

Master's thesis in Energy, Environment and Society

**Strategic Perspectives on Sustainable Manufacturing: Aligning Policy,  
Motivations, and Operations for Effective Change**



University of  
Stavanger

By **Jørgen Amundsen**

Candidate number: 252095

Spring 2023

University of Stavanger

Faculty of Social Sciences

Department of Media and Social Sciences

## Abstract

This thesis investigates the dynamics between manufacturing companies and politics in achieving sustainable production and consumption. The challenges posed by climate change, resource depletion, and waste accumulation require collective efforts across regional, national, and supranational levels. Qualitative expert interviews with sustainability representatives from the manufacturing industry provide valuable insights into their approaches to sustainability. The thesis explores the role of green industrial policy as a potential solution, examining its effectiveness in steering economic development towards sustainability. Transition Management serves as a guiding theory, categorizing strategic, tactical, operational, and reflexive activities to address societal system changes. The research aims to contribute empirical data from a firm-level perspective to the limited evidence on the effectiveness of green industrial policies. The findings highlight the need for policymakers to address challenges related to influence, profitability, and initiative. Measures such as targeted regulations, tax system alterations, public-private collaboration, risk-sharing instruments, and green public procurement policies are suggested to enhance the effectiveness of green industrial policies. The thesis underscores the importance of reflexivity and continuous policy evaluation in driving sustainable transitions.

Keywords: manufacturing companies, sustainability, green industrial policy, transition management, policy effectiveness, qualitative research.

## Foreword

Well, here it is—the moment you've all been waiting for (or at least I hope someone is eagerly anticipating this). Behold, the masterpiece that is my master thesis! Yes, you read that right. After countless cups of coffee, sleepless nights, and an unhealthy amount of procrastination, I proudly present this magnum opus of mine, aptly titled *Strategic Perspectives on Sustainable Manufacturing: Aligning Policy, Motivations, and Operations for Effective Change*.

First and foremost, I must express my deepest gratitude to my caffeine companions: coffee, tea, and energy drinks. Without you, I would have succumbed to the dark forces of sleep and never reached this point. You have fueled my late-night writing sessions and saved me from countless yawns during lectures.

Of course, I can't forget my faithful thesis supervisors, who tirelessly guided me through this academic maze. Your wisdom and patience were truly remarkable as you deciphered my ramblings and turned them into something coherent. I owe you a lifetime supply of chocolate or a trip to the Bahamas—your choice!

To the participants who willingly shared their time and thoughts for this research, thank you! Your willingness to participate proves that there are still people out there who find my endless questioning intriguing (or you were just being exceptionally kind). Either way, you made this research journey far more entertaining.

Let's not forget the heroes of this story: the researchers, scholars, and mad scientists whose work I shamelessly borrowed and cited throughout this thesis. Your brilliance and dedication have paved the way for my late-night Google searches and the ability to sound knowledgeable about things I barely understand. Hats off to you!

Lastly, I want to give a shoutout to my support squad—my family, friends, and loved ones. Thank you for enduring my thesis-induced meltdowns, providing words of encouragement when I doubted my sanity, and reminding me that there's a life beyond these academic endeavors. You are my lifeline, my source of laughter, and the reason I haven't completely lost my mind.

So, dear reader (if you've made it this far), I hope this thesis brings a smile to your face, a chuckle to your lips, or maybe even a snort of laughter. If nothing else, I hope it serves as a reminder that humor can be found even in the most serious of academic pursuits. Now, let's dive into the pages ahead and embark on this scholarly adventure together!

Jørgen Amundsen, 14.06.2023

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## 1.0 Introduction

Being a major driver of economic and technical development, supplying society with the goods it needs, manufacturing finds itself in the position of change. The ever-growing threat of climate change, depleting of natural resources, and waste accumulation, are unfortunately a by-product from manufacturing (amongst others). Transitioning to sustainable modes of production of consumption is not a simple task, it is neither a task for one person, company, or country alone. It is something that must be done in unison. In this thesis I am investigating the dynamics between manufacturing companies and politics on the regional, national, and supranational level. By doing this, I want to contribute to the understanding of how to achieve an increased acceleration towards sustainable production and consumption. Conducting qualitative expert interviews with sustainability representatives from the manufacturing industry have provided valuable insight in how these companies work with, and towards sustainability.

The challenges at hand are big and complex. Amongst others, it is a mixture of multiple deeply rooted problems such as: market failures, large greenhouse gas emissions, and unsustainable modes of production and consumption. Energy use in industry accounted for 24.2% of total greenhouse gas emissions in 2016 (Ritchie et al., 2020). Domestic Material Consumption, which measures the total amount of materials used by an economy to meet the demand for its goods and services, both within and outside the country, increased by around 65% globally between 2000 and 2019. (United Nations, 2022). When it comes to waste accumulation, electronic waste (e-waste), food waste, plastics and textiles are some major contributors. E-waste is the fastest growing category, and in 2019, average e-waste generated was estimated to 7.3 kilograms per person globally. Of this amount, only 1.7 kilograms are taken care of in a proper environmental manner (United Nations, 2022).

No matter how big these challenges are, the global society has acknowledged them, and are working on solutions. Developing from goals such as the Paris agreement (UNFCCC, 2015) and the United Nations sustainable development goals (United Nations, n.d.), countries and regions are looking for solutions. One potential part of the solution commonly discussed amongst scholars, and used by policymakers, is the introduction of green industrial policy. Industrial policy is the tools used by policymakers to steer the economic development. Green

industrial policy differs from traditional industrial policy in the sense that it tries to steer the development in a “green” (sustainable) direction.

The European Green Deal (COM(2019)640, 2019) is an example of green industrial policy. It aims at nothing less than making Europe the first climate neutral continent. To do so, different initiatives working on circular economy, clean energy production, and sustainable industry, are put in place with different instruments in order to make the transition. While traditional industrial policy initiatives are supported by empirical evidence, there is limited and inconclusive evidence on more targeted industrial policies such as green industrial policy (Criscuolo et al., 2022b). By providing empirical data from a firm-level perspective, this research can contribute to this inconclusiveness.

Transition Management (TM) will serve as a larger, guiding theory. TM is a prescriptive governance framework designed to manage transitions. The framework distinguishes between strategic, tactical, operational, and reflexive activities to address different patterns of change in societal systems. The classifications are based on time horizons, actors involved, and the expected outcomes section (Loorbach, 2007, 2010). TM is chosen because it links well with both the policy side, but has also been successfully applied to business cases (Loorbach & Wijsman, 2013). Transition management will be described more thoroughly in the theory section.

## 1.1. Problem statement & Research question

Being a major contributor to economic and technological development, the manufacturing industry is also contributing substantially to the problems of climate change, resource depletion, and waste accumulation (Ritchie et al., 2020; United Nations, 2022). While multiple strategic policy initiatives are deployed to target these issues, there is little evidence on the effectiveness of such environmental focused initiatives (Criscuolo, 2022b).

Considering this problem statement, I primarily want to answer one research question (RQ):

- What measures could policymakers take to increase the effectiveness of green industrial policies on manufacturing companies?

As this is a broad topic, a specific bottom-up centred approach was used to understand the manufacturing companies' perspectives on the sustainability transition. Expert interviews with manufacturing companies' sustainability managers were used to identify underlying motivations and challenges. These findings are then discussed in the light of the current political landscape, transition management theory, and academic literature on industrial policies, to suggest potential measures to policymakers.

## 1.2. Structure

Following this introduction is a section to clarify some of the terms central in the thesis. Chapter 2, political landscape provides an overview of selected relevant policies on the regional, national, and supranational level. Then, in chapter 3 I will thoroughly go through the theoretical foundation the thesis is based on. In chapter 4, a literature review with a focus on policy in a transition theory perspective and industrial policies are provided. Chapter 5 explains my research approach and the rationale behind it. In chapter 6, I discuss my methods. Chapter 7 is where I presented my findings, which will be discussed in chapter 8. Lastly, I conclude the thesis with recommendations and reflections from the discussion. Then, I provide a list of references.

### 1.3. Clarifications

In this part I will concisely provide some clarifications on the terms: sustainability and manufacturing.

Sustainability has come to be a buzzword and can encompass a wide variety of meanings. In this thesis I follow the notion of sustainable development as defined in *Our common future* where it is defined as a process of change where resource use, investment, and technological development, ensures both current and future generations of humans to meet their needs and aspirations (Brundtland, 1987). However, to better tailor it to industry, I use the more defined and developed definition of the EU Taxonomy. The taxonomy defines six environmental objectives: climate change mitigation, climate change adaption, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems. In order to be taxonomy-aligned, an economic activity must fulfil four conditions: (1) making a substantial contribution to at least one environmental objective, (2) do no significant harm to any other environmental objective, (3) complying with minimum social safeguards, and (4) complying with technical screening criteria (Lucarelli et al., 2020).

Being a central component of the thesis, the need to clarify the use of the terms manufacturing and industry seemed inevitable. Manufacturing and manufacturing companies refers to the literal creation of products by, mixing, putting together, or somehow altering input material. Industry is a term used to describe a group of companies or sector based on their defining activities. For example, the manufacturing industry would include companies or activities mainly concerned with the manufacturing of products, while the textile industry would mean companies or activities working with textile. Throughout this thesis, as it is focused on manufacturing firms, “industry” is often used interchangeably with “manufacturing industry”.



## 2.0 Background – Political landscape

An important part of investigating manufacturing companies' work towards sustainability is to look into the landscape in which they operate. Considering the scope of this thesis, I have performed a high-level review of the political landscape on the three levels of regional, national, and supranational. On all levels, there are ambitions to transition to a more sustainable society. For the scope of this thesis, I will not look into the dynamics of multi-level governance, but it could be relevant for future studies to incorporate. The political landscape is massive and all encompassing, which makes it difficult to get a thorough and complete overview. In the next paragraphs I will provide a high-level description of the selected relevant political landscape in Europe, Norway, and Rogaland.

### 2.1. European Green Deal

Starting off at the European level is the European Green Deal (EGD). EGD is Europe's ambitious strategy of becoming the first climate-neutral continent. The strategy revolves around becoming a net-zero economy by 2050 while creating economic growth and ensuring no one is left behind (COM(2019)640, 2019). The package is thorough and encompasses all parts of the economy either directly or indirectly. For the scope of this thesis, I have selected two initiatives that are particularly relevant initiatives: A new industrial strategy for Europe, and the European circular economy action plan. Given the depth of these initiatives I will continue with providing a general summary of the initiatives as put forward by the Commission.

