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Bridging the Gap: Effective Policy Instruments for Sustainable Practices in SME Manufacturing

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ABSTRACT

The increasing consequences of climate change have a serious effect on the planet. It is now more needed than ever for enterprises to transition from traditional to sustainable entrepreneurship by integrating sustainable practices into their business models. This research therefore investigates the barriers to implementing sustainable practices in small- and medium-sized enterprises (SMEs) within the manufacturing industry and explores effective policy instruments to overcome this. SMEs in the manufacturing industry are high-polluting businesses, and governments use policy instruments to help their transition. Specifically, this research focuses on SMEs in the Municipality of Emmen, employing a qualitative approach through semi-structured interviews with entrepreneurs from various sectors. The findings highlight significant barriers such as complex regulatory support and insufficient external support from governments. The study also identifies effective policy instruments to overcome these barriers, including regulatory and information-based policy instruments. The research highlights the importance of tailored policy interventions that address specific needs and emphasises the role of local governments in fostering an environment for sustainable entrepreneurship. By providing a comprehensive analysis of the barriers and potential solutions, this study contributes valuable insights into enhancing the environmental performance of SMEs in the manufacturing sector, especially in regions where sustainability is not prevalent.

Keywords:
Sustainable practices, sector-specific barriers, policy instruments, small-and medium-sized enterprises (SMEs), manufacturing industry

INTRODUCTION

The consequences of climate change (European Council, 2023) have enormous implications for people, ecosystems and businesses (Lobbezoo et al., 2022). To combat this, goals have been set and accords have been reached, such as a set of policy initiatives called the Green Deal, which aims to make the European Union climate-neutral by 2050 (Europese Raad, 2024a, 2024b). By adopting these goals and agreements, countries in the EU have shown the need for urgent action to foster sustainable development. Local action in cities is considered an essential part of this, as they are seen as critical sites for implementing these universal objectives (Fenton & Gustafsson, 2017). As a result, local governments respond to the complicated challenges of sustainable development, with a growing emphasis on introducing policies that focus on enhancing the environmental performance of small- and medium-sized enterprises (SMEs) to encourage them to adopt more environmentally friendly ways of operating (Blundel et al., 2013). While it has long been believed that large multinational enterprises (MNEs) are the biggest contributors to pollution, recent studies have shown that SMEs contribute significantly to environmental degradation and pollution (Alayón et al., 2022; Crals & Vereeck, n.d.). Therefore, sustainable entrepreneurship plays a significant role in SMEs' transition towards a more sustainable future (Greco & De Jong, 2017). However, the transition from traditional entrepreneurship to sustainable entrepreneurship can be challenging. Previous research has shown that SMEs face specific barriers when adopting sustainable practices, such as lack of knowledge, awareness, and financial resources (Álvarez Jaramillo et al., 2019). This research aims to identify additional barriers to enhance the current understanding of the challenges encountered by SMEs.

Various policy instruments were created over the last few years to help SMEs transition towards more sustainable business models, such as tax incentives and subsidies (Rogge & Reichardt, 2016). Despite growing literature on these policies' effectiveness, the challenge remains to

indicate which instruments work effectively, and which do not. This is particularly evident in regions where sustainability is not prevalent. Such areas lacking full integration and acceptance of sustainability remain insufficiently explored in literature. In essence, while it is established that SMEs significantly impact the environment (Alayón et al., 2022; Das & Rangarajan, 2020), the efficacy of policy instruments to help reduce their impact, especially in regions where sustainability engagement is low, remains uncertain. This entails examining the needs of entrepreneurs and determining which policy instrument would be most suitable for overcoming these barriers. The ultimate objective is to equip municipalities with insights into effective policy instruments for advancing sustainability goals. By adopting a bottom-up approach and soliciting input directly from SMEs, this research aims to identify the policy instruments that best address their needs and facilitate their transition towards sustainability. Therefore, this research aims to answer the following research question:

''What policy instruments can effectively address sector-specific barriers to implementing sustainable practices among SMEs in the manufacturing industry?''

To investigate this, a qualitative study has been employed in The Netherlands, focusing on an area where sustainability is still in the emerging phase but growing rapidly. Increasing sustainability is a complex task to which all municipalities in the Netherlands and their businesses have an important contribution to make (Struik & Sietsema, 2024). The municipality of Emmen especially wants to encourage organisations to innovate, mainly involving sustainability in manufacturing, chemistry, and greenhouse horticulture (Gemeente Emmen, 2021). Specifically, the municipality's manufacturing industry can use the transition to a more circular economy to develop future-proof businesses, which makes it an exciting sector to explore further (Gemeente Emmen, 2023).

This research is structured as follows: first, a literature review outlines the characteristics of SMEs, the barriers already explored in the literature, and an overview of policy instruments. Next, the chosen methods for data collection and analysis are explained. Subsequently, the results and findings are presented, and the paper concludes with a discussion of the most striking findings.

THEORY

Small- and medium-sized enterprises

There is no universal definition of small and medium-sized enterprises (SMEs), but the most common one is that they employ a maximum of 250 employees, have a total balance sheet of €43 million or a maximum turnover of €50 million (Alayón et al., 2022; Crals & Vereeck, n.d.). It has long been believed that large multinational enterprises (MNEs) are the biggest contributors to pollution, but recent studies have shown that SMEs also contribute significantly to environmental degradation and pollution (Alayón et al., 2022; Crals & Vereeck, n.d.). Here it is important to note that while the individual impact of SMEs is relatively small, their cumulative impact is substantial (Crals & Vereeck, n.d.). In Europe, SMEs comprise over 80% of the total number of organisations (Alayón et al., 2022; Biondi et al., 2002). Because of the vast majority of SMEs, their environmental impact is significant, as they generate up to 64% of pollution within the EU (Alayón et al., 2022; Blundel et al., 2013). Due to this, it has become increasingly important for SMEs to participate in managing environmental problems (Biondi et al., 2002), as they have a substantial global anthropogenic impact on the environment (Alayón et al., 2022; Blundel et al., 2013).

Manufacturing SMEs, in particular, contribute significantly to pollution through the various activities in their production processes. They often release harmful emissions, generate a substantial amount of waste, and consume large amounts of natural resources (Kot, 2018).

Fortunately, SMEs in the manufacturing sector possess unique characteristics and capabilities that enable them to effectively combat environmental pollution and implement sustainable practices (Ahmad & Wong, 2018; Kot, 2018). For instance, SMEs are often more flexible and agile compared to larger corporations, they are deeply rooted in local communities which makes them engaged and inclined to adopt sustainable practices that benefit their immediate surroundings (Ahmad & Wong, 2018; Burlea-Schiopoiu & Mihai, 2019; Kot, 2018) and SMEs are often driven by an entrepreneurial spirit, which encourages them to explore new ways of conducting business that align with sustainability principles, leading to the implementation of sustainable practices (Ahmad & Wong, 2018; Burlea-Schiopoiu & Mihai, 2019). Sustainable practices for SMEs in the manufacturing industry can be seen as development of eco-friendly products, services, and processes (Burlea-Schiopoiu & Mihai, 2019), and encompasses a range of initiatives that are aimed at reducing environmental impact and simultaneously promoting sustainability (Ahmad & Wong, 2018). Moreover, incorporating sustainable practices into the business model of SMEs can offer various benefits beyond just environmental stewardship, as it can enhance their brand image and reputation, but also create a competitive advantage and help with cost saving and efficiency (Caldera et al., 2018). Lastly, SMEs may choose to adopt sustainable practices due to the managers'/owners' ethics, values and concern for the environment (Das & Rangarajan, 2020).

