Management Review Quarterly
https://doi.org/10.1007/s11301-024-00475-4

Climate action in MNEs: insights and recommendations from previous research

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Received: 21 January 2024 / Accepted: 30 October 2024

Abstract
Addressing the Sustainable Development Goal of Climate Action is no longer a nice-to-have in the global business environment of multinational enterprises today, as MNEs are facing considerable pressure from various stakeholders while impacting the climate in a tremendous way. However, clear consensus of climate action in MNEs has been lacking, albeit extremely important due to the rising impact and expectations. The article encompasses a systematic literature review to analyze and present what the current literature says about climate action in MNEs. The study finds that although certain elements of climate action are universal to all companies, MNEs need to take additional action on especially collaborative action to ensure success. Additionally, as much of the insights are still highly reactive, future research should focus on concrete proactive actions, such as technology adoption, to fight climate change.

Keywords Climate change · Multinational enterprise · Carbon emissions · International business · Systematic literature review

1 Introduction

Climate change is one of the greatest challenges humankind faces (see, for example, Leal Filho 2015). As a result, immense pressure is put on businesses by various stakeholders and institutions to lower emissions (Noailly & Ryfisch 2015; Yu et al. 2021), and the regulations for reporting emissions are increasing every year (European Commission 2020). With a third of Europe's largest public companies having already set zero emission targets (Luu & Rowlands 2021), it is clear that sustainable business, and especially lowering carbon emissions, is no longer a passing trend.

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Published online: 23 April 2025

In 2015, the United Nations established Sustainable Development Goals (SDGs), and today, particularly goal 13 (Climate Action) is one of the most popular to be attained by the top businesses in the Fortune 500 list (Song et al. 2022). Van Tulder (2018, 97) even states that "almost all big companies embrace SDG13". With sustainability being considered a prerequisite in global business operations (see, for example, Yin & Jamali 2021), multinational enterprises (MNEs) should be at the forefront of the campaign, considering the large impact they have due to the economic power (Celone 2021, 494). With the legally binding international treaty of the Paris Agreement putting pressure on businesses (United Nations 2015) and thousands of MNEs having set emission reduction targets (Luu & Rowlands 2021), heads are now turning towards the actions needed to attain the targets MNEs have set, demanding for substantive emission reductions.

MNEs hold a significant responsibility for a number of the challenges associated with sustainability, including carbon emissions (Win 2020), and have long been criticised due to being one of the main contributors towards climate change (Burrit et al. 2020). Due to their globally dispersed operations, layered organisational structure and diverse stakeholders, MNEs operate in a very challenging global business environment (Jacqueminet et al. 2018, 170), and therefore sustainability actions are challenging to implement through all activities and layers of the organization. In fact, we cannot expect that MNEs are able to take climate action with the same guidelines set for single business entities operating in much less contexts, location-specific issues, and complexities. (Burritt et al. 2020.)

Furthermore, also from the perspective of climate action in the global context, characterized by strong interdependencies between the MNEs and the supply chains, transnational settings, and societies (see, for example, Kolk & Pinkse 2012), it must be challenged how MNEs have previously been assessed as siloed companies in the space of climate action rather than a part of the wider picture (see, for example Johnson et al. 2023). MNEs can gain competitive advantage specifically through a collaboration with different parties (Frynas et al. 2006) while balancing the long-term perspective of the needs of the society and environment with the economic business realities (Burritt et al. 2020), and thus, studies focusing not only on generic business actions on climate change but specifically on the context of MNEs is needed.

Naturally, as a result, the topic of climate action in MNEs has been studied intensely, but largely in separate streams and with a wide variety of terms. Thus, it has been challenging to create a clear consensus of which actions MNEs can take that lead to positive outcomes. (Burrit et al. 2020.) This study is a deviation from earlier research in which climate change and global MNE strategy have been developed in parallel (Jacqueminet et al., 2018, 169), limiting our understanding of the ways MNEs can take action in the complex organization to substantially reduce emissions. While many prior studies expect climate actions to abide to all companies regardless of complexity (see, for example, Johnson et al. 2023), it has been suggested this is not the case with MNEs (Burrit et al. 2020, 22): "sustainability and MNE engagement will provide a mine of information for future researchers to come". Although multiple previous literature reviews have been conducted on

the important topics (see, for example, Johnson et al. 2023; Jabbour et al. 2019), a holistic overview of precisely climate action in MNEs is still missing.

Through a multi-step systematic literature review, the current study collects what previous research states about climate change and MNEs. Post et al (2020, 8) asserts that literature reviews can "contribute to theory development by exposing and espousing an emerging perspective", which is also the goal of this study at hand. This study provides concrete suggestions for both academics and practitioners working on climate topics specifically in the MNE context, ones which have not been presented in a holistic manner prior to this.

In essence, this study asks: *What does previous research indicate about climate change action in MNEs?* Based on the literature review conducted, the findings of this study are threefold. First, this study shows that the focus of literature on MNEs has shifted significantly over time, with 21st-century research increasingly recognizing climate change as the primary challenge MNEs must address. Second, this study uniquely highlights that while certain climate actions, such as setting targets, are found to be universally important, MNEs face an additional complexity of managing a wider range of necessary actions. Collaborative efforts, in particular, are emphasized as essential for specifically MNEs to achieve their desired outcomes, an aspect previously neglected in literature reviews. Finally, this review finds that although numerous actions are discussed, the literature still tends to emphasize reactive measures. Thus, future research should prioritize developing technological capabilities to enable proactive approaches to combating climate change.