#### **Europe's industrial strategy**

Europe's new industrial strategy aims to navigate the twin transitions of ecological and digital transformations by creating a new industrial path for Europe. The strategy acknowledges that these transitions will impact all sectors of the economy and society, leading to the creation of new products, services, markets, and business models. Europe's industry already possesses a competitive advantage in high-value-added products and services, and the strategy aims to ensure that it becomes greener, more digital, and globally competitive while adhering to high social, labour, and environmental standards. The strategy emphasises three drivers: globally competitive and world-leading industry, paving the way to climate neutrality, and leveraging digital technologies and infrastructure. The fundamentals of Europe's industrial transformation include creating certainty for industry through a deeper and more digital

single market, upholding a global level playing field, supporting industry toward climate neutrality, building a more circular economy, embedding a spirit of industrial innovation, focusing on skilling and reskilling, and investing and financing the transition. The strategy also emphasises reinforcing Europe's industrial and strategic autonomy by reducing dependence on external sources for critical materials and technologies. Additionally, a partnership approach to governance is promoted, involving industrial alliances and tailored approaches to specific ecosystems. The strategy recognises the importance of dialogue with social partners and civil society, and aims to bring all stakeholders together through events like the annual Industry Days. Ultimately, the successful industrial transformation depends on a shared commitment from the EU, member states, regions, industry, small and medium-sized enterprises, and other stakeholders (COM(2021)350, 2021).

### **European circular economy action plan**

The initiative aims to scale up the circular economy and decouple economic growth from resource use. The focus is on transitioning from the linear "take-make-use-dispose" model to a circular approach. The sustainable product policy framework widens the scope of the Ecodesign Directive to promote circularity, emphasising durability, reusability, upgradability, and reparability. Priority sectors include electronics, ICT, textiles, furniture, and high impact intermediary products. Empowering consumers through proper information, protection against greenwashing, and minimum sustainability requirements is proposed. Circular practices in industry involve promoting industrial symbiosis, digital technologies for resource tracking, and verification of green technologies. Key value chains, including electronics, batteries, packaging, plastics, textiles, construction, and food, are targeted for waste reduction and increased circularity. Measures include waste reduction targets, extended producer responsibility, harmonised waste collection, and reduction of waste exports. The circular economy is expected to contribute to job creation. Crosscutting actions focus on climate change, non-financial reporting, economic instruments, research, innovation, and global cooperation. Progress monitoring and the development of resource use indicators are also emphasised (COM(2020)98, 2020).

From these summaries, it is apparent that the strategies will significantly impact the manufacturing industry. Firstly, the emphasis on transitioning to a greener and more circular economy presents significant opportunities for manufacturing companies. The integration of sustainable product policies, such as the extended scope of the Ecodesign Directive,

encourages the development of durable, repairable, and recyclable products. This opens up new markets and business models centred around sustainable production and consumption patterns. Manufacturing companies that embrace these principles can position themselves as leaders in the growing demand for eco-friendly and circular products.

Secondly, the focus on digital technologies and infrastructure in both strategies is crucial for the manufacturing sector's competitiveness. The digital transformation enables manufacturing companies to optimise processes, enhance productivity, and develop innovative solutions. It facilitates the adoption of advanced manufacturing techniques, such as automation, robotics, and data analytics, leading to increased efficiency and flexibility. By leveraging digital technologies, manufacturing companies can drive innovation, develop new business models, and stay globally competitive.

Furthermore, the strategies' commitment to supporting industry towards climate neutrality aligns with the growing importance of sustainability in the manufacturing sector.

Manufacturing activities account for a significant portion of greenhouse gas emissions, and transitioning to low-carbon production methods is essential. The strategies provide a framework for reducing emissions, promoting energy efficiency, and embracing clean technologies. Manufacturing companies that proactively align themselves with these goals can not only contribute to environmental preservation but also gain a competitive advantage by meeting the increasing demand for sustainable and climate-friendly products.

The initiatives' focus on investment, financing, and skills development is also significant for the manufacturing sector. Access to funding and support for innovation and research and development is vital for companies seeking to drive the green and digital transitions.

Additionally, investments in upskilling and reskilling the workforce are crucial to ensure that the manufacturing sector can adapt to the changing technological and environmental landscape. By investing in human capital and fostering a skilled workforce, manufacturing companies can enhance their ability to embrace new technologies, implement sustainable practices, and remain competitive in the evolving market.

Overall, the European industrial strategy and circular economy action plan offer a comprehensive framework and roadmap for the manufacturing sector's transformation.

## 2.2. Norwegian strategies for industry and circular economy

On the Norwegian national level there are also ambitions to transition. Following largely in the EU's footsteps, Norway have also released strategies on green industrial strategy and transition to a circular economy. As these initiatives are merely extensions and adaptations of the EU's initiatives, I will not provide summaries. However, I will provide some general reflections and notes that seem relevant. While there are a lot of good initiatives from the governments side, they also explicitly state that:

“It is primarily the industry itself that should take initiative to utilise the opportunities and solve the challenges following the green transition. However, the government will actively facilitate private initiatives through favourable framework conditions and an active business and industrial policy, where the government and the business community team to realise the opportunities of the green transition (Ministry of Trade, Industry and Fisheries, 2021, pp 22).”

Through this statement, they transfer most of the responsibility to the companies, leaving only the task of providing favourable conditions to themselves. The manufacturing industry is also specifically mentioned in Norway's Climate Action Plan for 2021-2030. It states that by 2030, Norway aims to have a competitive manufacturing industry that produces low-emission goods (Meld. St. 13 (2020-2021), p. 18-19). Additionally, it is worth mentioning that the Norwegian strategy is more narrowly focused than the EU's strategy. While this makes sense as Norway has its own industrial characteristics, it is relevant to this research as the companies interviewed would not be classified in the government's priority areas of: offshore wind, batteries, hydrogen, CO2 management, the process industry, maritime industry, and the forest and timber industry and other bioeconomy sectors (Meld. St. 13 (2020-2021)).

## 2.3. Rogaland regional plan for climate transition

The regional level of Rogaland continues to extend the climate ambitions of the EU and the Norwegian government. Notable priority areas in this strategy includes: reducing direct emissions, smart energy usage and energy transition, and circular resource usage (Rogaland Fylkeskommune, 2022). Some of the key actions mentioned include:

- Consider which means and measures will yield the necessary emission reductions.
- Consider the potential for energy efficiency in Rogaland, and which means could increase energy savings and more efficient energy usage.
- Uncover the potential for cooperation between public and private sector to increase circular resource usage.

It shows that the region is serious about working toward sustainability. While Rogaland, along the same lines as Norway, does not specifically target the manufacturing industry, this research might still be of value considering the last key action mentioned.

## 3.0 Theoretical background

### 3.1. Transition theory

Research within the realm of sustainability transitions has expanded fast in recent years. It encompasses a wide variety of topics in a large selection of geographical areas and social settings. Köhler et al., (2019, p. 3-4) has identified nine main themes: understanding transitions; power, agency and politics; governing transitions; civil society, culture and social movements; businesses and industries; transitions in practice and everyday life; geography of transitions; ethical aspects; and methodologies.

As these nine main themes show, the field of study is both broad and complex. It extends to all aspects of the social world and is rooted in everything from culture to industry. This is also why the field is broken down in different themes and a variety of methodologies and theories is used to gain a better understanding. For this understanding, there are four theoretical frameworks that create the foundation of theory on sustainability transitions: the Multi-Level Perspective (MLP), the Technological Innovation System approach (TIS), Strategic Niche Management (SNM) and Transition Management (TM) (van den Bergh et al., 2011; Markard et al., 2012; Köhler et al., 2019). For the sake of this thesis, transition management is selected as the most suitable framework. The reason for this is that the remaining three (MLP, TIS and SNM) are heavily innovation focused. While innovation still plays a part in transition management, the theory is more policy oriented and prescriptive which better connects with the main theme of the paper. A dedicated part to transition management comes in section 3.2. In the next sections the relevant themes that are not given an entire section in the literature review will be briefly discussed.

## **Business and industry**

Businesses and industries are central to this thesis, and they are also in the centre of the sustainability transition. The role of business and industry actors is a peculiar one, often found in the centre of the problem and solution at the same time. The study of business and industry's role in the transition is rather recent amongst transition scholars (Köhler et al., 2019). However, in organizational studies, social responsibility and sustainability issues have been studied for a while. Hahn et al., (2016) demonstrates how corporate sustainability has been established as a legitimate research topic in management and organization studies in the last decades. To learn from and consider these perspectives when working with business and industry, is therefore important in order to gain a holistic understanding.

## **Geography and scales of transitions**

Geography and scales of transitions is linked to the thesis in the sense that it proves that “no size fits all”, and therefore tailormade solutions to solve the challenges ahead is needed. Questions like: why do transitions occur in one place and not in another? How do transitions unfold across different geographical contexts? (Hansen & Coenen, 2015, p. 93), are important to consider when for example designing industrial policies. Hansen & Coenen also emphasise that there has been little focus on regime dynamics and later phases of innovation systems in contrast to the heavy focus on niche development (Hansen & Coenen, 2015). In this paper, geography and scales are taken into consideration as it is centred around western Norway and specifically the Rogaland region. The different scales of regional, national, and supranational is represented through the inclusion of political strategies from the three levels in the political background.

## **Temporalities**

Considering the temporalities of sustainability transitions, Sovacool (2016) discusses “How long will it take?”. The article compares ten cases of rapid energy transitions in order to investigate the temporal aspect of sustainability transitions. It concludes by stating that implications in defining and timing transitions can make a significant difference in stated timeframe. In addition, Sovacool states that, because of the complexity of the transitions generalizations are difficult, and might not be fruitful to other than very similar cases. E.g., cases from communist China and military governed Brazil, is not necessarily applicable to a typical democratic nation. The article is criticised for being: wishfull thinking (Smil, 2016),

lacking the importance of political will (Kern and Rogge, 2016) and not addressing the fundamental understanding of the multiple drivers that govern the temporalities of transitions (Grubler et al., 2016). However, the debate that the article propose is also welcomed in the sense that we need to move the discussion from “How long does it take?” to “What does it take?” to achieve rapid transitions (Grubler et al., 2016; Kern & Rogge, 2016).

## **Ethics**

Another important, yet limited, aspect of transitions, is ethics. Steering the transition means dealing with the questions of ‘who wins, who loses, how and why’ (Newell & Mulvaney, 2013, p. 133). Wang and Lo (2021), in their paper “Just transition: A conceptual review”, identify five themes around which the concept of just transition is discussed: just transition as a labor-oriented concept, just transition as an integrated framework for justice, just transition as a theory of sociotechnical transition, just transition as a governance strategy, and just transition as public perception. Out of these, “just transition as a governance strategy” is relevant for this thesis. It focuses on how (un)just transition is shaped by political context. It also deals with the dichotomy of leaving enough time for affected industries, communities, and individuals to rebuild and transition, while dealing with the urgency of climate change to prevent further injustice connected to climate change (Wang & Lo 2021, p. 7). In addition to this, there is a general notion that countries that contributed the least to the occurrence of climate change are less prepared, and that impoverished people in these countries will suffer more from the effects than individuals in wealthy nations (Wang & Lo, 2021). This notion connects to this research in the way that governments and companies that have means to do so, should take a larger responsibility in the green transition.