However, even though more research is being done on the role of SMEs in adding sustainable value to the world, the literature on this is not as thoroughly researched as MNEs. Therefore, understanding the collective impact of SMEs is crucial for developing comprehensive sustainability measures (Mousiolis et al., 2015). The sustainable practices of SMEs, especially when related to environmental aspects, are grossly neglected (Das & Rangarajan, 2020). In other words, the current debate on sustainable practices has a ‘’large firm bias’’ which implies the need to tailor these discussions and practices to the characteristics and size of SMEs as it is

important to adapt sustainable practices and strategies to their unique context (Mousiolis et al., 2015). Because SMEs have not been investigated often in previous research, they make an interesting case to examine and focus on further. Additionally, manufacturing SMEs have the potential to make the biggest impact on sustainable development due to their heavy pollution (Burlea-Schiopoiu & Mihai, 2019).

Barriers to sustainability

Even though implementing sustainable practices has potential, research has shown that implementing them might be difficult and barriers can be encountered (Greco & De Jong, 2017). Barriers is a key term in this research (Alayón et al., 2022). They are defined as ‘’something that prevents or hinders movement or action’’ (Alayón et al., 2022), and ‘’reasons that explain why something is not implemented’’ (Jaramillo et al., 2019). Based on this description, barriers in this paper are defined as obstacles for SMEs wishing to adopt sustainable manufacturing practices (Alayón et al., 2022). Previous research has stated that understanding the barriers is important for knowing how to tackle and overcome them (Alayón et al., 2022; Jaramillo et al., 2019). In order to increase the transition to sustainable entrepreneurship, research seeks to understand the barriers encountered when adopting sustainable practices as a company, and how they are overcome (Jaramillo et al., 2019). Previous research has identified several barriers to implementing sustainability on different levels. For example, barriers that have been identified for MNEs (Bocken & Geradts, 2020), barriers for nascent firms (Pinkse & Groot, 2015), and barriers for incumbent firms (Gasbarro et al., 2018). Barriers for different industries, such as technology, have also occasionally been identified (Khanzode et al., 2021). Barriers for different terms, such as circular business model innovation (Brändström et al., 2023; Guldmann & Huulgaard, 2020) and for implementing sustainable entrepreneurship (Hoogendoorn et al., 2019) have been identified. Additionally, barriers in different country contexts have been researched (Ghazilla et al., 2015), as they identified barriers in Malaysian

SMEs. For the scope of this research, I focus on barriers that SMEs face, particularly in the manufacturing industry. However, the research on these barriers is not vast, so the collection of barriers SMEs in manufacturing industries encounter is a combination of different literature. The barriers identified are lack of knowledge, skills and awareness (Caldera et al., 2019), lack of time (time constraints)(Alayón et al., 2022; Caldera et al., 2019), lack of financial resources, lack of effective legislation and regulation (Alayón et al., 2022; Álvarez Jaramillo et al., 2019; Caldera et al., 2019; Neri, 2021), resistance to change (Alayón et al., 2022; Neri, 2021), lack of adequate external support to firms who are looking to enhance their sustainability performance, lack of interest by the market and consumer for sustainable products or processes (Neri, 2021), risk of sustainable practice implementation and existing organisational culture (Caldera et al., 2019). These barriers represent common challenges faced by manufacturing SMEs when attempting to adopt and implement sustainable practices. Brändström et al. (2023) highlights the need for more sector-specific research, to provide a more nuanced understanding of the challenges that are faced by the SMEs in different sectors. Generic frameworks may not capture the full complexities of the barriers that are faced by the different sectors. Previous research however stresses the importance of knowing this, to enhance the applicability and relevance of the findings, which can facilitate more effective strategies for companies aiming to implement sustainability. Additionally, the validation and possible expansion of the identified barriers for sustainable manufacturing SMEs is not far advanced. By collecting data directly from manufacturing SMEs, researchers can gain a deeper understanding of the specific challenges these businesses face in adopting sustainable practices.

Policy instruments

In this paper, the term policy instruments is used to look at what different policies can help the municipality in facilitating sustainable transitions for SMEs. Knowing which policy

instruments exist, can help in identifying which would work in this scenario, and which might not be as effective. First, policy instruments are tools or mechanisms governments use to implement their policies and achieve specific objectives. They are designed to influence the behaviour of organisations, individuals or society, to address specific challenges and achieve desired outcomes (Pacheco-Vega, 2020). Understanding the effectiveness and appropriateness of different policy instruments in specific contexts is essential for policymakers to design and implement successful environmental policies, because they play a crucial role in reducing pollution, promoting sustainability and addressing climate change (Blundel et al., 2013).

Research on the different forms of policy instruments has been much and wide. One notable study classifies policy instruments as sticks, carrots and sermons (Al-Saleh & Mahroum, 2015; Pacheco-Vega, 2020). It was first introduced in 1998 to categorize the different approaches governments use to influence behaviour and achieve policy goals (Pacheco-Vega, 2020). They are based on the approach of the instruments to influence behaviour and promote sustainability (Al-Saleh & Mahroum, 2015). In this typology, the sticks represent regulatory policy instruments, where they represent coercive or regulatory measures that governments use to *enforce* compliance with laws and regulations. Regulatory instruments can include, taxes, permits, penalties, fines and laws and regulations. They are thus designed to get rid of undesirable behaviour through the threat of punishment or sanctions when not complying (Pacheco-Vega, 2020) and to encourage individuals or businesses to adopt more sustainable practices to avoid the negative consequences (Al-Saleh & Mahroum, 2015). The carrots represent economic policy instruments, referring to the economic rewards or incentives offered to *encourage* environmentally friendly behaviours (Al-Saleh & Mahroum, 2015; Pacheco-Vega, 2020). They can include financial incentives to promote environmentally friendly practices, subsidies, grants and also tax breaks (Pacheco-Vega, 2020). Lastly, the sermons refer

to information-based policy instruments. They use information, persuasion, education and social norms to influence behaviour. Information-based instruments aim to change attitudes, raise awareness and encourage voluntary compliance with environmental goals. Examples of these policies are education programs, sustainability awareness campaigns and information disclose initiatives (Al-Saleh & Mahroum, 2015; Pacheco-Vega, 2020). These policy instruments are shown in table 1.

Examples of stick, carrot and sermon-type green policy instruments.

'Sticks' as green policy Instruments	'Carrots' as green policy instruments	'Sermons' as green policy instruments
Energy Saving Obligations	Feed-in Tariffs	Provision of Information
Mandatory Green Building Codes	Net Metering	Eco-Labelling
Renewable Portfolio Standards	Tradable Certificates	Green Awareness Campaigns
Fuel/Carbon/Green Taxes	Capital Cost Subsidies	
Climate Change Levy	Grants	
Polluter Pays Principle-based Instruments	Tax Credits	
Top Runner Programme	Loan Guarantees	
Road/Congestion Charges	Competitive Contract Bidding/Tendering	

Table 1 Examples of stick, carrot and sermon-type policy instruments (Al-Saleh & Mahroum, 2015)

Policymakers can use the various options of policy instruments for improving environmental outcomes. This, however, leads to another set of choices, namely choosing the most appropriate policy instrument to address the particular problem. Due to this, policymakers choose different approaches to tackle the same problem, for example, addressing climate change. Knowing which policy instrument is actually preferred by the ones it is applied to will hopefully ensure that it is most effective. The overall approach that is adopted, including which tools are used and how they are combined, is likely to vary according to different circumstances (Blundel et al., 2013). Therefore, investigating the different policy instruments and which work best for SMEs in regions where sustainability is not prevalent can hopefully ensure that there becomes

some sort of unity and that it becomes clearer for other regions to know which policy instrument to use.

