi.org/10.1016/j.jbusvent.2014.09.003
Taherdangkoo, M., Ghasemi, K., & Beikpour, M. (2017). The role of sustainability environment in export marketing strategy and performance: a literature review. *Environment, Development and Sustainability, 19*(5), 1601-1629. doi: 10.1007/s10668-016-9841-4
Tapera, J. (2014). The Importance of Strategic Management to Business Organizations. *Volume: 03*, 122-131.
Terlaak, A., & Gong, Y. (2008). VICARIOUS LEARNING AND INFERENTIAL ACCURACY IN ADOPTION PROCESSES. *Acad. Manage. Rev., 33*(4), 846-868. doi: 10.5465/AMR.2008.34421979
Thanh, N. C., & Thanh, T. T. L. (2015). The Interconnection between Interpretivist Paradigm and Qualitative Methods in Education. *American Journal of Educational Science, 1*(2), 7-24.

The United Nations Indastrial Development Organization (UNIDO). (2006). CSR Questionnaire for companies. Retrieved 18 February 2015

Thomas, T., & Lamm, E. (2012). Legitimacy and Organizational Sustainability. *Journal of Business Ethics, 110*(2), 191-203. doi: 10.1007/s10551-012-1421-4

Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective : a new approach to culture, structure, and process*. Oxford: Oxford University Press.

Tolbert, P., & Zucker, L. (1983). Institutional Sources of Change in the Formal Structure of Organizations: The Diffusion of Civil Service Reform, 1880-1935. *Administrative Science Quarterly, 28*(1), 22.

Tost, L. P. (2011). AN INTEGRATIVE MODEL OF LEGITIMACY JUDGMENTS. *The Academy of Management review, 36*(4), 686-710. doi: 10.5465/amr.2010.0227

Truong, Y., Mazloomi, H., & Berrone, P. (2021). Understanding the impact of symbolic and substantive environmental actions on organizational reputation. *Industrial marketing management, 92*, 307-320. doi: 10.1016/j.indmarman.2020.05.006

Turner, J. (1992). The promise of positivism. In S. Seidman & D. G. Wagner (Eds.), *Postmodernism and social theory : the debate over general theory* (pp. 156-178). Cambridge, Mass: Blackwell

Turnheim, B., & Sovacool, B. K. (2020). Forever stuck in old ways? Pluralising incumbencies in sustainability transitions. *Environmental Innovation and Societal Transitions, 35*, 180-184. doi: https://doi.org/10.1016/j.eist.2019.10.012

Tushman, M. L., & O'Reilly, C. A. (2002). *Winning through innovation : a practical guide to leading organizational change and renewal*. Boston, Mass: Harvard Business School Press.

UN. (2017). Investing in the future we want. Economic growth, partnerships, reducing inequality. Retrieved 11.04.2018, from https://www.un.org/sustainabledevelopment/

UN (United Nations). (1987). Our Common Future: Report of the World Commission on Environment and Development. Retrieved from https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

UN Climate Change. (2021). What is the United Nations Framework Convention on Climate Change? Retrieved 16 February 2021, from https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

UNESCO. (2019). Resources for Educators - Responsible Consumption and Production. Retrieved 28 April 2020, from https://en.unesco.org/themes/education/sdgs/material/12

United States Environmental Protection Agency. (2019). Climate Change Terms. 27 April 2020, from https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=Glossary%20Climate%20Change%20Terms&filterTerm=recycling%20&checkedAcronym=false&checkedTerm=false&hasDefinitions=false&filterTerm=recycling%20&filterMatchCriteria=Contains

Vallance, S., Perkins, H. C., Bowring, J., & Dixon, J. E. (2012). Almost Invisible: Glimpsing the City and its Residents in the Urban Sustainability Discourse. *Urban Studies, 49*(8), 1695-1710. doi: 10.1177/0042098011417903

Van De Poel, I. (2000). On the role of outsiders in technical development. *Technology Analysis & Strategic Management, 12*(3), 383-397.

Van De Ven, A. H., & Poole, M. S. (2002). *Field research methods*. In: Baum, J.A.C. (Ed.) , Companion to Organizations. Blackwell, Oxford, pp. 867-888.

Vanolo, A. (2014). Smartmentality: The Smart City as Disciplinary Strategy. *51*(5), 883-898. doi: 10.1177/0042098013494427
Verburg, R. M., & Wiegel, V. (1997). On the compatibility of sustainability and economic growth. *Environmental ethics, 19*(3), 247-265. doi: 10.5840/enviroethics199719314
Von Schomberg, R. (2013). A Vision of Responsible Research and Innovation. In R. Owen, J. Bessant & M. Heintz (Eds.), *Responsible innovation : Managing the responsible emergence of science and innovation in society* (pp. 51-74). Chichester, UK: Chichester, UK: John Wiley & Sons, Ltd
Waddock, S., & McIntosh, M. (2009). Beyond Corporate Responsibility: Implications for Management Development. *Business and Society Review, 114*(3), 295-325. doi: 10.1111/j.1467-8594.2009.00344.x
Wang, J., & Wang, X. (2012). *Structural Equation Modeling: Applications Using Mplus* (3. Aufl. ed.). Somerset: Somerset: Wiley.
Warde, P. (2011). The invention of sustainability. *Modern Intellectual History, 8*(1), 153-170.
Weber, M. (1946). Class, status, party. In M. Weber, H. H. Gerth & C. W. Mills (Eds.), *From Max Weber : essays in sociology* (pp. 95-180). New York: Oxford University Press
Weijters, B., Cabooter, E., & Schillewaert, N. (2010). The effect of rating scale format on response styles: The number of response categories and response category labels. *International Journal of Research in Marketing, 27*(3), 236-247. doi: https://doi.org/10.1016/j.ijresmar.2010.02.004
Werbach, A. (2009). *Strategy for sustainability: a business manifesto.* : Harvard Business, Boston, MA.
Wernerfelt, B. (1984). A resource-based view of the firm. *Strat. Mgmt. J, 5*(2), 171-180. doi: 10.1002/smj.4250050207
Wernick, I. K., Herman, R., Govind, S., & Ausubel, J. H. (1996). Materialization and Dematerialization: Measures and Trends. *Daedalus, 125*(3), 171-198.
Wesseling, J. H., Niesten, E. M. M. I., Faber, J., & Hekkert, M. P. (2015). Business Strategies of Incumbents in the Market for Electric Vehicles: Opportunities and Incentives for Sustainable Innovation: Business Strategies of Incumbents in the Market for Electric Vehicles. *Business strategy and the environment, 24*(6), 518-531. doi: 10.1002/bse.1834
Williams, A., Kennedy, S., Philipp, F., & Whiteman, G. (2017). Systems thinking: A review of sustainability management research. *Journal of Cleaner Production, 148*, 866-881. doi: https://doi.org/10.1016/j.jclepro.2017.02.002
World Business Council for Sustainable Development (WBCSD). (2002). The Business Case for Sustainable Development: Making a Difference towards the Earth Summit 2002 and Beyond. *Corporate Environmental Strategy, 9*(3), 226-235. doi: https://doi.org/10.1016/S1066-7938(02)00071-4
World Energy Council. (2019). Day 1 - New Visions of Energy for Prosperity. Retrieved 07 October 2020, from https://www.worldenergy.org/experiences-events/world-energy-congress/24th-world-energy-congress-energy-for-prosperity/day-1-new-visions-of-energy-for-prosperity
Yanarella, E. J., & Bartilow, H. (2000). Beyond environmental moralism and policy incrementalism in the global sustainability debate: case studies and an alternative framework. *Sust. Dev, 8*(3), 123-134. doi: 10.1002/1099-1719(200008)8:3<123::AID-SD137>3.0.CO2-S
Yigitcanlar, T., Kamruzzaman, M., Buys, L., Ioppolo, G., Sabatini-Marques, J., da Costa, E. M., & Yun, J. J. (2018). Understanding 'smart cities': Intertwining development drivers with desired outcomes in a multidimensional framework. *Cities, 81*, 145-160. doi: https://doi.org/10.1016/j.cities.2018.04.003

Yin, R. K. (1994). *Case study research : design and methods* (2nd ed. ed. Vol. vol. 5). Thousand Oaks, Calif: Sage.
Yin, R. K. (2003). Case study research : design and methods *Applied social research methods series* (3rd ed. ed., Vol. 5, pp. 38-44). Thousand Oaks, Calif: Sage
Yin, R. K. (2014a). *Case study research : design and methods* (5th ed. ed.). Los Angeles, Calif: SAGE.
Yin, R. K. (2014b). Collecting Case Study Evidence: The Principle You Should Follow in Working with Six Sources of Evidence *Case Study Research : Design and Methods* (5th ed., pp. 103-130). Los Angeles, Calif: SAGE
Yin, R. K. (2014c). Designing Case Studies: Identifying Your Case(s) and Establishing the Logic of Your Case Study *Case Study Research : Design and Methods* (5th ed., pp. 27-69). Los Angeles, Calif: SAGE
Yin, R. K. (2014d). Getting started: How to Know Whether and When to Use the Case Study as a Research Method *Case Study Research : Design and Methods* (5th ed., pp. 3-25). Los Angeles, Calif: SAGE
Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology, 9*(2), 79-94.
Yoon, Y., Gürhan-Canli, Z., & Schwarz, N. (2006). The Effect of Corporate Social Responsibility (CSR) Activities on Companies With Bad Reputations. *Journal of Consumer Psychology, 16*(4), 377-390. doi: https://doi.org/10.1207/s15327663jcp1604_9
Yusuf, Y. Y., Gunasekaran, A., Musa, A., El-Berishy, N. M., Abubakar, T., & Ambursa, H. M. (2013). The UK oil and gas supply chains: An empirical analysis of adoption of sustainable measures and performance outcomes. *International Journal of Production Economics, 146*(2), 501-514. doi: https://doi.org/10.1016/j.ijpe.2012.09.021
Yüncü, V. (2020). Organizational legitimacy: evaluating the conceptual landscape of a multidimensional phenomenon. *Afyon Kocatepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi 22*(1), 101-114 doi: 10.33707/akuiibfd.686095
Zahraie, B., Everett, A. M., Walton, S., & Kirkwood, J. (2016). Environmental entrepreneurs facilitating change toward sustainability: a case study of the wine industry in New Zealand. *Small enterprise research, 23*(1), 39-57. doi: 10.1080/13215906.2016.1188717
Zhang, J., Xie, H., Schmidt, K., & Li, H. (2016). A New Systematic Approach to Vulnerability Assessment of Innovation Capability of Construction Enterprises. *Sustainability, 8*(1), 17.
Zhang, K., Pan, Z., Janardhanan, M., & Patel, I. (2022). Relationship analysis between greenwashing and environmental performance. *Environment, Development and Sustainability*. doi: 10.1007/s10668-022-02381-9
Zhang, Y., & Wildemuth, B. M. (2009). In Applications of Social Research Methods to Questions in Information and Library Science. In B. Wildemuth (Ed.), *Qualitative analysis of content* (pp. 308-319): Libraries Unlimited
Zhao, E. Y., Fisher, G., Lounsbury, M., & Miller, D. (2017). Optimal distinctiveness: Broadening the interface between institutional theory and strategic management: Optimal Distinctiveness. *Strategic management journal, 38*(1), 93-113. doi: 10.1002/smj.2589
Zhao, E. Y., Ishihara, M., & Lounsbury, M. (2013). Overcoming the Illegitimacy Discount: Cultural Entrepreneurship in the US Feature Film Industry. *Organization studies, 34*(12), 1747-1776. doi: 10.1177/0170840613485844

Zhou, H., Shou, Y., Zhai, X., Li, L., Wood, C., & Wu, X. (2014). Supply chain practice and information quality: A supply chain strategy study. *International Journal of Production Economics, 147*, 624-633. doi: https://doi.org/10.1016/j.ijpe.2013.08.025

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of operations management, 22*(3), 265-289. doi: 10.1016/j.jom.2004.01.005

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International journal of operations & production management, 25*(5), 449-468. doi: 10.1108/01443570510593148

Zimmerman, M. A., & Zeitz, G. J. (2002). Beyond Survival: Achieving New Venture Growth by Building Legitimacy. *The Academy of Management Review, 27*(3), 414-431. doi: 10.2307/4134387

Zucker, L. G. (1977). The Role of Institutionalization in Cultural Persistence. *American sociological review, 42*(5), 726-743. doi: 10.2307/2094862

Åmo, B. W., Bullvåg, E., & Oftedal, E. M. (2006). The influence from the organizational climate on employee innovation behavior. *Front. Entrep. Res.*

Aarseth, W., Ahola, T., Aaltonen, K., Økland, A., & Andersen, B. (2017). Project sustainability strategies: A systematic literature review. *International Journal of Project Management, 35*(6), 1071-1083. doi: https://doi.org/10.1016/j.ijproman.2016.11.006

Appendix

Appendix A. Overview of interviewees

Interviewee	Interviewee's position	Date of interview
1	Senior consultant and sustainability	2014
2	Project manager	2014
3	Engineer - Research and development	2014
4	Engineer - Research and development	2014
5	Strategy and innovation manager	2015
6	Head of innovation special projects	2015
7	Head of corporate strategy development	2015
8	Former chief economist	2015
9	Responsible for wind operations	2016
10	Leading analyst and carbon capture storage economist	2016
11	Senior vice president	2016
12	Head of wind assets management	2016
13	Special consultant for exploration activities	2017
14	Special adviser	2017
15	Principal engineer – mapping department	2017

Appendix B. Interview guide

Legitimacy	Questions
Moral Legitimacy	• How could renewable energy count as a business case for engaging in environmental solutions? • What kind of support do you have from Statoil to develop renewable energy projects? And what kind of benefits do Statoil and society gain from engaging in renewable energy cases? (Tips: reduced costs, improve resources efficiency, reduce risk, legal liability, enhance reputation, improve brand image, other factors?) • Public policy makers adopt regulations and incentives that reward companies for operating sustainable activities such as enactment of subsidies, and reduce taxes, etc. Why do you think Statoil developed renewable energy cases? Do you believe that they engage in renewable energy cases to achieve such rewards? • How can renewable energy activities benefit Statoil as an oil and gas company, and how this can benefit the society? • Why did renewable energy projects become part of Statoil strategies? • How do you convince managers/leaders who do not believe in renewable energy? How do you satisfy different audiences?
Pragmatic Legitimacy	• What do you think about involving employees in the new sustainable cases? How would this affect Statoil's activities? Or why could this be important for Statoil? • What kind of competence (employee background, managerial competence/charisma) do you have in sustainability/renewable energy? And how would this gain social acceptance? • Do you think engaging in renewable energy practises is a right decision to make now? Why? • How would you describe Statoil concerns on climate risks for Statoil's business?
Cognitive Legitimacy	• How do you think leaders and government view renewable energy activities in Statoil? Do you think they support the involvement of renewable projects as a right decision to make? • How did you find working in renewable energy projects and making decisions compared to oil and gas for example (degree of difficulty in dealing with renewable energy projects)? • Do you believe engaging in renewable energy activities helps streamline decision-making in the long run? How? • How could renewable energy cases be a potential source of competitive advantage? • How do renewable energy projects influence Statoil's image?

Appendix C. Survey used in the quantitative studies

1. Welcome to My Survey

Thank you for participating in our survey. Your feedback is important.

2. Introductory Questions

* 1. In your opinion, which methods would be the most effective in helping Statoil to become more sustainable in relation to the climate and environment?
Please rate each option on a scale of 1 (Not effective) to 7 (Extremely effective).

Investment decision	Not at all effective			Neutral			Extremely effective
Invest in more efficient oil & gas solutions	○	○	○	○	○	○	○
Invest in Renewable Energy	○	○	○	○	○	○	○
Invest in business outside of the oil and gas and renewable energy sector	○	○	○	○	○	○	○

* 2. In your opinion, which of the following drivers can make the biggest impact on the sustainable development of Statoil? Please rank each option on a scale of 1 (no impact) to 10 (powerful impact)

Drivers	No impact at all			Neutral			Powerful impact
1. Customer expectations	○	○	○	○	○	○	○
2. "Green" strategy	○	○	○	○	○	○	○
3. Internal requirements	○	○	○	○	○	○	○
4. Corporate Culture	○	○	○	○	○	○	○
5. Knowledge of sustainability	○	○	○	○	○	○	○
6. Use of new technology	○	○	○	○	○	○	○
7. Development of new technology	○	○	○	○	○	○	○
8. Return on investment of "green" technology	○	○	○	○	○	○	○
9. Demand from investors	○	○	○	○	○	○	○
10. Reputation of the firm	○	○	○	○	○	○	○

* 3. In your opinion, which of the following incentives would most encourage Statoil to implement sustainable practices? Please rank each option on a scale of 1 (no effect) to 7 (powerful effect)

Incentives	Un-encouraging			Neutral			Extremely encouraging
Governmental financial incentives (taxes/subsidies)	○	○	○	○	○	○	○
New environmental laws and regulations	○	○	○	○	○	○	○
Employees' desire for more sustainable work practices	○	○	○	○	○	○	○
Influence of the competitive landscape	○	○	○	○	○	○	○
Influence from partnerships	○	○	○	○	○	○	○

3. Position

* 4. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Position	Strongly disagree			Neither agree nor disagree			Strongly agree
Statoil has a clear strategy toward offering greener alternatives	○	○	○	○	○	○	○
Renewable energy activities would open new markets to Statoil	○	○	○	○	○	○	○
Statoil is motivated to introduce new technologies related to renewable energy activities	○	○	○	○	○	○	○
Statoil views renewable energy as a source of competitive advantage	○	○	○	○	○	○	○

* 5. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Product	Strongly disagree			Neither agree nor disagree			Strongly agree
Statoil develops renewable energy products	○	○	○	○	○	○	○
Statoil has strategies to develop new renewable energy products	○	○	○	○	○	○	○
Statoil aims to support innovation in renewable energy activities	○	○	○	○	○	○	○

* 6. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Process	Strongly disagree			Neither agree nor disagree			Strongly agree
Statoil is involved in developing new sustainable solutions for oil and gas.	○	○	○	○	○	○	○
Statoil aims to support innovation toward cleaner processes in oil and gas activities	○	○	○	○	○	○	○

* 7. What are the most important decision criteria for entering a new innovative project? Please rank the following criteria on a scale from 1 (Strongly disagree) to 7 (Strongly agree).

	Innovation Selection	Strongly disagree			Neither agree nor disagree			Strongly agree
1.	The project should be within our core strategy	○	○	○	○	○	○	○
2.	It should be covered by our competence	○	○	○	○	○	○	○
3.	It should represent an interesting market	○	○	○	○	○	○	○
4.	It should serve the interest of our top manager	○	○	○	○	○	○	○
5.	It should achieve high Return On Investment (ROI)	○	○	○	○	○	○	○
6.	It should achieve a positive environmental profile	○	○	○	○	○	○	○
7.	It should achieve a positive social profile	○	○	○	○	○	○	○

4. Sustainability commitment

* 8. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

	Regulative Pillar	Strongly disagree			Neither Agree nor Disagree			Strongly agree
1.	Your management team supports renewable energy activities	○	○	○	○	○	○	○
2.	There are incentives for sustainable activities at Statoil	○	○	○	○	○	○	○
3.	Statoil has policies to enhance its sustainable development practicies.	○	○	○	○	○	○	○
4.	Your management team has clear goals to make Statoil a sustainable company.	○	○	○	○	○	○	○
5.	Top management plays an important role in making Statoil a sustainable company.	○	○	○	○	○	○	○

* 9. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Stronly agree)

	Normative pillar	Strongly disagree			Neither Agree nor Disagree			Strongly agree
1.	Employees want to contribute to a variety of sustainable projects in my unit	○	○	○	○	○	○	○
2.	Individual initiatives towards sustainability are respected in my unit	○	○	○	○	○	○	○
3.	Sustainable activities are seen as the way toward future opportunities in my unit	○	○	○	○	○	○	○
4.	Operating sustainability is a goal in my unit	○	○	○	○	○	○	○
5.	In my unit, we believe that we have a personal responsibility/commitment towards society/the environment	○	○	○	○	○	○	○

* 10. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Cognitive pillar	Strongly disagree			Neither Agree nor Disagree			Strongly agree
1. My unit has a good understanding of sustainability	○	○	○	○	○	○	○
2. My unit has a good understanding of sustainable technology	○	○	○	○	○	○	○
3. My unit builds knowledge on becoming more sustainable	○	○	○	○	○	○	○
4. My unit is always looking for additional ways to improve sustainability	○	○	○	○	○	○	○

5. Organisational shift

* 11. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Sustainable Transition	Strongly disagree			Neither Agree nor Disagree			Strongly agree
1. Statoil has established environmental targets to introduce a shift toward sustainability	○	○	○	○	○	○	○
2. Sustainability will become considerably more important to Statoil in the future	○	○	○	○	○	○	○
3. Statoil has implemented sustainability goals into their overall strategy	○	○	○	○	○	○	○
4. This is the right time for Statoil to introduce clean activities into their business practices	○	○	○	○	○	○	○

6. Transition Towards a sustainable future - Competence

* 12. Please assess the following statements on a scale from 1 (Strongly disagree) to 7 (Strongly agree)

Competence	Strongly disagree			Neither Agree nor Disagree			Strongly agree
Using available resources from oil and gas activities would increase our competence in renewable energy activities.	○	○	○	○	○	○	○
Managing oil and gas projects would help us understand the sustainable renewable energy market and turn it into business	○	○	○	○	○	○	○
Statoil is using its experience from oil and gas activities to implement renewable energy activities	○	○	○	○	○	○	○
Statoil is transferring offshore competence from oil and gas into renewable energy activities.	○	○	○	○	○	○	○
New and additional resources are crucial to addressing a sustainable shift at Statoil	○	○	○	○	○	○	○

* 13. What are the main barriers for achieving more sustainable activities in Statoil?
Please rank the following statement on a scale from 1 (Strongly disagree) to 7 (Strongly agree).