## **3.2. Transition management**

Transition Management (TM) is chosen as the main theoretical framework for this thesis. TM is a governance framework developed to address persistent societal problems. The framework consists of four different governance activities that are related to social transitions: strategic, tactical operational, and reflexive (Loorbach, 2010).

Strategic activities are directed towards the culture of a societal (sub-) system. It is focused on the long-term processes that should steer development, such as: creating a vision, strategic

discussions, long-term goals, formulating collective goals and norms, etc. Loorbach (2010) uses the example of a debate about energy supply to demonstrate the strategic level. In this debate, issues like: energy security, climate impact, energy prices, availability of resources need to be addressed. Because of political cycles, individual interest and public pressure, long-term concerns and governance are often overshadowed. This leads to these future visions and reflections being more implicit than systematically structured. In the transition management framework, these long term governance activities are integrated as a fundamental element of policymaking for sustainable development.

On the tactical level, steering activities related to the dominant structures (regime) of the societal system are in focus. This encompasses all established patterns and structures, including rules and regulations, institutions, organizations and infrastructure. This level also deals with all the actors that work with developing programs, financial and institutional regulation and frameworks, organizing networks and coalitions, and, generally, representing interests. The activities at this level are focused on achieving goals within the specific context but are not concerned with the general development of the societal system. It operates at a time horizon of 5-15 years and would generally be considered strategic activities at the individual level of actors. Because companies and organizations often have such strategic visions that creates the baseline of their interactions and negotiations with other actors, it is important to recognise that this creates fragmentation in the governance. Other actors like business, science and NGOs are also contributing to this fragmentation in their performance of day-to-day actions. This happens not because they are not willing to contribute to system innovation, but because an integrative strategic governance level is missing (Loorbach, 2010).

The Operational level deals with typical short-term activities. This is the level of innovation and day-to-day activities. It is important to note that in the context of transition management, the definition of innovation concerns all social, technological, institutional and behavioural practices that either introduce or operationalise new structures, culture or actors (Loorbach, 2010, p. 170). What is important to note, is that the innovation and activities carried out on this level must fulfil two criteria. First, the innovation and activities must be in line with the envisioned vision and strategy developed at the strategic level. Second, the innovation must be closely followed (evaluating and learning), so that when successful projects are encountered it is possible to scale up and broaden it.



Lastly there is the reflexive level. Reflexive activities deal with the process of monitoring, assessing, and evaluating ongoing policies and changes. This level is related to all the previous three. However, it is important to stress that reflexivity should be an integral part and embedded in the actual governance. Both designated existing institutions and public opinion, like media and internet, plays a central role in judging effectiveness of policies and political agendas. This level is especially important to prevent lock-ins and to explore new ideas and trajectories (Loorbach, 2010).

### **Business Transition Management**

Considering the basics mentioned above, multiple scholars have applied TM theory outside of the traditional field of governance. Using the framework to analyse the business role in the transition is one of these discussions.

Loorbach and Wijsman (2013) discusses how transition management theory can be applied in business cases. The three levels of strategic, tactical, operational, and reflexive are utilised, but with more defined activities. On the strategic level, the business should decide on which societal issue(s) or transition(s) it want to contribute to. This decision should consider factors such as the characteristics of the relevant (sub)systems, the company's own position and relationship to the problem, the anticipated impact of the company's actions on the problem, and the society at large. Based on this decision, activities at the tactical level should develop strategies and coalitions around key issues related to this challenge, including identifying learning objectives, milestones and experiments (Loorbach & Wijsman, 2013). Following the rationale of both the strategic challenge(s) and the tactical objectives, activities at the operational level should experiment with new business models and practices. This is where the strategic and tactical activities materialise.

Finally, reflexive activities need to be integrated at all levels. Continuous evaluation and reflection of strategies, activities and the system as a whole is important in order to learn from experimentation and improve performance (Loorbach & Wijsman, 2013).

Hernández-Chea et al., (2021) combines transition management to understand transitions on a macro level, with the business model activity system to understand firm activities at the micro level. The result conceptualises how firms can initialise changes at the system level by working on the micro level. There are also scholars that argue for an increasing attention towards business model perspectives in transition theory (Sarasini & Linder, 2018; Bidmon & Knab, 2018).

## 4.0 Literature review

### 4.1. Policy

When it comes to policy, Rogge & Reichardt (2016) is used as a point of departure in this thesis. In their article, they argue that one of the main challenges in the field of sustainability transitions is to improve the political understanding of transitions. While mainly focusing on technology innovation, their framework for understanding the political landscape of transitions, seems to be useful also when considering transitions from a more general perspective. The key takeaways that is relevant for this paper is Rogge & Reichardt's focus on policy mixes and importance of a systems perspective in policy making. Another takeaway is the "building blocks" of policy mixes. Rogge & Reichardt (2016) argue that a policy mix concept for sustainability transitions must include three building blocks: a strategic component, the policy process, and the characteristics of the policy mix. This will now be explained in greater depth.

#### **Elements**

Building block one, elements, is divided into two main parts: the policy strategy, and the instruments. The policy strategy consists of two components, policy objectives and principal plans. Policy objectives come together with long-term goals with measurable ambition levels. An example of this is the reduction of greenhouse gasses by 2050. The strategy could also include social and economic issues and learning objectives. The second component, principal plans, are concerned with achieving these objectives. Principal plans are the general path, the frameworks, guidelines, action plans and roadmaps that governments suggest to realise the stated long-term goals. This way, both the ends and the intended means are communicated in a way that informed actions and decisions can be made.

The second part of building block one is the instruments. Instruments are the concrete tools used to accomplish the defined objectives. The term is chosen to make it clear that it encompasses all the alternative terms from the existing literature such as implementing measures, programs, and policies. Two key features are discussed, namely instrument *type* and instrument *design feature*. The Instrument types, economic instruments, regulation, and information are combined with three primary purposes (technology push, demand pull and systemic) to create a type-purpose instrument typology (Rogge & Reichardt 2016, p. 1624).

## **Policy processes**

Shifting away from policy strategies and their specific instrument mixes, this building block deals with the processes of making policies. It is through these processes the elements are decided, and how the instruments and strategy changes over time. Policy processes encompass all the stages of the policy cycle from identifying the problem, setting the agenda, formulating policies, implementation, and evaluation.

It is important to note that policy making is a highly political process characterised by resistance to change, especially from actors with vested interests. While a policy strategy may set the agenda for change, it can be challenging to radically adjust the instrument mix due to political constraints. As a result, new instruments supporting niches may be added alongside existing instruments, rather than replacing them entirely. Policy implementation refers to the arrangements and actions taken by authorities and other actors to put policy instruments into action. Effective implementation is crucial for realising the full potential of policy instruments, and challenges can arise from complex implementation structures, insufficient resources, and political resistance at subordinate governance levels (Rogge & Reichardt, 2016).

## **Characteristics**

The last building block of policy mixes is the characteristics. Four characteristics are chosen to best describe the policy mixes. They are consistency, coherence, credibility, and comprehensiveness (Rogge & Reichardt, 2016).

Consistency in the policy mix refers to the alignment and absence of contradictions between the elements of the policy mix. It includes consistency in the policy strategy, instrument mix, and the interplay between them. A consistent policy mix contributes to achieving policy objectives effectively and efficiently.

Coherence in policy processes refers to the systematic and synergistic approach to policy design and implementation that contributes to the achievement of policy objectives. It involves aligning different areas and levels of governance, harnessing organisational capacity, and integrating different knowledge and stakeholders. Coherence directly affects the effectiveness of a policy mix and indirectly influences its consistency. Policy integration and coordination are important tools for improving coherence. Striving for maximum coherence and consistency improves the performance of a policy mix in terms of effectiveness and efficiency.

Credibility in policy processes entails the extent in which the policy mix is believable and reliable, both in general and in its specific elements and processes.

Lastly, the comprehensiveness of a policy mix refers to how extensive and exhaustive the elements of the mix are. It also includes to what extent the processes involved are based on extensive decision making (Rogge & Reichardt, 2016).

The three building blocks provide useful insight to understand the policy processes of sustainability transitions. It connects well with facilitating for the transition in manufacturing, and in the discussion, some of these terms are used to create a more nuanced discussion on relevant policy processes. It also connects well with the following section of industrial policy which makes use of some of the same principles.

## 4.2. Industrial Policy

Industrial policy is defined by Altenburg and Rodrik (2017) as the interventions and initiatives taken by a government to shape the economic landscape and promote the growth of particular sectors deemed important for future development. It involves directing resources and investment towards these sectors to facilitate their expansion and success.

In the existing literature, industrial policy is consistently characterised by its focus on specific economic activities with the aim of achieving long-term societal benefits. Recently, a new strand of industrial policy research has emerged, referred to as "new industrial policy" (NIP). This approach emphasises that industrial policy should go beyond the pursuit of short-term competitiveness and economic growth. Instead, it should embrace a broader and multidimensional objective that includes long-term social welfare. This idea is exemplified in the work of Rodrik and Sabel (2019), who propose rethinking and testing a range of policies aimed at promoting a "good jobs economy." Which they briefly define as typical stable middle-class employment.

The discourse surrounding targeted industrial policies is polarised, with proponents and sceptics offering contrasting views. Proponents of targeted industrial policies highlight notable success stories, such as post-World War II technology policy in the United States, which resulted in transformative inventions and breakthroughs in various sectors (Criscuolo et al., 2022). They argue that targeted interventions, particularly in areas such as climate change mitigation and green transformation, have the potential to stimulate innovation and address market uncertainty (Rodrik & Sabel, 2019). Conversely, sceptics raise concerns about

the role of government in decision-making, the potential capture of support by specific firms, and the risk of crowding out private investment (Lincicome, 2021). They question the effectiveness of interventions based on past experiences marked by inefficiencies and debate the overall net benefits of such policies (Criscuolo et al., 2022; Tagliapietra & Veugelers, 2020). Moreover, the issue of aligning targeted industrial policies with competition policy remains a subject of ongoing deliberation, with concerns about preferential treatment and the resulting impact on market fairness (Criscuolo et al., 2022).