The remainder of the paper consists of five sections. First, an overview of the existing literature reviews on the matter is presented in order to visualize the research gap. Second, in Sect. 3, an overview of the methodology and research is offered. In Sect. 4, a range of descriptive statistics about the field as well as outlined themes are presented, with findings offered in Sect. 5. Section 6 demonstrates what the findings of this study on climate change literature in MNEs are while also setting directions for future research. Finally, the conclusions and limitations are presented in Sect. 7.

2 Prior literature reviews on climate action in MNEs

This study answers the need for a better view of climate change action in MNEs. To date, apart from the influential work of Ans Kolk (see, for instance, Pinkse and Kolk 2012), not a great deal of empirical literature reviews on climate change in MNEs has been conducted. Table 1 below presents a comparison of existing systematic literature reviews identified and describes how this study differs from the previous works.

The literature reviews indicate that there is a need for consolidation of studies (Burritt et al. 2020), that the conceptualization of climate topics has been driven by policies (Wimbadi & Dialante 2020), that more actionable strategies are still needed (Lopes et al. 2019), that deep carbonization differs from conventional measures (Johnson et al. 2023), and that institutional and stakeholder theories are the most commonly examined perspectives (Daddi et al. 2018). Although the findings of

Table 1 Comparison of existing systematic literature reviews

Title	Keywords	Time period	Number of articles	Findings	What is missing and how this study differs
Daddi T, Todaro NM, De Giacomo MR, Frey M (2018). A systematic review of the use of organization and management theories in climate change studies	Climate change, global warming + theory	No time span	131	The study focuses on theories, finding that previous research lacks a clear theoretical contribution, and that institutional and stakeholder theory are the most common	The MNE perspective is missing, while remaining at a very theoretical level. This study focuses on MNE's actions on a more concrete and focused level
Johnson, M.P., Rötzel, T.S., & Frank, B. (2023). Beyond conventional corporate responses to climate change towards deep decarbonization: a systematic literature review	Corporate, response, carbon, climate	2001–2022	370	Provides a view on corporate responses to climate change, highlighting that deep carbonization responses differ from conventional ones, emphasizing strategic shifts	The MNE perspective is missing, while very relevant action findings in general are presented. This study builds on top of the findings by incorporating the MNE view
Lopes deS, Jabbour ABL, Chiappetta Jabbour CJ, et al. (2019). Decarbonisation of operations management-looking back, moving forward: a review and implications for the production research community	Barriers, limitations, difficulties, obstacles, incentives, motivations, drivers,enablers, low carbon carbon management, carbon emission	No time span	58	Analyzed the motivators and barriers to the adoption of low-carbon operations management practices. Suggested seven propositions for future research. The study finds that there is still need for more actionable strategies into production research	The MNE perspective as well as concrete actions are missing by focusing on general barriers and motivations. This study will focus on both missing features
Wimbadi RW, Djalante R (2020). From decarbonization to low carbon development and transition: a systematic literature review of the conceptualization of moving toward net-zero carbon dioxide emission (1995–2019)	Low carbon development, low carbon transition, climate change, emission	1992–2019	1371	Analyzes previous research in a quantitative manner, identifying that the conceptualization has been driven by the climate politics	The MNE perspective as well as concrete actions are missing by focusing on quantitative analysis. This study will focus on both missing features

Table 1 (continued)

Title	Keywords	Time period	Number of articles	Findings	What is missing and how this study differs
Burritt, R. L., Christ, K. L., Rammal, H. G., & Schaltegger, S. (2020). Multinational enterprise strategies for addressing sustainability: The need for consolidation. *Journal of Business Ethics*, *164*, 389–410	MNE, MNC, sustainability, strategy, home country, host country	2000–2018	87	The study finds that most researchers have focused on their own niche problem, and do not consider the need for consolidation	While the study examines the MNE perspective, actions are missing due to focusing on a wide perspective of describing what has been researched. This study focuses on MNE action

these selected studies can be considered relevant in understanding the big picture, it is clear that the perspective of MNEs and the action these companies are able to take have largely been ignored. Other literature reviews touching the topic also shed light on carbon strategies in general (see, for example, Mio et al. 2020; Cave 2014; Becker-Ritterspach et al. 2019), on taking carbon action (Johnson et al. 2023), as well as some even on MNEs' sustainability (see, for example, Linnenluecke 2022), but studies combining these perspectives are rare.

The study by Johnson et al. (2023) describes several actions that may be relevant for all companies, including administative, applicative, communicative, and collaborative actions, but expects MNEs to operate in the same way as other companies, not taking into account the widened complexity. For example, actions like political activities or product innovation can be expected to be very different when operating in one country versus globally. The study mentions with one sentence, referring to the study of Pinkse and Kolk (2012), how due to the complexity and variety in policy approaches, MNEs cannot simply approach the matter on a country-by-country basis. Building on top of the study by Johnson et al. (2023) and similar works, a calling for a more detailed understanding of specifically MNEs is evident.