	Barriers	Strongly disagree			Neither Agree nor Disagree			Strongly agree
1.	Lack of financial funds	○	○	○	○	○	○	○
2.	Lack of competence and capabilities	○	○	○	○	○	○	○
3.	Lack of employee motivation	○	○	○	○	○	○	○
4.	Lack of technology	○	○	○	○	○	○	○
5.	Lack of support from top-management	○	○	○	○	○	○	○
6.	Lack of Return on Investment (ROI)	○	○	○	○	○	○	○
7.	Lack of perceived importance (ex. giving priority to other activities)	○	○	○	○	○	○	○

7. Background questions

14. Optional - Used for a drawing to win 4000 Norwegian Kroner !
Please enter the first letter of your first name and your family name

* 15. Gender

- ◯ Female
- ◯ Male

* 16. Age

- ◯ 25 or younger
- ◯ 26-40
- ◯ 41-55
- ◯ 56 or older

* 17. What is the highest level of education you have completed?

- ◯ High school graduate
- ◯ College
- ◯ Trade/technical/vocational training
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Doctorate Degree
- ◯ Other (please specify)

* 18. What is your educational background?

- ◯ Math and Science
- ◯ Engineering
- ◯ Economy, Business, & Administration
- ◯ IT
- ◯ Other (please specify)

* 19. Please identify the field in which you work (ex. exploration, business development, projects, operations, marketing, etc)

* 20. What is your job title?

* 21. Do you have management experience?

- ◯ Yes, with Statoil
- ◯ Yes, with another company
- ◯ No, I have no management experience

8. Background questions

* 22. How many years of experience do you have?

- ◯ 4 years or less
- ◯ 5 - 10 years
- ◯ 11- 16 years
- ◯ 17+ years

* 23. Number of years you have been working in the energy field

- ◯ 4 years or less
- ◯ 5 - 10 years
- ◯ 11 - 16 years
- ◯ 17+ years

24. Do you have any other comments, questions, or concerns?

PART II: RESEARCH PAPERS

RESEARCH PAPER 1

RESEARCH PAPER 2

sustainability

MDPI

Article

Legitimacy for Sustainability: A Case of A Strategy Change for An Oil and Gas Company

Tahrir Jaber * and Elin M. Oftedal

School of Business and Economics, UiT–The Arctic University of Norway, N-9037 Tromsø, Norway; elin.m.oftedal@uit.no

* Correspondence: tahrir.jaber@uit.no

Received: 9 November 2019; Accepted: 7 January 2020; Published: 10 January 2020

Abstract: This study introduces and validates a measure of a company's institutional profile for sustainability. It uses institutional theory as a lens to understand the factors that legitimize the adoption of renewable energy activities in an oil and gas company. The three institutional dimensions used in this study are regulative, normative and cognitive, which aimed to measure legitimacy in an oil and gas company under a sustainable change. Survey-based research was carried out among employees to test this theory. Moreover, structural equation modeling was used to test the model fit, validate the measures, and test the four hypotheses. The results showed that regulative and normative pillars play the main role in legitimating renewable energy practices in our case company. The findings provide researchers and companies with a valuable resource for exploring legitimacy in order to understand what makes companies legitimize new sustainable activities that are outside the companies' core business.

Keywords: validity; model fit; legitimacy; institutional theory; sustainability; oil and gas industry.

1. Introduction

In today's world, companies are pushed to adopt social and environmental responsibilities within their strategies and management systems [1,2]. Some companies have developed their own activities in order to produce more sustainable ones. Other companies have chosen to develop new sustainable activities and enter new markets. Thus, this approach has become a key item on the management agenda, and caused stakeholders to adjust their expectations of companies [3,4]. However, established companies require more work on developing their legitimacy when introducing new technologies [5–7].

The starting point of understanding legitimacy and the legitimation process was developed by Suchman [8], who explained "how the organization is built, how it is run, and simultaneously, how it is understood and evaluated". However, we know little about how established companies carry out sustainability in practice [9,10], how possible initiatives are engaged in [4,9], and how companies legitimate their new technologies during an institutional change [11]. Therefore, the objective of this paper was to examine the emergence of legitimacy in an established company under a sustainable change.

There is a tendency to use sustainability for symbolic purposes (to enhance reputation or build a public image), but not necessarily involve substantial changes in the organization [12]. Thus, even if sustainability is used in a company´s strategy plan and rhetoric, it still might not trickle down into the organization and might remain on the surface. This leads to a problem as companies are then judged on false premises. Another complexity of sustainable transition belongs to measuring sustainability. It is argued that measuring sustainability is seen as a challenging task since it is difficult to implement and there is no specific goal to obtain when introducing sustainability within companies [13,14]. In an attempt to examine how an established company legitimizes its new sustainable activities, a

clear definition of this concept and its key dimensions is needed. It is argued that companies must be perceived as legitimate to meet and balance the expectations of different stakeholders such as employees, suppliers, customers, investors, and society as a whole [15,16]. Thus, legitimacy is divided into two categories, internal and external. Internal legitimacy, on one hand refers to how people in companies direct the actions that would be beneficial for their companies [17]. On the other hand, external legitimacy deals with organizational fields, regulatory agencies, professional associations, and reputation [18,19].

External legitimacy has an impact on companies, triggering them to change in order to maintain good standards for the society as a whole [20]. However, pursuing clean technologies in companies requires the companies' internal resources to undergo a sustainable change because companies are responsible internally for framing their identity and shaping their strategic direction [17,21]. Thus, we believe that studying internal legitimacy in companies undergoing change is essential in order to understand the process of their legitimacy creation.

Thus, this paper builds on work done on legitimacy and creates a measure of an organization's internal legitimacy of sustainability. In the present study, we explore this topic by addressing the following research question: 'How does an established company build internal legitimacy for investment in clean technologies under conditions of institutional change'. This question is critical to our knowledge of legitimacy, and helps us understand the process of legitimating new sustainable technologies in an established company.

Institutional theory and its core pillars (regulative, normative, and cognitive) are used within the context of an established oil and gas (OG) company. However, researchers have proven that institutional theory changes in character and potency over time, and this requires more research in order to investigate the diversity of viewpoints within the domain of the boundaries of institutional theory [22].

In this study, our context is the OG sector. OG companies belong to industries that, in the common conception, are contradictive to the sustainability imperative. OG companies are included in this category where their core competence and products are finite and, by definition, not sustainable. In fact, there has long been a dilemma in the OG industry because, while oil is considered as an unsustainable business, the revenue it generates is substantially larger than any other industry [23]. However, sustainable business is given a higher reputation among civil society, but might not be given confidence in the stock markets. Thus, with its current investment shift toward renewable energy (RE), the sector presents an ideal setting for an industry under institutional change.

Agreeing that RE activities are outside the core business of OG companies requires these companies to enhance their capabilities of integrating RE knowledge and competencies outside their boundaries. Thus, a sustainable transition in this study is seen as an institutional change that is taking place in an established company and requires more work on legitimacy. We therefore contribute to existing research by employing a quantitative empirical approach and thus developing a measurement system (through a questionnaire) for how the idea of legitimacy is reviewed and measures are derived. The questionnaire is then tested, followed by the results and discussion. Finally, implications, limitations, and directions for future research are provided. However, for the theoretical background of our study, we combine insights from the literature on institutional theory which will be presented next.

2. Theoretical Aspects

The Paris Agreement establishes a global goal on a sustainable low carbon future that includes commitments from countries to cut their climate pollution [24]. The EU adopted this agreement and set up policies that aimed to reduce greenhouse gas emissions by 40% by 2030; this has forced EU countries, companies, and society at large to take action and accelerate the achievement of a sustainable low carbon future [25]. This has further forced OG companies to support the Paris Agreement and invest heavily in RE activities [26,27].

Thus, by providing a three-dimensional institutional profile, we clarify the distinct roles that the regulatory, normative, and cognitive dimensions play in an OG company; mainly, the roles that lead to the acceptance of sustainable practices in an OG company. This section provides us with an introduction to institutional theory and its evolution. It then describes the three institutional dimensions followed by Scott [28,29] and develops four hypotheses that will be empirically tested later in the study.

2.1. Legitimacy as A Catalyst for Sustainability

Ideas and innovation have been studied extensively in the literature; mainly how new ideas are diffused and interpreted in organizations [30,31]. On one hand, the explanation of how new ideas are diffused leans on the economic theory of efficiency. On the other hand, it is more closely associated with a sociological perspective and a focus on the social embeddedness of actors. The sociological perspective leans on the importance of legitimacy for adopting new ideas [32].

This shows that the adoption of the concept of sustainability can be viewed as the diffusion of a new idea. This paper develops a model of an OG company profile by applying the three institutional pillars by Scott [28], and measures the factors that lead an OG company to legitimize new sustainable activities (RE operations in our case). Accordingly, Scott's institutional context has been applied in the literature. For example, the concept of a three-dimensional country institutional profile has been used to explain how a country's government policies (constituting a regulatory dimension), widely shared social knowledge (a cognitive dimension), and value systems (a normative dimension) affect domestic business activity, as developed by Busenitz, et al. [33].

Moreover, another version was later adapted and tested concerning employees' behavior toward innovation [34]. In addition, Oftedal [35] confirmed that the institutional pillars framework measures how a certain concept such as entrepreneurship is legitimized among a specific group. This illustrates that these measurements show different types of legitimacy in different contexts. Finally, Oftedal, et al. [36] developed a new version of the institutional pillars in order to test the legitimacy of student entrepreneurship in universities. As a result, one can conclude that legitimacy has long been viewed as a catalyst for innovation diffusion [37,38], and we believe that it is well-applied in this study.

The three institutional dimensions exist independently of each other in certain societal constructs. For example, while the regulative dimension might favor one certain activity, the normative dimension might favor another. Therefore, it might be difficult to see a real sustainable change within the company despite the fact that they have improved the company's overall strategy. This is also considered as an issue in a company where resistance to a sustainable change would be a large topic in the company.

Furthermore, Suddaby [39] indicates that individuals in any institutional work play an important role in the company; however, their role is almost missing in institutional research. Thus, there is a lack of analysis on an individual's behavior, especially when the change is outside the organizational context [40]. Therefore, our study aims to contribute to institutional research by understanding how new sustainable changes are understood and accepted at the individual level (employees) of an OG company. The next section shows how we applied the theoretical concept of institutional theory to reflect upon an OG company's shift toward RE activities.

2.2. Model and Hypotheses

A company is seen as a society in miniature, which shows a culture made up of internal rules, norms, and beliefs in order to guide day to day behavior [41]. New institutionalism has developed a sociological view of institutions in order to explain why and how an institution emerges in a certain way and shapes the behavior of its employees [42]. This approach focuses on the micro level of an institution and enhances new institutional economics with political outcomes [42]. However, Scott [43] made a decisive contribution in adapting the new institutionalism by combining the regulative, normative, and cognitive processes together.

In addition, Scott [44] believes that the concept of institution and institutionalization can be defined in different ways. Scott [44] argues that some versions are much more explicit and clearer than others and include some similarity and little agreement on the definition [44]. Selznick [45] was one of the earliest and most essential versions of institutional theory, shaping organizational structure in reaction to the commitments of participants and influences from external parties. Thus, Selznick ([45], p.16) clearly views institutionalization as a "process", as something "that happens to the organization over time".

Thus, this paper uses institutional theory, which provides deeper and more resilient aspects of social structure, that enables us to understand how an OG company legitimizes a sustainable transition internally. We thus adopted the institutional theory approach by Drori and Honig [17], which views internal legitimacy as "the acceptance or normative validation of an organizational strategy through the consensus of its participants, which acts as a tool that reinforces organizational practices and mobilizes organizational members around a common ethical, strategic or ideological vision". This view of internal legitimacy explains how the three pillars shape the culture of an organization [17]. It also shows whether the acceptance of an emergent practice takes a 'bottom up' approach where employees at different levels of the resource shape the culture of the organization [46], or when the acceptance takes a more 'top down' approach, where managers/founders shape the organizational culture [47]. Thus, focusing on internal legitimacy plays an essential role in framing organizational identity in order to shape its new strategic direction [17].

This study looks at some of the elements that we have developed to understand what occurs in an OG company in transition; Figure 1 shows an illustration of the developed theoretical framework. Our study, thus, focuses on the development of an appropriate measurement instrument, testing its validity, reliability, and hypotheses through an empirical study.

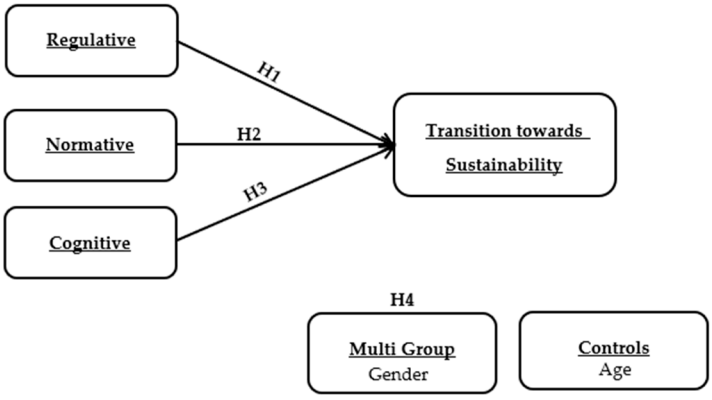


Figure 1. Theoretical framework.

Accordingly, the dependent variable in this study (transition toward sustainability) consists of elements that aim to shift the company toward sustainability. The independent variables include the three institutional pillars. Thus, this study analyzes the relationship (correlation) between sustainable transition and the three institutional pillars by hypothesizing the factor(s) that play(s) a crucial role in legitimizing a company's transition toward sustainability.

Thus, transition toward sustainability is acknowledged as long-term development goals that deal with collective or social interests through new technologies and under supportive policies [48]. The sustainable transition in this study is seen as a sustainable energy or a new shift toward a low-carbon economy. In other words, the establishment of RE activities in an OG company is seen as the main sustainable transition to a clean energy future.

According to the three institutional pillars, first, the regulative view of the institutional profile consists of rules and laws regulated by governments or other authorities that force companies to act in a certain way or provide support for new businesses [28,49,50]. Regulative legitimacy is seen as a

self-evaluation process that enables an organization to map out its activities in order to achieve societal welfare [51].

Second, the normative view of the institutional profile involves values and norms regulated by individuals who introduce, evaluate, select, and implement the organization's new actions [52,53]. Normative legitimacy is seen as a 'self-interested' assessment that enables the individuals to accept its activities based on tangible outcomes of the value they receive [54].

Finally, the cognitive view of an institution deals with the company's assumptions that determine its beliefs and interpretations in a wider belief system and cultural frame [29,53,55]. Cognitive legitimacy is seen as an evaluation or judgement that is required to assess regulative and normative legitimacy [51].

However, in order to fill the lack of research on the company's legitimation strategies, we identified the three pillars in this study as represented in Table 1. First, the regulative pillar deals with the new policies driven by the management team that aim to face the external pressures by governments and other authorities such as the Paris Agreement. Thus, the regulative pillar focuses on the internal policies and strategies initiated by the management team. We thus hypothesize that:

Hypothesis 1. *The regulative pillar has a positive effect on transition toward sustainability.*

Second, the normative pillar focuses on the employees and their understanding of the value they receive from the new sustainable activities shift that is taking place in the company. Thus, the normative pillar measures the employees' attitudes and their understanding of the sustainable development process. We thus hypothesize that:

Hypothesis 2. *The normative pillar has a positive effect on transition toward sustainability.*

Third, the cognitive pillar focuses on the company's beliefs that lead to acceptance of its sustainable shift in a wider range of systems and then captures the perception of 'taken-for-grantedness'. We thus hypothesize that:

Hypothesis 3. *The cognitive pillar has a positive effect on transition toward sustainability.*

In addition, we are interested to know if gender differences matter in sustainable transition. Based on Outsios [56], Polk [57] claims that women are more willing to adopt sustainable actions than men. We thus hypothesize that:

Hypothesis 4. *The positive effect of the three institutional pillars on sustainable transition is stronger for females than for males.*

Table 1. Dimensions of institutional theory.

Construct	Regulative	Normative	Cognitive
Definition adapted from [58,59]	Formal rules, laws, incentives, governance system, protocols, standards and procedures.	Societal expectations, values, norms and duties.	Beliefs, bodies of knowledge.
Paradigm for change	• Polices to enhance sustainability. • Clear goal to sustainability.	• Attitudes among employees that influence the adoption of sustainable activities. • Sustainability is seen as a goal. • Sustainable initiatives and contributions.	• Sustainability knowledge and competence among employees are perceived as accepted in the company. • Good understanding of sustainability and new sustainable technologies.

Table 1. *Cont.*

Construct	Regulative	Normative	Cognitive
Motivation for change	• Support from the management team. • Incentives and sanctions that promote sustainable activities.	Sustainability is seen as a future opportunity.	Looking for ways to improve sustainability.
Obstacle to change	No incentives.	No personal responsibility towards the environment and society.	No ability to build knowledge on future sustainable projects.

3. Research Method

This paper employed a quantitative analysis stemming from a survey conducted between 2017–2019 in one of the leading OG companies in Europe. This section explains the empirical context of our study and describes and analyzes the dataset. It also validates the model fit of the study and tests the developed hypotheses that explain how internal legitimacy for new sustainable activities is built in an OG company.

3.1. Oil and Gas Industry toward Renewable Energy

Europe's growth strategy aims to reduce greenhouse emissions by 20% where RE is expected to provide 27% of the total energy production by 2030 [60]. Wilks [61] confirms that the RE sector is growing fast, and that the OG industry should play a serious role in developing RE activities. This requires large greenhouse emissions producers such as the OG field to enter the RE market.

This paper presents a European OG company committed to providing the world's energy needs in a responsible manner. The company's petroleum activities are crucial for its country's financial growth. In addition, sustainability is already part of the company's overall strategy and they work continuously to reduce their emissions when producing OG. However, the increasing need for energy and a low carbon future is being recognized faster than ever before. In addition to the external pressures to reduce the climate change effects of greenhouse gases [62,63], this has forced the company to be part of the low carbon transformation and introduce an alternative clean energy such as RE.

Thus, the transition toward sustainability is considered new at this company. This means that the company's employees understand the overall sustainability strategy, but this does not guarantee that investing in RE is considered accepted by everyone in the company. This is due to the fact that the development of RE activities by major OG companies requires different corporate strategies that aim to achieve a long-term economic advantages [64]. For this reason, the next sections will empirically show how we measured and validated the model fit of this study.

3.2. Description of the Dataset

This study included a Likert scale (ordinal variables) where structural equation modeling (SEM) and Chi-square test statistics are a key diagnostic to measure the model fit [65,66]. SEM is one of the most powerful tools being increasingly used in social sciences to test and evaluate multivariate causal relationships [67]. It was used in this study to check the overall goodness of fit in the model, improve the model fit, and validate the reliability and stability of the model [67]. Thus, SEM is used to explain the relationship between latent variables by one or more observed variable, and to determine how far the theoretical model fits the data [68]. In addition, a good fit of the model is essential for determining whether the conclusions about participants on the scale are valid [69].

Thus, we developed a survey instrument that allowed us to empirically validate a survey that measures the profile of the company's employees as a key driver for legitimizing a sustainable future, as shown in Table 2. This section contains a brief review of our methodological approach, adopted from MacKenzie, et al. [70], as shown in the scale development procedure in Figure 2. In the first step,

we developed and refined our institutional measures, then we created our survey, pre-tested, and distributed it. These measures were used in the scale evaluation and validation as a second step.

Table 2. Items for measuring the institutional pillars.

Variables	Items
Regulative Pillar	1. Your management team supports renewable energy activities 2. There are incentives for sustainable activities at X Company *** 3. X Company has policies to enhance its sustainable development practices *** 4. Your management team has clear goals to make X a sustainable company 5. Top management plays an important role in making X a sustainable company
Normative Pillar	1. Employees want to contribute to a variety of sustainable projects in my unit *** 2. Individual initiatives towards sustainability are respected in my unit *** 3. Sustainable activities are seen as the way toward future opportunities in my unit *** 4. Operating sustainability is a goal in my unit *** 5. In my unit, we believe that we have a personal responsibility/commitment towards society/the environment
Cognitive Pillar	1. My unit has a good understanding of sustainability*** 2. My unit has a good understanding of sustainable technology 3. My unit builds knowledge on becoming more sustainable *** 4. My unit is always looking for additional ways to improve sustainability ***
Transition toward sustainability	1. X Company has established environmental targets to introduce a shift toward sustainability*** 2. Sustainability will become considerably more important to X Company in the future *** 3. X Company has implemented sustainability goals into their overall strategy 4. This is the right time for X Company to introduce clean activities into their business practices

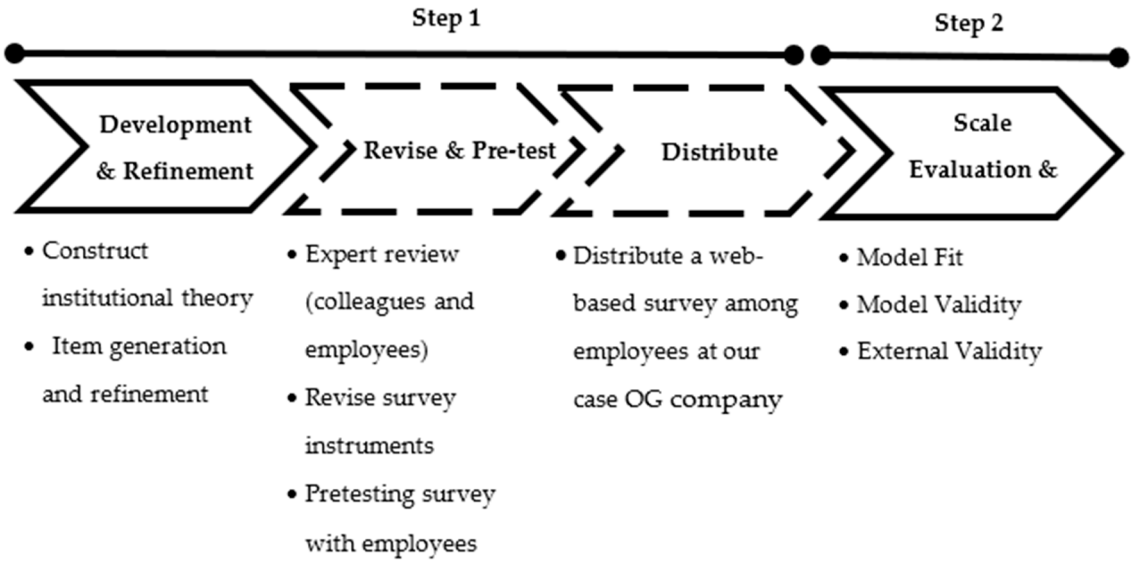


Figure 2. Scale development procedure.