Despite these debates, economists are now reassessing the role of targeted policy, acknowledging the existence of market imperfections as a crucial factor. In imperfect market contexts, targeted policies can be justified as a means of correcting sectoral inefficiencies and facilitating productive reallocations (Bloom et al., 2019; Criscuolo et al., 2022a). The aftermath of the global financial crisis provided an impetus for interventions aimed at facilitating restructuring and addressing inefficient sectoral allocations (Warwick, 2013). In addition, industrial policies have been used by governments to counteract perceived unfair foreign policies that include tax, trade, and foreign direct investment practices that adversely affect specific sectors or firms. The contemporary landscape of technological advances and evolving societal challenges further underscores the relevance of targeted industrial policies. Urgent global challenges such as climate change, demographics, and cybersecurity require synergy between public leadership and private investment (Criscuolo et al., 2022; Mazzucato, 2018; Rodrik, 2008). Emerging general-purpose technologies, such as big data and artificial intelligence, hold great potential and require public impetus and cross-sector collaboration to unlock breakthroughs and promote spillovers across industries (Criscuolo et al., 2022). Moreover, the rise of the digital economy and winner-take-most dynamics, especially in sectors characterised by platform-based business models, have forced governments to strategically invest in emerging technologies to secure global leadership positions. Such investments aim to promote technology diffusion and improve the productivity of lagging sectors and firms. Ultimately, the pursuit of prominent positions in high-value segments of global value chains emerges as a central objective driving targeted industrial policies (Criscuolo et al., 2022).

## **History and the debate about industrial policy**

Two arguments are recognised as opposing the idea of industrial policy.

The first one is that governments do not possess the information needed to make optimal decisions about what businesses or industries to support. Thus, governments are ultimately going to waste a lot of resources in the process. The second argument addresses political influence and argues that industrial policy can quickly fall victim to well-connected firms and lobbyists. This would then lead to industrial policy becoming driven by political motives instead of economic ones (Rodrik, 2014). However, Rodrik (2014) continues by saying they can both be overcome through appropriate institutional design. Successful industrial policy does not depend on the government's ability to predict outcomes or pick winning industries. Mistakes are expected and necessary in a well-designed industrial policy programme, as they provide opportunities for learning and policy adjustment. Rather than trying to pick winners, it is more important to have mechanisms in place to acknowledge and correct mistakes. Rodrik (2014) argues that an explicit industrial policy, implemented with an awareness of potential challenges, is more likely to overcome informational and political barriers than a covert or hidden policy.

## **The case for green industrial policy**

The field of industrial policy is broad and, with multiple fields overlapping, it is challenging to gain a thorough understanding. Developing from the overarching challenges of climate change and biodiversity loss, green industrial policy is about integrating proper environmental considerations into industrial policymaking. It goes against the typical notion of industrial politics in a few important ways. First, environmental externalities are seen as a particular harmful market failure. Green industrial policy makes a clear and predictable distinction between technologies that are “good” or “bad”. Furthermore, there is the duality of urgency to achieve structural change, while at the same time dealing with the uncertain and long time horizon of transformation. Finally, the concern of the global commons like the atmosphere and oceans for long term sustainability, is not necessarily aligned with immediate national interests (Altenburg & Rodrik, 2017).

## Instruments in industrial policy

Criscuolo et al., (2022a) have created a taxonomy of industrial policy instruments. Two points are important in this new taxonomy. First, it uses the mainstream split of supply-side instrument and demand-side instruments. The supply-side instruments are the ones that affect domestic production, no matter where it is consumed. Demand-side instruments then affects the domestic consumption regardless of where the production took place. The second point is concerned with catching the interaction between different instruments. On the supply-side, it distinguishes “between instruments” from “within instruments”. The between instruments are the general instruments affecting industry dynamics, while the within instruments affect the firm performance. Lastly, governance is recognised as an important enabler of policy interventions.

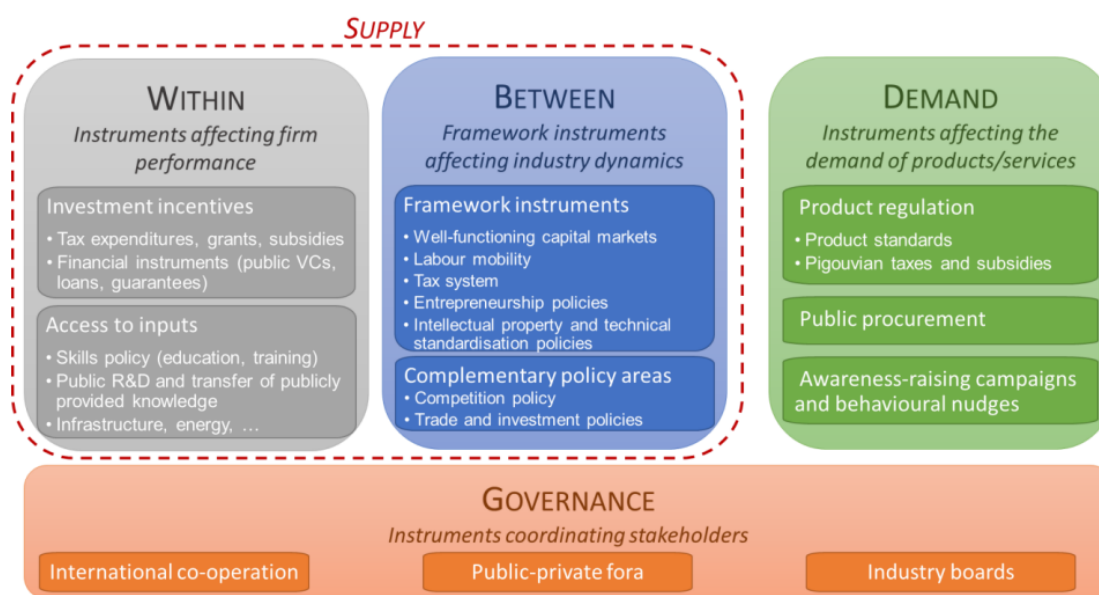


Figure 1. Taxonomy of policy instruments (Criscuolo et al., 2022a)

I will now elaborate on the three categories of the taxonomy threefold division (illustrated in Figure 1). On the supply-side, the within instruments can be divided into two sub-categories. The first sub-category focuses on sharing costs or risks with the public sector to incentivise business investment and address market failures related to knowledge externalities and asymmetric information. This involves the use of instruments such as research and development (R&D) tax credits, grants, subsidies, loans, guarantees and public venture

capital. The second sub-category aims to improve firm performance by providing efficiency-enhancing inputs such as skills, knowledge and infrastructure. Interventions include support for specific skills, vocational training, exploitation of research results, university-enterprise cooperation and addressing skills shortages. These instruments promote both frontier innovation and technology diffusion by increasing the absorptive capacity of firms and facilitating the adoption of new technologies (Criscuolo et al., 2022a).

Between instruments can be divided into two categories: Framework instruments and complementary policy areas. Framework instruments influence factor allocation, facilitate entry of new ventures, and balance innovation diffusion with incentives through intellectual property and standardisation policies. Complementary policy areas ensure fair competition between firms. Product market regulations (PMR) play a vital role in factor allocation, while tax systems impact capital allocation. Framework instruments indirectly enhance incentives for both challengers and incumbents to innovate, promoting within-firm performance by enabling competition and challenging established incumbents (Criscuolo et al., 2022a).

Demand-side instruments in the third category focus on domestic consumption, regardless of the location of production. They influence the demand for products and services by reducing prices, increasing availability or increasing public demand. The distinction between supply-side and demand-side instruments is commonly referred to in the innovation literature as the "supply-push" versus "demand-pull" dichotomy. While demand-side instruments focus primarily on consumer security and behavioural objectives rather than on business productivity and innovation, public procurement instruments are often used to incentivise innovation. These instruments mitigate market size risks and facilitate product demonstration to public purchasers prior to private sector uptake.

Some demand-side instruments are explicitly aligned with industrial policy objectives, although their impact on domestic producers is less direct. While demand-side instruments are expected to have a symmetric impact on domestic and foreign producers, in practice they may disproportionately favour domestic producers due to deliberate regulatory design (e.g., local content requirements) or their familiarity and lower implementation costs. In general, the local nature of innovation and the inherent uncertainty of demand justify the use of demand-oriented instruments (Criscuolo et al., 2022a).



### 4.3. Circular economy

In this last section, the concept of circular economy is introduced. The term has recently gained traction both in the academic literature and, as shown in the chapter on the political landscape, in policy-making in recent years (Ghisellini et al., 2016; Kirchherr et al., 2017; Korhonen et al., 2018; Geissdoerfer et al., 2017 ). The concept refers to moving away from a linear economy of resource extraction into manufacturing and consumption to waste. Instead, we are to introduce a circular economy where the resources are caught in a circle instead. It is based on the principles of reducing, reusing, recycling, and recovering materials in production, distribution, and consumption processes (Kirchherr et al., 2017; Stahel, 2016). As the topic of circular economy is relatively new, it has some challenges. Scholars argue for an increased coherency and stronger agreement on the definition (Kirchherr et al., 2017; Geissdoerfer et al., 2017). Hopefully these challenges will be overcome as the field matures. Because as previously mentioned, both policymakers and businesses are starting to catch on to the idea, and according to some a shift to a circular economy could drastically increase sustainability while still growing the economy (Stahel, 2016).

What is particularly interesting for this research is that some scholars argue that the policies we have today are not suitable or aligned with the concept of circular economy (Domenech & Bahn-Walkowiak, 2019; Milios, 2021). Milios (2021) proposes a framework for circular economy taxation which I will now briefly explain. The framework leverages different taxation approaches at the different life stages of a product. At the production stage, a virgin material resource tax is suggested. Four arguments are provided to justify this implementation. They are (a) resource depletion concerns, (b) the need to address environmental externalities, (c) an expectation of future amounts of emissions or waste and (d) an encouragement to substitute virgin materials with recycled materials.

Second, at the product stage, a value added tax (VAT) relief on reuse/repair is proposed. This suggestion could make reuse and repair of old products more attractive for consumers leading to less resource intensive consumption patterns.

Last, at the end of life stage, Milios (2021) introduces a waste hierarchy tax. The waste hierarchy ranks different options waste treatment. The most desirable option is waste prevention, while disposal of material (landfilling), is defined as the least preferred option (Hultman & Corvellec, 2012). Milios (2021) suggestion is a progressive tax rate following

this hierarchy, where it decreases progressively from landfilling to recycling, no tax should apply to any level above recycling. The framework will serve as an example of addressing market failures in the discussion.

## 5.0 Research approach

### **Introduction**

My bachelor's degree in social anthropology has influenced my way of understanding and interpreting the world. This led me to choose a qualitative study where the goal is to gain an understanding of the landscape from those that are directly working with sustainability transitions in the manufacturing industry. I can therefore say that my choices for this research have been influenced by my background.