The literature reviews that *have* attempted to depict the state of MNEs and climate change have omitted the crucial part of taking action. For instance, Haque (2020) focuses solely on the adoption of environmental standards, and finds in the literature review that the institutional environments of the home-country also affect those of the subsidiaries. Furthermore, several literature reviews focus on the adaptation to the effects of climate change, rather than the actions taken to mitigate these effects, finding that a wider understanding of the adaptation measures is also still needed (Averchenkova et al. 2016). Even the study by Pinkse and Kolk (2012) which is referred to in many of these literature reviews, expressing both the topic of climate change as well as a wide multinational perspective, explores institutional failures as opposed to taking action. However, a key finding of the study is that MNEs "face a complex balancing act" concerning the multiple institutional factors that play a role, one which can be thought to be a crucial starting point for planning climate action.

In terms of the findings of climate action that are suggested to be universal as per the studies examined in the previous literature reviews, a few key findings are seen. Firstly, the reasons why companies engage in climate action are quite well established, mainly relating to regulations and external pressure (see, for example, Wimbadi & Dialante 2020). Thus, the companies that pollute the most and have most pressure often also take action in a more proactive manner (see, for example, Burritt et al. 2020). Additionally, the outcomes of climate action are quite well established, relating to better financial performance and competitiveness (see, for example, Lopes et al. 2019). In terms of concrete actions, especially Johnson et al. (2023) have established a long list of relevant actions, including target setting, managerial vision, innovation, and energy efficiciency. However, these studies have not laid out how MNEs should adapt to these increased pressures to substantially reduce emissions in the form of taking action, considering the transnational settings.

It is clear that there is demand for a literature review on what actions MNEs can take to combat climate change, even more now considering the focus on

sustainable business recovery after the pandemic (Qiang et al. 2021). This study differs from previous literature reviews in several ways. Firstly, the study focuses on specifically on MNEs as opposed to a general business perspective due to the distinct difference in complexity and impact on wider topics such as supply chains and intergovernental aspects. Secondly, this study focuses on climate action instead of either a more general sustainability perspective or merely reacting to climate change. Building on the great work and callings from studies on MNE research (see, for example, Burritt et al. 2020), and on taking climate action in business (see, for example Johnson et al. 2023), this study answers to the need of more in-depth understanding on the crucial topic.

3 Data and methods

To answer the research question, the author explores the existing literature to be able to perform a systematic literature review. This type of review is an organized and transparent research methodology of the existing literature (see, for example, Jaramillo et al. 2019), and can be justified in cases like this, when identifying potential research topics for the future (Sivarajah et al. 2017, 267).

The methodology of this study follows the example of Zahoor et al. (2020), adopting the multi-step review process from Denyer and Tranfield (2009), also applied by Mio et al. (2020). These studies were chosen as benchmarks due to a similar methodology (systematic literature review), focus topic (MNE and sustainable development goals) as well as being well received by the academic community (e.g., citations on the article). The four-step approach of Denyer and Tranfield (2009), which can be seen as increasing the study robustness of the study and reducing subjectivity (Cacciotti and Hayton 2015), is visible in Fig. 1. The examples followed were included to ensure that the study becomes more credible and trustworthy.

In terms of the first step, defining the research question, the key content was defined in the first chapters. While outlining the future research agenda based on the findings, the author deemed it to be most relevant to investigate what previous research suggests about climate action in MNEs by dividing the results into two parts. First, the studies were separated into specific themes, and second, into antecedents, moderators, and outcomes of the phenomena.

In terms of the second step, establishing the scope and boundaries of review, a number of criteria for exclusion and inclusion were defined (see appendix A for more details).

1. In line with Mio et al. (2020), both qualitative and quantitative studies were included to be able to give a broad overview of the research available
2. To increase the accuracy of the search, requiring the search terms to be named directly in the title is one option suggested by Johnsen et al. (2017). This was