3.3. Step 1: Development and Refinement of Institutional Measures

Institutional theory is used as a powerful explanation for both individual and organizational action [22]. In this study, we used a specific company as an example for the OG industry in which RE has become institutionalized, focusing our study on a European OG company.

Accordingly, we began operationally developing the institutional profile of our study that is related to sustainable practices. We derived a large pool of items from the institutional literature, particularly from the three pillars of institutions by Scott [29,43], as shown in Table 2, which indicates

the items relevant to our research question and were used in this study [71]. For the regulatory pillar, five items were generated that focused on management policies supporting new sustainable businesses (renewable energy), the management role in making a sustainable company, and indirect government support for OG companies that came through incentives. The intent of the regulatory pillar was to measure the institutional arrangements that would affect an OG company's business agenda as a whole.

The normative pillar consisted of five items focusing on employees' contributions to sustainable activities and their sustainable goals and personal responsibility toward society and the environment. The purpose of the normative pillar was to measure the employees' engagement in the company's sustainable shift. Finally, the cognitive pillar included four items with the aim to accelerate the company's awareness of sustainability, enhance sustainable knowledge, and thus promote sustainable development. The aim of the cognitive pillar was to measure sustainability awareness in the company that will more likely help manage new sustainable activities.

In addition, our dependent variable (transition toward sustainability) included four items as described in Table 2 that focused on the employees' perception of the new sustainable transition that is taking place in the company. This includes environmental goals and targets that will make the company more sustainable.

By following the methodological approach suggested by MacKenzie, Podsakoff and Podsakoff [70], we first developed conceptual definitions for the three institutional pillars related to the introduction of RE activities in an OG company. We then developed a web-based survey and conducted several pre-test rounds with twelve experts; six academic experts and six employees from our case company. They reviewed the original survey and helped shape the content and form a survey that resulted in better data quality. Our survey used a seven-point Likert scale because it works better with educated samples [72]. The data to evaluate the model were gathered among employees from a European OG company in the period between 2017 and 2019.

4. Data Analysis and Results

Our case company is a broad energy company that involves thousands of employees. However, due to its high policy, the company allowed us to collect the data by distributing our survey through our contact person via the company's internal network. Therefore, our data included only the participants who voluntarily filled out our survey, resulting in a dataset of 113 respondents.

After undertaking data screening, we excluded 21 respondents who had missing values, in addition to one unengaged respondent who gave the exact same response for every single item. We had also three variables with missing values, all less than 5% missing, which we replaced with the mean. This left us with a dataset of 91 responses. In addition, we intended to do a skewness and kurtosis variable screening test to find if there were any abnormal variables. We found two abnormal variables: regulative (item 5) and transition toward sustainability (item 4).

Exploratory factor analysis (EFA) was used to regroup our variables into a limited set of items so that relationships and patterns between variables could be easily interpreted and understood [73]. In addition, maximum likelihood and ProMax rotation were selected and used to estimate the factor loadings and because it is more useful when undertaking confirmatory factor analysis (CFA) in statistical Software Analysis of Moment Structures (AMOS) [74]. When applying the EFA, a decision was made to drop the abnormal items (regulative 5 and transition toward sustainability 4). Then, we forced the factors to extract four factors and dropped the problematic items one by one respectively; cognitive 2, normative 5, transition 3, regulative 4, and regulative 1. The final pattern matrix table is displayed in Table 3. Table 3 contains the rotated factor loadings that shows how the variables were loaded significantly on each factor and represents the correlation between the variables and the factors. The four-factor solution provided meaningful factors that reflected regulatory, normative, and cognitive pillars and transition toward sustainability, explaining 73.67% of the variance. The Kaiser–Meyer–Olkin (KMO) test was 0.87 and the Bartlett's test was significant. However, Cronbach's alphas confirmed

an internal-consistency coefficient for the regulatory pillar (0.88), normative pillar (0.87), cognitive pillar (0.93), and transition toward sustainability (0.69). Thus, the final survey instrument consisted of 11 items: two items for the regulative pillar, four for the normative pillar, three for the cognitive pillar, and two items for the transition toward sustainability as shown in Table 2 (text displayed in ***).

Table 3. Pattern matrix [a].

	Factor			
	1	**2**	**3**	**4**
Cronbach's Alpha	0.932	0.873	0.876	0.69
Regulative Pillar 2			0.775	
Regulative Pillar 3			0.989	
Normative Pillar 1		0.541		
Normative Pillar 2		0.613		
Normative Pillar 3		0.997		
Normative Pillar 4		0.726		
Cognitive Pillar 1	0.647			
Cognitive Pillar 3	0.955			
Cognitive Pillar 4	0.920			
Transition 1				0.871
Transition 2				0.567

Extraction method: Maximum likelihood. Rotation method: Promax with Kaiser normalization. [a] Rotation converged in five iterations.

4.1. Step 2: Scale Evaluation and Validation

In our study, we chose to validate the survey instrument with employees in different positions in the OG company. The survey was distributed mainly to people who had a deeper knowledge of relevant sustainability business issues than the rest of the company. The survey was administered to employees who faced major sustainability changes and invested heavily in RE activities as a step to move from an OG into a broad energy company. In addition, our case company engaged its employees in its sustainable activities in order to meet its new challenges, which makes the three institutional pillars relevant in this paper. The survey was conducted in two languages, English and the local nation language of the country where the company is located. Of the respondents, 71 filled out the survey online and 20 respondents filled out a paper-based survey. Most respondents (43%) were between 41 and 55 years old and (37%) were between 26 and 40 years old. Slightly more than half of the sample's members were men (52%).

4.1.1. Model Fit

We used SEM to perform a CFA on the company institutional profile measure. CFA was used to verify the factor structure that was extracted from the EFA [75]. However, since we are in the early stages of developing our model, we applied a common method bias (CMB) that will allow us to test the fit of the model by using a common latent factor (CLF) against the alternative one without the CLF [76]. We first ran the CFA on the reduced model (11 items) and measured the correlations among the latent variables. We had to drop one item (normative 1) due to low loadings between factors. We then ran the CMB and compared the unconstrained common method factor model to the fully zero constrained common factor model. The Chi-square test by Gaskin [77] showed a significant *p*-value as shown in Table 4.

Table 4. Common bias method test results.

	Chi-Square	df	*p*-Value	Invariant?	
Overall Model					Step 1. Provide Chi-square and df for unconstrained and constrained models, and provide the number of groups. The thresholds will be updated automatically.
Unconstrained	21.4	19			
Fully constrained	56.9	29			
Number of groups		2			
Difference	35.5	10	0.000	NO	Groups are different at the model level. Check path differences.

The result provided evidence of a problem in the fully constrained model (CFI = 0.96, RMSEA = 0.10, GFI = 0.89, and PCLOSE = 0.019), which led us to retain the actual model with the CLF as shown in Figure 3. In other words, the model with the CLF method showed a better model fit (CFI = 0.997, RMSEA = 0.037, GFI = 0.995, and PCLOSE = 0.563).

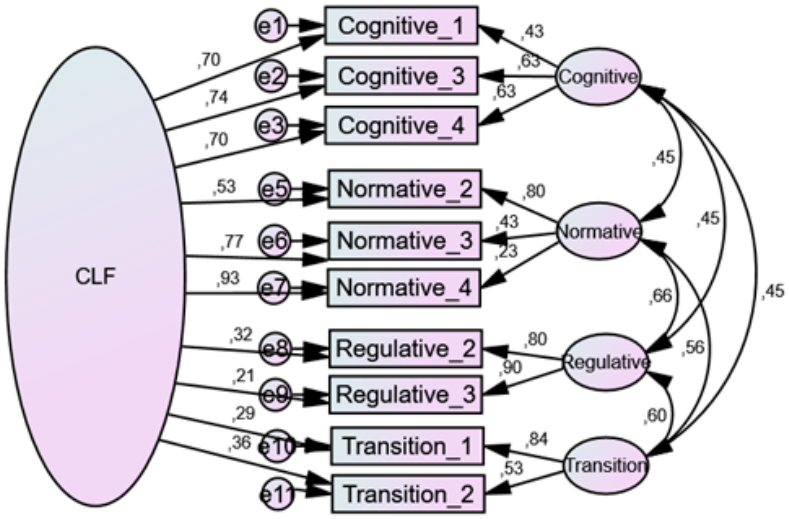


Figure 3. Confirmatory factor analysis results (unconstrained model where all paths are constrained to zero).

Our assumptions was based on Hair, et al. [78], who defined the comparative fit index (CFI) as an incremental fit index, and is accepted when the values are between 0 and 1; the higher value indicates a better fit. Root mean square error of approximation (RMSEA) represents how well a model fits a population, and it is accepted when the value is between 0.03 and 0.08. Goodness of fit index (GFI) is a fit statistic that is less sensitive to sample size, and the possible range of GFI is 0 to 1 where a higher value indicates a better fit. However, according to Kenny, et al. [79], a fit indices in confirmatory factor analysis (PCLOSE) measures the fit indices in CFA and helps understand the sampling error in the RMSEA. It is normally used for small DF and low N models, and is accepted when it is greater than 0.05.

The shortened scale, with three cognitive, three normative, two regulatory, and two sustainability toward transitions items was retained. Thus, the CFA was performed on the 91 responses by adding the CLF in order to capture the common variance among all observed variables in the model.

However, in order to examine which items contributed to a sustainable transition in an OG company, multiple regression analysis was run by Statistical Package for Social Sciences (SPSS) software. The general model takes the following equation:

$$Y = \beta_0 + \beta_1 * Reg. + \beta_2 * Norm. + \beta_3 * Cog + \varepsilon$$

where Y refers to the dependent variable (transition toward sustainability) and represents transition 1 and transition 2; Reg. represents regulative 2 and regulative 3; Norm represents normative 2, 3, and

4; and *Cog*. represents cognitive 1, 3, and 4. In addition, β_0 represents constants; β_i represents the unstandardized coefficients for each independent variable (derived from Table 5); and ε represents the error term. After doing the analysis, the equation takes the form:

$$\text{Transition toward sustainability} = 2.14 + 0.34 \text{ *Reg.} + 0.26 \text{ *Norm.} + 0.17 \text{ *Cog.} + \varepsilon$$

Table 5. Coefficients [a].

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.135	0.303		7.041	0.000		
	Regulative	0.342	0.104	0.377	3.301	0.001	0.481	2.081
	Normative	0.264	0.099	0.303	2.671	0.009	0.488	2.049
	Cognitive	0.169	0.148	0.101	1.145	0.256	0.811	1.234

[a] Dependent variable: Transition.

4.1.2. Model Validity

External Validation

Another objective of this study was to validate a measure of the company institutional profile. Thus, it required some comprehensive validity assessments to ascertain the utility of this measure [80]. Therefore, the goal of testing a SEM is measuring concepts in a reliable and valid manner [78]. In this section, we aimed to test how well the variables related to one another by measuring reliability, convergent validity, and discriminant validity. Thus, by using a formula provided by Gaskin [77], as presented in Table 6, we automatically calculated the construct reliability (CR), average variance extracted (AVE), and maximum shared variance (MSV).

Table 6. Reliability and validity results [1].

	CR	AVE	MSV	MaxR (H)	Regulative	Cognitive	Normative	Transition
Regulative	0.881	0.787	0.461	0.882	0.887			
Cognitive	0.935	0.829	0.677	0.963	0.524	0.910		
Normative	0.904	0.759	0.677	0.914	0.587	0.823	0.871	
Transition	0.714	0.556	0.461	0.724	0.679	0.603	0.589	0.746

[1] CR measures the internal consistency of the variables and is accepted when it is 0.7 or higher. AVE (convergent validity) assesses the degree of correlation between two variables of the same concept, and is accepted when it is higher than 0.5. MSV (discriminant validity) measures the extent to which a construct is truly distinct from another, and it should be less than the AVE [78].

Construct Reliability (CR)

We assessed the CR of each pillar of our institutional profile, as shown in Table 6, and found that all of the measures met the threshold suggested by Hair, Black, Babin and Anderson [78] (CR > 0.7). Thus, the scales show an excellent reliability for the three institutional pillars. In sum, the scales underlying our company institutional profile showed very good internal consistency.

Convergent Validity (AVE)

We measured the convergent validity of each institutional pillar as shown in Table 6. This is essential in the SEM in order to understand which pillars share a high proportion of variance in common. We found that all of the measures met the threshold suggested by Hair, Black, Babin and Anderson [78] (AVE > 0.5). We also compared our measures to a survey question contained in a publication of the international conference on information system [40]. The mentioned study

asked actors to rate their institutional influences on adopting green innovations that were outside the organizational context on a five-point Likert scale. We found that our regulatory pillar (0.79) correlated positively (P < 0.03) to their regulatory pillar (0.82). In addition, our cognitive pillar (0.94) correlated positively (P > 0.26) to their cognitive pillar (0.68). However, our normative pillar (0.56) correlated positively (P < 0.09) to their normative pillar (0.65). In sum, these comparisons indicate a respectable correspondence between our measures of the regulatory, cognitive, and normative pillars and relevant variables from external sources.

Discriminant Validity (MSV)

We measured discriminant validity in order to understand the difference between these pillars and the phenomena they capture. This is essential in order to know if one measure (institutional pillar in our case) is distinct from another measure [78,80]. The results from Table 6 show that the discriminant validity (MSV) is supported in the three pillars (regulatory, normative, and cognitive) (MSV < AVE). This means that the three institutional pillars influence internal employees to legitimize sustainable changes, and attempt to start or manage sustainable activities in the company. The next section will show how we tested our hypotheses, and which pillar will take a stronger role to build internal legitimacy.

4.2. Testing Hypotheses

In order to test our hypotheses, we imputed the factor scores for our variables and looked at the influential records in the dataset by using Cook's distance analysis, which found one record with an abnormal Cook's distance. We decided to remove it from our data in order to strengthen the regression weight, which we will later observe in our results. Furthermore, we performed a multicollinearity test in order to predict the correlation between the independent variables themselves and with the dependent variables. Therefore, we intended to test the tolerance that measures unexplained independent variables by other independent variables in the model, and it should be greater than 0.1 [78,81,82]. In addition, we tested the variance inflation factor (VIF) that translates the tolerance value in order to express the degree of multicollinearity, and it should be less than 3 [78,81,82]. Thus, results presented in Table 5 shows that we did not have any multicollinearity problems (tolerance > 0.1, VIF < 3).

As a result, our new causal model was built by AMOS and left us with a good model fit (CFI = 0.999, GFI = 0.992, PCLOSE = 0.413, and RMSEA = 0.032). This also shows that our model explains 46% of the outcome data ($R^2 = 0.46$). In addition, Table 7 shows the regression weights for our model and indicates that H1 (regulative pillar) and H2 (normative pillar) have significant and positive effects on sustainable transition.

Table 7. Regression weights [b].

			Estimate	S.E.	C.R.	P
Transition	<—	Regulative	0.342	0.102	3.358	***
Transition	<—	Normative	0.264	0.097	2.717	0.007 **
Transition	<—	Cognitive	0.169	0.145	1.164	0.244

[b]. *** $P < 0.001$, ** $P < 0.01$.

However, in order to test H4, we undertook a Chi-square difference test for the whole model, as shown in Table 8 [77]. We found that the Chi-square difference test was not significant ($P = 0.228$), indicating that the effect was not different for males than females. We then measured the Chi-square for each single path (regulative, normative, and cognitive) and found a non-significant P value for each path of 0.206, 0.274, and 0.183, respectively. As a result, we concluded that H4 is not supported, meaning that the measures are the same across groups and between paths.

Table 8. Chi-square test across two groups (female/male).

	Chi-Square	df	*p*-Value	Invariant?	
Overall Model					Step 1. Provide Chi-square and df for unconstrained and constrained models, and provide the number of groups. The thresholds will be updated automatically.
Unconstrained	100.4	58			
Fully constrained	115.9	68			
Number of groups		2			
Difference	3.763	3	0.228	YES	Groups are not different at the model level, however, they may be different at the path level.

Finally, a post-hoc analysis was tested to make sure that our non-significant effect on gender and cognitive legitimacy was truly not significant. Post hoc test is required when a hypothesis is not supported, and it should be greater than 0.8 [78,83]. Our post-hoc result gave us a value of 1, meaning that our non-significant effect was valid.

5. Discussion

Measuring sustainability is seen as a challenging task since it is difficult to implement and there is no specific goal to obtain when introducing sustainability within companies [13,14,51]. Therefore, we found it interesting to measure legitimacy among employees in an OG company, because they shape their legitimacy based on their experience within the company [51]. This enabled us to understand how employees direct actions, practices, and values and understand how they translate these actions into a benefit for their organization [17].

Our findings offer interesting insights into the literature on institutional theory and contribute to a richer understanding of internal legitimacy. Other studies have focused on the emergence of new institutional practices [84,85], the evolution of new institutions [86,87], or the role of individuals in embracing or undermining new practices [46].

The institutional theory presented here draws attention to how an established company under a sustainable change builds its internal legitimacy. The developed model is built around the three institutional pillars and sustainability and aims to analyze the employees' role in shifting an established OG company to a broad energy company. Based on the model, our key findings reveal that our case company employed regulative and normative legitimacy to justify their transition toward RE activities.

Our findings present regulative legitimacy as the important carrier of shaping the sustainable transition in the company. The company's employees consider their management team as the initial supporter for sustainability. This shows that the management team is responsible for adopting sustainable commitments and establishing new policies that aim to enhance the sustainable development practices in the company. At the same time, our results show that normative legitimacy plays an important role in strengthening the sustainability transition. This shows that the employees have a self-interest to shift the company toward a sustainable future and that they see sustainability as the way toward future opportunities. However, cognitive legitimacy was not supported in this study. Cognitive legitimacy requires more time in order to be achieved so that everybody in the company understands and accepts the sustainable shift that is taking place in the company.

Thus, our study shows that the company's employees understand the environmental issues and the sustainable development change that is taking place in the world. They also believe that OG companies should change in order to help the environment, accelerate the transition toward clean energy, and cover that need in the market. This emphasizes that the change must be achieved internally in order to enhance the actual shift toward sustainability afterward.

We empirically explored the rhetorical justification for investments in new sustainable technologies, and found significant support in both regulative and normative legitimacy. Our findings support previous work by Drori and Honig [17], who argued that regulative and normative legitimacy play an essential role in framing organizational identity and shaping its strategic direction. In addition, Laïfi and Josserand [88] argued that gaining cognitive legitimacy would be automatically achieved when

regulative and normative are legitimized in companies and should be adopted on a large scale when the new change becomes taken-for-granted.

These results are expected for a company under sustainable change for several reasons: (1) People see that a large OG producer such as our case company should focus on producing OG that gives the company the most profitable business; (2) people consider that there is still a market demand for OG even if RE is growing very fast; and (3) some see that investing in RE is a risky business for an OG company since it is outside the core business and requires new skills, competencies, and technologies.

In line with our argument above on regulative and normative legitimacy as a carrier of sustainable change, previous research shows that commitment leads to the adoption of responsibility standards [89]. In our study, we argue that new policies, new sustainable strategies, and self-interest can accelerate the institutionalization of sustainability in an OG company. This complements previous studies that have identified regulative and normative legitimacy as contributors.

Additionally, we observed that gender has no effect on legitimizing new sustainable practices. This is surprising, given the previous research suggesting that women are more willing to adopt sustainable action [56,57]. However, we believe that sustainability is becoming essential in companies that are striving to adopt sustainability in their organizational culture.

Our contribution to the literature is based on an OG company under sustainable change; a situation where the company has to legitimize its investments in RE practices. This is essential in order for an OG company to meet its internal uncertainties, especially when it is investing in new technologies that are outside its core business. We propose that regulative and normative legitimacy are a potential indicator of institutional change in an OG company and a carrier of a new sustainable process. We thus indicate that the OG sector is at a crossroads of intersecting legitimacy for the new sustainable technologies populating it.

6. Conclusions, Limitations, and Future Studies

Our study aimed to make a methodological contribution to the research of legitimacy by developing a valid measure of regulative, normative, and cognitive legitimacy. In this study, we developed and empirically validated a survey instrument for measuring the institutional profile of an OG company under a sustainable transition. This study showed us a 'top-down' approach where the regulative pillar plays the essential role in legitimizing the investment of sustainable activities in an OG company. The normative pillar also plays an important role in legitimizing the company's investment of sustainable activities. More information about our results is summarized in Appendix A.