Researching how policymakers and governments can accelerate the transition through industrial policies, expert interviews with sustainability managers in the manufacturing industry in Rogaland, were chosen as the main source of data. This data serves the purpose of a bottom-up perspective. Additionally, policy documents and industrial strategies were analysed on a high level to get a top-down understanding of the situation. These perspectives are then discussed on the theoretical grounds of transition management and green industrial policy.

Coming from an anthropological background, it was important for me to collect data from the people directly involved in the transitioning of manufacturing firms. Therefore, the research has an inductive approach. Analysing the political landscape, with an emphasis on the future initiatives like the EU Green Deal, Norway's strategies for green industry and circular economy, and Rogaland's regional plan for climate transition. After analysing the political documents, expert interviews were conducted to get a deeper and more "hands on" understanding of what's actually going on, and what the industry is concerned with.

To investigate the research question, "How can the government facilitate for an accelerated transition towards sustainability in the manufacturing industry in Norway?", expert

interviews and policy documents were used as data to be analysed. This study is inductive by nature and utilizes the knowledge of experts in the field as point of departure for the analysis and discussion. The interviews provided a great amount of qualitative data on the industrial-political landscape, through an anthropological inspired perspective, the goal of the study will be to combine this knowledge with existing theory and academic literature to provide valuable insight to inspire action. In the following sections the research approach will be discussed in detail. Starting with the underlying research philosophy, followed by sections on positionality and limitations.

### **Epistemology**

The issue of epistemology is concerned with the answers to the question of what is or should be regarded as acceptable knowledge in a research discipline. In the social sciences, the epistemological debate is usually centred around whether or not the social world can and should be studied in compliance with the natural sciences principles, procedures, and ethos (Bryman, 2016). An example of this latter epistemological position is positivism. Positivism advocates for the extension of natural sciences methods to the study of social reality. The exact way of doing this varies between authors, but some key principles are commonly agreed upon. First, only phenomena and knowledge confirmed by the senses can be legitimized as knowledge. Second is the principle of deductivism. This entails that the role of theory is to generate a testable hypothesis which, when tested, can provide explanations of laws. Third, the research must (and presumably can) be conducted objectively. Lastly, there should be a clear distinction between scientific and normative statements (Bryman, 2016).

The other, contrasting epistemological position, is interpretivism. It includes different views of writers critical of the usage of the scientific model to study the social world. An interpretivist view stresses that the subjects studied in social science, people and institutions, are fundamentally different from the subjects of the natural sciences. Because of this difference, studying the social world requires a different logic of research. This logic should reflect on, and take into account, the distinctiveness of humans as against the natural order. (Bryman, 2016). Another key point of interpretivism stems from phenomenology, and builds on this fundamental difference between social and natural science. The difference is anchored in that the social reality has a meaning for humans, which again leads us to saying that human action is meaningful. The work of social science should therefore be concerned with

accessing people's general world view and common sense. The social scientist will then put the interpretations attained in to social science theories and frameworks, creating a three layered interpretation. First, the subjects' own interpretations. Then the researcher's interpretation of the subjects' interpretation. Third, the researcher's interpretation through the concepts, literature, and theories in the given subject (Bryman, 2016).

In the context of this thesis, I have an interpretive epistemological approach. This is especially relevant for the parts where data from interviews are used because that's where most of the interpretations takes place. It is linked to the anthropological influence in the way that I want to understand the manufacturing companies' experiences in working towards sustainability. These experiences are gathered through interaction with the firms sustainability experts.

### **Ontology**

The question of ontology deals with the nature of social entities. There are two main positions, respectively objectivism and constructionism. Objectivism's ontological position suggests that social phenomena are external facts beyond our reach or influence.

Constructivism however, implies that social phenomena and their meanings are dynamic and in a continually state of revision (Bryman, 2016).

My thesis has a constructivist ontological position. The way the constructivist position has influenced this research is similar to what I mentioned about interpretivism. An example could be the way I talk about "sustainability" in the interviews. A constructivist approach implies that the meaning of different concepts or categories varies between context, time, and place. It is created in and through interactions. This notion ultimately influences the way research is carried out (Bryman, 2016).

### **Positionality**

In modern social research, it is widely accepted that researchers cannot achieve complete objectivity. The values held by a researcher inevitably shape various aspects of the research process, including the choice of topic, research questions, methodology, data analysis and the resulting conclusions. While it is impossible to eliminate these values, researchers should be aware of their potential impact and strive to minimise their influence on the research. This

can be done through self-reflection, acknowledging biases and assumptions, and critically examining how these factors may have influenced the findings. By engaging in such reflective practices, researchers can enhance the transparency and integrity of their work (Bryman, 2016; Loseke 2017). After studying energy transitions for almost two years, I have become quite passionate about the topic. Even though I strive to be neutral, reflexive, and transparent about my own positionality this certainly influences the way I think about the subject. A potential threat of such influence driven by passion, is that it might lead to confirmation bias. Because of this, I have tried to be reflexive and critical both in the sources and information used, but also with my own reflections.

### **Limitations and future research**

Factors limiting the research include scope and generalisability. Considering the timeframe and scope of this thesis some priorities had to be made. First, for the political background, priority areas had to be made as the political landscape is too wide to account for in one study, this can potentially lead to overlooking of important aspects or make generalisations where specific nuances could provide to be useful. The number of informants is also a limiting factor, a low number means that generalisation is difficult and potential important experiences are left unheard.

Based on these limitations, I will outline some areas of interest for future research to advance the understanding and implementation of green industrial policy in the manufacturing sector. First, there is a need to assess the effectiveness of green industrial policies in different contexts by conducting rigorous empirical research and evaluating the outcomes of policy initiatives in order to identify best practices and policy approaches that successfully promote sustainable production and consumption.

Research could focus on enhancing policy integration and coherence by addressing institutional fragmentation and developing more comprehensive and coordinated policy frameworks. This includes exploring ways to align policies across different ministries, agencies and levels of government, and identifying mechanisms to integrate sustainability considerations into different policy areas beyond industrial policy.

Finally, further research on transition management approaches, including their application in different industries and regions, can contribute to our understanding of how to effectively

manage and facilitate sustainable transitions. This includes examining the role of strategic, tactical, operational, and reflexive activities in driving system-level change and identifying strategies for overcoming barriers and resistance to change.

## 6.0 Methods

### **Qualitative research**

While deciding on a topic and designing this thesis, there were a lot of different, yet related, topics that were considered. I wanted to research business roles in the sustainability transition. As this is a very broad topic, a need to narrow it down was obvious. While familiarising with the topic and general literature, I got the notion of an unproportional emphasis placed on niches, innovations, and start-ups. While new ideas are a precondition for change, it led me to the interest of what is going on in well-established companies. Questions such as “how they are working with sustainability?”, “what is their motivation, is it going fast enough?”, and “what conditions they are facing in the political landscape?”, peaked my interest.

Having a rather short period to conduct the research, I decided to do expert interviews to gather data. The decision was heavily influenced by the timeframe and the uncertainty of getting access to enough representatives to do other approaches like quantitative surveys or qualitative comparative analysis. Doing qualitative research often implies the generation of theories, additionally it puts an emphasis on how individuals interpret their social world (Bryman, 2016). In this research I conducted expert interviews to gain a detailed description of how the experts understand the transition of the manufacturing industry towards sustainability. These descriptions were then used to produce a more general theory of which challenges the industry are facing. It is based on this theory my discussion, and ultimately my answer to the research question is based on.

Induction is commonly connected to qualitative research. This thesis is inductive in the way it starts of with observations and findings, which then leads to theory generation. In contrast, deductive approaches start off with a theory. It then applies observations or findings to either

prove wrong or strengthen the scientific claim of said theory.

One of the weaknesses qualitative types of research has is that it involves and gather data from few numbers of participants. This small number makes it so the findings cannot be generalized. However, by comparing findings to other studies and theories, they can be understood as tentatively transferable to similar contexts (Bryman, 2016).

### **Data selection**

When it comes to the selection of experts (informants), a lot of factors weigh in. In order to get the best possible picture of what is going on, I needed both inside and outside experts. Following the logic of Soest (2023), in this research inside experts are referred to as sustainability managers working for (inside) a company. Outside experts is then referred to as relevant actors that are not directly affiliated with a manufacturing company.

I decided to look solemnly on the manufacturing industry and excluding the oil industry as I think the oil industry just operates on a different scale when it comes to economics and scale. Excluding the oil industry, I searched and reached out to the biggest manufacturing companies in the region, asking for a meeting with a representative that works with sustainability. I ended up interviewing the head of sustainability in three companies and one quality, health, safety and environment (QHSE) manager. These constitutes the group of inside experts.

For the outside experts, I searched for local politicians, people representing multiple companies in political matters, or people working with multiple companies on sustainability topics. I ended up with one of each. One representative from the county municipality, one industrial political advisor working for the local businesses, and one representative from an organization helping businesses with sustainability transitions.

In total this accumulated to seven interviews over the course of March and April 2023. All interviews were done in person at their workplace. This was done for two reasons. First, I wanted to make it as convenient as possible for the subject, and second, I wanted the full experience of the physical interview. All the interviews lasted approximately 45 minutes.

When it comes to sampling for the political background, I had to restrict myself. The three levels of regional, national, and supranational politics were chosen. Respectively Rogaland,

Norway, and the European Union. The selected strategies were: Rogaland regional plan for the transition; national action plan for climate (2021-2030); and the EU Green Deal. These are rather large and general policy documents, so based on my own reasoning, I carefully selected the most relevant parts. This left me with two strategies on the EU level: EU industrial strategy and the circular economy action plan. Two strategies on the Norwegian national level: National strategy for a green, circular economy, and the green industrial strategy. And finally, Rogaland regional plan for the transition.

These document and strategies were selected with both the scope of the thesis and the research question in mind.

### **Expert interview**

In this study, the choice of utilising expert interviews was made in the early phase of the research design. To understand how the government can facilitate for an accelerated transition in the manufacturing industry, I felt the need to understand what is already happening on the ground. I use an inclusive definition of the term experts. More specifically I follow Soest's (2023) definition in that "Broadly understood, experts have specific knowledge about an issue, development or event... an expert is any person who has specialized information on or who has been involved in the political or social process of interest (Soest, C., 2023, p. 278)". The process of selecting experts, as mentioned in the sampling strategy, led me to interviewing seven experts, three outside, and four inside experts.

The expert interview has for a long time been popular in social science research. It often varies in its design, form and methods used to analyse the result. There are multiple reasons for this, and Bogner, Littig and Menz lists a few in their book *Interviewing Experts* (2009). For one, talking to experts in the exploratory phase of a study is an efficient method of gathering data. Second, expert interviews may be especially useful in situations where it might be difficult to gain access to the field of study. However, expert interviews should not merely be used as information gathering meetings to obtain facts. Some key questions to consider and reflect upon when doing expert interviews are: what constitutes an expert? What is the expert's positionality in the matter, and how does it influence the data they provide? (Bogner et al., 2009).