METHOD

To answer the research question, a qualitative research approach is employed, as it helps to understand one's behaviour, beliefs, experiences, and attitudes and gives a voice to the participants (Veluswamy et al., 2013). It helped to identify the various challenges and needs encountered by SMEs in the manufacturing industry which consequently provided valuable information for identifying and understanding which policy instruments effectively address their needs.

Case and research setting

The study focused on The Municipality of Emmen, which is located in the north of the Netherlands. They are a municipality in the province of Drenthe, with about 100,000 residents (Gemeente Emmen, 2021; Möhlmann, 2021). Emmen has been successful in the past in transitioning their chemistry industry towards sustainability and circularity (Petri-Bezemer & Veenstra, 2023). This indicates that there is potential for other industries to make this same transition, and it highlights that the municipality is capable of helping industries make this transition. However, the notable transformation of the chemistry industry stands out as a unique accomplishment within the municipality. This indicates that despite progress, Emmen still maintains a status where it is not yet fully advanced in terms of sustainability and circularity. Consequently, this presents a valuable opportunity to investigate challenges at an early stage of development and to gain insights into issues that may not be as evident in more developed areas, providing a unique perspective on the specific barriers faced by SMEs in the manufacturing industry. Lastly, the municipality of Emmen is keen to become a CO2-neutral municipality (Lobbezoo et al., 2022), therefore serving as a promising location to conduct the research.

Data collection

The data was collected among SMEs in the manufacturing industry in the municipality of Emmen. The SMEs were chosen through interviews in collaboration with the municipality's account managers since they had the most knowledge about the various organisations in this industry. Summaries of these discussions can be found in Appendix E. Subsequently, I collaborated with my supervisor from the municipality, Harriet, to determine which companies align best with the research scope. In appendix B is a table with an overview of each of the companies that were interviewed. Semi-structured interviews were chosen because they helped to understand the different perspectives of the respondents (Bell et al., 2019). The layout of the semi-structured interview can be found in appendix D. The interviews were conducted in April and May 2024. Besides primary data, secondary data was also collected to validate the findings from the interviews and base the research on, in the form of reports by the court of auditors on the current sustainability policies of the municipality of Emmen (Petri-Bezemer & Veenstra, 2023; Struik & Sietsema, 2024).

Data analysis

Each interview was recorded using an mobile phone, transcribed using Transkriptor and documented in the standardized form, using first and second order coding themes, which enhanced the reliability of the research, because it helps to uncover new perspectives, insights and relationships in the data that may not have been apparent initially (Campbell et al., 2013). The gathered data was examined, looking for similarities and differences in answers. In appendix G, the transcriptions of the interviews can be found.

Ethics

Several steps were taken into account to guarantee the ethical integrity of the research. First of all, it was ensured that the interviewees were fully informed about the research, by providing them with an information sheet prior to the interview that explains the research topic. In addition, participants were given an informed consent form before the interview to ensure that they understood the purpose of their involvement and how their anonymity and confidentiality would be protected. After this the participant could decide whether to participate in the study. Nonetheless, the possibility of withdrawing from the research at any time without any consequence remained. Lastly, to ensure anonymity, I removed personally identifiable information from the recording, and the recordings were stored in a secure location, with limited access to authorised persons.

FINDINGS

This research is set out to identify the barriers for sustainable entrepreneurship in SMEs in the manufacturing industry, and explore which policy instruments can help overcome these barriers. The findings are organised into two categories, namely the barriers to implementation of sustainable practices, and effective policy instruments, and are based on the conducted interviews. A visualisation of the data is provided of the encountered barriers and effective policy instruments, which can be used as an overview of the findings. The research involved semi-structured interviews with four SME owners and managers from various sectors within the manufacturing industry.

Barriers to sustainability

Limited financial resources

Incumbent and start-up firms, especially those with minimal staff and resources, often face significant challenges in securing adequate funding compared to larger SMEs. These financial

constraints are particularly present in smaller companies where operational focus primarily centres around production rather than business development.

''Those companies with twenty, thirty people… they have very different questions. And there are many of them, especially here in Emmen, in the manufacturing industry. Financially, it's not feasible.'' (M).

Smaller start-ups face difficulties to achieve financial viability, especially when their business model is to operate socially responsible.

''*Money is often a problem... Do you know that company in Emmen, Drents Bakkie? He started his own business. He supplies coffee, and he employs 4 or 5 people with a disability. I said, but can you make money with that then? He said, yes, but I have to work on the side as well. At the end of the day, we just have to make money.''* (V)

Conversely, larger, incumbent firms often enjoy more financial autonomy and flexibility when investing in sustainability initiatives. *''Actually, at this moment, we're only investing in growth. Everything we earn plus additional growth capital we've raised, it's all going in.''* (B). These firms, as noted by one respondent, prioritise investment in growth, leveraging their financial stability to pursue innovative technologies and expansion opportunities. Despite this advantage, it's essential to acknowledge that financial resources, while comparatively more abundant for larger firms, are not unlimited, as emphasised by another respondent: *''We're lucky to have a company here that has always done well and can invest on its own, but that doesn't mean that anything is possible, of course that's not the case at all.'' (V)*

Complex subsidy access

To combat the financial barriers, the participants looked at the possibilities of receiving funding or subsidies, for example for the development of new technology, but encountered many issues there. Namely, there were difficulties in accessing them due to administrative burdens, lengthy waiting times, and complex requirements. So despite the availability of subsidies, they are often seen as not useful, leaving many companies discouraged from pursuing subsidies.

Administrative burdens

Administrative burdens pose significant obstacles for SMEs seeking to access subsidies. The inconvenient paperwork and lack of tangible benefits discourage participation, leaving many companies disinterested in pursuing available opportunities.

''The problem is, there are hardly any subsidies that are useful. So, most companies just aren't interested. There's a lot of paperwork involved and it doesn't contribute.'' (M)

Lengthy waiting times

Lengthy waiting times pose a significant challenge for SMEs, as receiving a subsidy often takes years. Despite the potential benefits, the duration and costs make applying for subsidies impractical for them, diminishing the feasibility and value of pursuing them.

"Yes, and then you often see that these kinds of projects are all well and good, but we can't wait for that, it often takes years. In the end, the costs and the waiting time don't make it worthwhile. It's complicated, it all takes a long time.''(V)

Complex requirements

Complex requirements make accessing subsidies challenging for SMEs. As one respondent noted, *‘’Yeah, no, we knew it existed. It's just that those are all very specific regulations and requirements you have to meet. For us, it was more a question of whether we could meet them.´´ (B)*

The Court of Audit's study on The municipality of Emmen's sustainability policy also indicates that obtaining subsidies that help implement sustainable practices presents challenges and limitations. It is indicated that entrepreneurs sometimes struggle to understand everything when it comes to financing in the field of sustainability. There are several subsidy schemes available, each with its own conditions, criteria and procedures. Entrepreneurs need to be familiar with these schemes and know how to take advantage of them. Additional requirements and provisions of subsidies can further complicate product procedure applications (Struik & Sietsema, 2024).