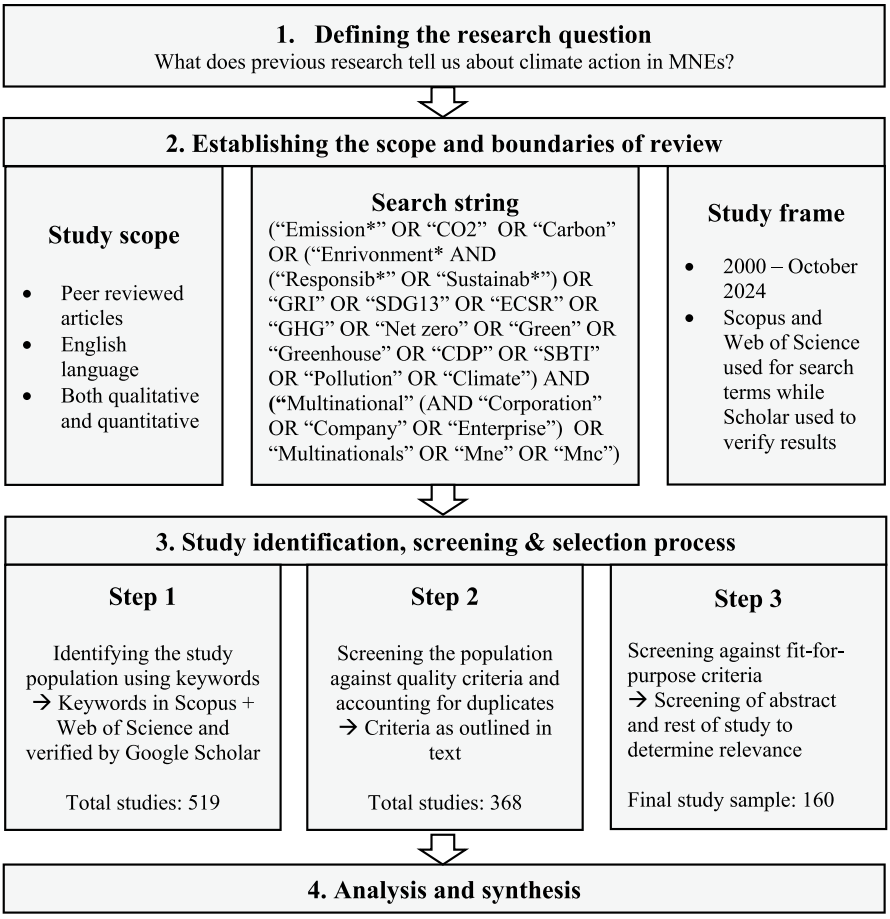

Fig. 1 Summary of the systematic literature review methodology

deemed useful to limit the vast amount of studies that were not relevant for the present study.

3. The search was conducted from the years 2000 to 2024 (October) to ensure expansive information, following the example of Burritt et al. (2020) and Johnson et al. (2023)
4. The scope of the study only included published studies in the English language, a common condition also applied by, for example, Mio et al. (2020)
5. Only peer-reviewed published articles were selected, which meant excluding book chapters, university theses, and certain conference papers, as suggested by Sivarajah et al. (2017) and also adopted by Zahoor (2020)

As regards establishing the boundaries, the choice of keywords is of importance to find all the relevant studies (Williams et al. 2021, 523). To ensure the suitability

and accuracy in this review, all keywords related to climate change in MNEs as well as synonyms were considered. The search terms are presented in Fig. 1. These were deemed relevant search words by researching the topic from not only previous research (see Luu & Rowlands 2021), examples from previous literature reviews (see Gulluscio et al. 2020), but also business articles written on the topic (see Financial Times 2022). The non-profit organizations CDP, SBTI, and GHG were chosen as extremely relevant search terms as an increasing number of companies report emissions via these parties (see, for instance, Luu & Rowlands 2021). Although the topic of the review is particularly climate change "action", this last word was not used as a limiting factor in the key words to allow for all relevant studies to be presented.

This systematic literature review was based on a combination of three databases. First, the search started by using Scopus and Web of Science, and the results were also validated with the help of another database, Google Scholar, as per the suggestion of Bramer et al. (2013). Scopus is among the most reliable databases (Baas et al. 2020), and the validation with Google Scholar is useful for this type of a study as the database does not favor any publishers over others or focus on citation counts (Burritt et al. 2020), it has a "substantial extra coverage" compared to Scopus or Web of Science (Martin-Martin et al. 2018), and using the database, no citations are missed (Gehanno et al. 2013). Therefore, the combination of these three databases can be considered particularly useful in this systematic literature review.

The study identification, screening, and selection process is presented in Fig. 1, presenting how the author reduced the 519 studies to 160. The rigorous process established in the earlier phases was followed in order to exclude certain studies and remove duplicates by manually going through them with an analytics tool, following the example of Medeiros et al. (2013), after which 368 studies remained. Studies were also ultimately excluded based on the criteria in Appendix A. The final selection of the 160 studies was confirmed by the abstract of each paper as suggested by Sivarajah et al. (2017) and it was done in two phases: first reading the abstracts and excluding studies that did not match, and after that skimming through the actual study for the final selection.

4 Analysis of the selected articles

Following the example of Mio et al. (2020) and Tranfield et al. (2003), the analysis of the selected articles was divided into three phases. First, the articles were analyzed by a descriptive analysis, after which themes were collected in an inductive manner and finally decomposing them into antecedents, moderators, or outcomes, following the example of Zahoor et al. (2020).

4.1 Descriptive analysis

The findings are in line with previous research (Luu & Rowlands 2021; Qiang et al. 2021), showing that the topic of climate change has gained significant interest after

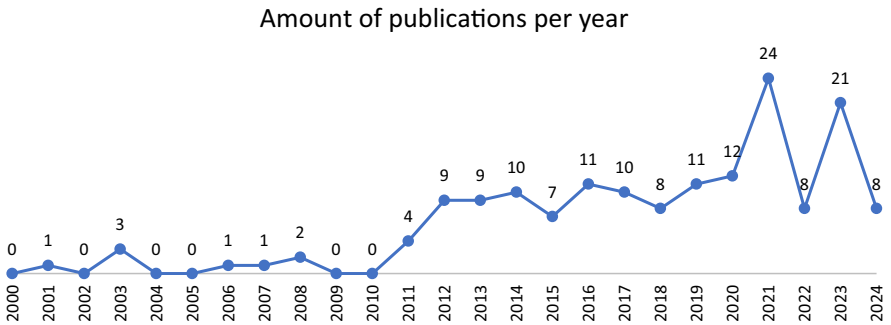

Fig. 2 Number of publications per year

the Covid-19 pandemic, with stakeholders and regulations expecting more from multinational corporations (see Fig. 2). In general, the vast majority of the studies conducted on climate action are published since the start of the twenty-first century as new policies and agreements have been set, with a clear spike in the year 2021 (see, for example, Johnson et al. 2023; Wimbadi and Djalante 2020). The spike in 2016 may be explained by the decisions made by the Paris Agreement in 2015, which also affected the regulatory requirements of MNEs (United Nations 2015).