The interviews were semi-structured and the interviews were relatively similar, but there were a few differences between the inside and outside interviews with a main emphasis on



the specificity of the topics. In all the interviews, I started by asking the informants about their work in a general sense. This proved to be valuable in two ways. First, it provided me with insight on their role in the company. Second, I got a better understanding of exactly what the company is doing. In the inside interviews this naturally transitioned from the company in general, to how the company works with sustainability. This was usually the longest part of the interview, as the informants usually were passionate about how they are working. This part was very interesting and gave a good overview of different approaches that one can have to working with sustainability. As a follow up, I asked about the motivations driving the sustainability work. E.g., What outside and inside factors put sustainability on the agenda? This led to multiple interesting thoughts and reflections about the company, investors, and customers. Towards the end of the interviews, I asked about what struggles the company faces in their sustainability work, and what could make these burdens lighter.

The interviews with the outside experts were conducted a little differently. In these interviews politics and general tendencies were the focus. Again, I first asked the informant to provide an overview of their general work. Then I asked them about their general impression of businesses' work with sustainability. As the outside experts were from different organisations, at this point in the interviews it generally developed more towards the specific knowledge of the expert making these interviews less structured than the inside interviews. During the interviews I took notes, then after the interviews, I wrote a summary which is what I have relied on.

## 7.0 Findings

### **Interviews**

In this section I will present the data obtained through the expert interviews. The data will be presented through sections of different topics selected from the interviews. The topics are selected to be as representative as possible in order to present a clear understanding of the data. First, I will present my understanding of the external and internal motivations for working on sustainability. Second, I will explain how and why different companies take different approaches. Then I will look at reporting and attitudes to reporting on sustainability issues, and finally I will give an overview of the different challenges that manufacturing companies face in working with sustainability.

I would like to start on a positive note and say that all companies are working with sustainability and they all recognise the importance of becoming more sustainable.

### **Motivations**

As I got the notion of the companies working well with sustainability, I wanted to place a greater focus on the motivations behind this work instead. I asked about this in all the interviews. I split this question in two parts consisting of external motivations and internal motivation. Internal motivations could be from employees in the company, company vision/values, business strategy etc. External motivations would then encompass all the external factors, like the market, business partners, politics, and development in the general society. I got the impression that there are both external and internal forces that give motivation to becoming more sustainable. However, the general level of motivation and which source are having the biggest impacts are difficult to measure.

### **Internal**

Amongst the internal factors that were mentioned, the biggest emphasis was put on the fact that sustainability is now an integrated part in the companies' visions. This factor was reported in all the instances. In some of the companies they also reported a general company culture of innovation and sustainability as an internal factor. Another important factor is that employers, and especially the younger generation, want to work for companies that take sustainability seriously. For the companies this means that they have to work with sustainability in order to attract the best talents. The last factor I want to mention is regarding

energy efficiency. All companies see the value of working with energy efficiency, this focus seems to go hand in hand with the energy intensity of the business.

### **External**

When it comes to the external factors, three points seem to be especially relevant: Owners and investors, market demands, and EU politics. The greatest emphasis is placed on the owners and investors. Situations vary, whether or not the company is listed, is a subsidiary or unlisted, the feedback from the interviews are clear; the owners have a great impact on the sustainability work in the company. This impact can vary in form, one of the representatives said that without a proper environmental, social, and governance (ESG) report and strategy, investors wouldn't take the company seriously. Another, speaking for a subsidiary company, explained that the owners give them strict guidelines when it comes to which numbers to report, and clear targets to work towards. The next factor of great importance is market demands. All the companies reported that sustainability is in increasing demand. This rise in demand, according to the interviews, is the largest in the B2B (business to business) market, but there is also an increasing awareness amongst the end consumer (private). This is an important element, as it means that a company that does not work with sustainability issues will have a harder time selling their products.

The last point of the external factors are the EU policies. All companies seem to be somewhat influenced by EU policies like the European Green Deal. However, except for reporting, which I will talk more about in the next section, there seems to be little direct influence from these policies for now. The European Green deal may, however, influence a great deal indirectly, through agenda setting and creating expectations that sustainability will pay off in the long term, which again will influence the demand of owners, investors, and customers.

### **Different company, different approach**

The interviews revealed that companies adopt varying approaches to their sustainability efforts, which is not surprising considering the inherent differences among companies and industries. However, this finding holds significant implications. When asked about how the government could better support their transition, the representatives provided diverse responses and highlighted different potential initiatives that would assist them in their sustainability journey. This highlights the absence of a one-size-fits-all approach to facilitating sustainability in companies. The most effective strategies for sustainability differ depending on the company. One representative said their company would benefit from

optimising their energy systems and transitioning to renewable energy sources, while another reported that they have a greater impact by addressing downstream issues in their product design. This poses a challenge in designing equitable political initiatives. There was a consensus among the representatives that focusing subsidies or incentives on specific aspects of the transition may unfairly advantage certain businesses while leaving others at a disadvantage. For instance, incentivizing energy efficiency measures could disadvantage companies that had already implemented such measures prior to the incentive, giving their competitors an advantage. The representatives therefore generally agreed upon the need for political packages that consider the complexity and variations among companies to effectively facilitate the transition in manufacturing.

### **Reporting - a common denominator**

During my interviews there was one common denominator when it came to implementing sustainability measures - reporting. Reporting seems to be a prominent first step in transitioning to more sustainable ways of manufacturing. Reporting is also one of the areas where the companies report to be influenced by the political landscape. The attitudes towards mandatory reporting seems to not be universal. My impression, from the interviews is that reporting is quite demanding when you are getting started with it. Meaning that creating the new routines and systems for effective reporting is time and resource consuming. However, once the ball gets moving and the system is in place, it can prove to be very useful, both on sustainability matters, but also more general in finding bottlenecks, or resource and energy waste. Because of this, it was put a great emphasis on the importance of standardisation and maturity in ESG reporting. Standardisation is mainly important for two reasons. First, it makes the reporting easier and less of a toll on the companies. This is especially important for companies with smaller economic muscles. Second, standardisation makes it possible to actually compare different companies' sustainability work. This way, customers and investors can make more informed choices when they consider investing in, or buying from the company.

## Challenges

I have chosen to divide the answers to the question “what challenges are the firm experiencing in their sustainability work” into three categories. The categories are based on where in the manufacturing process the challenges occur and came up in one of the interviews. The categories are upstream, direct operations, and downstream. For context, I will briefly explain them. Upstream, refers to all processes before the company acquire the raw materials or components they use. This includes for example raw material acquisition, pre-processing, and the transportation of said resources. Direct operations relate to what happens at the company’s own site and is mainly concerned with energy usage e.g., electricity or fossil fuel. Downstream relates to what happens with the product after it leaves the site, like operations related to retail and market distribution, the use phase, and waste management (incineration, landfilling, recycling) (Meinrenken et al., 2022).

The upstream challenges were mainly centred around the acquisition or integration of recycled materials. Multiple companies reported that the cost of recycled materials often were higher than those of their virgin counterparts. This makes it so the company must choose between profits or sustainability. One company reported that shortage on some recycled materials occurred sporadically as well. When it came to the integration of recycled materials or increasing the percentage of recycled content in their products, the main concerns were related to product quality. Some of the products must comply with a set of standards or regulations. This was usually the main concern expressed by the representatives. If recycled materials hold a lower quality this might put the compliance at risk.

Challenges related to direct operations were mainly directed towards the company’s energy system. Only one of the companies interviewed could be described as energy intensive, and it was the only one to emphasise this. A key challenge is that replacing entire energy systems takes time and costs money. Another interesting finding is that the company representative said that the company had investigated both the possibilities of solar panels on the factory roof, and creating infrastructure for sharing their waste heat, but they found the processes difficult.

The last category, downstream, is complicated. Optimising the product for the use phase seemed to be a given amongst the representatives, but the processes are complex. The company needs to balance product quality and functionality with innovation regarding choice of material, efficiency, durability, repairability, and recyclability. However, it also became apparent that there are plenty of challenges related to these choices. Recyclability was

emphasised the most, and in particular two aspects of it. Firstly, how do you make sure that your product is properly recycled at the end of its life? Secondly, if your product is complex and made up of many different types of materials, how can you make sure that everything is properly taken care of? Regarding the first question, multiple representatives reported that their company were experimenting with new types of business models where they kept ownership, typically leasing or product as a service. Regarding this, one company reported that it was difficult to introduce these new business models to public procurers (e.g., hospitals), as their financial situations makes them more prone to buying than leasing. For the question about complex products, one representative emphasised the need for more complex waste management systems, before noting that some “mega companies” like Apple, have the means to create their own complex recycling facilities. However, this is not the case for “normal” sized companies, they rely on public waste management systems.

To summarise the findings, I would like to highlight a few points. First, while companies report multiple motivations for working on sustainability, apart from ESG reporting, few of these stem directly from policymakers' sustainability initiatives. Second, the implementation and focus on ESG reporting appears to be successful, with all companies recognising its importance and working towards compliance. Third, upstream challenges seem to be rooted in the economic dimension through high prices for recycled materials. Fourth, the reported downstream challenges relate to infrastructure and a lack of cooperation between the public and private sectors.

## 8.0 Discussion

This chapter aims to effectively address the imperative of accelerating sustainable manufacturing by examining the findings derived from the conducted expert interviews within the context of the political background and relevant theoretical literature. First it discusses the political landscape in the context of the theory, before going into the questions of how and why manufacturing firms are working towards sustainability. Then it goes deeper into the challenges they experience. Following from the research question of how to increase the effectiveness of green industrial policies, discussing how to recognise and overcome the challenges, is the main objective of this chapter. Concrete potential solutions are discussed through the industrial policy framework proposed by Criscuolo et al., (2022a).