Complex Regulatory Pressure

According to the interviewees, they feel overwhelmed by the regulatory pressure imposed by the government. *"I'm not sure if these regulations are well-intentioned,"* one respondent explained. *"If people, consumers, don't want it, whether it's a solar panel, a face cream, or packaging, it won't happen."* (M). They express frustration with the increasing regulatory burden and the lack of consideration for feasibility in decision-making. *"It is best to make a decision as a municipality without increasing the regulatory burden.´´* The interviewees highlight the ineffectiveness of imposing regulations for every specific issue, noting that those decisions are often technically unfeasible and met with resistance. They emphasize the need for natural trends rather than forced initiatives.

‘’The regulatory pressure to keep up with everything is overwhelming. A municipality can make a decision without increasing regulatory pressure, but that doesn't seem to happen. Decisions are made that aren't feasible, and everyone knows they can't be implemented technically. With various enforcement measures and rules, they try to push it through, but it doesn't work. You can't force things.’’ (M)

One respondent wanted to deviate from established standards and introduce a more sustainable product variation, but had to undergo extensive approval processes, facing resistance from a quality mark and municipalities. They had to put in a lot of effort, therefore highlighting the need for municipalities to embrace innovation and adapt regulations to foster progress to embrace flexibility and openness in industry practices.

‘’B*ut if you want to stray away from that quality mark… you have to demonstrate that we still achieve our strengths. And once you have demonstrated that… then you have to prove that it's also good.’’ (H)*

This complexity of laws and regulations is also endorsed in the report by the Court of Audit on the sustainability policy of The Municipality of Emmen, as SMEs experience difficulty in understanding them. The regulations related to sustainability can be very diverse and cover different aspects. This can make it difficult for SMEs to get a complete overview of all relevant laws and regulations applicable to their specific situation. Furthermore, the laws and regulations on sustainability are constantly changing, which can lead to uncertainty among entrepreneurs about which regulations apply and how they have to comply with them. As a result of the complexity of sustainability-related laws and regulations, SMEs may be reluctant to take sustainability measures. They may feel overwhelmed by the amount of information and uncertain about the right steps to take (Struik & Sietsema, 2024).

Disconnect with practice

Several interviewees express a significant gap between policymakers and actual business practices. *"Also to the municipalities, the governments. I sometimes think, gosh, you should spend a year at a manufacturing company. You have to keep that connection with the business community. It is so important," (V)* one respondent remarked. They stress the importance of policymakers immersing themselves in business environments to gain firsthand experience and insights. Another interviewee highlights the frustration when councillors of the municipality express agreement but do not proceed to take action. "*Sometimes you come across a situation where there's a councillor and they're like, 'yes, yes, yes, yes, yes'. And then they leave and... they don't do anything about it."* (M). This disconnect is also seen in the influence of public opinion on government decisions, where the public often lacks expertise and the municipality makes conflicting decisions.

As also supported by the Court of Audit's report in its study on Green Chemistry in Drenthe, it stresses the importance of having a good alignment between the ambitions of the municipality and the practices of companies in the region, which can be achieved by having the voice of the business community reflected in government decisions and actions. Through good alignment, sustainability initiatives can be implemented more effectively because businesses often have specific considerations that need to be aligned with the government's broader sustainability objectives. It ensures that sustainability initiatives are realistic and achievable for companies. A good alignment between government ambitions and business practices is essential for the successful development and implementation of sustainability initiatives (Petri-Bezemer & Veenstra, 2023).

Lack of appropriate government initiatives

The lack of appropriate government initiatives to help the organizations with their sustainability questions also came forward as a barrier. In the past, a so-called frontrunners project was initiated by the municipality, but it was never fully pursued correctly. This annoyed organizations, as they are interested in such a topic, but when it's not followed through correctly, it makes them less keen to participate in the future.

"Once, there was a frontrunners' project here, I think two or three years ago. But the funny thing is, this man said, there were also many other companies involved, and at the end of the project, we will conclude it with you. Never seen again! Seriously, we facilitated it and we did do that, but we never heard anything about it again. That can happen too." (V)

''We talked about it, about frontrunners' projects and such. Well, they had researched a few things about it… which would then begin I think two years ago. And then it just fizzles out, and you never hear anything about it again. So it was initiated, but not really followed through. So they did say, yes we need to do something with those frontrunners, and... But nothing ever gets going." (M)

In addition to the fact that the project never got off the ground, it also emerges that the format of the project was not satisfactory.

''The government wanted a few frontrunners with the rest following behind, so that the frontrunner could pull the rest along. But actually, what came out of that discussion more was, let the frontrunners come together. Let them come together to further strengthen each other. Then they will automatically pull the others along. Because, you see, that becomes obvious on its own. They are all already doing that. So let those frontrunners especially learn from each other, and as for the rest, you must make known what they are all doing. But then they already feel obligated to themselves." (M)

Market and consumer resistance and misconceptions about sustainability

The SMEs rely heavily on their stakeholders, particularly the market in which they operate and their customers, as their actions and decisions are largely dictated by their demands and preferences. Consumers sometimes make choices that feel good despite not being the best solution for the environment. Sustainability and circularity are complex issues, with technical solutions often clashing with government perceptions and regulations.

"The end consumer tells our customer they want different packaging… either because they find it aesthetically pleasing, or because the narrative is that this is better. And that's where our problem begins. Another material would be better, but that needs to be accepted by the market and consumer. It's not automatic that everyone says, 'oh great, let's do that'. So you need a change in consumer behaviour.'' (M)

Sometimes customers know what the most sustainable solution is, but do not choose it because of specific requirements.

''Well, we also have customers involved in aerospace and aviation. They don't take risks with recycled plastics. They say, we want virgin materials so that we can be sure that they meet the requirements and no properties of the material can be lost.'' (B)

Besides not always making the best sustainable choices, customers may also be reluctant to buy sustainable products because of aesthetics.

''Someone said, yes, but I don't want to feel like I'm in a second-hand shop. If my stuff is refurbished. So that lives with customers. We used to get tenders, a few years back, and it just said, hey, okay, we do need refurbished stuff, but from one-and-a-half metres I don't want to be able to see that it's second-hand.'' (V)

Resistance to change

Within companies, there appears to be a notable absence of internal backing for sustainability initiatives. As one interviewee noted:

"I've been trying to send others to some meetings for a couple of years now. But it's not easy. Because sometimes they don't want to… they're not used to that.' But it's good for them to come there once in a while too." (M)

Others mentioned that it can be difficult to get everyone internally on-board with new sustainable innovations and solutions.

"What do you actually do for the world? Some people find it a bit challenging here. Having support from your surroundings is nice, but having support from your own people is even more important. And often people struggle with that. How do I now get support within that organization for the vision? Sometimes it's difficult to get everyone on the same page… we have quarterly sessions so that employees know what's happening, what direction we're going in, why we have a circular centre, so that people here don't get the feeling of, 'But earlier I used to make beautiful new things and now I have to deal with second-hand...' they can also think that, you know! While it's not like that at all." (V)

Lack of a sustainability-oriented mindset

Fostering a sustainability-oriented mindset is crucial for companies to effectively integrate sustainable practices into their operations. One respondent emphasized:

‘’It starts with the mindset. When sustainability is not included as a core value in the business strategy from the beginning, it becomes more difficult to make adjustments later. A company

must embed sustainability in all aspects of its operations, from production to marketing, to achieve effective change.'' (V).