In addition, the terminology used in the related research has also changed over time. For example, in the start of the twentieth century, the Kyoto Protocol, signed in 1997, is referred to (see, for example, Kolk & Levy 2001), whereas from 2021 onwards, wider regulations and frameworks as well as especially the term "CO2" showed a clear share increase. This can be considered to be related to the overall trend of understanding that in order to fight climate change, particularly CO2 emissions need to be reduced drastically, and more rapidly than what the world initially thought (see, for example, IPCC 2022). This trend is also in line with initiatives undertaken in the business world, such as MNEs setting emission targets for various third party organizations, like CDP and SBTI (Luu & Rowlands 2021). A further split and analysis of the descriptive analytics can be found in the appendix.

4.2 Thematic analysis

The inductive approach to identifying the main focus area of the studies by grouping similar studies together (as following the structure of e.g. Hummel (2014) and Touboulic (2015)) resulted in seven specific themes. The process is based on the thinking behind Corley and Gioia (2013), suggesting that the topics be first ordered into 1st order concepts, and only then into a clear set of emerging themes.

This structuring was performed by going through the main purpose of the studies based on the titles and abstracts, and listing the key points and questions discussed in the studies. The author used the help of an analytics tool to keep track of each study. After this, similar studies with the same keywords and themes were grouped together during the analysis to ultimately narrow down the studies to the seven themes shown

Fig. 3 Theme constructing

below. Finally, each theme was inductively linke to either antecedents, moderators, or outcomes, following the example of Zahoor et al. (2020).

The *antecedents*, or conditions, that affect climate change action in MNEs are grouped with studies analyzing where MNE emissions come from, and thus which aspects of the company should be focused on and why. Although other studies also touched upon the topic, they were categorized in the other themes due to having multiple findings. The *moderators* influence the magnitude of the outcomes and allow for MNEs to achieve the desired outcomes. Most of the themes are related to moderators, examining the topic of action in different ways. Finally, the *outcomes* of climate action are related to the outcomes of MNEs engaging in climate action, largely related to studies justifying the investments. All the themes are summarized in Fig. 3.

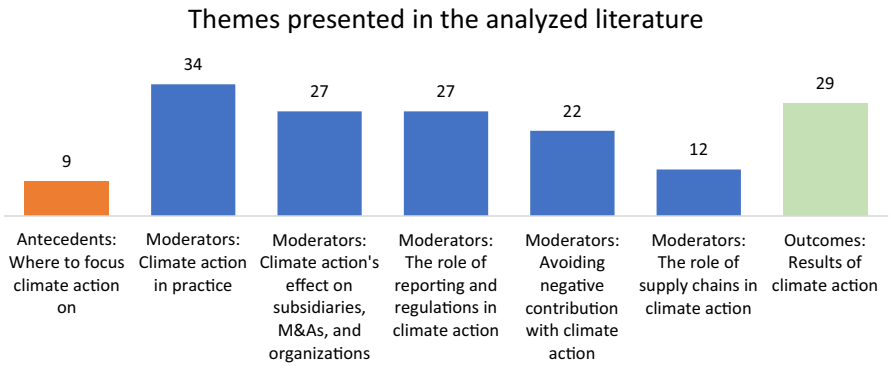

Fig. 4 Themes presented in the analyzed literature (number of studies)

The seven themes identified help in answering the research question of what previous research indicates about climate change action in MNEs. It must be noted that some topics overlap with each other. For instance, legal topics were an aspect discussed in many studies (see, for instance, Lind 2021), but as they were not the main focus of these studies, such studies were rather categorized under another more relevant theme. Figure 4 presents the prevalence of each study.

During the analyzed time period, different themes are highlighted. Studies investigating where to focus climate action on and why as well as the results of it are more visible in the first years analyzed, whereas half of the studies focusing on the effects of climate action on subsidiaries, mergers and acquisitions (M&As), and organizations are published only in the past four years, indicating increased understanding on the topic. The role of reporting is evenly discussed throughout the years, showing the significant pressure, with some reasons for this being the new regulations especially in the EU (European Commission 2021) as well as stakeholder pressure to communicate emissions (see, for example, Ecoact 2020).

Furthermore, an important highlight needs to be made about the studies related to the actions to combat climate change. Even though a large share of the studies are conducted on the moderators of climate action, most of the studies end up analyzing the issue from various high level view points as opposed to offering concrete actions MNEs can take in practice. Furthermore, a clear majority of these studies is conducted in the past four years, indicating that this area of research is still rather new. The next part of the article will go through the findings from the literature using the different themes presented.

5 Findings

This section will shed light on the research question concerning what previous research tells us about climate change in MNEs. The sections are organized by splitting into antecedents, moderators, and outcomes, as following Zahoor et al. (2020), and include the elements of each theme as identified above based on the studies by Corley and Gioia (2013) and Mio et al. (2020).

5.1 Antecedents

Antecedents affecting climate action were mainly related to theme number 1 (where to focus climate action on), but also the reasons why climate action is being partaken in the first place (see, for example, Zhu et al. 2021). In addition, studies charectirized in other themes shed light on this topic from the angle of the prerequisites for climate action (see, for example, Lei et al. 2017).