This study contributes to the broader literature on legitimacy by developing a measure of all three institutional pillars of legitimacy that can be adapted for different research contexts. Thus, our study makes two contributions. First, our company institutional profile can serve as a tool to understand employees' acceptance of the new sustainable transition that is taking place in the company. Second, the study helps researchers and companies understand the relevance of the three pillars and the role they play in adopting new activities. This is important for companies to improve their institutional environment for sustainability.

We believe that our instrument was conceived as an initial measure of a company institutional profile for legitimizing sustainability. Our sample represents a specific example of a European OG company. Additional studies in other cultures, companies, industries, and research contexts would help generalize our method in the future. This can be done through developing or applying our survey instrument in a broader context and comparing it with other methods. This would show us how other companies would act and which pillar plays the essential role in legitimizing their new investments. Thus, more research on legitimacy as an institutional theory will help us understand the complexity of this phenomenon and enhance our understanding of organizational culture in different industries.

In sum, the scales developed in this study can improve both the empirical and theoretical rigor of legitimacy. The scales underlying our OG company institutional profile have valid reliability, external

validity, and discriminant validity. Thus, this institutional profile should provide a useful tool with which researchers can explore a variety of issues regarding legitimizing new activities in companies.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Author Contributions: Conceptualization, T.J. and E.M.O.; Methodology, T.J.; Software, T.J.; Validation T.J. and E.M.O.; Formal analysis, T.J.; Investigation, T.J. and E.M.O.; Resources, T.J. and E.M.O.; Data curation, T.J.; Writing—original draft preparation, T.J; Writing—review and editing, T.J. and E.M.O.; Visualization, T.J.; Supervision, E.M.O.; Project administration, T.J. and E.M.O.; Funding acquisition, T.J. All authors have read and agreed to the published version of the manuscript.

Funding: The publication charges for this article were funded by a grant from the publication fund of UiT, The Arctic University of Norway.

Acknowledgments: We would like to thank David Gibson, Tatiana Iakovleva, Mikko Moilanen, Martin Shrolec, and Jessica Green for their valuable feedback on the survey. We would also like to thank all the people from our case company for their assistance and time in filling out our survey.

Conflicts of Interest: The authors declare no conflicts of interest

Appendix A Summary of the Analysis of Hypotheses

Hypothesis	Quantitative Analysis	Comment
Hypothesis 1	Supported	The positive relationship between regulative pillar and transition toward sustainability was supported. This confirms that our case company has new policies and strategies to invest in RE practices.
Hypothesis 2	Supported	The positive relationship between normative pillar and transition toward sustainability was supported, but comes second place after the regulative. This also confirms that internal employees are engaged and have a self-interest toward the new sustainable shift in the company.
Hypothesis 3	Not Supported	The relationship between cognitive legitimacy and transition toward sustainability was not supported. This informs us that sustainable activities are not fully legitimized in the company. The sustainable activities have been introduced recently in the company, and it requires more time to be accepted by everyone in the company.
Hypothesis 4	Not Supported	The relationship between gender and transition toward sustainability was not supported in this study. This shows that there is no gender effect on legitimizing sustainable activities. This shows that the employees are interested in making the OG company a cleaner one.

References

1. Werbach, A. *Strategy for Sustainability: A Business Manifesto*; Harvard Business: Boston, MA, USA, 2009.
2. Peng, Y.; Li, J.; Yi, J. International Oil Companies' Low-Carbon Strategies: Confronting the Challenges and Opportunities of Global Energy Transition. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *237*. [CrossRef]
3. Rodrigues, M.; Franco, M. The Corporate Sustainability Strategy in Organisations: A Systematic Review and Future Directions. *Sustainability* **2019**, *11*, 6214. [CrossRef]
4. Schrettle, S.; Hinz, A.; Scherrer-Rathje, M.; Friedli, T. Turning sustainability into action: Explaining firms' sustainability efforts and their impact on firm performance. *Int. J. Prod. Econ.* **2014**, *147*, 73–84. [CrossRef]
5. Deephouse, D.L.; Suchman, M. Legitimacy in organizational institutionalism. In *The Sage Handbook of Organizational Institutionalism*; Greenwood, R., Oliver, C., Sahlin, K., Suddaby, R., Eds.; SAGE Publications: London, UK, 2008; pp. 49–77.
6. Galaskiewicz, J. Interorganizational Relations. *Annu. Rev. Sociol.* **1985**, *11*, 281–304. [CrossRef]

7. Hargadon, A.B.; Douglas, Y. When Innovations Meet Institutions: Edison and the Design of the Electric Light. *Adm. Sci. Q.* **2001**, *46*, 476–501. [CrossRef]
8. Suchman, M.C. Managing Legitimacy: Strategic and Institutional Approaches. *Acad. Manag. Rev.* **1995**, *20*, 571–610. [CrossRef]
9. Engert, S.; Rauter, R.; Baumgartner, R.J. Exploring the integration of corporate sustainability into strategic management: a literature review. *J. Clean. Prod.* **2016**, *112*, 2833–2850. [CrossRef]
10. Moldavska, A. Defining Organizational Context for Corporate Sustainability Assessment: Cross-Disciplinary Approach. *Sustainability* **2017**, *9*, 2365. [CrossRef]
11. Patala, S.; Korpivaara, I.; Jalkala, A.; Kuitunen, A.; Soppe, B. Legitimacy Under Institutional Change: How incumbents appropriate clean rhetoric for dirty technologies. *Organ. Stud.* **2019**, *40*, 395–419. [CrossRef]
12. Gond, J.-P.; Grubnic, S.; Herzig, C.; Moon, J. Configuring management control systems: Theorizing the integration of strategy and sustainability. *Manag. Account. Res.* **2012**, *23*, 205–223. [CrossRef]
13. Baumgartner, R.J.; Rauter, R. Strategic perspectives of corporate sustainability management to develop a sustainable organization. *J. Clean. Prod.* **2017**, *140*, 81–92. [CrossRef]
14. Sandhawalia, B.S.; Dalcher, D. Dynamic Knowledge Support Model for Decision-Making and Sustainable Growth: An Empirical Study. *Group Decis. Negot.* **2015**, *24*, 803–823. [CrossRef]
15. Fisher, G.; Kotha, S.; Lahiri, A. Changing with the times: An integrated view of identity, legitimacy, and new venture life cycles. *Acad. Manag. Rev.* **2016**, *41*, 383. [CrossRef]
16. Jawahar, I.M.; McLaughlin, G.L. Toward a Descriptive Stakeholder Theory: An Organizational Life Cycle Approach. *Acad. Manag. Rev.* **2001**, *26*, 397–414. [CrossRef]
17. Drori, I.; Honig, B. A Process Model of Internal and External Legitimacy. *Organ. Stud.* **2013**, *34*, 345–376. [CrossRef]
18. Dimaggio, P.J.; Powell, W.W. The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *Am. Sociol. Rev.* **1983**, *48*, 147–160. [CrossRef]
19. Greenwood, R.; Suddaby, R.; Hinings, C. Theorizing change: The role of professional associations in the transformation of institutional fields. *Acad. Manag. J.* **2002**, *45*, 58–80. [CrossRef]
20. Rocha, R.S.; Granerud, L. The search for legitimacy and organizational change: The agency of subordinated actors. *Scand. J. Manag.* **2011**, *27*, 261–272. [CrossRef]
21. Li, J.; Tang, Y. CEO hubris and firm risk taking in China: the moderating role of managerial discretion. *Acad. Manag. J.* **2010**, *53*, 45. [CrossRef]
22. Dacin, M.T.; Goodstein, J.; Scott, W.R. Institutional Theory and Institutional Change: Introduction to the Special Research Forum. *Acad. Manag. J.* **2002**, *45*, 45–56. [CrossRef]
23. American Petroleum Institute. *Putting Earnings into Perspective—Facts for Addressing Energy Policy*; American Petroleum Institute: Washington, DC, USA, 2016.
24. United Nations Climate Change. What is the Paris Agreement? Available online: https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement (accessed on 27 November 2019).
25. European Commission. Paris Agreement. Available online: https://ec.europa.eu/clima/policies/international/negotiations/paris_en#tab-0-0 (accessed on 27 February 2019).
26. Hansen, G.H.; Steen, M. Offshore oil and gas firms' involvement in offshore wind: Technological frames and undercurrents. *Environ. Innov. Soc. Transit.* **2015**, *17*, 1–14. [CrossRef]
27. The Guardian. Shell Says it Wants to Double Green Energy Investment. Available online: https://www.theguardian.com/business/2018/dec/26/shell-says-it-wants-to-double-green-energy-investment (accessed on 27 November 2019).
28. Scott, W.R. *Institutions and Organizations*; Sage: Thousand Oaks, CA, USA, 1995.
29. Scott, W.R. *Institutions and Organizations: Ideas, Interests, and Identities*, 4th ed.; Sage: Thousand Oaks, CA, USA, 2014.
30. Katz, E. Theorizing Diffusion: Tarde and Sorokin Revisited. *Ann. Am. Acad. Political Soc. Sci.* **1999**, *566*, 144–155. [CrossRef]
31. Terlaak, A.; Gong, Y. Vicarious Learning and Inferential Accuracy in Adoption Processes. *Acad. Manag. Rev.* **2008**, *33*, 846–868. [CrossRef]
32. Ansari, S.M.; Fiss, P.C.; Zajac, E. Made to fit: How practices vary as they diffuse. *Acad. Manag. Rev.* **2010**, *35*, 67–92. [CrossRef]

33. Busenitz, L.W.; Gómez, C.; Spencer, J.W. Country Institutional Profiles: Unlocking Entrepreneurial Phenomena. *Acad. Manag. J.* **2000**, *43*, 994–1003. [CrossRef]
34. Åmo, B.W.; Bullvåg, E.; Oftedal, E.M. The influence from the organizational climate on employee innovation behavior. *Front. Entrep. Res* **2006**, *26*, 10.
35. Oftedal, E.M. *Legitimacy for Creative Destruction: A Structure-Agent Perspective of Entrepreneurship*; Handelshøgskolen i Bodø: Bodø, Norway, 2008.
36. Oftedal, E.M.; Iakovleva, T.A.; Foss, L. University context matter: An institutional perspective on entrepreneurial intentions of students. *Educ. Train.* **2018**, *60*, 873–890. [CrossRef]
37. Bloodgood, J.; Hornsby, J.; Rutherford, M.; McFarland, R. The role of network density and betweenness centrality in diffusing new venture legitimacy: an epidemiological approach. *Int. Entrep. Manag. J.* **2017**, *13*, 525–552. [CrossRef]
38. Delmar, F.; Shane, S. Legitimating first: organizing activities and the survival of new ventures. *J. Bus. Ventur.* **2004**, *19*, 385–410. [CrossRef]
39. Suddaby, R. Challenges for Institutional Theory. *J. Manag. Inq.* **2010**, *19*, 14–20. [CrossRef]
40. Hoerndlein, C.; Benlian, A.; Hess, T. Institutional Influences in Individual-Level Innovation Adoption Outside Organizational Contexts: A Scale Development Study. In Proceedings of the Thirty Third International Conference on Information Systems, Orlando, FL, USA, 16–19 December 2012.
41. Ulla de, S. Knowledge Culture. In *Organizational Culture and Behavior: Concepts, Methodologies, Tools, and Applications*; IGI Global: Hershey, PA, USA, 2017; pp. 1856–1880. [CrossRef]
42. Powell, W.W.; Dimaggio, P.J. Introduction. In *The New Institutionalism in Organizational Analysis, Powell, W.W., Dimaggio, P.J., Eds.*; University of Chicago Press: Chicago, IL, USA, 1991.
43. Scott, W.R. Institutions and Organizations. Ideas, Interests and Identities. *M@n@gement* **1995**, *17*, 136. [CrossRef]
44. Scott, W.R. The Adolescence of Institutional Theory. *Adm. Sci. Q.* **1987**, *32*, 493–511. [CrossRef]
45. Selznick, P. *Leadership in Administration*; Harper & Row: New York, NY, USA, 1957.
46. Lounsbury, M.; Crumley, E.T. New Practice Creation: An Institutional Perspective on Innovation. *Organ. Stud.* **2007**, *28*, 993–1012. [CrossRef]
47. Schein, E.H. The role of the founder in creating organizational culture. *Organ. Dyn.* **1983**, *12*, 13–28. [CrossRef]
48. Hofman, P.S.; Elzen, B. Exploring system innovation in the electricity system through sociotechnical scenarios. *Technol. Anal. Strateg. Manag.* **2010**, *22*, 653–670. [CrossRef]
49. Cruz-Suárez, A.; Prado-Román, C.; Díez-Martín, F. Por qué se institucionalizan las organizaciones. *Rev. Eur. Dir. Econ. Empresa* **2014**, *23*, 22–30. [CrossRef]
50. Díez de Castro, E.P.; Díez Martín, F.D.A.; Vázquez Sánchez, A.E. Antecedentes de la institucionalización de las organizaciones. *Cuad. Gestión.* **2015**, *15*, 15–38. [CrossRef]
51. Alexiou, K.; Wiggins, J. Measuring individual legitimacy perceptions: Scale development and validation. *Strateg. Organ.* **2019**, *17*, 470–496. [CrossRef]
52. Díez-de-Castro, E.; Peris-Ortiz, M.; Díez-Martín, F. Criteria for Evaluating the Organizational Legitimacy: A Typology for Legitimacy Jungle. In *Organizational Legitimacy: Challenges and Opportunities for Businesses and Institutions*; Díez-De-Castro, E., Peris-Ortiz, M., Eds.; Springer International Publishing: Cham, Switzerland, 2018; pp. 1–21. [CrossRef]
53. Munir, K.A. Being Different: How Normative and Cognitive Aspects of Institutional Environments Influence Technology Transfer. *Hum. Relat.* **2002**, *55*, 1403–1428. [CrossRef]
54. Dart, R. The legitimacy of social enterprise. *Nonprofit Manag. Leadersh.* **2004**, *14*, 411–424. [CrossRef]
55. Goulden, S.; Portman, M.E.; Carmon, N.; Alon-Mozes, T. From conventional drainage to sustainable stormwater management: Beyond the technical challenges. *J. Environ. Manag.* **2018**, *219*, 37–45. [CrossRef] [PubMed]
56. Outsios, G. Gender in sustainable entrepreneurship: Evidence from the UK. *Gend. Manag. Int. J.* **2017**, *32*, 183–202. [CrossRef]
57. Polk, M. The influence of gender on daily car use and on willingness to reduce car use in Sweden. *J. Transp. Geogr.* **2004**, *12*, 185–195. [CrossRef]
58. Geels, F.W. From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Res. Policy* **2004**, *33*, 897–920. [CrossRef]

59. Scott, W.R. *Institutions and Organizations: Ideas and Interests*; Sage: Thousand Oaks, CA, USA, 2008.
60. Nilsen, T. Innovation from the inside out: Contrasting fossil and renewable energy pathways at Statoil. *Energy Res. Soc. Sci.* **2017**, *28*, 50–57. [CrossRef]
61. Wilks, N. Oil and gas special: Offshore industry goes green. *Prof. Eng.* **2011**, *24*. Available online: https://www.onacademic.com/detail/journal_1000029716629299_8771.html (accessed on 8 January 2020).
62. Brundtland, G.H. *Report of the World Commission on Environment and Development: Our Common Future*; Oxford University Press: Oxford, UK, 1987.
63. Norwegian Ministry of Climate and Environment (KLD). *Norway's Sixth National Communication, Under the Framework Convention on Climate Change*; KLD: Oslo, Norway, 2014.
64. Chaiyapa, W.; Esteban, M.; Kameyama, Y. Why go green? Discourse analysis of motivations for Thailand's oil and gas companies to invest in renewable energy. *Energy Policy* **2018**, *120*, 448–459. [CrossRef]
65. Hipp, J.R.; Bollen, K.A. Model Fit in Structural Equation Models with Censored, Ordinal, and Dichotomous Variables: Testing Vanishing Tetrads. *Sociol. Methodol.* **2003**, *33*, 267–305. [CrossRef]
66. Lubke, G.H.; Muthen, B.O. Applying Multigroup Confirmatory Factor Models for Continuous Outcomes to Likert Scale Data Complicates Meaningful Group Comparisons. *Struct. Equ. Model.* **2004**, *11*, 514–534. [CrossRef]
67. Fan, Y.; Chen, J.; Shirkey, G.; John, R.; Wu, S.R.; Park, H.; Shao, C. Applications of structural equation modeling (SEM) in ecological studies: an updated review. *Ecol. Process.* **2016**, *5*, 19. [CrossRef]
68. Schumacker, R.E.; Lomax, R.G. *A Beginner's Guide to Structural Equation Modeling*, 2nd ed.; Lawrence Erlbaum Associates: Mahwah, NJ, USA, 2004.
69. Sijtsma, K.; Straat, J.H.; van der Ark, L.A. Goodness-of-Fit Methods for Nonparametric IRT Models. In *Quantitative Psychology Research. Springer Proceedings in Mathematics & Statistics*; van der Ark, L.A., Bolt, D.M., Wang, W.-C., Douglas, J.A., Chow, S.-M., Eds.; Springer Nature: Cham, Switzerland, 2015; pp. 109–120. [CrossRef]
70. MacKenzie, S.B.; Podsakoff, P.M.; Podsakoff, N.P. Construct Measurement and Validation Procedures in MIS and Behavioral Research: Integrating New and Existing Techniques. *MIS Q.* **2011**, *35*, 293–334. [CrossRef]
71. Buchanan, D.A.; Bryman, A. Contextualizing Methods Choice in Organizational Research. *Organ. Res. Method* **2007**, *10*, 483–501. [CrossRef]
72. Weijters, B.; Cabooter, E.; Schillewaert, N. The effect of rating scale format on response styles: The number of response categories and response category labels. *Int. J. Res. Mark.* **2010**, *27*, 236–247. [CrossRef]
73. Yong, A.G.; Pearce, S. A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutor. Quant. Methods Psychol.* **2013**, *9*, 79–94. [CrossRef]
74. Gaskin, J. SEM Series (2016) 3. Exploratory Factor Analysis (EFA). Available online: https://www.youtube.com/watch?v=VBsuEBsO3U8&list=PLnMJlbz3sefJaVv8rBL2_G85HoUko5I--&index=3 (accessed on 26 October 2018).
75. Gallagher, M.W.; Brown, T.A. Introduction to Confirmatory Factor Analysis and Structural Equation Modeling. In *Handbook of Quantitative Methods for Educational Research*; Teo, T., Ed.; SensePublishers: Rotterdam, The Netherlands, 2013; pp. 289–314. [CrossRef]
76. Podsakoff, P.M.; Mackenzie, S.B.; Lee, J.-Y.; Podsakoff, N.P. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *J. Appl. Psychol.* **2003**, *88*, 879–903. [CrossRef]
77. Gaskin, J. Excel StatTools. Available online: http://statwiki.kolobkreations.com/index.php?title=Main_Page (accessed on 20 August 2018).
78. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis: Pearson New International Edition*; Pearson Education Limited: Harlow, UK, 2013.
79. Kenny, D.A.; Kaniskan, B.; McCoach, D.B. The Performance of RMSEA in Models With Small Degrees of Freedom. *Sociol. Methods Res.* **2014**, *44*, 486–507. [CrossRef]
80. Tracey, J.B.; Tews, M.J. Construct Validity of a General Training Climate Scale. *Organ. Res. Methods* **2005**, *8*, 353–374. [CrossRef]
81. Kock, N. Common method bias in PLS-SEM: A full collinearity assessment approach. *Int. J. E-Collab.* **2015**, *11*, 1–10. [CrossRef]
82. O'brien, R.M. A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Qual. Quant.* **2007**, *41*, 673–690. [CrossRef]

83. Loken, E.; Gelman, A. Random measurement error and the replication crisis: A statistical analysis. *Science* **2017**, *335*, 584–585. [CrossRef]
84. Golant, B.D.; Sillince, J.A.A. The Constitution of Organizational Legitimacy: A Narrative Perspective. *Organ. Stud.* **2007**, *28*, 1149–1167. [CrossRef]
85. Greenwood, R.; Suddaby, R. Institutional Entrepreneurship in Mature Fields: The Big Five Accounting Firms. *Acad. Manag. J.* **2006**, *49*, 27–48. [CrossRef]
86. Schneiberg, M.; Lounsbury, M. Social movements and institutional analysis. In *Handbook of Organizational Institutionalism*; Greenwood, R., Oliver, C., Sahlins, K., Suddaby, R., Eds.; SAGE Publications: London, UK, 2008; pp. 648–670.
87. Zietsma, C.; Lawrence, T. Institutional Work in the Transformation of an Organizational Field: The Interplay of Boundary Work and Practice Work. *Adm. Sci. Q.* **2010**, *55*, 189–221. [CrossRef]
88. Laïfi, A.; Josserand, E. Legitimation in practice: A new digital publishing business model. *J. Bus. Res.* **2016**, *69*, 2343–2352. [CrossRef]
89. Haack, P.; Schoeneborn, D.; Wickert, C. Talking the Talk, Moral Entrapment, Creeping Commitment? Exploring Narrative Dynamics in Corporate Responsibility Standardization. *Organ. Stud.* **2012**, *33*, 815–845. [CrossRef]

RESEARCH PAPER 3

Revista de Administração Contemporânea
Journal of Contemporary Administration

ASSOCIAÇÃO NACIONAL DE PÓS-GRADUAÇÃO E PESQUISA EM ADMINISTRAÇÃO

e-ISSN: 1982-7849

Research Article

A Surge toward a Sustainable Future: Organizational Change and Transformational Vision by an Oil and Gas Company

O Despontar de um Futuro Sustentável: Mudança Organizacional e Visão Transformadora em uma Empresa de Gás e Petróleo

Tahrir Jaber[1]

ABSTRACT

Context: reflecting the call being made by the United Nations to solve our current climate challenges and reduce companies' CO_2 emissions, there is a strong need for large corporations to not only employ the terminology of sustainable transitions, but to implement strategies and select new alternative sustainable solutions. **Objective:** this study fills a gap in the literature by developing and validating a model that helps researchers understand the factors that enable a large corporation undergoing a sustainable transition to select its new sustainable practices. The developed model used theories of sustainability transition and institutional theory with three pillars (regulative, normative, and cognitive) in order to help understand the nature of the company's innovation selection criteria. **Method:** survey-based research was carried out among an oil and gas company's employees, and structural equation modeling was used to test the model fit, validate the survey, and test the hypotheses. **Results:** the results showed that normative and regulative pillars play the main role in selecting renewable energy activities as a first step toward the company's sustainable future. **Conclusion:** the findings provide researchers with a valuable model for understanding the main criteria for selecting new sustainable projects in established companies.