The growing global awareness of environmental issues further underscores the importance of a sustainability-oriented mindset. In the industry, it is vital to work on sustainability and circularity, as neglecting these can jeopardize a company's reason for existence: *''If you are not working on that theme, i.e. sustainability circularity… then your raison d'être ends. It's as simple as that.'' (V).*

Effective policy instruments

Access to financial incentives

The municipality can help manufacturing SMEs by making subsidies easier to access and encouraging sustainable investments and innovation. SMEs saw the municipality's proactive attitude as a positive attribute.

"When I hear about all the things the municipality of Stadskanaal does and organizes and achieves, it's not comparable to the municipality of Emmen. We do have a very active municipality." (B)

''I am glad that they proactively make us aware of it, keeping us informed." (H)

The municipality of Emmen has furthermore proactively informed businesses that there are certain subsidies that the companies were not yet taking advantage of, but to which they are entitled.

"They helped us, they even covered the startup costs for such a subsidy for us. In the end, they came to us and said, 'Hey, there's a subsidy fund, three hundred and fifty million for Emmen

and the surrounding area. Would you like to make use of it?' And we thought it wasn't suitable for us. But they eventually explained it better, which showed that we could indeed be eligible for it.'' (B)

Additionally, companies stress the importance of financial support to implement sustainable practices: *''And the most important thing is, and this is often forgotten by the government, is you have to be able to pre-calculate. You have to help people in the field. And that is different for every company... But the story is that it must be affordable. If it's not affordable, it won't work. How does that math work? That's interesting for another company, that they think of, I thought it was only costing money, but so it's making a profit after all." (M).*

This is underlined by the findings of the Court of Audit's report, where they indicate that it is important for SMEs that sustainability goes hand in hand with financial returns. The report highlights that entrepreneurs need support to make the translation into feasible plans that are also financially attractive and to identify and exploit these opportunities. It is stressed that the municipality plays a role in encouraging sustainability by providing information and making subsidy schemes accessible (Struik & Sietsema, 2024).

Regulatory flexibility and adaptive governance

By implementing regulatory flexibility and adaptive governance, the government can reduce bureaucratic inertia, make regulations more efficient and less cumbersome, thus facilitating the adoption of innovative technologies and practices that enhance sustainability improvements. For example, one interviewee is seeking ways to make materials more environmentally friendly by reducing the use of a particular component that requires a lot of energy to produce. They are exploring alternative methods to maintain the quality and strength of their product without

relying so heavily on this component. The municipality can assist by being receptive to these innovations and swiftly approving new sustainable materials that can be utilized in this industry.

‘’Ultimately being open to collaborating on these kinds of trajectories where there is an alternative material… that doesn't yet have the standard seal of approval. Be open to this kind of thing. Picking up that kind of trajectory quickly is what municipalities can do.’’ (H)

Clarity on regulations and standards is crucial for companies to remain proactive in their sustainability efforts: "*Look, clarity is always good. You know what you're complying with... So, if the norm is made known in advance, then as a company, you can assess whether we can comply with it."* (H).

The approach of implementing regulatory flexibility and adaptive governance to facilitate the adoption of sustainable technologies is a relevant strategy often recommended in sustainability discussions. By adapting regulations and making administrative processes more flexible, governments can be more responsive to changing needs and encourage sustainability innovations (Struik & Sietsema, 2024).

Knowledge dissemination

The role of communication between businesses and municipalities is key to promoting sustainable practices. One respondent suggests that municipalities should focus more on sharing success stories and good practices of businesses in the region, rather than relying solely on formal meetings and regulations. This approach would contribute to better dissemination of sustainability knowledge and experiences. *"Look, those companies also read magazines. So, there are interviews in there from employers' associations, things they're involved in."* (M).

This indicates that every company gets trade-related magazines and journals, which contain the latest information and updates. The interviewees also indicate: *"I, as the municipality, would visit companies and simply ask: 'What have you actually done?' And then the municipality would compile a brochure or some medium. And you just share that. By way of example, you make that known in the region. If trends evolve, people naturally adapt to them. It's fine to advocate for reduced usage, but it should align with these evolving trends. But that comes naturally. It should actually become a kind of trend. That other companies then think 'wait a minute, everyone is doing that, should I join too'.... then of course they will start looking at solutions too''. (M)*

Support and Collaboration with the Government

Interviewees value direct interaction with government officials on company initiatives and informal discussions with deputies and other government officials to promote effective cooperation.

''A week and a half ago, we had deputy of Drenthe province visiting us. And then it's good to have a non-political conversation for a while. You get more out of that if you so then, if you can do something then.''(M)

''But also when we initiated something and I thought, I need someone from the municipality, they came. So important to have the right people every now and then... then it's just a phone call. Then he just comes. I like that.'' (V)

This need for guidance and support also emerged in the Court of Audit's report on the investigation into the municipality of Emmen's sustainability policy. SME entrepreneurs need

practical support and guidance in implementing sustainability measures. By offering targeted support and guidance to SME entrepreneurs, they can be better enabled to integrate energy transition into their business operations. This can contribute to making the local economy more sustainable and achieving the municipality's sustainability targets (Struik & Sietsema, 2024).

The importance of directing policies and support not only towards executives but also towards middle management within companies is emphasized. This broader focus can help sustain and promote sustainable practices more effectively:

"It's often just a handful within the company who are aware of these initiatives. The other ninety-nine percent are focused on their work. The government could do something for this ninety-nine percent, not just the executives who already know and are working on these policies, but also for the middle management. They should be informed about what opportunities are available for them. So, not only targeting the top management but also considering the middle management... So, it's crucial to provide tools for these key players within a company, particularly middle management, so they can see and engage with sustainability initiatives. It's not just about the top leaders but also about empowering the middle management to take action." (M).

Facilitating Innovation and Collaboration Platforms

Participation in innovation and collaboration platforms enables companies to share knowledge and collaborate on sustainable and innovative solutions. These platforms promote learning from each other and provide inspiration by sharing success stories and methods. Participants emphasise that they are very open to the idea of collaborating with others to facilitate innovation: *''We facilitated it. We always do that… we just show everything we do.''* (V).

Additionally, another interviewee mentions: ‘’W*e can definitely contribute something to that as well, yes. We like to think along.”* (H). Another company recognises that participation is useful, despite participating in a smaller sector: ‘*’If we could help someone in that, we would be open to it.’’* (B)

The government plays a crucial role in facilitating these platforms by providing resources and support by helping set up meetings and networking sessions. However, it is proposed to revise the format. Instead of mixing frontrunners with less sophisticated companies, it would be more effective to let frontrunners cooperate among themselves. ‘*’Let the frontrunners get together to strengthen each other even more,‘’* states one interviewee, and this would automatically draw others along by example. *‘’Let those frontrunners mainly learn from each other and the rest, then you have to make known what all these are doing. But then those already feel obligated...that will come naturally. As long as you show what is modern.‘’* (M). By bringing together leading companies within a sector, they can serve as examples for other companies. This creates a trickle-down effect whereby innovations and sustainable practices are adopted by companies that are not yet as far along in their development.

In addition, companies feel a duty to share their knowledge and successes with the wider community and other businesses in the region. Participation in these initiatives can be beneficial for the entire region, not just individual companies. As one participant mentioned, *“It's good to think broadly for the region. If the region improves, everyone benefits, including our company.’’ (H)*

An example of how cooperation between companies, initiated by the municipality of Emmen, has gone well is in the transition of the chemical cluster of the municipality of Emmen to green

chemistry. According to the court of auditors, the municipality was successful in creating the Emmen Chemical Cluster: the process of greening chemistry was initiated through cooperation between companies and knowledge institutions within the Emmen Chemical Cluster (Petri-Bezemer & Veenstra, 2023)

Facilitating sustainability events

Local government networking policies play a crucial role in bringing businesses together, although their effectiveness depends on the form and frequency of these initiatives. These include initiatives where businesses can meet, share knowledge, and form collaborations to promote sustainability goals.