The main findings in terms of emission sources are that although different locations and industries have a clear impact on where and how the emissions are generated (see, for example, Lopez et al. 2019; Yan et al. 2023a), it is clear that supply chains are where most of the emissions lie: for instance, Duan and Jiang (2021) found that MNE emissions are intense specifically in supply chain -based emissions. Although the intensity is the reality in all companies, MNEs' supply chains are generally more complex, thus highlighting the importance of the topic (Duan & Jiang 2021).

Zhu et al. (2021) found that FDI-related emissions are significant especially in high-income economies as well as high-tech manufacturing sectors. Industries that are known to have poor environmental management naturally already also invest more in environmental research and development (Jeong et al. 2017). Lopez et al. (2019) found that US-based MNE foreign affiliates operating abroad emit higher emissions than domestic MNEs, while the situation is equally negative in Europe, with the companies producing more emissions than value (Ortiz et al. 2020). Furthermore, MNEs in the construction industry that are the most geographically diversified have the most reactive environmental strategies (Ong et al. 2015).

In general, it is clear that industry differences (for example, high-tech manufacturing sectors) as well as certain actions (such as carbon-intense supply chains or location decisions) affect the source of MNE emissions to be focused on (see, for example, Ong et al. 2015). In addition, several studies investigated the extent of the pressure within the industry or region (see, for example, Lin et al. 2019). They found that reporting and standards are not the only pushing factor for climate action and competitive advantage, as there is also pressure from stakeholders (Maialle et al. 2015; Darrifues & Montaud 2012), internationalization (Maialle et al. 2015; Khalid et al. 2021), as well as technological capabilities (Lin et al. 2019) in a much wider context than companies not operating in multiple locations. Thus, Darrifues and Montaud (2012) found the ways in which stakeholder pressure, coming specifically from consumers, encourages MNEs to self-regulate (Darrifues & Montaud 2012).

In addition, supported by Noailly and Ryfisch (2015), green R&D in host countries tends to increase in those with stronger regulation and market size. Liao (2016) also found that a reason for MNEs' differences in taking action is the amount of control and mandates. Environmental regulations can have a negative effect on the amount of foreign direct investment (FDI) to a certain country (Naughton 2014), further highlighting regulations' impact in MNEs taking environmental action. Yu et al. (2021) even highlight how the ex ante cost of equity of a firm is reduced, to a certain extent, when increasing the extent of environmental disclosure.

In contrast, the reasons why companies are *not* engaging in climate action have also been found. The key reason, according to research, is a lack of resources (He & Chen 2008). For instance, the lack of natural resources resulted in multinational mining companies in Ghana not being able to make the needed investments (Amoah & Eweje 2020), and the lack of financial support reduced the amount of green procurement in the company (Kipkorir & Wanyoike 2015). Lei et al. (2017, 23) agree in their findings which show that the reason why many MNE subsidiaries have not yet taken climate action is because of the limitations of their capabilities and resources. Amoah and Eweje (2022) also find contradicting interests and values to be one reason hindering direction. The question of "why not" may also differ by region, as in MNEs in China, local reasons like price competition, paying environmental fees, and a lack of management implementation will have an effect (Lam 2011).

To summarize antecedents of MNE climate action, it is evident that although similar factors are seen in the studies which are thought to work as antedecentes in companies in general (such as having a more carbon-intense supply chain or reporting pressure), the intensity by which they hit MNEs is a lot wider due to the complexity the MNEs operate in. Having to consider various different locations, resources, institutional distances and connections, it is clear that although it being clear why MNEs engage in climate action, it is an extremely compounded topic to overcome.

5.2 Moderators

Moderators influence the magnitude of the outcomes and allow for MNEs to achieve the desired outcomes. As taking concrete action is the "core component of environmental protection" (Kaman et al. 2016, 1749), naturally most of the studies conducted focus around what can be done to battle climate change, mainly in the theme of climate action in practice. Scholars have attempted to divide the adaption strategies and actions into various types, ranging from reactive (such as reacting to new regulations when needed) to proactive (such as planning ahead and going beyond regulatory needs) and "soft" (cheaper alternatives, such as initiating partnerships) to "hard" measures (more expensive investments, such as adjusting the entire infrastructure) (Averchenkova et al. 2016).

In addtion, especially relevant to the findings of this study, Johnson et al. (2023) found four distinctive action types, inspired by two seminal papers (Jeswani et al. 2008; Kolk and Pinkse 2004): **administrative** (i.e., managerial activities), **applicative** (i.e., operational activities related to goals), **communicative** (i.e.,

managerial activities to external initiatives), and **collaborative** (i.e., operational activities with stakeholders to achieve joint goals). This split also indicates how although there are multiple actions studied, not all of them answer to particularly climate action but rather how to prepare the company to ultimately take climate action.

Comparing the findings to the findings from Johnson et al. (2023) related to what concrete actions can be taken by businesses in general, it is clear that there is a lot of overlapping in the topics mentioned when considering MNEs. With this being said, the studies focusing on MNEs that are examined in this study highlight not only the complexity of these topics but also introduce completely new actions unique to MNEs.