Keywords: sustainable transition; innovation selection; oil and gas industry; renewable energy; institutional theory; organizational culture.

RESUMO

Contexto: como reflexo do chamado das Nações Unidas para que se busquem soluções para os desafios climáticos atuais e se reduza a emissão de CO2 pelas empresas, há uma grande necessidade de que as grandes empresas não apenas empreguem a terminologia referente à transição para a sustentabilidade, mas também implementem estratégias e adotem soluções alternativas sustentáveis. **Objetivo:** este estudo preenche uma lacuna na literatura ao desenvolver e validar um modelo que ajuda os pesquisadores a compreender os fatores que permitem a seleção de novas práticas sustentáveis no âmbito de uma grande empresa em transição para a sustentabilidade. O modelo desenvolvido utilizou teorias de transição para a sustentabilidade e a teoria institucional com três pilares (regulativo, normativo e cognitivo) para ajudar a compreender a natureza dos critérios de seleção de inovação da empresa. **Método:** realizou-se uma pesquisa do tipo survey junto a funcionários de uma empresa de gás e petróleo, e realizou-se uma modelagem de equações estruturais para testar o ajuste do modelo, validar a pesquisa e testar as hipóteses. **Resultados:** identificou-se que os pilares normativos e reguladores exercem o papel principal na seleção das atividades de energia renovável como um primeiro passo da empresa em direção a um futuro sustentável. **Conclusão:** os resultados fornecem aos pesquisadores um modelo valioso para a compreensão dos principais critérios para a seleção de novos projetos sustentáveis em empresas estabelecidas.

Palavras-chave: transição para a sustentabilidade; seleção de inovação; setor de gás e petróleo; energia renovável; teoria institucional; cultura organizacional.

1. UiT The Arctic University of Norway, School of Business and Economics, Tromso, Norway.

Cite as: Jaber, T. (2021). A Surge toward a sustainable future: Organizational change and transformational vision by an oil and gas company. *Revista de Administração Contemporânea*, *25*(3), e200031. https://doi.org/10.1590/1982-7849rac2021200031.en

JEL Code: Q56, K32, O3.

Editor-in-chief: Wesley Mendes-Da-Silva (Fundação Getulio Vargas, EAESP, Brazil)
Associate Editor: Elin Oftedal (The Artic University of Norway, Norway)
Reviewers: Two reviewers chose not to disclose their identities.
Peer Review Report: The disclosure of the Peer Review Report was not authorized by its reviewers.

Received: January 29, 2020
Last version received: September 01, 2020
Accepted: September 02, 2020

# of invited reviewers until the decision:

	1	2	3	4	5	6	7	8	9
1st round	X	X	X	X	X	✋			
2nd round	X	✋	X						
3rd round	✋								
4th round	✋								

INTRODUCTION

We have moved into a world where the environment, with its natural resources, is becoming endangered due to the growth of emissions (Wenzel & Alting, 2004). This has led international organizations and political efforts to meet problems like climate change, in addition to finding solutions and encouraging people to change (Molcho & Shpitalni, 2006). The United Nations (UN), for example, is working toward a goal to limit the average global temperature to no more than two degrees Celsius (United Nations, 2016). This has forced companies to change their environmental engagement and invest in sustainable activities (Miras-Rodríguez, Domínguez-Machuca, & Escobar-Peréz, 2015).

In particular, many companies have considered sustainability as a management tool that identifies the company's position in relation to sustainable development (Baumgartner, 2003). For example, researchers report that integrating sustainable strategies into overall business can bring several benefits: triggered innovations that are efficient in the use of resources, development of new environmental markets, improved corporate image, product differentiation, enhanced competitive advantage, and economic growth (Porter & Van der Linde, 1995; Shrivastava, 1995). However, meeting climate objectives requires technological and organizational changes in business activity (Molcho & Shpitalni, 2006). This growing interest in sustainability calls for more research to better understand how sustainability is developed in companies (Binz, Harris-Lovett, Kiparsky, Sedlak, & Truffer, 2016; Kishna, Niesten, Negro, & Hekkert, 2017).

Integration of sustainability in companies has been extensively studied. For example, it has been found that sustainability adoption occurs when employees support corporate efforts to move toward a more sustainable future (Frandsen, Morsing, & Vallentin, 2013). Markard, Raven, and Truffer (2012) have also found that sustainability transition requires different actors and interests to make sustainability part of the company. Furthermore, Daneshpour and Takala (2016) indicate that renewable energy (RE), social satisfaction, efficiency improvement, and innovation are the key drivers to achieve sustainability. However, Kudratova, Huang, and Zhou (2018) indicate that there is still a lack of quantitative studies concerning sustainability project selection. Consequently, this paper fills the lack of quantitative studies and aims to explain how an established company selects its sustainable, innovative projects to meet global environmental challenges.

The world today faces fundamental sustainability challenges in several areas, energy supply being one of them (International Energy Agency [IEA], 2017). The oil and gas (OG) sector, for example, is challenged by social and environmental pressures to engage with low carbon energy transition. This has forced OG companies to move toward a cleaner market and invest in RE. However, given that RE is outside the core business of OG companies, this requires such companies to gain legitimacy in order to meet the expectations of different stakeholders such as employees, suppliers, customers, investors, and society as a whole (Fisher, Kotha, & Lahiri, 2016; Jawahar & McLaughlin, 2001). Thus, companies in transition are required to include changes in user practices, technological and institutional structures (Markard, Raven, & Truffer, 2012). At the same time, selecting a new sustainable project is a difficult process especially for established companies in transition. Thus, this paper uses institutional theory and its three pillars: regulative, normative, and cognitive, as a tool to understand how people in established companies make their sustainable choices and aim to perceive these choices as legitimate internally.

This study creates a measure of a company's innovation selection that helps us understand how a new sustainable culture in an established company is maintained. Thus, this topic is explored by addressing the following research question: How does an established company manage its sustainable transition? This question contributes to existing literature by employing a quantitative empirical approach and developing a questionnaire for how the idea of innovation selection is reviewed. Thus, this paper is structured as follows: First, relevant literature on institutional theory and sustainability are reviewed. Second, theoretical background, theoretical model, and hypotheses are provided. The article continues with a description of research methodology, testing of the model, followed by the results and discussion. Finally, conclusions, limitations, and directions for future research are provided.

THEORETICAL FRAMEWORK AND HYPOTHESES

In this section, streams of literature are reviewed that are of major relevance to this study, namely sustainability, institutional theory and innovation selection. This helps develop the theoretical framework, understand how an established company manages its sustainable activities, and create hypotheses that will be tested later in the study.

Sustainability: principles and practices

The concept of sustainable development has been raised since the introduction of the Brundtland report in 1987 as "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs' (United Nations, 1987). Sustainability

in this study is seen as a commitment that enables an established company to develop new clean alternatives and aims to achieve new perspectives such as social and environmental development, rather than focusing on economic gains.

Previous research indicates that studies on sustainability have expanded rapidly (Caprar & Neville, 2012; Freeman & Soete, 1997; Grin, Rotmans, & Schot, 2010; Khalili-Damghani, Sadi-Nezhad, Lotfi, & Tavana, 2013; Markard et al., 2012). For example, Kemp (1994), Kemp, Schot, and Hoogma (1998), and Schot, Hoogma, and Elzen (1994) have investigated the factors that have led companies to develop new sustainable regimes, while others were concerned with examining how companies manage transitions toward sustainability. In addition, Markard et al. (2012) highlight that relatively little effort has been made concerning sustainable transition, especially within the domains of management studies such as sustainable transition initiatives and sustainable project selection criteria.

Furthermore, other researchers have considered clean innovation as one of the core drivers for sustainable shifts in industry, focusing mostly on innovation systems and the link between societal and technical regimes (Markard et al., 2012). Other researchers highlight that sustainability transition is a narrow field that needs more in-depth quantitative studies concerning how this transition could be undertaken in practice and how a sustainable strategy process is measured (Engert, Rauter, & Baumgartner, 2016; Kudratova, Huang, & Zhou, 2018; Musiolik, Markard, & Hekkert, 2012).

As a result, Galbreath (2009) and Hahn (2013) show that some companies still find it difficult to integrate sustainability into business strategy and there is a need for more research concerning how companies select their sustainable projects. Therefore, in order to fill the lack of research, this study follows an OG company that is experiencing a major period of transition (low oil price and climate challenges) and aiming to introduce RE practices into its business. This would create uncertainty in the OG company, which is aiming to invest heavily in alternative, cleaner sources of energy and adapt new technologies in their production in order to meet sustainable measures and standards. The next section introduces a viable theoretical framework and hypotheses developed to answer the research questions of this paper.

Theoretical model and hypotheses

Sustainability transition

Researchers like Tushman and O'Reilly (2002) indicate that organizations demand change and renewal when new modes of innovation demand it. This allows organizations to respond quickly to market change and secure their survival and growth (Tushman & O'Reilly, 2002). This paper focuses on a sustainable change that happens in an OG company. Sustainability transitions can be defined as "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (Markard et al., 2012, p. 956). Sustainability transition, in this study, is viewed as an introduction to a sustainable shift (RE) in an OG company and is seen as a long-term goal of the company's overall strategy, as indicated in Table A1.

Researchers show that there is a rapidly growing amount of literature in the field of transition studies (Markard et al., 2012). This includes studies such as infrastructures and transitions (Loorbach, Frantzeskaki, & Thissen, 2010), the transformation of the energy system (Schreuer, Rohracher, & Späth, 2010), and actor strategies (Farla, Markard, Raven, & Coenen, 2012) in addition to studies to address environmental problems in companies and which aim to explore new commercial opportunities related to new technologies (Smith, Stirling, & Berkhout, 2005).

New sustainable innovations do not offer user benefits, but they do offer a collective good that scores lower on price than established technologies (Geels, 2011). This makes it difficult for companies to replace existing technologies without changing their company policies and regulatory framework (Geels, 2011). This also demands changes in their institutional systems, organizational culture, and technological configurations (Gaziulusoy & Ryan, 2017; Loorbach, 2010).

In addition, Tushman and O'Reilly (2002) show that managing organizational change requires a strategic imperative that is reflected in organizational culture, structure, and practices. For instance, researchers like Selznick (1957) have developed institutional theory that aims to study how organizations shape their structures in relation to the commitments of their participants and external parties. In addition, Orji (2019) identifies the sustainable drivers and barriers that might enhance or block sustainability transition in companies. Other researchers such as Michaelides, Bryde, and Ohaeri (2014) have studied management experience and its effect toward investing in sustainable activities. Therefore, this study presents a theoretical model and defines the main factors that would influence an established OG company to select its sustainable projects as shown in Figure 1.

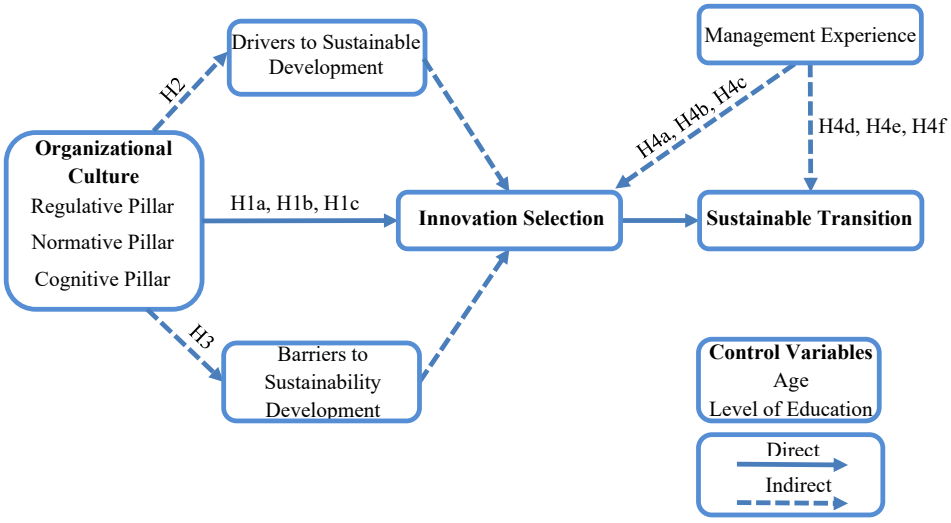


Figure 1. A theoretical framework.

The factors in Figure 1 include sustainable transition (dependent variable) that depends jointly on innovation selection (another dependent variable) and the organizational culture (independent variables). Consequently, the ambition of this paper is to enrich the existing theoretical basis of sustainability transition research and organizational culture.

However, a core challenge toward moving into sustainable solutions in an OG company is faced when producing a new business activity that is not perceived as a core activity. Yusuf et al. (2013) claim that studying how an OG company reacts toward a sustainable change remains an under-researched field of inquiry. Therefore, it is interesting to understand how a sustainable innovative project is selected.

In this account, the central factor of the developed model (Figure 1) is the company's innovation selection. Innovation selection is assumed to capture the main factors (three institutional pillars, drivers, and barriers) that enable the company to select its sustainable, innovative projects.

Direct hypotheses: innovation selection

The field of innovation is very broad; authors like Kimberly (1981, p. 85) focus on the difference between 'diffusion' and 'adoption' of innovation; additionally, Van de Ven and Rogers (1988, p. 636) make the distinction between studies of 'innovating' and 'innovativeness.' This study focuses on the adoption of 'clean innovations' in an established OG company in order to examine what enhances or hinders the company's innovation selection criteria.

Literature in innovation selection was started in the 1960s and covered areas such as uncertainty, degree of risk and research, and development and innovation projects that are needed to understand the decision-making process (Bin, Azevedo, Duarte, Salles-Filho, & Massaguer, 2015). However, Kudratova et al. (2018) and Solak, Clarke, Johnson, and Barnes (2010) argue that literature is limited in the innovative project selection issues, due to the fact that it is difficult to capture the whole concept of project selection in addition to the complexity of integrating new sustainable solutions in the company's routines.

Selecting a sustainable project is essential in order to obtain expected outcomes, maintain competitiveness, or increase a company's value (Kudratova et al., 2018). In addition, the innovation selection criteria should cover important needs for users, provide expected profitability for the company, improve brand image, conquer new markets, and function effectively (Yannou, Zimmer, Farel, Jankovic, & Cardinal, 2013). Other researchers like Payne, Bettman, and Johnson (1988) claim that the project selection approach looks at costs, efforts required, and benefits that enable a company to select the best alternative choice.

In addition, researchers like Burgelman have confirmed that the internal selection mechanism is linked strongly to the overall strategy that aims to maintain and gain control over the company's destiny (Burgelman, 1991, 2002). This way, the internal selection environment deals with the overall corporate strategy, competition, competence, and strategic action (Burgelman & Siegel, 2008). Thus, the internal selection environment is essential to help a company align its strategic action.

Furthermore, companies adopt innovations in order to respond to either technological or market challenges (Brenner, 1987; Gomes-Casseres, 1996; Gomes-Casseres,

1994; Hage, 1988; Smith, Grimm, & Gannon, 1992). For example, in OG companies, there are no definite answers concerning the selection of RE sources (wind, hydropower, solar energy, geothermal energy, or bio energy). Selecting an RE case is not simply about the finished product or its impact on society, but the whole physical life cycle of the RE case (technology used, location, competences, long-term strategy, and profit).

According to the case company of this paper, sustainability is embedded in the overall strategy that aims to provide low carbon energy. However, the sustainable innovation selection mechanism has become a multi-criteria decision-making problem, and is derived to satisfy the company's overall strategy. Thus, in this paper, innovation selection is seen as a project that will be within the core strategy, covered by the company's competence, representing an interesting market, serving the top manager's interests, achieving a high profit and positive environmental/social profile, as listed in Table A1. However, the adoption of innovation in an established company requires a change in its internal environment — for example, the structure and functioning of the company (Damanpour, 1991). This requires activities that help facilitate the adoption of innovation and putting it into use (Damanpour, 1991). At the same time, the required activities to initiate and implement the innovation are different in each organization (Marino, 1982; Zaltman, Duncan, & Holbek, 1973; Zmud, 1982). This opens new perspectives in organizational research, including the issues of institutional change (Bell, 1974; Hage & Powers, 1992) and the integration of micro-level analysis in companies (Hage, 1999).

Thus, institutional theory, in this paper, plays an essential role in analyzing rules, norms, and routines that leads the company to achieve specific goals (sustainable transition, in this study) (Scott, 2014). Institutional theory also provides a comprehensive theoretical lens that helps understand different attitudes and practices in a particular social context (Scott, 1995a; Scott, 2014).

Direct hypotheses: Institutional pillars

An organization can adopt a new idea or behavior that is new to the organization (Daft & Becker, 1978; Damanpour, 1988, 1991; Hage & Aiken, 1970; Oerlemans, Meeus, & Boekema, 1998; Zaltman et al., 1973; Zammuto & O'Connor, 1992). This study takes an OG company as an example of a large corporation that adopted clean innovations that are new to the company and outside its core business. This sustainable change introduces new technologies to the OG company and leads to its transformation from only OG to mixed-energy. This concept is interesting because it changes the institutional embeddedness of the company and the internal attitudes toward that change. This allows us to understand how the employees perceive this change and select new sustainable projects.

Sustainable transition in companies is complex and there is profound disagreement between researchers on how to investigate such a transition (Geels, 2011). Geels (2011), for example, called sustainable transition a 'socio-technical regime' that aims to achieve long-term changes by struggling against existing regimes. The socio-technical regime includes rules such as cognitive routines, shared values, competences, user practices, and institutional arrangements and regulations (Geels, 2011). The socio-technical regime aims to capture different regimes so that companies can adjust their cultural, political, and industrial dimensions in order to adopt new technologies (Geels, 2004, 2011).

Institutional theory assumes that organizations change due to external forces; however, organizational culture deals with these changes internally in order to undergo new changes and secure the company's internal legitimacy (Barley & Tolbert, 1997; DiMaggio & Powell, 1991; Pedersen & Dobbin, 1997, 2006; Scott, 2014). Thus, institutional theory and its three pillars are used in this article in order to examine the role culture plays during a change and how this culture affects the company's sustainable choices. Thus, understanding the relationship between a company's culture and selecting new sustainable technologies can provide greater insight into the organization undergoing change.

In addition, this paper focuses on the employees' sustainable choices due to the fact that employees have an essential influence on the implementation process (Zammuto & O'Connor, 1992) and that the greatest innovation challenges might come from them (Tushman & O'Reilly, 2002). In other words, a change in an organization requires changing a culture that occurs at the internal levels in a company (Kondra & Hurst, 2009).

Thus, the three institutional pillars, regulative, normative, and cultural-cognitive, help us understand how a company undergoes new change, how employees make choices, and the extent to which their choices are rational (Marx, 2014). First, the regulative pillar is associated with the regulatory processes that involve the capacity to establish new laws and rules in order to influence future behavior (Scott, 2014) and advance an individual's interest (Marx, 2014). The regulative pillar emphasizes the importance of maintaining and changing institutions Scott (2014). Thus, the regulative pillar, in this paper, focuses on employees' perceptions of new policies and goals developed by the OG company that lead to a sustainable transition, as listed in Table A1. By this, it is hypothesized that:

> Hypothesis 1a — The regulative pillar strengthens the effect of innovation selection on sustainable transition.

Second, the normative pillar is associated with both values and norms. Values are perceptions of preferred or desired standards to which existing behaviors can be compared and assessed; however, norms involve shared behavior that specify how things should be done (Scott, 2014). Values and norms are not predictions; they are prescriptions used to understand how the company's employees are supposed to behave (Scott, 2014). Thus, the normative pillar in this paper involves a measure of the employee's self-evaluation that acts as a stabilizing influence on the social beliefs and norms that are considered morally appropriate and correct, as listed in Table A1. By this, it is hypothesized that:

> Hypothesis 1b — The normative pillar strengthens the effect of innovation selection on sustainable transition.

Third, the cultural-cognitive pillar involves shared conceptions that create the nature of social reality, and build the frames that make this meaning possible. By this, Scott (2014) believes that institutions should take the cognitive dimensions of human existence by dealing with the external world of stimuli and the reaction of individual organisms. Thus, the cultural-cognitive pillar explains how a company's employees respond to the world around them (Turner, 1974; Ventresca & Mohr, 2002). Thus, the cultural-cognitive pillar in this paper plays a central role in connecting the companies to the external environmental problems and challenges them to build sustainable knowledge and solve such environmental problems by engaging in new sustainable practices, as listed in Table A1. By this, it is hypothesized that:

> Hypothesis 1c — The cognitive pillar strengthens the effect of innovation selection on sustainable transition.