‘’From the beginning I worked here… we were invited by an initiative of the municipality. I did get to know people there… They come together through the municipality's initiative. So in that sense, the initiating role and connecting role of the municipality has been quite important.‘’ (V)

This quote highlights the long-lasting impact of municipal initiatives in forming networks and promoting business cooperation. It shows how the role of government has been essential in connecting different parties. However, there are limits to organising networking events, as one respondent highlights: *"Nowadays, you see network clubs and initiatives from the government, and sometimes you think there are more initiatives than entrepreneurs, which is not good either."* (V). Another respondent commented: *‘’The concentration of events into two seasons causes an overload. If I let myself go… then I have four meetings every week. That's not possible; so then you have to choose. What is important is that you know who the participants are… then you think, 'Oh, if they're also there, I find that interesting.’’ (M).*

At the same time, smaller, more focused meetings are also said to be more effective for meaningful interaction and collaboration between companies: *"Only in small groups can you achieve anything. If you're in a large network club, everyone always agrees. That's all just a facade. You only have meaningful conversations with two or three people, no more. In large groups, people naturally put on a show, or ninety percent remain silent, only a few people say something. And those few immediately dictate the conversation. This is while the others are thinking: 'I don't agree, but I won't say anything.' So, large gatherings are of no use." (M)*

Additionally, It's considered important to provide educational workshops and presentations on circularity, which can help companies recognize and expand their existing sustainability practices. For instance, one respondent shared their experience:

"When I first attended a circularity workshop… we weren't focused on circularity. However, during the presentations, I realized that many of our practices already aligned with circular principles. And then it turns out that this is already standard in our DNA. By attending these workshops, we realized just how much we were already contributing to circularity." (M)

The Court of Audit's report on the investigation into the municipality of Emmen's sustainability policy mentions several initiatives by the municipality to support sustainability at companies. The report emphasises the importance of cooperation, knowledge exchange, and encouraging business participation in sustainability projects (Struik & Sietsema, 2024).

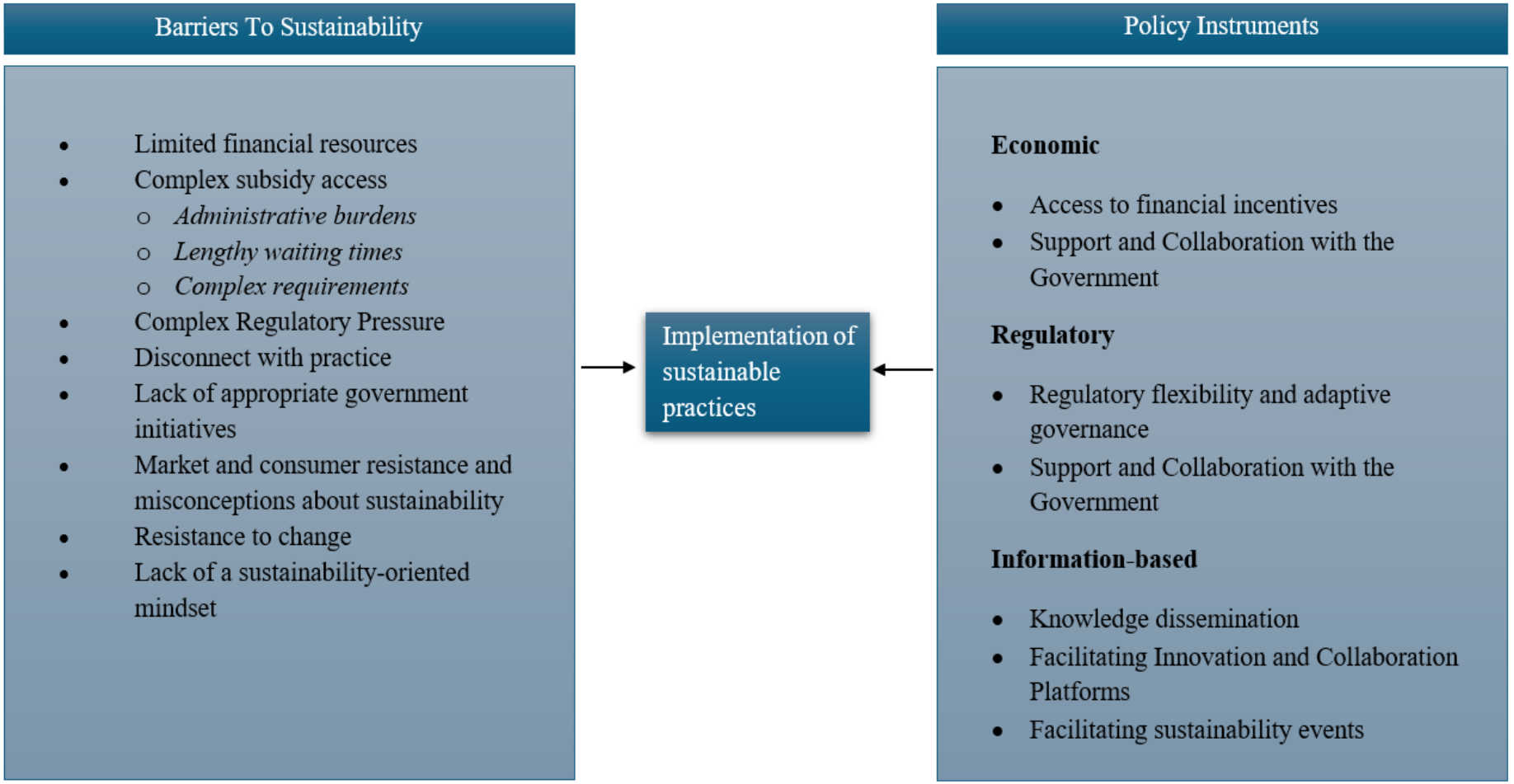

Figure 1: model of effective policy instruments to overcome barriers to sustainability

DISCUSSION

This study explored the barriers SMEs face when implementing sustainable practices, and which policy instruments can help overcome these barriers. Four SMEs in the manufacturing industry were interviewed, and the secondary data was applied to validate the findings from the interviews. The findings show that economic and information-based policy instruments are most effective in overcoming the barriers SMEs experience when trying to implement sustainable practices into their business organization.

First of all, it is interesting to note that lack of knowledge is not mentioned as a barrier among the participants, despite it being frequently mentioned in literature (Caldera et al., 2019). In fact, every interviewee indicated that they believe companies themselves are responsible for gaining the necessary knowledge to implement more sustainable practices. Additionally, lack of time (Alayón et al., 2022; Caldera et al., 2019) to implement sustainable practices is not found to be a barrier. The interviewees find that searching for and applying sustainable practices is part of their daily operations. Furthermore, implementing sustainable practices (Caldera et al., 2019) is not perceived as a risk by the interviewees because they have already implemented some version of this in their operations. The finding of the disconnect with practice is an additional barrier that is found in this research, as the laws and regulations made by the governments and municipality, often do not correlate and translate well to practice.