5.2.1 Administrative actions

In terms of *administrative actions*, a lot of the results circle around the positive effects of implementing formal environmental management systems and procedures, including the continued progress towards distinct climate reduction goals (Kawai 2018). These include mindful organising (Ndubisi et al. 2020), clear communication about the benefits of the actions internally, conducting compliance audits, helping with resources (Hsu et al. 2014), including sustainability topics in existing operations, utilizing social networks, connecting top management all the way to operational plans (Nilsson-Linden et al. 2014), as well as operational agility through individual creativity and flexible work arrangements (Bouguerra 2021). Naturally also target setting as well as data collection and monitoring in relation to reporting emissions are necessary actions to take (Becker-Ritterspach 2019). It must also be noted that although there are several company specific actions, similarities between various industries also exist to learn from (Johannsdottir et al. 2014). Finally, in order to be able to implement any management system and procedure, a clear managerial vision is needed. A vision is needed not only for a climate change strategy (Lei et al 2017), but also a proactive environmental strategy (Chen et al. 2016) and a CSR strategy in general (Pei & Man 2019).

As the studied examined also state, many of the administrative actions are relevant regardless of what type of company is in question. For instance, a managerial vision is needed regardless of the size and location of the company. However, considering MNEs specifically, the importance of these items is highlighted due to, for instance, needing to ensure that the entire wide organization is on the same page regardless of which location is in question (Hsu et al. 2014). Moreover, since MNEs often prioritize efforts and results in their most significant markets, typically in their home country (Li & Li 2024), varying levels of incentives must be addressed to ensure consistent administrative actions across the organization.

5.2.2 Applicative actions

In terms of *applicative actions*, in addition to areas studied a lot, including focusing on energy efficiency and renewable energy (Lei et al. 2017) as well as increasing R&D spend on climate positive product innovation which has already proven results

(Gonenc & Poleska 2022), multiple other applicative actions are explored. These include giving a large amount of autonomy to subsidiaries to take innovative action (De Marchi et al. 2020), introducing clean technology (Dong et al. 2021; Oliveira et al. 2023), as well as generally digitalizing solutions across the MNE (Ferreira et al. 2023). Leading countries in environmental technology also lead in the capture of overseas technology and competence, which further affects innovation capability (Urraca-Ruiz et al. 2013). Moreover, reaching outside the existing company, green FDIs are among the actions that can be taken to improve climate change results in MNEs. More specifically, green FDI in newly established subsidiaries has an even stronger effect on environmental sustainability capabilities than acquisitions. (Amendolagine et al. 2021.) For manufacturing companies, servitization (for example, offering machines as a service) was suggested to reduce the emission intensity in the whole enterprise, but only after the process reaches a certain level of maturity (Qiao et al. 2024).

Due to MNEs having such a large responsibility and impact on the environment, several of the studies focused on the negative effect MNEs have and how to tackle it (see, for instance, Baghebo 2012). An example of this breadth is one article stating that the main cause for the deteriating environmental conditions is "the irresponsibility of enterprises, which selfishly strive for business profits and totally ignore their bad impacts on the environment" (Khoi et al. 2016, 43). It can therefore be stated that there were strong opinions expressed about the wider impact of MNEs throughout various studies, largely justified, when examining where emissions arise from (GHG protocol 2020). The most discussed negative effect was the pollution haven, asking whether MNEs are moving polluting activities to countries with less strict policies. According to various studies, it is an established activity that many MNEs have taken advantage of, although the matter is not always so unambiguous. (See, for example, Naughton 2014; D'Agostino 2015; Sat 2016; Ben-David et al. 2021; Duan & Jiang 2021; Ma et al. 2023.) Even negative relationships were found between a host country's pollution levels and MNEs' foreign investment in the country, highlighting regional and industry-specific differences (Bu & Genin 2024). It is also proposed that the negative environmental transfering of MNEs can be explained by the concept of institutional voids, more precisely the lack of both formal and informal institutions to help in environmental protection (Becker-Ritterspach et al. 2019). On the contrary, low corruption is highlighted as a possible means to limit the negative impacts (Das et al. 2023).

Although the companies that participate in pollution havens are critized, they emit less CO2 emissions overall, highlighting the importance of strict policies (Ben-David et al. 2021). Furthermore, despite several negative features, residents in, for example, Nigeria would prefer that MNEs change the way they conduct business rather than shut down the oil and gas companies in the region altogether, emphasizing the important role of MNEs and the climate action taken in the wider context of societies and supply chains (Baghebo 2012). In conclusion, as a lot of the research examined portrayed a rather pessimistic view of the MNEs, applicative action is required.

To summarize, several of the applicative actions are verifying previous findings on more universal studies, such as finding that energy efficiency and innovation

are crucial to reduce emissions in general. At the same time, several MNE-specific actions are presented, such as green FDI, expanding to less financially established countries, and not partaking in pollution havens.

5.2.3 Communicative actions

In terms of *communicative actions*, reporting is a frequent measure to be taken, to communicate to both internal and external audiences, as has been found in other studies as well (Becker-Ritterspach (2019). More impact is gotten when the quality of impact statements are continuously improved (Gwimbi & Nhamo 2016). Political activities, such as lobbying, are also taken by MNEs, despite the fact that due to the variety of regulations and complexity, the results may be slower (Wagner & Asnastasiadis 2014).