### **Theoretical lens on the political landscape**

To create the baseline on which to discuss the way forward, I will describe the political landscape in terms of transition management and green industrial policy. The European Green Deal, the Norwegian national plans for green industry, and roadmap towards a circular economy, are all clear examples of green industrial policy and can be analysed through the lens of transition management. As shown in the political background section, there is clearly a lot going on in both Europe and in Norway. Using a wide mix of policy instruments, the policymakers are working on changing the direction of the industry. The mentioned industrial policies can be classified as what the literature on industrial policy are calling mission-oriented policies. These are, as mentioned in the theoretical background, normative in nature, and based on clear measurable targets and time frames. Criscuolo et al., (2022a) provides four rationales behind mission oriented policies. The first is concerning the benefit of reaching the goal and the mission itself. In the case of the European Green Deal, that would be the benefit of becoming a circular and carbon neutral continent. The second rationale is about dealing with coordination failures. This is especially relevant when investment and coordination that spans across multiple industries are needed. E.g., when transitioning to a circular economy. The next strength of mission oriented policies, is that the articulation of a political vision around a mission creates a higher acceptance of expenditures. For the abovementioned industrial strategies, that means the public are more likely to support the cost of a transition if they believe that the mission ultimately will benefit them. Fourth, and last, is concerned with regulatory uncertainty. A strong mission-oriented policy will remove doubt around the regulatory situation. For example, the emission trading system in Europe puts

forward a clear trajectory of increasing prices of emission (Bayer & Aklin, 2020). This creates a stronger case for investing in low or zero emission technology (Morley, 2012). In the next section a few specific instruments from the European Green Deal will be discussed to demonstrate some of the instruments in place, and how a variety of instruments can be used to complement and strengthen the policy.

### **Examples from the Circular Economy Action Plan**

This section will take a look at the EU Circular Economy Action Plan (COM(2020)98, 2020) to show the concrete instruments put together to transition the European economy away from a linear consumer society to a circular economy. The plan is following many of the principles from theory on transition management and green industrial policy. E.g., a multitude of different supplementing actions are initiated, covering both the economy in general (horizontal) and specific key sectors (vertical). I have selected three ‘key actions’ to demonstrate this. The first action is the creation of a general sustainable product policy framework. This framework utilises horizontal and vertical demand side instruments in order to turn the economy away from the take-make-use-dispose pattern, into a circular one. To do that, the core of this legislative initiative is to widen the scope of the already existing eco design directive, which today only is concerned with energy related products. Some key instruments in this initiative are legislative proposal on product standards to improve durability, reusability, upgradability, and reparability, increasing recycled content in products without losing quality, restricting single-use products, and incentivising product-as-a-service or similar models where producers keep ownership of the product. The proposal is demand-sided as it is concerned with product regulation through product standards or Pigouvian subsidies.

The next action from the Circular Economy Action Plan is chosen as an example of a vertical targeting instrument. A common charger framework and reward system for returning old devices is targeting the electronics industry very specifically. By defining a standard charger for electronic devices, and providing incentives for the return of old devices, the commission is again utilising the demand-side instruments, product standards and behavioural nudges, to increase circularity in the electronics industry. These concrete vertical targeted works well to supplement the broader horizontal initiatives by enabling impact on specific industries or product categories deemed especially important. However, some argue that for for example the standardisation to a common charger could hinder innovation. Whether this is true, is not



the scope for this thesis, but it is important to recognise and acknowledge the potential disadvantages of the policy.

The last example from the plan is the initiative to update the circular economy monitoring framework. Multiple scholars have stressed the need for clear, transparent, monitoring and evaluation of the instruments and initiatives implemented (Criscuolo et al., 2022a; Rodrik, 2014; Warwick, 2013).

### **Theoretical context**

Discussing this in the light of the transition management theory, one would focus more on the defined activity levels in the framework. Using the Circular Economy Action Plan as an example again, it is an example of a tactical activity in the larger context of EU's goal of becoming climate neutral. It is also possible to classify the three abovementioned key actions in the framework of transition management. First, the general sustainable product policy framework, would also be classified as a tactical activity. The reason for this is that tactical activities are identified as steering activities relating to the dominant structures of a societal (sub-) system (Loorbach, 2010). The sustainable product policy framework is a regulation meant to alter the linear production and consumption pattern (dominant structure) of production and consumption of products (subsystem).

Second, looking at the common charger framework and reward system for returning old devices, it is a good example of an operational activity. It is more concrete, making it easier and faster to implement. I classify it as an operational activity and not tactical because of this concreteness as it has the potential to operationalise new structures and routines, which is a defining trait of the operational level (Loorbach, 2010). Last, the updating of the circular economy monitoring framework, are classified as a reflexive activity. Reflexive activities relate to all activities regardless of level.

As the two last sections demonstrate, there is little conflict between the two perspectives. While the green industrial policy perspective is narrow and focuses on policy and policy making, transition management has a broader system perspective. By utilising both perspectives, the strengths of both perspectives can be leveraged to gain a more nuanced discussion.

Considering the political landscape and the two abovementioned perspectives of TM and

GIP, looking into the dynamics of how the landscape are affecting the firms are interesting. As shown in the section on the political landscape and in the findings, there are no doubt that sustainability is on the agenda. Both policymakers and companies recognise the need of the transition. Following is a section where I discuss the findings in the light of these two perspectives.

### **Context from the findings**

Moving back to the findings, it seems like having sustainability on the agenda and committing to different sustainability goals, sets a precedence for sustainability. As more and more companies also are aligning their strategies with e.g., net zero by 2050 (Rekker et al., 2022), demand for more sustainable material, solutions, and technology are on the rise. Also, the public are getting more aware, and as confirmed by both studies (Yamane & Kaneko, 2021) and my interviews, people in general, but especially young people, are concerned with sustainability. They challenge their workplace on the topic, but also ask questions about it on interviews when applying for new positions. As I mentioned before, this is one of the strengths of mission-oriented policy strategies. The normative nature of the strategy is recognised by the public, and thus creates a drive forward. Also, in the perspective of transition management, a clearly defined strategy is emphasised. It phrases such as “envisioning alternative futures” and “dealing with the culture of a societal system” (Loorbach, 2010).

As mentioned in the findings, reporting seems to be a clear common denominator for companies’ sustainability work. One reason for this is probably because it is an obvious first step. To make informed decisions, data is needed. This is why ESG reporting is such a big deal in the political landscape as well. As multiple different political instruments are used on a multitude of different actors and levels, a thorough reporting practice on the firm level, provides an excellent starting point. Even though companies must mobilise some resources to get proper routines and standards in place, it seems like once those are in place, the reporting is rather straight forward. But by having that in place, the firm, the public, investors, and governments can utilise the data to make informed decisions. On the company side, the data can be used to locate the highest impact areas and efficiency potential. The public can make use of the information to make more informed choices on what products they want to purchase, leveraging the power of the market. For investors, which through initiatives like the

EU Taxonomy, are judged on how sustainable their portfolio is, demand data on sustainability before they invest. Last, governments have multiple use cases for the data generated. As emphasised in both the transition management, and the green industrial policy perspective, proper evaluation and assessment of the transition are important in order to not get stuck in unproductive ways for too long.

Proper reporting creates a good baseline also for the next finding, the way companies should have different approaches working with sustainability depending on their situation. Without a common reporting framework, this could easily be used as a company just to bypass their responsibility. However, with a common reporting baseline, companies are pressured in to working with the numbers that matters. Mandatory reporting can therefore be seen as a fair way of pushing companies in to working with sustainability. Compared to e.g., subsidising electrification or energy efficiency, which would mainly, or at least disproportionately, benefit energy intensive industry or even just the companies that were the latest to start transitioning. The point being that it is more beneficial for the society if an energy intensive manufacturer invests in their energy system, while another company which aren't energy intense, but uses a lot of resources (e.g., plastics) focuses on resource efficiency or integration of recycled material in their product. In short, the point is that it is important to direct investments and resources to the areas of highest impact.

## **Mismatch**

This leads us to the main point of the discussion. Because I have now argued that the political landscape seemingly looks good. Then I argued that the companies I interviewed are working well with sustainability. However, as we also know, the transition does not go fast enough. Hence there must be a mismatch somewhere. This mismatch is what I want to locate and address in the coming sections. Using the challenges mentioned in the findings as a point of departure, I will provide a description of the mismatch before discussing the way forward and bring in perspectives from transition management and green industrial policy.

The mismatch is of course more complex than just one concrete problem. It consists of multiple problems and challenges, both specific and abstract ones. In this thesis I am only able to illuminate a small piece of the larger picture. The mismatch I address became

apparent when I compared the results from the interview to the political landscape. Three problems are identified to understand the mismatch:

- The problem of influence
- The problem of profitability
- The problem of initiative

In the next sections I provide the rationale behind each problem. Then I will discuss potential ways to solve or minimise their effects.

### **The problem of influence**

The problem of influence is addressing the mismatch between the political landscape and the motivations the firms report for working with sustainability. Examining the reported motivations from the firms, policy and regulations play a minor role as motivators when it comes to the companies' work towards sustainability. The only reported instance is the regulations around ESG reporting, where all firms are pushed by the policymakers. One exception is that one company mentioned the eco-design directive as motivating factor. As for now, the overarching strategies of the EU Green Deal and the transition to a circular economy are still mainly at the strategic long-term level. The lack of more specific and targeted policies might make it so the strategic visions are not properly translated into everyday operations. On a national level, it is worth mentioning that policymakers are to a large extent focusing on creating new green industries like batteries or offshore wind (Meld. St. 13 (2020–2021), 2021). This focus makes the existing manufacturing industry overlooked, which might help explain why the industry are not motivated by the policies. However, there is one proposal for regulation on Ecodesign for sustainable products (European Commission, 2022). This proposal's goal is to make sustainable products the norm instead of the niche on the European market. At the time of writing, this is only a proposal, and it remains to see whether it will be adapted. Even though at the face of it, the proposal could solve some of these challenges, I have chosen to not speculate on this matter. To sum up, the problem of influence can be reduced to the lack of influence the green policy initiatives have on companies' reported motivations to work with sustainability.

## **The problem of profitability**

This problem is concerned with the economic challenges of the transition. It deals with the questions of who should pay for the transition, and how much profit a company should make. The problem of profitability primarily consists of one key point, the importance of making sustainable products economically competitive to their unsustainable counterparts.

One aspect of the problem, as described in the findings, is the higher production costs or initial investment often associated with sustainable practices and products. These costs can arise from factors such as the use of environmentally friendly materials, the implementation of environmentally friendly production processes and compliance with stricter environmental regulations. These additional costs can make sustainable options less economically viable or less attractive to companies seeking to maximise profits.

Because of this first aspect the issue of profitability highlights the potential market disadvantages of sustainable products. Consumers are often sensitive to price and affordability when making purchasing decisions. If sustainable products are priced higher than their non-sustainable counterparts due to the costs associated with sustainability, this may discourage consumers from choosing the sustainable option, leading to lower demand and limited market penetration for these products.

Finally, following a generally recognised notion in transition theory, the issue of profitability also addresses the existing economic structures and market dynamics that favour unsustainable practices. Traditional industries and established supply chains may have built-in advantages and economies of scale that make it difficult for sustainable alternatives to compete effectively. This can create barriers for new entrants or companies trying to transition to more sustainable practices (Geels, 2005; Kemp, 1994).