Mediation hypothesis: drivers/barriers

In addition, the proposed model in Figure 1 explores the role that drivers/barriers play in enhancing or blocking the sustainability effort by an OG player. Miras-Rodríguez, Domínguez-Machuca, and Escobar-Peréz (2015) claim that there is limited quantitative research discussing the impact of drivers and barriers on sustainability activities adopted by companies. However, Orji (2019) summarizes the studies (mostly qualitative) that identify the drivers and barriers that might enhance or block sustainability in companies. On one hand, Orji (2019) identifies drivers as governmental regulation, promoting sustainable products, developing infrastructure support, etc. On the other hand, Orji (2019) identifies the barriers as inefficient legal framework, inadequate proactive plans, lack of employee welfare, etc. Furthermore, Table 1 helps reveal a clear picture of the overall impact of mediating institutional theory on innovation selection and sustainable transition.

Table 1. Moderation and mediation studies in sustainability.

Literature	Outcomes variables	Moderator	Mediator
Gabzdylova, Raffensperger, and Castka (2009)	Personal values, preferences, satisfaction (i.e., enjoyment of the work itself), product quality, and customers' demand.	Size of the involved companies	Sustainability drivers
Bjørner, Hansen, and Russell (2004); Haigh and Jones (2006); Marshall, Cordano, and Silverman (2005); Tullberg (2005)	Managerial attitudes, employees' demands, organizational culture, internal pressure on business managers, and social development activities.	----------	Sustainability drivers
Luthra, Govindan, and Mangla (2017)	Management support, governmental policies and regulations, gaining the market edge, and improving the overall performance.	----------	Drivers to sustainable consumption and production adoption
Thomas-Seale, Kirkman-Brown, Attallah, Espino, and Shepherd (2018)	Education, cost, software, materials, mechanical properties, validation, and finishing.	Industrial manufacturing companies	Barriers to the progression of technologies government and policy makers are interested in
Trianni, Cagno, and Neri (2017)	Economic barrier and resistance to change (lack of information and other priorities).	Manufacturing firms	Barriers that hinder sustainable implementations
Aboelmaged (2018)	Organizational drivers, environmental pressure, and competitive capabilities.	Small and medium-sized industries	Drivers to sustainable manufacturing practices
	More sustainability awareness.	Experience of project managers	----------
Hind (2009)	Responsible leadership (integrity, open-minded, ethical behavior, care for people, and managing responsibility outside the organization).	Leadership sustainable skills	----------
Robinson (2006)	Environmental issues, social issues, and financial issues.	Managers' knowledge toward promoting sustainability in companies	----------

This paper views sustainability drivers as customer expectations, green strategy, internal requirements, corporate culture, knowledge of sustainability, use of new technology, development of new technology, return on investment (ROI), demand from investors, and reputation of the firm. However, barriers are viewed as lack of: financial funds, competence and capabilities, employee motivation, technology, support from top-management, ROI, and perceived importance. The list of drivers and barriers are listed in Table A1.

Consequently, it is hypothesized that:

Hypothesis 2 — Drivers mediate the positive effect of the regulative, normative, and cognitive pillar on innovation selection.

Hypothesis 3 — Barriers mediate the positive effect of the regulative, normative, and cognitive pillar on innovation selection.

Moderation hypotheses: management experience

Finally, managers are becoming aware of the need to satisfy social and environmental issues, thus, they play an essential role in selecting a specific sustainable project and in driving their companies toward sustainability. In addition, investing in sustainable projects has increased dramatically in the business world, where companies realize the importance of emphasizing social and environmental goals in their companies (Bansal, 2005; Global Reporting Initiative [GRI], 2011; Hoffman, 1999). Researchers have found that management experience increases the awareness of sustainability and, thus, more experienced managers are able to drive sustainability into the company's activities (Michaelides, Bryde, & Ohaeri, 2014). Furthermore, Table 1 helps reveal a clear picture of the overall impact of moderating institutional theory on innovation selection and sustainable transition.

Therefore, it is hypothesized that:

Hypothesis 4a — Management experience strengthens the positive effect of the regulative pillar on innovation selection.

Hypothesis 4b — Management experience strengthens the positive effect of the normative pillar on innovation selection.

Hypothesis 4c — Management experience strengthens the positive effect of the cognitive pillar on innovation selection.

Hypothesis 4d — Management experience strengthens the positive effect of the regulative pillar on sustainable transition.

Hypothesis 4e — Management experience strengthens the positive effect of the normative pillar on sustainable transition.

Hypothesis 4f — Management experience strengthens the positive effect of the cognitive pillar on sustainable transition.

RESEARCH METHOD

In order to examine the selection criteria of sustainable projects and test the above hypotheses, this section describes the survey developed for this study, defines its empirical context, and describes and analyses the dataset.

Oil and gas industry toward renewable energy

The world faces a change in the energy industry and moves toward electrification in order to tackle the climate challenges we meet today. Gielen, Boshell, Saygin, Bazilian, Wagner, and Gorini (2019) show that RE provided 14% of the global energy sources in 2015 with an expectation of this growing very fast in the future. This put the OG industry under risk and forced it to reduce its OG production (Dale & Fattouh, 2018; Eser & Stansbury, 2018).

This challenges OG companies to introduce new, clean energy activities to their businesses, such as RE. In particular, RE has received significant attention as a means to improve environmental activities for commercial use, and is found to be a new promise to the world's future energy (Bayer, Dolan, & Urpelainen, 2013), due to its low environmental impact and low energy costs.

Thus, the context of this study is the OG sector. With its current sustainable shift toward RE, it presents an ideal setting to understand how an OG company selects its sustainable activities. However, introducing RE technologies to a pure OG company adds complexity to its organizational processes. This requires the company to enhance its capabilities by adapting knowledge and competencies outside its boundaries. The case company of this paper presents a well-established European OG producer; however, as a strategic response to the climate change and growth in the RE market, it managed to enter the RE market and shift the company from purely OG to a broad energy major. This paper focuses on the company's employees who have an essential role in introducing new sustainable ideas to their management team, as will be explained next.

Data description and procedure

This quantitative paper has been developed from a survey conducted between 2017 and 2019. Part of the data was used in another article, mainly the institutional pillars (regulative, normative, and cognitive) and sustainable transition as shown in the dataset description by Jaber and Oftedal (2019). The article was published in *Sustainability Journal* by Jaber and Oftedal (2020) and aimed to understand the factors that legitimize the adoption of renewable energy activities in an oil and gas company. The survey was undertaken in English as well as the local national language of the country where the company is located. A sample of 113 respondents participated in this study, where 90 respondents fully completed the survey. The 93 respondents filled out the survey through a self-administered web survey (SurveyMonkey). In addition, 20 respondents filled out a paper-based survey. The respondents who participated in this survey were mainly employees working in a sustainability unit, business development department, and corporate strategy unit, and engineers who understand the new sustainable shift that is taking place in the company. Most respondents (43%) were between 41 and 55 years old and 37% were between 26 and 40 years old. Slightly more than half of the sample's members were men (52%). In addition, 74% of the respondents had management experience and 83% had experience within the energy field.

To check conduct validity and correct any ambiguities, steps by MacKenzie, Podsakoff, and Podsakoff (2011) were followed. In the first step, the survey was developed and refined by the author and another researcher where a large pool of items was derived from institutional theory by Scott (1995b; 2014). The survey was then pre-tested with twelve experts — six academic experts and six employees from the case company. Thus, the company's contact person distributed the final version of the survey, as shown in Table A1, through the company's internal network. In the second step, the survey was evaluated and the model was validated, as will be described in the next section.

The survey in Table A1 shows the three independent variables that were derived from institutional theory. The regulatory pillar includes five items that focus on the company's regulations, policies, and incentives that aim to drive a sustainable change in the company as a whole. The normative pillar includes five items that focus on employees' contributions and expectations in order to measure their role in achieving the company's sustainable goal. Finally, the cognitive pillar involves four items that aim to measure sustainability knowledge and acceptance among employees.

In addition, the survey presents two dependent variables. First, transition toward sustainability includes four items and focuses on the new sustainable goals that the company aims to achieve. Second, innovation selection involves seven items that present the strategic decisions criteria to be taken into consideration before selecting a sustainable project. More information about the items can be shown in Table A1.

Finally, the survey presents two mediators that aim to measure the indirect effect of the interaction of institutional pillars on sustainable transition through innovation selection. First, drivers include ten items that aim to test whether there is any issue that would push the company to adopt sustainability in its agenda. Second, barriers involve seven items that aim to measure if there is any issue that would prevent the company from adopting sustainability in its agenda. Table A1 indicates the relevant items used in this study.

The survey consists of a seven-point Likert scale (ordinal variables) because it works better with educated samples (Weijters, Cabooter, & Schillewaert, 2010). The Statistical Package for Social Sciences (SPSS) and analysis of moment structures (AMOS) were used as statistical software in this study. Thus, structural equation modeling (SEM) was applied as a key diagnostic to measure the direct and indirect effects in the developed model and determine the model fit, reliability, and validity of the model (Sijtsma, Straat, & van der Ark, 2015). The next section describes in detail how the data have been analyzed.

DATA ANALYSIS AND RESULTS

Before analyzing the data, data screening of 113 respondents was undertaken. This resulted in 90 fully completed responses. This is due to excluding 22 respondents who had missing values, in addition to one unengaged respondent who gave the exact same response for every single item. In addition, four variables with less than 5% missing were replaced by the median (ordinal variables) and one variable was replaced by the mean (continuous variables). Furthermore, a skewness and kurtosis variable screening test was made where two abnormal variables were found: regulative (item 5) and sustainable transition (item 4).

The model developed in this study includes many different variables. Therefore, exploratory factor analysis (EFA) was made only for the dependent variable (sustainable transition) and the independent variables (regulative, normative, and cognitive) pillars. EFA helped regroup the variables into a limited set of items in order to better understand the relationships and patterns between variables (Yong & Pearce, 2013). In addition, when applying EFA,

maximum likelihood and promax rotation were selected because it is more useful when undertaking confirmatory factor analysis (CFA) in AMOS (Gaskin, 2016). As a result, the abnormal items (regulative 5 and sustainable transition 4) were taken into consideration and a decision was made to drop them. Then, other variables were analyzed one by one and a decision was made to drop the problematic items, respectively cognitive 2, normative 5, transition 3, regulative 4, and regulative 1. The final pattern matrix table is shown in Table 2.

Table 2. Pattern matrix[a].

	Factor			
	1	2	3	4
Cronbach's alpha	0.932	0.873	0.876	0.69
Regulative pillar 2			0.787	
Regulative pillar 3			0.979	
Normative pillar 1		0.541		
Normative pillar 2		0.605		
Normative pillar 3		0.994		
Normative pillar 4		0.720		
Cognitive pillar 1	0.635			
Cognitive pillar 3	0.954			
Cognitive pillar 4	0.919			
Transition 1				0.857
Transition 2				0.581

Note. Extraction method: maximum likelihood. Rotation method: promax with Kaiser normalization. a. Rotation converged in 5 iterations.

The pattern matrix table shows how the variables loaded significantly on each factor and represents the correlation between the variables and factors. The four-factor solution provided meaningful factors that reflected regulatory, normative, cognitive pillars and sustainable transition, explaining 73.67% of the variance. The Kaiser-Meyer-Olkin (KMO) test was 0.87 and the Bratlett's test was significant. However, Cronbach's alphas confirm an internal-consistency coefficient for the regulatory pillar (0.88), normative pillar (0.87), cognitive pillar (0.93), and sustainable transition (0.69). The rest of the variables will be analyzed one by one in the next section.

Scale evaluation and validation

As mentioned earlier, the company allows its employees to present new business ideas to the top management team. This makes the responses of the survey valid and the next section shows how the theoretical model and its variables have been validated empirically in this study.

Model fit

The SEM analysis method was used to perform a CFA that is essential to verify the factor structure that was extracted from the EFA (Gallagher & Brown, 2013). However, as this study presents a new model, common method bias (CMB) was applied to test the fit of the model by using a common latent factor (CLF) against the alternative one without the CLF (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). First, all variables from the EFA (institutional pillars and transition) in addition to the other variables (innovation selection, drivers, and barriers) were analyzed. The CFA was then applied and items that had loadings below 0.7 were dropped from the model. This presented a reduced model of 19 items (Normative 2,3&4, Regulative 2&3, Cognitive 1,3&4, Transition 1&2, Drivers 6&7, Barriers 2,3&4, Selection 1,2,3&4).

The CMB was then applied and a comparison was made between the unconstrained common method factor model to the fully zero constrained common factor model as shown in the chi-square test in Table 3 (Gaskin, 2018). The results showed a significant p-value, as shown in Table 3.

Table 3. Common method bias test results.

	Chi-square	df	p-value	Invariant?	
Overall model					
unconstrained	149.8	114			Step 1. Provide chi-square and df for unconstrained and constrained models, and provide the number of groups. The thresholds will be updated automatically.
Fully constrained	205.3	131			
Number of groups		2			
Difference	55.5	17	0.000	NO	Groups are different at the model level. Check path differences.

This result provided evidence that the actual model with the CLF model showed a better model fit (CFI = 0.964, RMSEA = 0.059, GFI = 0.864, and PCLOSE = 0.272) than the fully constrained model (CFI = 0.924, RMSEA = 0.08, GFI = 0.817, and PCLOSE = 0.015) as shown in Figure 2.

This study followed the measures by Hair, Black, Babin, and Anderson (2013) who suggest that the comparative fit index (CFI) is accepted when the values are between 0 and 1. Root mean square error of approximation (RMSEA) is accepted when the value is between 0.03 and 0.08 (Hair, Black, Babin, & Anderson, 2013). Goodness of fit index (GFI) is accepted when the value is between 0 to 1 (Hair et al., 2013). However, Kenny, Kaniskan, and McCoach (2014) accept the p of close fit (PCLOSE) when it is greater than 0.05 (Kenny, Kaniskan, & McCoach, 2014).

Figure 2 shows a shortened scale of items with three normative, two regulative, three cognitive, two transition, two drivers, three barriers, and four selection. Thus, the CFA was performed on the 90 responses by adding the CLF in order to capture the common variance among all observed variables in the model. Subsequently, the final survey instrument consisted of 19 items as shown in Table A1 (text displayed in bold ***).

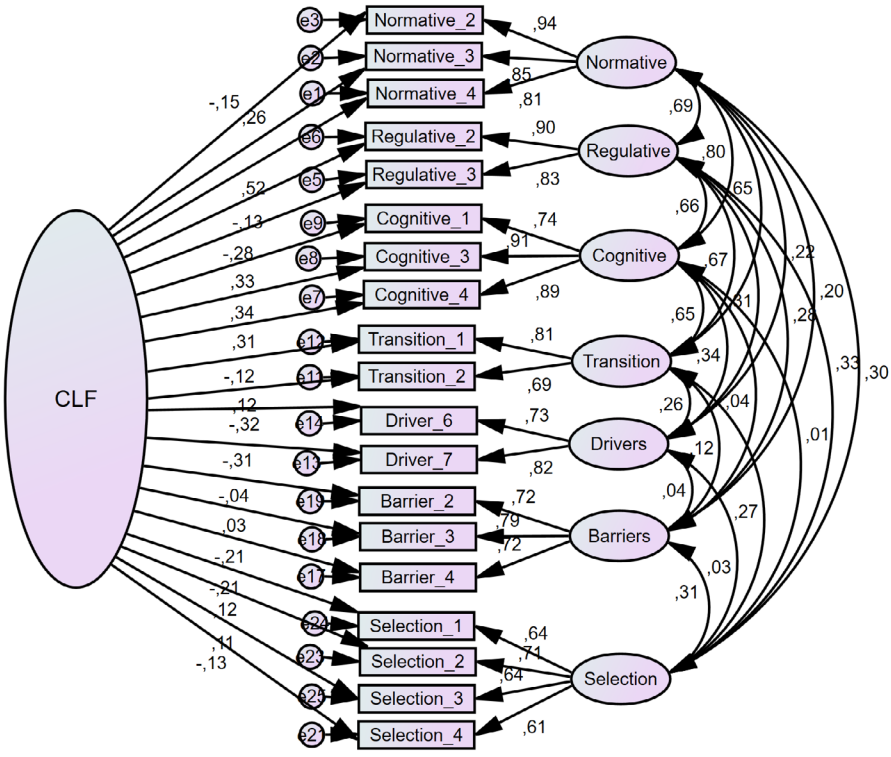


Figure 2. Confirmatory factor analysis results.
(Unconstrained model where all the paths are constrained to zero)

Table 4. Correlation matrix.

	Selection	Barriers	Drivers	Transition	Cognitive	Regulative	Normative
Selection	1.00						
Barriers	0.38**	1.00					
Drivers	0.03	0.04	1.00				
Transition	0.32**	0.16	0.32**	1.00			
Cognitive	0.03	0.06	0.42**	0.74**	1.00		
Regulative	0.38**	0.31**	0.35**	0.77**	0.72**	1.00	
Normative	0.34**	0.23*	0.28**	0.74**	0.82**	0.75**	1.00

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

In addition, Pearson's correlations for all scaled variables are presented in Table 4. As predicted, 'selection' is statistically significant with barriers, regulative and normative, and 'transition' statistically significant with drivers, cognitive, regulative, and normative. However, to examine the direct effect among institutional pillars and selection and transition, and the indirect effect among driver/barriers and innovation selection, SEM was performed using the program AMOS, as will be described later in the study.

Model validity

To validate a measure of a model in a reliable and valid manner, it is required to undertake some comprehensive validity assessments (Hair et al., 2013; Tracey & Tews, 2005). Thus, measuring reliability, convergent validity, and discriminant validity is essential to test how well the variables relate to one another. Table 5 uses a formula provided by Gaskin (2018) that automatically calculates the construct reliability (CR), average variance extracted (AVE), and maximum shared variance (MSV).

Table 5. Reliability and validity.

	CR	AVE	MSV	MaxR(H)	Barriers	Normative	Regulative	Cognitive	Transition	Drivers	Selection
Barriers	0.789	0.555	0.106	0.790	0.745						
Normative	0.903	0.757	0.689	0.914	0.156	0.870					
Regulative	0.881	0.788	0.448	0.891	0.296	0.583	0.888				
Cognitive	0.935	0.829	0.689	0.964	0.011	0.830	0.531	0.910			
Transition	0.713	0.554	0.448	0.719	0.128	0.590	0.669	0.607	0.744		
Drivers	0.828	0.708	0.127	0.863	0.061	0.092	0.357	0.163	0.259	0.841	
Selection	0.740	**0.417**	0.113	0.742	0.325	0.297	0.336	0.000	0.282	0.028	0.645

Note. Validity concerns. Convergent validity: the AVE for Selection is less than 0.50.

The CR was assessed for each variable in the model in order to measure the internal consistency of the variables (Hair et al., 2013) as shown in Table 5. This represents that all the measures meet the threshold suggested by Hair et al. (2013) (CR > 0.7). Thus, this shows an excellent reliability and internal consistency. For the AVE, it is important in the SEM in order to determine which variables share a high proportion of variance (Hair et al., 2013). Table 5 shows that all the measures meet the threshold suggested by Hair et al. (2013) (AVE > 0.5) except the variable 'Innovation Selection'. However, Malhotra and Dash (2011) argue that AVE is too strict, and reliability can be established through CR alone (which was achieved in this study).

In addition, external validity was performed by comparing the AVE measures to a paper published in the international conference on information systems (Hoerndlein, Benlian, & Hess, 2012). The mentioned study asked actors to rate the institutional influences concerning adopting green innovations that were outside the organizational context, on a five-point Likert scale survey. This shows that the regulatory pillar in this paper (0.79) correlated positively ($p < 0.03$) to their regulatory pillar (0.82). In addition, the normative pillar (0.76) correlated positively ($p > 0.11$) to their normative pillar (0.65). However, the cognitive pillar (0.83) correlated positively ($p > 0.15$) to their cognitive pillar (0.68). In sum, these comparisons indicate a respectable correspondence between

this study's institutional measures and relevant variables from external sources.

Finally, the MSV was also measured in order to ascertain whether one measure is distinct from another measure (Hair et al., 2013; Tracey & Tews, 2005). Results from Table 5 show that the MSV is supported (MSV < AVE) according to Hair et al. (2013).

These results show that the model developed in this study was validated empirically, and ready for testing.

Testing hypotheses

Before testing the developed hypotheses, Cook's distance analysis and multicollinearity test have to be considered in this study. The Cook's distance analysis helped look at the influential points in the dataset and was made on each dependent variable against all the independent variables. Thus, no abnormal records were found in the Cook's distance analysis on 'selection.' However, one abnormal record was found when the Cook's distance analysis was applied to the 'transition,' and a decision was made to keep the abnormal record because it was not very far from the other records.

Furthermore, a multicollinearity test helped predict the correlation between the independent variables themselves and with the dependent variables. Table 6 shows that the dependent variable 'selection' has no multicollinearity problems. Table 7 shows, also, that the dependent variable 'transition' has no multicollinearity problems. This is based on the threshold values by Hair et al. (2013), Kock (2015), and O'Brien (2007), where the tolerance should be greater than 0.1. In addition, a variance inflation factor (VIF) value should be less than 10 (O'Brien, 2007; James, Witten, Hastie, & Tibshirani, 2013). James, Witten, Hastie, and Tibshirani (2013) and O'Brien (2007) indicated that in practice a small amount of collinearity among independent variables is accepted and a VIF value that exceeds 10 indicates a problem.

Table 6. Multicollinearity test for 'Selection'.

		Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
	Model	B	Std. error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.463	0.419		5.881	0.000		
	Barriers	0.074	0.052	0.130	1.428	0.157	0.810	1.234
	Drivers	0.036	0.082	0.041	.443	0.659	0.797	1.255
	Cognitive	-0.396	0.073	-0.897	-5.419	0.000	0.245	4.081
	Regulative	0.303	0.091	0.459	3.347	0.001	0.357	2.799
	Normative	0.471	0.110	0.693	4.279	0.000	0.256	3.904

Table 7. Multicollinearity test for 'Transition'.

		Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
	Model	B	Std. error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.067	0.491		4.213	0.000		
	Barriers	-0.042	0.061	-0.047	-0.685	0.495	0.810	1.234
	Drivers	0.007	0.096	0.005	0.073	0.942	0.797	1.255
	Cognitive	0.164	0.086	0.240	1.912	0.059	0.245	4.081
	Regulative	0.457	0.106	0.448	4.307	0.000	0.357	2.799
	Normative	0.225	0.129	0.214	1.745	0.085	0.256	3.904

Subsequently, the general model takes the following equations:

$$Y = \beta_0 + \beta_1 * Barriers + \beta_2 * Drivers + \beta_3 * Cognitive + \beta_4 * Regulative + \beta_5 * Normative + \varepsilon$$

$$\text{Innovation Selection} = 2.5 + 0.07 * Barriers + 0.04 * Drivers - 0.4 * Cognitive + 0.3 * Regulative + 0.47 * Normative + \varepsilon$$

$$\text{Sustainable Transition} = 2.07 - 0.04 * Barriers + 0.01 * Drivers + 0.16 * Cognitive + 0.46 * Regulative + 0.23 * Normative + \varepsilon$$

As a result, the output results from AMOS show that the model explains 46% of the outcome data (R^2= 0.46). Furthermore, in order to test the indirect effects of the model, a plugin built by Gaskin and Lim (2018) was used in AMOS as shown in Table 8. Table 8 shows the standardized estimates of the direct and indirect effects. Thus, it indicates that H1a and H1b are significant and thus supported. H1c indicates a negative but statistically significant relation among cognitive and transition. This might be due to the addition of the two mediating variables (drivers/barriers). However, H2 and H3 are not significant and not supported by this study. This means that the data provides little or no evidence that the mediators (barriers/drivers) have an indirect effect on the model.

Furthermore, by using the Excel tool developed by Gaskin (2018), Figure A1 shows the results of the moderator's effect (management experience) on the model. This shows that H4b, H4c, H4d, and H4e are significant and supported; however, H4a and H4f are not significant and not supported in this model. This means that management experience strengthens the relationship between the regulative pillar and innovation selection, strengthens the relationship between the normative pillar and transition, strengthens the relationship between the normative pillar and innovation selection, and strengthens the relationship between the cognitive pillar and transition. However, management experience weakens the relationship between the regulative pillar and transition and weakens the relationship between the cognitive pillar and selection.

Finally, the results show some non-significant effects on the hypotheses and, therefore, a post-hoc analysis is required. According to Hair et al. (2013) and Loken and Gelman (2017), a post-hoc test is valid when it is greater than 0.8. Thus, the post-hoc result for the dependent variable 'transition' gave a value of 0.875, and the post-hoc result for the dependent variable 'selection' gave a value of 1, meaning that the non-significant effects are valid in this study.

Table 8. The direct/indirect effects of the model[a].

	Direct/indirect path	Unstandardized estimate	Lower	Upper	p-value	Standardized estimate
H2	Normative --> Drivers --> Selection	-0.011	-0.090	0.020	0.429	-0.016
H3	Normative --> Barriers --> Selection	0.032	-0.001	0.091	0.112	0.047
H1b	Normative --> Selection --> Transition	0.234	0.104	0.401	0.001	0.223***
H2	Cognitive --> Drivers --> Selection	0.012	-0.027	0.073	0.523	0.027
H3	Cognitive --> Barriers --> Selection	-0.034	-0.081	0.003	0.131	-0.076
H1c	Cognitive --> Selection --> Transition	-0.202	-0.301	-0.101	0.001	-0.296***
H2	Regulative --> Drivers --> Selection	0.007	-0.010	0.054	0.348	0.011
H3	Regulative --> Barriers --> Selection	0.042	-0.001	0.100	0.105	0.063
H1a	Regulative --> Selection --> Transition	0.161	0.067	0.301	0.001	0.158***

Note. a. *** p < 0.001, ** P < 0.01, * P < 0.05, ┼ P < 0.1.

DISCUSSION

Selection of innovation criteria is difficult in companies because it requires listening to external pressures, in order to make a decision that matches that external pressure (Karlsson & Middleton, 2015). This paper presents a case company from the OG sector that managed to shift its core business from pure OG into a

mixed-energy company. This shift was faced as a result of challenges and risks given that the company invested in alternative clean energy (RE) outside its core business. Therefore, this paper developed and validated a model that measures how an established company would select its sustainable projects.

Institutional theory and its core pillars (regulative, normative, and cognitive) provided deeper understanding of how an OG company selects its sustainable projects. Thus, the findings offer interesting insights into the literature on institutional theory and contribute to a richer understanding of the transition of companies toward sustainability as summarized in Table A2. The key findings of this study reveal that the regulative and normative pillars play an essential role in selecting sustainable projects that enables them to shape their sustainable future. For the regulative pillar, this means that employees believe in their management team and accept the company's contribution of shifting a pure OG energy player into a broad energy company. In addition, the normative pillar shows that employees believe in the company's sustainable transition; they see it as the way toward future opportunities and they are interested in moving the company toward sustainability.

On one hand, researches like Drori and Honig (2013) confirm that regulative and normative pillars play an essential role in framing organizational identity and shaping its strategic direction. The results show that the normative pillar presents the strongest factor in all pillars. This is not surprising because this paper focuses on selecting innovative sustainable projects and not on shaping its sustainable strategic direction. By this, the employees play the most essential role in selecting innovative sustainable projects and introducing them to the top management team. In this case company, the employees selected RE projects such as offshore wind energy projects that enabled them to use their skills, knowledge, and competences used in offshore OG projects. In addition, the results show that the regulative pillar plays an important role in shaping the company's sustainable transition, as confirmed by previous studies.

On the other hand, Laïfi and Josserand (2016) argue that the cognitive pillar would be automatically achieved when regulative and normative pillars are achieved in companies. The cognitive pillar in this study indicates that the employees have a good understanding of sustainability and they aim to find new ways to improve the company's sustainable goals. However, the developed hypothesis about a positive relationship between the cognitive pillar and the effect of innovation selection on sustainable transition was not supported. The results show that the cognitive pillar has a statistically significant but negative effect. The negative result was caused due to the addition of mediating variables (drivers and barriers), and this means that as the cognitive pillar increases, sustainability transition decreases. In other words, this means that lack of knowledge about the company's sustainability leads to more investment in RE activities. This result could present some explanations: (1) The number of responses was not high according to the total number of the company's employees, thus increasing the sample size might change the result achieved. (2) Another explanation could be that the respondents who participated in this study were mostly employees who already have some knowledge about the company's sustainable transition than anyone else in the company. Thus, the participants in this study may be in search of new knowledge related to sustainable projects they wanted to introduce to the top management team. This result is not surprising in social science — for example, researchers like Oftedal, Iakovleva, and Foss (2018) and Oosterbeek, van Praag, and Ijsselstein (2010) found a negative cognitive pillar effect on their studies.

Furthermore, the results show a non-significance indirect effect between institutional pillars, drivers/barriers, and innovation selection. This means that the data provide little or no evidence that the drivers and barriers have any effect on innovation selection. This is due to the number of responses included in the study. Thus, increasing the number of responses might solve this challenge and support previous research suggesting that there are some factors that would enhance or block the sustainable shift in companies (Orji, 2019). According to this study, this might mean that the company's innovation selection criteria seem to depend on the company's management team and its employees who have initiatives to adopt new sustainable activities in the company.

Finally, the results show that management experience dampens the effect of the regulative pillar on sustainable transition (H4a) but strengthens the effect of the regulative pillar on innovation selection (H4d). Thus, the results show that managers with long management experience might find it difficult to adopt sustainable shifts in their companies, but they are willing to select suitable innovative projects. The reason might be that it is difficult for them to adapt new sustainable changes and facilitate these changes within employees. In addition, introducing new sustainable projects to an established company requires a large investment and, more likely, new partners. Furthermore, managers with long management experience would not prefer to invest in new technologies that are different to what they are used to do.

In addition, management experience strengthens the positive effect of the normative pillar on sustainable transition (H4b) and innovation selection (H4e). This means that employees with longstanding management

experience have a self-interest to shift the company toward sustainability, and they are willing to introduce new sustainable activities to the top management team. Furthermore, the results show that management experience strengthens the effect of the cognitive pillar on sustainable transition (H4c); however, it dampens the effect of the cognitive pillar on innovation selection (H4f). This indicates that employees with longstanding management experience understand the importance of engaging the company in new sustainable practices. However, the new sustainable shift taking place in the company still needs time to be accepted and understood by everyone.

Consequently, the contribution of this study is that the survey and model developed help to understand how an established company under a sustainable transition selects its sustainable projects and the kind of drivers/barriers that would enhance or hinder such a selection process. Thus, the results show that the regulative and normative are the potential carriers of the sustainable selection criteria.

CONCLUSION, LIMITATIONS, AND FUTURE STUDIES

This study aimed to make a methodological contribution to the research of sustainability transitions and organizational culture by developing a valid measure of regulative, normative, and cognitive legitimacy. This study has developed and empirically validated a survey instrument for studying innovation selection toward sustainability in an established OG company. The results showed us that regulative and normative pillars play an essential role in selecting a sustainable strategy in the company. The results also show that sustainability has been embedded in the company and that drivers/barriers have no effect in enhancing or hindering the company's investment in new sustainable activities. In addition, generally, longstanding management experience increases the sustainability awareness in companies.

This study contributes to the broader literature on sustainability transition by developing a measure from institutional theory. Thus, this study makes three contributions. First, the main contribution of this paper is the developed framework that presents a tool to understand a company's innovation selection approach. Second, the study helps researchers understand how sustainability is developed and embedded in the company. Third, the study helps researchers understand how sustainability would be perceived in the company.

In addition, the study improved both the empirical and theoretical rigor of sustainability transition theory and institutional theory. Thus, the author believes that the developed model was conceived as an initial measure of an innovation selection approach in a company under a sustainable change. This study applied the latent common methods variance factor in order to handle the problem of the CMB. Podsakoff, Mackenzie, Lee, and Podsakoff (2003) evaluated various statistical techniques that can be used to control CMB and they mentioned that there is no single best method for handling the problem. This means that the applied technique in this study still exists.

However, the study represents a specific example of a single European OG company, which makes it difficult to generalize. In addition, the number of responses was not high, which affected the result achieved. Thus, additional studies in other cultures, industries, and research contexts are required in order to generalize this framework and survey in the future. This would require studying the strategy-making process in companies in order to understand how companies in different industries respond to sustainable challenges. In sum, this developed model should provide a useful tool with which researchers can explore a variety of issues regarding selecting new sustainable projects in established companies.

REFERENCES

Aboelmaged, M. (2018). The drivers of sustainable manufacturing practices in Egyptian SMEs and their impact on competitive capabilities: A PLS-SEM model. *Journal of Cleaner Production, 175*, 207-221. https://doi.org/10.1016/j.jclepro.2017.12.053

Bansal, P. (2005). Evolving sustainably: a longitudinal study of corporate sustainable development. *Strategic Management Journal, 26*(3), 197-218. https://doi.org/10.1002/smj.441

Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and Structuration: Studying the Links between Action and Institution. *Organization Studies, 18*(1), 93-117. https://doi.org/10.1177/017084069701800106

Baumgartner, R. (2003). Tools For Sustainable Business Management. *WIT Transactions on Ecology and the Environment, 63*. https://doi.org/10.2495/ECO030171

Bayer, P., Dolan, L., & Urpelainen, J. (2013). Global patterns of renewable energy innovation, 1990–2009. *Energy for Sustainable Development, 17*(3), 288-295. http://dx.doi.org/10.1016/j.esd.2013.02.003

Bell, D. (1974). *The coming of post-industrial society : A venture in social forecasting*. London: Heinemann.

Bin, A., Azevedo, A., Duarte, L., Salles-Filho, S., & Massaguer, P. (2015). R&D and Innovation Project Selection: Can optimization methods be adequate? *Procedia Computer Science, 55*, 613-621. https://doi.org/10.1016/j.procs.2015.07.051

Binz, C., Harris-Lovett, S., Kiparsky, M., Sedlak, D. L., & Truffer, B. (2016). The thorny road to technology legitimation — Institutional work for potable water reuse in California. *Technological Forecasting and Social Change, 103*, 249-263. https://doi.org/10.1016/j.techfore.2015.10.005

Bjørner, T. B., Hansen, L. G., & Russell, C. S. (2004). Environmental labeling and consumers' choice — An empirical analysis of the effect of the Nordic Swan. *Journal of Environmental Economics and Management, 47*(3), 411-434. https://doi.org/10.1016/j.jeem.2003.06.002

Brenner, R. (1987). *Rivalry: In Business, Science, among Nations*. Cambridge: Cambridge University Press.

Burgelman, R. A. (1991). Intraorganizational Ecology of Strategy Making and Organizational Adaptation: Theory and Field Research. *Organization Science, 2*(3), 239-262. https://doi.org/10.2307/2634929

Burgelman, R. A. (2002). *Strategy is destiny: How strategy-making shapes a company's future*. New York: Free Press.

Burgelman, R. A., & Siegel, R. E. (2008). Cutting the strategy diamond in high-technology ventures. *California Management Review, 50*(3), 140-167. https://doi.org/10.2307/41166449

Caprar, D. V., & Neville, B. A. (2012). "Norming" and "conforming": Integrating cultural and institutional explanations for sustainability adoption in business. *Journal of Business Ethics, 110*(2), 231-245. https://doi.org/10.1007/s10551-012-1424-1

Daft, R., & Becker, S. (1978). *Innovation in organizations: Innovation adoption in school organizations*: New York: Elsevier.

Dale, S., & Fattouh, B. (2018). *Peak oil demand and long-run oil prices*. Osford: The Oxford Institute for Energy Studies. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/Peak-Oil-Demand-and-Long-Run-Oil-Prices-Insight-25.pdf

Damanpour, F. (1988). Innovation type, radicalness, and the adoption process. *Communication Research, 15*(5), 545-567. https://doi.org/10.1177/009365088015005003

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *The Academy of Management Journal, 34*(3), 555-590. https://doi.org/10.2307/256406

Daneshpour, H., & Takala, J. (2016, december). The key drivers of sustainability. *Conference of IEEE International Conference on Industrial Engineering and Engineering Management*, Bali, Indonesia. https://doi.org/10.1109/IEEM.2016.7798069

DiMaggio, P. J., & Powell, W. W. (1991). *Introduction.* In P. J. DiMaggio & W. W. Powell (Eds.). *The new institutionalism in organizational analysis*. Chicago: University: Chicago Press.

Drori, I., & Honig, B. (2013). A Process model of internal and external legitimacy. *Organization Studies, 34*(3), 345-376. https://doi.org/10.1177/0170840612467153

Engert, S., Rauter, R., & Baumgartner, R. J. (2016). Exploring the integration of corporate sustainability into strategic management: A literature review. *Journal of Cleaner Production, 112*(Part 4), 2833-2850. https://doi.org/10.1016/j.jclepro.2015.08.031

Eser, A., & Stansbury, N. (2018). Oil must face its future as a declining industry: The sector must be ready to invest less and return mode cash to investors. *Finantial Times, 13*. Retrieved from https://www.ft.com/content/bc84470a-6e65-11e8-852d-d8b934ff5ffa

Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. *Technological Forecasting and Social Change, 79*(6), 991-998. https://doi.org/10.1016/j.techfore.2012.02.001

Fisher, G., Kotha, S., & Lahiri, A. (2016). Changing with the times: An integrated view of identity, legitimacy, and new venture life cycles. *Acadmy of Management Review, 41*(3), 383. https://doi.org/10.5465/amr.2013.0496

Frandsen, S., Morsing, M., & Vallentin, S. (2013). Adopting sustainability in the organization: Managing processes of productive loose coupling towards internal legitimacy. *Journal of Management Development*, *32*(3), 236-246. https://doi.org/10.1108/02621711311318265

Freeman, C., & Soete, L. (1997). *The Economics of Industrial Innovation* (3rd ed.). Cambridge: MIT Press.

Gabzdylova, B., Raffensperger, J. F., & Castka, P. (2009). Sustainability in the New Zealand wine industry: drivers, stakeholders and practices. *Journal of Cleaner Production, 17*(11), 992-998. https://doi.org/10.1016/j.jclepro.2009.02.015

Galbreath, J. (2009). Building corporate social responsibility into strategy. *European Business Review, 21*(1), 109-127. https://doi.org/10.1108/09555340910940123

Gallagher, M. W., & Brown, T. A. (2013). Introduction to Confirmatory Factor Analysis and Structural Equation Modeling. In T. Teo (Ed.), *Handbook of Quantitative Methods for Educational Research* (pp. 289-314). Rotterdam: SensePublishers.

Gaskin, J. (2016). SEM Series (2016) 3. Exploratory Factor Analysis (EFA). *SEM Series.* Video posted to https://www.youtube.com/watch?v=VBsuEBsO3U8&list=PLnMJlb-z3sefJaVv8rBL2_G85HoUko5I--&index=3

Gaskin, J. (2018). Excel StatTools. Retrieved from http://statwiki.kolobkreations.com/index.php?title=Main_Page

Gaskin, J., & Lim, J. (2018). Indirect Effects. Retrieved from http://statwiki.kolobkreations.com/index.php?title=Structural_Equation_Modeling#Mediation

Gaziulusoy, A. İ., & Ryan, C. (2017). Roles of design in sustainability transitions projects: A case study of Visions and Pathways 2040 project from Australia. *Journal of Cleaner Production, 162*, 1297-1307. https://doi.org/10.1016/j.jclepro.2017.06.122

Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy, 33*(6-7), 897-920. https://doi.org/10.1016/j.respol.2004.01.015

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions, 1*(1), 24-40. https://doi.org/10.1016/j.eist.2011.02.002

Gielen, D., Boshell, F., Saygin, D., Bazilian, M. D., Wagner, N., & Gorini, R. (2019). The role of renewable energy in the global energy transformation. *Energy Strategy Reviews, 24*, 38-50. https://doi.org/10.1016/j.esr.2019.01.006

Gomes-Casseres, B. (1994). Groups versus Group - How alliance networks compete. *Harvard Business Review, 72*(4), 62-74. Retrieved from https://hbr.org/1994/07/group-versus-group-how-alliance-networks-compete

Gomes-Casseres, B. (1996). *The alliance revolution: The new shape of business rivalry*. Cambridge: Harvard University Press.

Global Reporting Initiative (2011). *A new phase: The growth of sustainability reporting. GRI's Year in review 2010/11*. Retrieved from https://www.globalreporting.org/resourcelibrary/GRI-Year-In-Review-2010-2011.pdf

Grin, J., Rotmans, J., & Schot, J. W. (2010). *Transitions to sustainable development: New directions in the study of long term transformative change.* New York: Routledge. https://doi.org/10.4324/9780203856598

Hage, J. (1988). *Futures of organizations: Innovating to adapt strategy and human resources to rapid technological change*. Lexington, MA: Lexington Books.

Hage, J., & Aiken, M. (1970). *Social change in complex organizations*. Englewood Cliffs, NJ: Prentice-Hall.

Hage, J., & Powers, C. H. (1992). *Post-industrial lives: Roles and relationships in the 21st Century*. http://doi.org/10.4135/9781483325828

Hage, J. T. (1999). Organizational innovation and organizational change *Annual Reviews of Socioloy, 25*(1), 597-622. http://doi.org/10.1146/annurev.soc.25.1.597

Hahn, R. (2013). ISO 26000 and the Standardization of strategic management processes for sustainability and corporate social responsibility. *Business Strategy and the Environment, 22*(7), 442-455. https://doi.org/10.1002/bse.1751

Haigh, M., & Jones, M. T. (2006). The drivers of corporate social responsibility: A critical review. *The Business Review*, 245-251. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.528.6764&rep=rep1&type=pdf

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate data analysis: Pearson new international edition*. Harlow: Pearson Education Limited.

Hind, P. (2009). Developing leaders for sustainable business. *Corporate governance: The International Journal Of Business In Society, 9*(1), 7-20. http://doi.org/10.1108/14720700910936029

Hoerndlein, C., Benlian, A., & Hess, T. (2012, December). *Institutional influences in individual-level innovation adoption outside organizational contexts: A scale development study.* International Conference on Information Systems, Orlando, FL, USA, 33.

Hoffman, A. J. (1999). Institutional evolution and change: Environmentalism and the U.S. chemical industry. *The Academy of Management Journal, 42*(4), 351-371. https://doi.org/10.2307/257008

IEA. (2017). IEA World Energy outlook 2017 introduces sustainable development scenario. Retrieved from http://sdg.iisd.org/news/iea-world-energy-outlook-2017-introduces-sustainable-development-scenario/

Jaber, T., & Oftedal, E. M. (2019). *Quantitative data: A case of an oil and gas company under a sustainable change*. https://doi.org/10.18710/HLYZIB

Jaber, T., & Oftedal, E. M. (2020). Legitimacy for sustainability: A case of a strategy change for an oil and gas company. *Sustainability, 12*(2), 525. Retrieved from https://www.mdpi.com/2071-1050/12/2/525

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). Linear regression. In G. James, D. Witten, T. Hastie, & R. Tibshirani. *An Introduction to Statistical Learning: with Applications in R* (1st ed., Vol. 103). New York, Springer.