The remaining findings are consistent with the existing literature on barriers to implementing sustainable practices (Alayón et al., 2022; Álvarez Jaramillo et al., 2019; Caldera et al., 2019; Neri, 2021). However, notable things stand out in these findings. While lack of effective legislation and regulation is seen as a barrier in literature (Alayón et al., 2022; Álvarez Jaramillo et al., 2019; Caldera et al., 2019; Neri, 2021), this is perceived by the interviewees in a different

way. According to the interviewees, the laws and regulations are perceived as too heavy and strict, hindering flexibility, creativity and the implementation of sustainable practices. This extends to the subsidies that are offered by the municipality. They are perceived as complicated and too specific, making it difficult for SMEs to access them. Participants also highlighted a lack of adequate external support for firms seeking to enhance their sustainability performance, suggesting that the municipality's initiatives could benefit from improvements. Additionally, there is a perceived lack of market and consumer interest in sustainable products or processes. Interviewees note a gap between what consumers believe to be the best solutions and what they actually are.

The policy instruments identified in this research to help SMEs overcome the barriers they encounter, fall into three categories: regulatory, economic, and information-based policy instruments. These categories are consistent with those found in the literature (Al-Saleh & Mahroum, 2015; Pacheco-Vega, 2020). Regulatory policy instruments are perceived as less effective. They often lead to resistance and are seen as regulatory pressure, making compliance challenging. Interviewees strongly believe that integrating sustainable practices into business models should become a trend. Conversely, economic policy instruments, like subsidies offered by the municipality, are more favoured by interviewees despite the difficulties in accessing them. Most notably, information-based policy instruments are the most desired. Persuading SMEs and providing information about competitors' sustainable practices and the growing trend are seen as the most effective strategies. By highlighting the specific needs and challenges of manufacturing SMEs, this research contributes to the broader literature on sustainability in small and medium-sized enterprises, offering evidence-based recommendations for enhancing sustainable practices.

Practical Recommendations

The findings provide actionable insights for policymakers on how to design and implement effective policy instruments that address the specific barriers faced by manufacturing SMEs. As the results show, especially economic and information-based policy instruments are found to be most effective and wanted by the interviewees. Municipalities that actively inform and assist SMEs in accessing subsidies and financial incentives are perceived positive, as this proactive approach helps SMEs take advantage of available funds. To reduce complexity and improve the accessibility of subsidies, the report by the court of auditors suggests appointing subsidy coaches alongside energy coaches. These coaches can support entrepreneurs and residents in understanding the regulations, applying for subsidies and creating feasible plans for sustainability (Struik & Sietsema, 2024).

Reducing bureaucratic inertia and providing flexible regulatory support can significantly ease the adoption of innovative, sustainable technologies, as simplifying regulations makes it easier for SME entrepreneurs to understand and comply with sustainability requirements. Furthermore, clear guidelines and early communication of regulatory changes enable SMEs to plan and comply proactively, fostering a more supportive environment for sustainability initiatives. The Court of Audit's report suggests that support and guidance should be available to help SME entrepreneurs navigate through the complex regulatory environment so that they can effectively and efficiently contribute to sustainability objectives (Struik & Sietsema, 2024). Also, it came forward that sometimes it is best to reduce regulatory pressure, and instead focus on creating trends. Sharing success stories and best practices through various communication channels should help motivate other companies to adopt sustainable practices, as publicizing sustainability trends and societal shifts can encourage companies to align their practices with broader movements, making sustainability more attractive and normalized. Lastly, cooperation

between governments, businesses and other stakeholders is essential to address the complexity of laws and regulations in the field of sustainability and to jointly arrive at effective solutions (Struik & Sietsema, 2024). Informal, non-political interactions with government officials can lead to more productive cooperation and support for sustainability initiatives. For example ensuring there is one account manager per company available, who takes proactive action to visit and advice companies.

Additionally, it is important for governments and businesses to work together. This can be done by improving communication and coordination between government and business. Ensure that networking meetings are held, but on a small scale and not as often. An initiative where SMEs can come together to learn from each other and to drive business development is also recommended by the Courts of Auditors (Petri-Bezemer & Veenstra, 2023). Especially educational workshops can help companies recognize their existing sustainability practices and encourage further development. Raising awareness about sustainability within all levels of a company, not just top management, is crucial for the widespread adoption of sustainable practices. Policies should therefore also target middle management, who play a key role in implementing sustainability practices within their departments.

Limitations

This research offered to highlight the various policy instruments that can be applied to help SMES in the manufacturing industry to overcome sustainability barriers they may encounter. Despite all necessary steps being taken to obtain reliable and rigorous results, this study also has its limitations. First of all, due to the time constraints, the number of participants is limited. Though the participants were diverse, not all sectors were covered. Unfortunately, no start-ups were interviewed, which means that their input lacks in this research, as they might have

different experiences than the bigger SMEs. Furthermore, despite the various studies that have been done on the barriers that SMEs may encounter when implementing sustainability, this study may have limited generalizability, as the sample was only limited to the West, and not applied in other parts of the world where there are different cultures. Additionally, this research was conducted in a region with limited emphasis on sustainability, which can imply the findings are also not generalizable to other, more advanced regions where sustainability practices are more prevalent. Lastly, the companies that were interviewed mainly already incorporate some sort of sustainability innovation in their business model. Finding a business that was willing to participate who does nothing with sustainability was hard to find, but may deliver different answers.

Future Research

Next to the findings and limitations of this study, there are future research recommendations that can be explored further. First of all, a recommendation is to conduct the research with a larger and more diverse sample size, to enhance the generalizability of the findings. It would provide a more comprehensive understanding of the barriers to sustainable practices, and which policy instruments are most effective to overcome this. Additionally, longitudinal research is recommended on this topic, as it helps to track the progress and impact of the applied policy instruments over time. This will consequently help to understand the long-term effects of the implemented policies. Also, as stated in the limitations, this research is confined to the Western context. Future studies should consider conducting similar research in different geographical locations. Lastly, further research is recommended on specific high-polluting industries, such as the manufacturing industry, to enhance the breadth of literature on this topic.

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APPENDICES

Appendix A: Conceptual Model

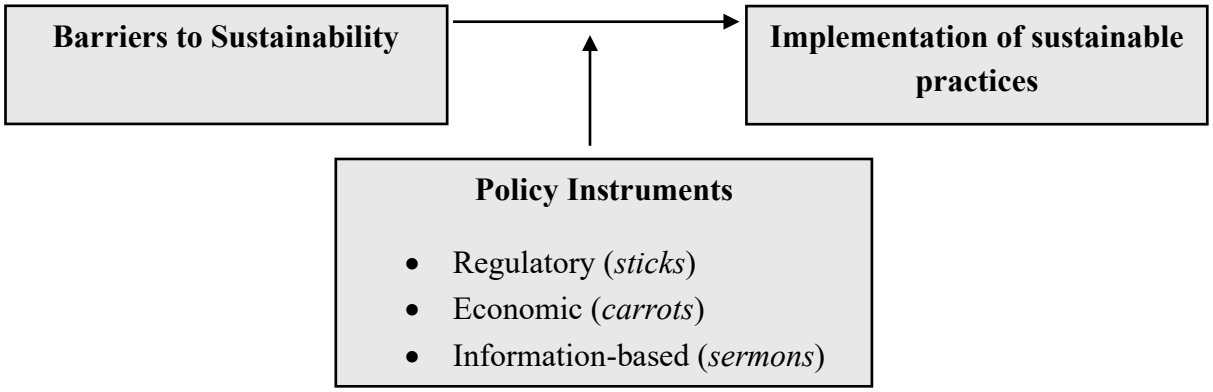

Figure 2 Conceptual model based on literature

Appendix B: Overview Interviewees

Company	Sector	Role interviewee	Size	Duration of interview
VEPA (V)	Furniture	Sustainability Coordinator	SME+ / 200+ employees	48:01
Manter (M)	Machinery	CEO	SME+ / 200+ employees	1:18:22
BMTEC (B)	Laser cutting	CEO	SME / 23 employees	30:22
Heembeton (H)	Building	Plant manager in charge of operations	SME+ / 200 employees	51:44