## **The problem of initiative**

The problem of initiative revolves around the challenge of coordinating efforts between industry and government in developing the necessary infrastructure and products for a sustainable manufacturing industry. This problem is characterised by a dual dynamic in which industry appears to be waiting for the development of infrastructure and market demand, while the government is waiting for the availability of sustainable products.

The problem of initiative also connects well with a weak tactical level in transition management theory. Loorbach (2010) argues that a company or organisation typically has a strategic vision based on its position within its specific industrial, institutional, or societal context. However, when considering transitions, this approach can lead to fragmented governance and sub-optimal system-level solutions. This fragmentation is evident within government, where different ministries, departments, executive offices, and directorates operate independently, hindering the development of integrated long-term policies. The same challenge exists for other actors, including businesses, scientific institutions, and NGOs, which operate within their own networks and focus on their day-to-day operations. While some of these actors may not have the capacity or willingness to contribute to system innovation, others are unaware of the potential due to the lack of an integrative strategic governance level (Loorbach, 2010).

An example of the problem of initiative was mentioned in the findings. It highlights the difficult process of getting government support to install solar panels on the roof of their factory, but also to invest in infrastructure to make use of their substantial amount of waste heat.

In summary, the problem of initiative highlights the challenge of coordination between industry and government. Addressing the problem of initiative requires active engagement, trust-building, and alignment of interests between industry and government. By working together, they can overcome the coordination challenge and drive the necessary initiatives for the successful transition to sustainable manufacturing.

## **How to address these problems?**

On the basis of the three problems identified, the following sections discuss possible ways of overcoming or otherwise dealing with them. There are several different ways to address these problems. Using the perspectives and principles of transition management and green industrial policy, I will now present some of the possible solutions.

Using principles of transition theory, transition management, and green industrial policies, I will look into the three aforementioned problems and discuss potential solutions and measures policymakers could adopt in order to effectively enable the transition in the manufacturing industry. First it is important to note that the policies regarding the manufacturing industry are small pieces of a larger puzzle. In the theories and frameworks this thesis is based on, scholars are stressing the importance of holistic and coherent policy strategies (Criscuolo et al., 2022a; Loorbach, 2010; Rogge & Reichardt, 2016), and the development of policies for manufacturing needs to consider the full picture. E.g., transition management emphasises the need for creating a vision or long term strategy, and then aligning tactical and operational activities to this goal. Rogge & Reichardt (2016) discussion of policy consistency reinforces this notion. Consistency refers to how well the elements of the policy mix are aligned with one another and is influencing the effectiveness and efficiency of the overall mix.

Starting off with the problem of influence, I will discuss how to potentially increase policymakers' influence on the firms' actions. The discussion will revolve around how the policymakers can have a bigger influence also on short-term activities. When discussing the different motivations of working with sustainability with representatives from the industry, it became apparent that the strategic vision of a sustainable and circular society has not been properly translated into short-term and everyday actions. It is important to note that the companies are working with sustainability, but there is limited influence from the policymakers on this work. Product regulations are discussed as the main suggestion to influence short-term activities, but indirectly influencing the firms through increasing market demands and nudging owners and investors will also be discussed.

### **Addressing the problem of influence**

Utilising the principles of transition management as a guiding framework, it becomes evident that addressing the problem of influence should be given significant priority. Policies that do not inspire actions serve a very limited purpose. However, there are opportunities to enhance the influence of policies on companies and facilitate the transition. Following the principles of transition management, it is essential to ensure that short-term actions and day-to-day operations are aligned with the long-term strategic vision. The findings indicate limited direct influence from policymakers on the daily operations of manufacturing companies. Instead, owners and investors were reported as exerting the most significant influence, alongside general market demands. While EU policies and regulations were mentioned, their impact on sustainability efforts was primarily attributed to ESG reporting requirements. However, a notable proposal exists that holds the potential to significantly increase government influence on firms. The proposal suggests implementing stricter product standards (COM(2020)98, 2020) for the European market, directly affecting manufacturing companies operating within Europe. Such enhanced product regulations would likely result in companies acknowledging a greater level of government influence on their sustainability practices. Using the perspective of green industrial policies, strong product regulations will force companies to work on making their products more sustainable. While companies might find new regulations ‘annoying’, I got the notion that the firms interviewed welcomed sustainability regulations. Especially as long as the regulations are open ended and focused on the results rather than the means, which leaves more room for innovation. For proactive companies, in terms of sustainability, these new requirements can even be considered as an advantage, as they would already be fulfilling multiple requirements.

The next two points of discussion are related to an indirect influence based on the two highest influential factors reported, namely owners and investors, and market demands. Owners and investors seem to be on board, and in multiple cases a driver, for sustainability work. I therefore argue that there is no need for any dramatic change regarding this aspect. The general work of creating stronger green policies should indicate to investors that there is no way around addressing sustainability. Continuation on the work of the EU Taxonomy and reflexive activities around the initiative is encouraged. This leads us to the last point, market demands. Market demands are a key factor influencing the work towards sustainability. For example, public procurement is covering a market share of 19% (Rainville, 2017). This



purchasing power could be leveraged to increase the demand for sustainable products. One study demonstrates that the potential for green public procurement can be as high as a 25% reduction emission reduction on average for the ten product groups analysed (Testa et al., 2016).

### **Levelling the playing field – Problem of profitability**

Potential solutions to the problem of profitability primarily rely on leveraging political instruments to influence product prices, such as Pigouvian taxes and subsidies. In the context of Transition Management theory, these solutions typically operate at the tactical level, as they involve activities that steer the economy toward the ultimate goal of sustainability. The key objective is to close the price gap that arises from the externalised costs associated with unsustainable products. However, the question of who should bear the costs of the transition arises, and it is important to consider this aspect before implementing new policies.

One approach is to internalise the environmental and social costs in unsustainable products. This would entail higher costs for firms, who would likely pass the costs over on consumers. It would effectively level the playing field between unsustainable and sustainable products. However, this solution could be unpopular among the general public, as consumers would have to pay extra for the products. Another option is to subsidise sustainable products to make them competitive. This would mean shifting the cost from the consumer to the government. A third approach could be a hybrid model, where products with a certain level of additional environmental costs receive a slight price increase which is earmarked for subsidising sustainable products.

Considering Europe's existing thorough policies on emissions through the European Emission Trading System, recommendations on policies towards sustainable manufacturing should focus on products' life cycles. Scholars such as Milios (2021), Wilts and O'Brian (2019), and Hartley et al., (2020) have explored ideas in this regard. For example, Milios proposes a taxation framework based on the three stages of a product's life cycle, including a raw material resource tax, tax relief on reuse and repair, and a waste hierarchy taxation scheme. This approach follows the principles of green industrial policies and the notion of policy consistency put forward by Rogge and Reichardt (2016). By implementing complementary policies that slightly tax negative aspects of the product life cycle, while incentivising reuse and repair through reduced taxation, policymakers can potentially steer economic development towards more sustainable practices.

Overall, leveraging political instruments like Pigouvian taxes and subsidies, in combination with a comprehensive and coherent policy framework, can contribute to addressing the problem of profitability and promoting sustainability in manufacturing.

### **Initiating initiative**

To address the problem of initiative in driving the transition towards sustainability in manufacturing, it is essential for the government to take a stronger role in leading and facilitating the transition. Unlike the problem of profitability that primarily leverage demand-side instruments, the problem of initiative requires the government to create a productive environment that encourages and supports sustainability initiatives on the supply side. This necessitates a productive tactical level approach from the logic of transition management. Overcoming the problem of initiative requires the government to focus on creating an enabling environment for sustainable practices. Following the taxonomy of policy instruments, several measures targeting the supply should be considered.

First, as reported in the findings, one of the challenges of the manufacturing industry is the access to high quality recycled resources. Another, interlinked problem, is that some of the more complex products can not be properly recycled, even if the materials used are recyclable. The development of a robust and technically advanced recycling infrastructure is therefore crucial. By investing in the establishment of efficient recycling facilities, waste management systems, and material recovery processes, the government can improve sustainability in manufacturing. A well-integrated recycling infrastructure contributes to reduced waste generation and optimises resource utilisation. This would lead to an overall environmental improvement.

Second, involving stakeholders, particularly representatives from the manufacturing industry, in the development of the infrastructure and the establishment of technical product standards is essential. Through collaborative efforts between the government, industry stakeholders, and relevant actors, considerations can be made to optimise the new systems to the industries' needs, leading to a smoother transition for the participating firms. This participatory approach enhances the sense of ownership and commitment among stakeholders, fostering a shared responsibility for driving the sustainability transition.

Lastly, the government can facilitate sustainability initiatives by offering guarantees and implementing risk and cost-sharing mechanisms. By providing financial support, incentives, and risk-sharing frameworks, the government can lower the barriers for firms to explore and adopt new sustainable practices, technologies, and business models. Such support can

alleviate the perceived risks and uncertainties associated with sustainability investments, enabling companies to more confidently engage in the transition.

Ultimately, overcoming the problem of initiative entails creating an attractive and conducive environment for firms to embrace sustainability initiatives. Central to this environment is a strong relationship between the public sector, which sets the scene through policy and governance, and the private sector, which actively participates in implementing sustainable practices. By taking a proactive role in driving the transition, the government can foster collaboration, innovation, and mutual engagement, leading to a successful and sustainable manufacturing sector.

## 9.0 Conclusion

In this thesis I have investigated the relationship and dynamic between industrial politics and manufacturing companies' work towards sustainability. From the conducted expert interviews, three main challenges became apparent: The problem of influence, the problem of profitability, and the problem of initiative. These problems were discussed through the theoretical lens of transition management and green industrial policies.

The problem of influence describes the mismatch between the overarching political agenda of moving towards sustainability, and the motivations reported by the company representatives. I argue that the problem stems from not being able to translate the long-term vision into everyday action. To deal with the problem of influence, I suggest that policymakers implement regulations directly targeting products.

The problem of profitability entails the economic challenge faced by the manufacturing companies. The main factor is the market failure and how unsustainable products fail to account for their environmental cost. To overcome the problem of profitability, I encourage policymakers to consider altering the tax system. I provide an example of a way such an alteration could be done. The example shows a circular economy taxation framework where different policy instruments are leveraged throughout the life cycle of a product to stimulate sustainable actions (Milios, 2021).

Last, the problem of initiative is concerned with the coordination challenge between the industry and the government. It seems like there is a deadlock where government is waiting for the industry to transition, while the industry is waiting for the appropriate infrastructure and market demand. I argue that going forward there must be a stronger public-private relationship. Additionally, if the government want to take an even stronger position, risk-sharing instruments, and strong green public procurement policies can foster more initiative from the companies.

In the end, I want to emphasise the importance of reflexivity and continuous evaluation of the policies. It needs to be an integrated part of policy processes to prevent lock-ins and enable exploration of new ideas (Loorbach, 2010).

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