Jawahar, I. M., & McLaughlin, G. L. (2001). Toward a descriptive stakeholder theory: An organizational life cycle approach. *The Academy of Management Review, 26*(3), 397-414. http://doi.org/10.2307/259184

Karlsson, T., & Middleton, K. W. (2015). Strategies for creating new venture legitimacy. *Industry and Higher Education, 29*(6), 469-479. http://doi.org/10.5367/ihe.2015.0279

Kemp, R. (1994). Technology and the transition to environmental sustainability: The problem of technological regime shifts. *Futures, 26*(10), 1023-1046. https://doi.org/10.1016/0016-3287(94)90071-X

Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis & Strategic Management, 10*(2), 175-198. https://doi.org/10.1080/09537329808524310

Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2014). The Performance of RMSEA in Models With Small Degrees of Freedom. *Sociological Methods & Research, 44*(3), 486-507. https://doi.org/10.1177/0049124114543236

Khalili-Damghani, K., Sadi-Nezhad, S., Lotfi, F. H., & Tavana, M. (2013). A hybrid fuzzy rule-based multi-criteria framework for sustainable project portfolio selection. *Information Sciences, 220*, 442-462. https://doi.org/10.1016/j.ins.2012.07.024

Kimberly, J. R. (1981). Managerial innovation. In P. C. Nystrom & W. H. Starbuck (Eds.). *Handbook of organizational design* (Vol. 1, pp. 84-104). New York: Oxford University Press.

Kishna, M., Niesten, E., Negro, S., & Hekkert, M. P. (2017). The role of alliances in creating legitimacy of sustainable technologies: A study on the field of bio-plastics. *Journal of Cleaner Production, 155*(Part 2), 7-16. https://doi.org/10.1016/j.jclepro.2016.06.089

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration, 11*(4), 1-10. http://doi.org/10.4018/ijec.2015100101

Kondra, A. Z., & Hurst, D. C. (2009). Institutional processes of organizational culture. *Culture and Organization, 15*(1), 39-58. http://doi.org/10.1080/14759550802709541

Kudratova, S., Huang, X., & Zhou, X. (2018). Sustainable project selection: Optimal project selection considering sustainability under reinvestment strategy. *Journal of Cleaner Production, 203*, 469-481. https://doi.org/10.1016/j.jclepro.2018.08.259

Laïfi, A., & Josserand, E. (2016). Legitimation in practice: A new digital publishing business model. *Journal of Business Research, 69*(7), 2343-2352. https://doi.org/10.1016/j.jbusres.2015.10.003

Loken, E., & Gelman, A. (2017). Measurement error and the replication crisis. *Science, 355*(6325), 584-585. Retrieved from https://science.sciencemag.org/content/355/6325/584

Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance, 23*(1), 161-183. https://doi.org/10.1111/j.1468-0491.2009.01471.x

Loorbach, D., Frantzeskaki, N., & Thissen, W. (2010). Introduction to the special section: Infrastructures and transitions. *Technological Forecasting and Social Change, 77*(8), 1195-1202. https://doi.org/10.1016/j.techfore.2010.06.001

Luthra, S., Govindan, K., & Mangla, S. K. (2017). Structural model for sustainable consumption and production adoption—A grey-DEMATEL based approach. *Resources, Conservation and Recycling, 125*, 198-207. https://doi.org/10.1016/j.resconrec.2017.02.018

MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in mis and behavioral research: Integrating new and existing techniques. *MIS Quarterly, 35*(2), 293-334. https://doi.org/10.2307/23044045

Malhotra, N. K., & Dash, S. (2011). *Marketing Research an Applied Orientation*. London: Pearson.

Marino, K. E. (1982). Structural correlates of affirmative action compliance. *Journal of Management, 8*(1), 75-93. https://doi.org/10.1177/014920638200800105

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy, 41*(6), 955-967. https://doi.org/10.1016/j.respol.2012.02.013

Marshall, R. S., Cordano, M., & Silverman, M. (2005). Exploring individual and institutional drivers of proactive environmentalism in the US Wine industry. *Business Strategy and the Environment, 14*(2), 92-109. https://doi.org/10.1002/bse.433

Marx, K. (2014). Crafting an analytic framework I: Three pillars of institutions. In W. R. Scott (Ed.). *Institutions and Organizations Ideas, Interests, and Identities* (4th ed.). Sage: Thousand Oaks: Sage.

Michaelides, R., Bryde, D., & Ohaeri, U. (2014). Sustainability from a project management perspective: are oil and gas supply chains ready to embed sustainability in their projects? *Project Management Institute Research and Education Conference*, Phoenix, AZ, USA. Retrieved from https://www.pmi.org/learning/library/sustainability-project-management-perspective-8954

Miras-Rodríguez, M. M., Domínguez-Machuca, J. A. D., & Escobar-Peréz, B. (2015, October). Sustainability drivers, barriers and outcomes: Evidence from european high performance manufacturing companies. Proceeding of International Conference on Industrial Engineering and Systems Management, Seville, Spain. Retrieved from https://ieeexplore.ieee.org/xpl/conhome/7368810/proceeding

Molcho, G., & Shpitalni, M. (2006). A business-oriented approach to the product life cycle. In **Brissaud** D., **Tichkiewitch** S., **Zwolinski**, P. (Eds.). *Innovation in life cycle engineering and sustainable development* (1st ed.). Dordrecht: Springer. Retrieved from https://www.springer.com/gp/book/9781402046018

Musiolik, J., Markard, J., & Hekkert, M. (2012). Networks and network resources in technological innovation systems: Towards a conceptual framework for system building. *Technological Forecasting & Social Change, 79*(6), 1032-1048. https://doi.org/10.1016/j.techfore.2012.01.003

O'brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*(5), 673-690. https://doi.org/10.1007/s11135-006-9018-6

Oerlemans, L., Meeus, M., & Boekema, W. (1998). Do networks matter for innovation? The usefulness of the economic network approach in analyzing innovation. *Tijdschrift voor Economische en Social Geografie, 89*(3), 298-309. https://doi.org/10.1111/1467-9663.00029

Oftedal, E. M., Iakovleva, T., & Foss, L. (2018). University context matter: An institutional perspective on entrepreneurial intentions of students. *Education + Training, 60*(7/8), 873-890. https://doi.org/10.1108/ET-06-2016-0098

Oosterbeek, H., van Praag, M., & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review, 54*(3), 442-454. https://doi.org/10.1016/j.euroecorev.2009.08.002

Orji, I. J. (2019). Examining barriers to organizational change for sustainability and drivers of sustainable performance in the metal manufacturing industry. *Resources, Conservation and Recycling, 140*, 102-114. https://doi.org/10.1016/j.resconrec.2018.08.005

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 14*(3), 534-552. http://doi.org/10.1037/0278-7393.14.3.534

Pedersen, J. S., & Dobbin, F. (1997). The social invention of collective actors: On the rise of the organization. *American Behavioral Scientist, 40*(4), 431-443. http://doi.org/10.1177/0002764297040004006

Pedersen, J. S., & Dobbin, F. (2006). In search of identity and legitimation: Bridging organizational culture and neoinstitutionalism. *Special issue of American Behavioral Scientist, 49*(7), 897-907. https://doi.org/10.1177/0002764205284798

Podsakoff, P. M., Mackenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Porter, M. E., & Van der Linde, C. (1995). Green and competitive: ending the stalemate. Harvard Business Review, *73*(5), 128-129. *Long Range Planning, 28*(6), 128-129. https://doi.org/10.1016/0024-6301(95)99997-E

Robinson, H. S. (2006). STEPS: a knowledge management maturity roadmap for corporate sustainability. *Business Process Management Journal, 12*(6), 793-808. https://doi.org/10.1108/14637150610710936

Schot, J., Hoogma, R., & Elzen, B. (1994). Strategies for shifting technological systems: The case of the automobile system. *Futures, 26*(10), 1060-1076. https://doi.org/10.1016/0016-3287(94)90073-6

Schreuer, A., Rohracher, H., & Späth, P. (2010). Transforming the energy system: the role of institutions, interests and ideas. *Technology Analysis & Strategic Management, 22*(6), 649-652. https://doi.org/10.1080/09537325.2010.496280

Scott, W. R. (1995a). *Institutions and organizations*. Thousand Oaks: Sage.

Scott, W. R. (1995b). Institutions and organizations. Ideas, interests and identities. *M@n@gement, 17*(2), 136. https://doi.org/10.3917/mana.172.0136

Scott, W. R. (2014). *Institutions and Organizations: Ideas, Interests, and Identities* (4th ed.). Thousand Oaks: Sage.

Selznick, P. (1957). *Leadership in Administration*. New York: Harper & Row.

Shrivastava, P. (1995). Environmental technologies and competetive advantage. S*trategic Management Journal, 16*, 183-200. https://doi.org/10.1002/smj.4250160923

Sijtsma, K., Straat, J. H., & van der Ark, L. A. (2015). Goodness-of-fit methods for nonparametric IRT models. In L. A. van der Ark, D. M. Bolt, W.-C. Wang, J. A. Douglas, & S.-M. Chow (Eds.). *Quantitative psychology research: The 79th Annual Meeting of the Psychometric Society* (pp. 109-120). Switzerland: Springer Nature.

Smith, A., Stirling, A., & Berkhout, F. (2005). The governance of sustainable socio-technical transitions. *Research Policy, 34*(10), 1491-1510. https://doi.org/10.1016/j.respol.2005.07.005

Smith, K. G., Grimm, C. M., & Gannon, M. J. (1992). *Dynamics of competitive strategy*. Thousand Oaks: Sage.

Solak, S., Clarke, J.-P. B., Johnson, E. L., & Barnes, E. R. (2010). Optimization of R&D project portfolios under endogenous uncertainty. *European Journal of Operational Research, 207*(1), 420-433. https://doi.org/10.1016/j.ejor.2010.04.032

Thomas-Seale, L. E. J., Kirkman-Brown, J. C., Attallah, M. M., Espino, D. M., & Shepherd, D. E. T. (2018). The barriers to the progression of additive manufacture: Perspectives from UK industry. *International Journal of Production Economics, 198*, 104-118. https://doi.org/10.1016/j.ijpe.2018.02.003

Tracey, J. B., & Tews, M. J. (2005). Construct validity of a general training climate scale. *Organizational Research Methods, 8*(4), 353-374. https://doi.org/10.1177/1094428105280055

Trianni, A., Cagno, E., & Neri, A. (2017). Modelling barriers to the adoption of industrial sustainability measures. *Journal of Cleaner Production, 168*, 1482-1504. https://doi.org/10.1016/j.jclepro.2017.07.244

Tullberg, J. (2005). Reflections upon the responsive approach to corporate social responsibility. *Business Ethics: A European Review, 14*(3), 261-276. http://doi.org/10.1111/j.1467-8608.2005.00408.x

Turner, R. (1974). *Ethnomethodology: Selected readings*. Harmondsworth: Penguin.

Tushman, M. L., & O'Reilly, C. A. (2002). *Winning through innovation: A practical guide to leading organizational change and renewal*. Boston: Harvard Business School Press.

United Nations. (1987). *Report of the world commission on environment and development: Our common future.* New York: UN. Retrieved from https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

United Nations. (2016). Sustainable Development Goals. Retrieved from https://www.un.org/sustainabledevelopment/climate-change/

Van de Ven, A. H., & Rogers, E. M. (1988). Innovations and organizations: Critical perspectives. *Communication Research, 15*(5), 632-651. http://doi.org/10.1177/009365088015005007

Ventresca, M. J., & Mohr, J. W. (2002). Archival research methods. In J. A. C. Baum. *Companion to organizations* (Cap. 35, pp. 805-828). Hoboken: Wiley-Blackwell. https://doi.org/10.1002/9781405164061.ch35

Weijters, B., Cabooter, E., & Schillewaert, N. (2010). The effect of rating scale format on response styles: The number of response categories and response category labels. *International Journal of Research in Marketing, 27*(3), 236-247. https://doi.org/10.1016/j.ijresmar.2010.02.004

Wenzel, H., & Alting, L. (2004). Architecture of environmental engineering. In G. Seliger, N. Nasr, B. Bras,& L. Alting. *Global Conference on Sustainable Product Development and Life Cycle Engineering*, Berlin, Germany. Retrieved from https://portal.findresearcher.sdu.dk/en/publications/architecture-of-environmental-engineering

Yannou, B., Zimmer, B., Farel, R., Jankovic, M., & Cardinal, J. S. (2013). Proofs of utility, innovation, profitability and concept for innovation selection. Proceeding of International Conference on Engineering Design, Seoul, Korea, 19.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology, 9*(2), 79-94. https://doi.org/10.20982/tqmp.09.2.p079

Yusuf, Y. Y., Gunasekaran, A., Musa, A., El-Berishy, N. M., Abubakar, T., & Ambursa, H. M. (2013). The UK oil and gas supply chains: An empirical analysis of adoption of sustainable measures and performance outcomes. *International Journal of Production Economics, 146*(2), 501-514. https://doi.org/10.1016/j.ijpe.2012.09.021

Zaltman, G., Duncan, R., & Holbek, J. (1973). *Innovations and organizations*: New York: Wiley.

Zammuto, R. F., & O'Connor, E. J. (1992). Gaining Advanced Manufacturing Technologies' Benefits: The Roles of Organization Design and Culture. *The Academy of Management Review, 17*(4), 701-728. http://doi.org/10.2307/258805

Zmud, R. W. (1982). Diffusion of Modern Software Practices: Influence of Centralization and Formalization. *Management Science, 28*(12), 1421-1431. Retrieved from https://EconPapers.repec.org/RePEc:inm:ormnsc:v:28:y:1982:i:12:p:1421-1431

Authorship

Tahrir Jaber*

UiT The Arctic University of Norway, School of Business and Economics
Breivangvegen 23, 9010 Tromsø, Norway.
E-mail address: tahrir.jaber@uit.no

https://orcid.org/0000-0002-0428-1810

* Corresponding Author

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Funding

There are no funders to report for this article.

Conflict of Interests

The authors have stated that there is no conflict of interest.

Plagiarism Check

The RAC maintains the practice of submitting all documents approved for publication to the plagiarism check, using specific tools, e.g.: iThenticate.

Copyrights

Authors' Contributions

1st author: conceptualization (lead); writing – original draft (lead); project administration (lead); validation (lead).

Peer Review Method

This content was evaluated using the double-blind peer review process. The disclosure of the reviewers' information on the first page, as well as the Peer Review Report, is made only after concluding the evaluation process, and with the voluntary consent of the respective reviewers and authors.

Data Availability

All data and materials were made publicly available through the DataverseNO platform and can be accessed at:

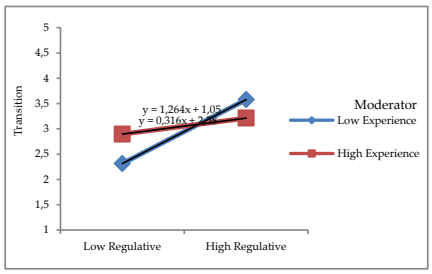
Jaber, Tahrir; Oftedal, Elin Merethe, 2019, "Quantitative data: A case of an oil and gas company under a sustainable change", DataverseNO, V1.
https://doi.org/10.18710/HLYZIB

RAC encourages data sharing but, in compliance with ethical principles, it does not demand the disclosure of any means of identifying research subjects, preserving the privacy of research subjects. The practice of open data is to enable the reproducibility of results, and to ensure the unrestricted transparency of the results of the published research, without requiring the identity of research subjects.

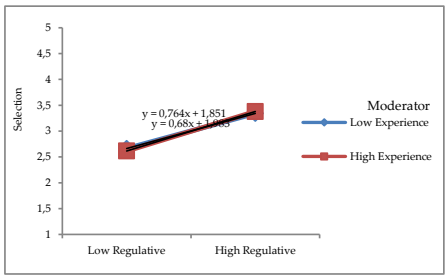
APPENDIX A

Table A1. Items used in the survey.

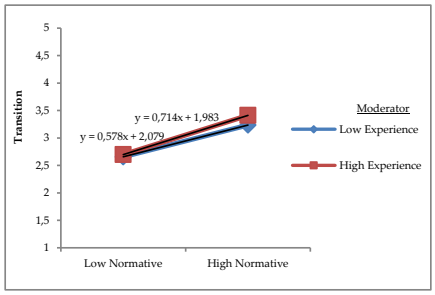
Variables	Items
Regulative pillar	Your management team supports renewable energy activities **There are incentives for sustainable activities at X Company***** **X Company has policies to enhance its sustainable development practices***** Your management team has clear goals to make X a sustainable company Top management plays an important role in making X a sustainable company
Normative pillar	Employees want to contribute to a variety of sustainable projects in my unit **Individual initiatives toward sustainability are respected in my unit***** **Sustainable activities are seen as the way toward future opportunities in my unit***** **Operating sustainability is a goal in my unit***** In my unit, we believe that we have a personal responsibility/commitment toward society/the environment
Cognitive pillar	**My unit has a good understanding of sustainability***** My unit has a good understanding of sustainable technology **My unit builds knowledge on becoming more sustainable***** **My unit is always looking for additional ways to improve sustainability*****
Sustainable transition	**X Company has established environmental targets to introduce a shift toward sustainability***** **Sustainability will become considerably more important to X Company in the future***** X Company has implemented sustainability goals into its overall strategy This is the right time for X Company to introduce clean activities into its business practices
Innovation selection	**The project should be within our core strategy***** **It should be covered by our competence***** **It should represent an interesting market***** **It should serve the interest of our top manager***** It should achieve high return on investment (ROI) It should achieve a positive environmental profile It should achieve a positive social profile
Drivers	Customer expectations 'Green' strategy Internal requirements Corporate culture Knowledge of sustainability **Use of new technology***** **Development of new technology***** Return on investment of 'green' technology Demand from investors Reputation of the firm
Barriers	Lack of financial funds **Lack of competence and capabilities***** **Lack of employee motivation***** **Lack of technology***** Lack of support from top management Lack of return on investment (ROI) Lack of perceived importance (ex.: Giving priority to other activities)



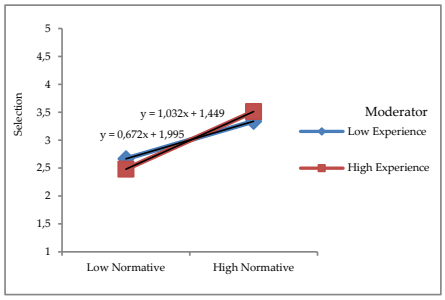
H4a: Experience dampens the positive relationship between Regulative and Transition.



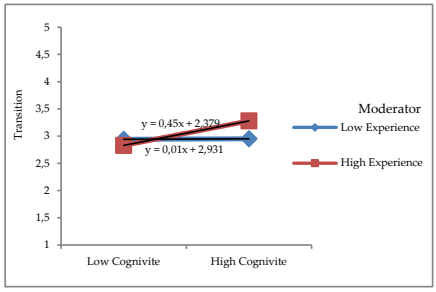
H4d: Experience strengthens the positive relationship between Regulative and Selection.



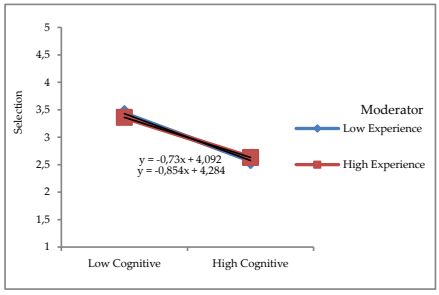
H4b: Experience strengthens the positive relationship between Normative and Transition.



H4e: Experience strengthens the positive relationship between Normative and Selection.



H4c: Experience strengthens the positive relationship between Cognitive and Transition.



H4f: Experience dampens the negative relationship between Cognitive and Selection.

Figure A1. Figures derived from the moderator effect test.

Table A2. Summary of the analysis of hypotheses.

Hypothesis	Quantitative analysis	Comment
Hypothesis 1a	Supported	The regulative pillar increases the effect of innovation selection on sustainable transition. This confirms that the case company has new policies and laws to invest in new sustainable activities.
Hypothesis 1b	Supported	The normative pillar increases the effect of innovation selection on sustainable transition. This confirms that the employees are engaged in the sustainable shift that is happening in the company and they are willing to introduce new sustainable projects to the top management team.
Hypothesis 1c	Not supported	The cognitive pillar dampens the effect of innovation selection on sustainable transition. This is due to the negative effect on this factor. This means that lack of sustainability knowledge increases the intention to select more RE activities. This shows that employees might need to find new knowledge to shift the company toward sustainability.
Hypothesis 2	Not supported	The sustainable drivers have no effect on the company's innovation selection. This confirms that the company itself was interested in adopting new sustainable practices into its business.
Hypothesis 3	Not supported	The sustainable barriers have no effect on the company's innovation selection. This confirms that the barriers could not prevent the company from adopting new sustainable activities.
Hypothesis 4a	Not supported	Experienced managers weaken the relationship between the regulative pillar and sustainable transition. This shows that experienced managers have some difficulties in shifting the company toward sustainability.
Hypothesis 4b	Supported	Experienced managers strengthen the relationships between the normative pillar and sustainable transition. This shows that the employees have a self-interest to shift the company toward sustainability.
Hypothesis 4c	Supported	Experienced managers strengthen the relationship between the cognitive pillar and sustainable transition. This shows that the employees understand what would satisfy external audiences and understand the importance of the sustainable change.
Hypothesis 4d	Supported	Experienced managers strengthen the relationship between the regulative pillar and innovation selection. This shows that experienced managers are willing to select appropriate sustainable projects into their companies.
Hypothesis 4e	Supported	Experienced managers strengthen the relationships between the normative pillar and innovation selection. This shows that the employees have a self-interest to introduce new sustainable projects to their top management teams.
Hypothesis 4f	Not supported	Experienced managers weaken the relationship between the cognitive pillar and innovation selection. This shows that the sustainable shift still needs time to be accepted and understood by everyone.