Appendix C: Interview Guide

Company name

I. Introduction

1. Greet the interviewee and express gratitude for their participation
2. Briefly introduce the purpose of the interview
3. Ease the interviewee and set the mood, as there is no right or wrong, no strategic answers are necessary; just answer how you want
4. Ask the interviewee if they still agree with the given consent. If not, we can stop the interview at any time
5. Ask if the interviewee is okay with me recording the interview

Thank you for participating in this interview. Your insights will contribute significantly to my research on sustainability practices in the manufacturing industry. The purpose of this interview is to understand your company's sustainability initiatives, challenges faced, and perspectives on policy instruments aimed at promoting sustainable practices.

II. General information

1. Can you provide a brief explanation of your company? Think of:
    a. background
    b. objectives
    c. core business activities
    d. mission and vision (particularly concerning sustainability and environmental responsibility)
    e. sector
2. What's your role within the company?
3. Where in the supply chain is the company located? (beginning, middle, endsupplier)
4. Are you autonomous in making decisions, or do you need to coordinate them with the head office?

III. Sustainability Practices

A. Current State of Sustainability Efforts

1. Could you outline any specific sustainability goals or targets your company has set for itself?
2. Does your company currently engage in any form of sustainability initiatives?
3. If yes, could you describe the sustainability initiatives implemented within your company? For example:
    a. Green packaging
    b. Minimizing raw material usage
    c. Minimizing pollution
    d. Circular economy principles
    e. Cooperation in the chain (may be one person's waste is another person's raw material)
4. If yes, how long has your company been actively involved in sustainability practices?

B. Motivations behind Sustainability Efforts

1. If you do apply sustainability initiatives, what motivated your company to adopt sustainability initiatives? (Why is being sustainable important for this company)
2. Did you decide to implement sustainability initiatives because of extrinsic motivations or because of intrinsic motivations?
    a. Extrinsic motivations such as regulatory compliance, consumer expectations, stakeholder pressure, good brand image
    b. Intrinsic motivations such as caring for the environment, ethical values, personal fulfillment and purpose
3. If you do not apply sustainability initiatives, why doesn't your company currently engage in any form of sustainability initiatives?

C. Identification & Selection of Sustainability Initiatives

1. If you do apply sustainability initiatives, how did you identify where to innovate on sustainability?
2. Do you examine the sustainability practices of competitors or other companies as part of your decision-making process before determining your own approach?

D. Success & Scalability of Sustainability Efforts

1. If you do apply sustainability practices, do you actively measure the success of your sustainability initiatives?
    a. If yes, how?
2. If you do apply sustainability practices, what impact do you perceive the sustainability practices have on your company's branding and corporate success?
3. If you do apply sustainability practices, how feasible do you consider your sustainability initiatives, and how scalable are they for future expansion?
4. Does sustainability play a key role among buyers/customers searching for what you manufacture?
5. If you do not apply sustainability practices, would you like to implement sustainability initiatives in the future?
    a. Why / why not?

E. Challenges & Barriers

1. If applicable, what challenges or barriers have you encountered in implementing sustainability practices? Think of examples like:
    a. Resistance/skepticism from stakeholders
    b. Limited resources
    c. Lack of knowledge
    d. Lack of awareness
    e. Too costly
    f. Resistance to change

    g. Other (?)
2. How did you address these barriers or challenges, and how did you (try to) overcome them?
3. Have you faced any sector-specific barriers unique to the sector you are operating in?
4. Do you think the barriers/challenges you have encountered while implementing sustainability are different for SMEs in the manufacturing industry, compared to larger corporations?
    a. If yes, how so?
5. If you do not apply sustainability practices, what are the primary barriers or challenges hindering your company from adopting them?

1. From your perspective, what role can businesses play in promoting a circular economy?

IV. Policy Instruments and Support

1. Are you aware of any policy instruments or governmental support aimed at promoting sustainability within the manufacturing industry? For example:
    a. Environmental regulations
    b. Tax incentives
    c. Subsidies
    d. Training and assistance
2. If yes, how did you come to know these policy instruments? Through which channel?
3. Have you benefited from any policy instruments or received support from governmental bodies to enhance your sustainability efforts?
4. If not, why haven't you utilized these policy tools?
5. If yes, how have they helped/impacted your company?
    a. What did they improve?
    b. What has changed?
    c. Did something not occur, that you did hope for?
6. In your opinion, how effective are these policy instruments in addressing the specific challenges faced by your company?
7. What improvements or changes would you suggest to make these policy instruments more effective? (e.g., more even distribution of knowledge between participants)
8. What practical information or output would you like to receive from the municipality to help you on your sustainability journey?
9. Are there certain policy tools you miss that you would have liked to have used? For example, workshops, conferences, certain incentives, experts from the field, etc?

V. Current sustainability projects

1. Are you aware of any current state/government/municipal sustainability programs that can help companies become more sustainable? For example
    a. Project Duurzaamheid Nederland
    b. Equivalent Circular Friesland
    c. Koplopers Project
    d. Duurzame Maakindustrie
2. If yes, how did you know about these programs? How did you become aware of them?

3. Are you participating in these programs?
4. Why are you / are you not participating in these programs?
5. If you are not participating, would you like to participate in such programs in the future?
6. If you are not participating, would you be willing to participate if changes were made to these programs?
7. If yes, what changes would you like to see?
8. Do you have any recommendations for these programs, so they might be more successful?

VI. Future Outlook

1. Where do you see your company in terms of sustainability practices in the next 5 years?
2. If you do intend to introduce sustainable initiatives in the future, will it be more because you want to (intrinsic), or because you 'have to', by buyers/governments (extrinsic)?
3. What additional support or resources would facilitate your company's transition to more sustainable practices?
4. How do you envision the role of policy instruments in shaping the future of sustainability within the manufacturing industry?
5. Are there any other sustainable practices or projects on the horizon for the company?
6. Are there potential expansions or improvements in the current process on the horizon for the company?

VII. Recommendations

1. Do you have any advice or recommendations for other companies interested in similar initiatives?
2. Can you tell me a bit about lessons learned or best practices that could be shared?

VIII. Closing

1. Thank the interviewee for their time, insights, and participation.
2. Ask if they would be interested in receiving the final results.
3. Ask if they are open to the possibility for me to ask follow-up questions, if necessary?
4. Ask feedback for the interviewer (verbal feedback)
5. Provide contact information for any follow-up questions or additional comments from their part.

Thank you for your time and valuable insights. Your input will greatly contribute to our research on sustainability practices in the manufacturing industry. If you have any additional comments or suggestions, please feel free to share them.

Appendix D: Coding Tree

Coding Tree

Appendix E: Summary Discussions Municipality

Summary 1

Summary 2

Summary 3

Summary 4

Roadmap Chemical Industry to Green Chemistry Emmen

Appendix F: Information Sheet & Consent Form

Information sheet

Consent form

Appendix G: Transcription Interviews

Transcription 1

Transcription 2

Transcription 3

Transcription 4