That the role of reporting in MNEs' climate action is enormous, naturally a lot of the studies focused on this theme. The topic was examined from the angles ranging everywhere from board independence (Cui et al. 2020), the different strategies used to respond to the topic (Leung & Snell 2021; D'Agostino 2015), the EU emissions trading system (Grosskurth & Themann 2018), risk preferences of multinational investments (Peng & Jiang 2021) and ultimately understanding the local differences between MNEs in the UK, Australia, and South Africa (Al Farooque & Ahulu 2015).

A key finding in addition to the wide impact of reporting is that MNEs in Europe are evidentially ahead in environmental reporting due to the legal impetus (see, for example, Grosskurth & Themann 2018), resulting in other regions needing to catch up (see, for example, Dura et al. 2017). The fact that lobbying and sustainability operations are not combined in companies also affects policy-makers receiving mixed signals as regards to developing these regulations further (Wagner & Asnastasiadis 2014).

Although evidently reporting emissions is an important step on the journey of MNEs, reformulating mitigation measures may indeed be necessary so as to include concrete actions (Gwimbi and Nhamo 2016), which, according to the authors, has long been neglected. Wu and Ma (2016) found similar findings as to how regulations can improve environmental strategies. Becker-Ritterspach (2019) found that although complying with environmental regulations can be considered a minimum requirement, it is not enough in today's MNEs, and that any actionable responses would work as role model solutions to other MNEs.

In conclusion, reporting and regulations are a driving force behind MNEs' climate action, thus needing to be considered closely. In the regions where regulations are tighter, such as Europe, reporting them is also expected to be more advanced due to the legal pressure. However, several studies express the idea that the regulatory requirements of today are no longer sufficient for MNEs and that more action beyond them is needed, as opposed to smaller companies with less impact.

5.2.4 Collaborative actions

Finally, in terms of *collaborative actions*, it is clear that MNEs need to work together to reach the targets set, as stakeholder engagement is an aspect that is mentioned in a considerable number of studies. MNEs can join communities and networks to initiate collaboration (Akhtar et al. 2020), collaborate with the supply chain (Li et al. 2018a, b), as well as work with different parties to offset emissions or obtain certain rewards (Mezeh & Adim 2023). Kolk and Pinkse (2008, 24) also found that "particularly for the purpose of developing climate-friendly technologies, many MNEs seem to prefer to cooperate with external parties".

Some more precise actions include environmental training for employees and dialogue with local communities (Del-Castillo Feito et al. 2021), backward linkages with suppliers (Li et al. 2018a, b), as well as coordinated efforts by various stakeholders (Akhtar et al. 2020). Such actions can help companies to not only overcome the liability of foreigness (Del-Castillo-Feito et al. 2021), but also improve environmental performance on both a mandatory and voluntary level (Li et al. 2018a, b; Akhtart et al. 2020). Although often coordinated from the headquarters, the climate change strategies are most effective when locally embedded (Lei et al. 2017), such as when a culture for becoming environmentally responsible is built, for example, through rewards and recognition, awareness and education, and empowerement (Lasrado & Araora 2018; Mezeh & Adim 2023).

As the studies analyzed were centered around MNEs, a lot of the research examined the collaboration in terms of subsidiaries, mergers and acquisitions, and organizations. A number of the studies examined the topic from the angle of specific regulations and policies in the operating countries of the MNE (see, for example, Tole & Koop 2011). Some of the key findings include the fact that headquarters and subsidiaries have a positive effect on each other's climate activity levels, and thus this exchange should be encouraged. For instance, after the headquarters adopt carbon pricing to financially motivate carbon reduction, the overall emissions can be reduced in the overseas operations as well (Li 2024). These foreign MNEs also have positive effects on a subsidiary's green innovation as well as on their own green operations when expanding and gaining knowledge. (Ha & Wei 2019; Fazal et al. 2019; Maksimov et al. 2019.) Futhermore, with a lower environmental institutional distance, the MNE is encouraged to transfer the standards and practices to the host country as well (Aguilera-Caracuel et al. 2012).

Futhermore, as more eco-innovation is achieved by the MNE at a local level, MNEs should ensure to also focus on local firms to gain better results (Ha 2021). In a similar manner, customers of MNEs can urge local companies to improve environmental strategies, especially in the countries with high export activity (Wu & Ma 2016). The guidance given by the MNEs also gives an advantage to the subsidiaries compared to their local peers (Lei et al. 2017, 23). With this being said, some mixed conclusions are found about the exact relationship between M&A and MNEs' green innovation performance (Hu et al. 2022).

In terms of where the expanding happens, Li et al. (2018a, b) found that companies expanding to developing countries see a decrease in environmental protection activities, while the MNEs expanding to developed countries experienced

the opposite. However, Luxmore et al. (2018) have different findings, as their research indicated that selling in poorer nations is "positively associated with increased levels of environmental CSR". This contrast may signify, as also Luxmore et al. (2018) suggest, that the regulations and stakeholder pressure in said location may have a stronger impact on climate action results compared to how rich or poor the country in question is. Additionally, because good environmental responsibility reduces the liability of foreiggness (Yan et al. 2023a), more opportunities may exist for future investments.

To align with both the headquarters' policies – driven by factors such as brand image – and local demands, including regulatory obligations and pressure from local stakeholders (Hsu et al. 2014; Lei et al. 2017), host-country regulations significantly influence FDI activities at specific locations (Peng & Jiang 2021; Rivera & Oh 2013; Nkwor et al. 2024; Pi & Liu 2024).

To summarize the collaboration with subsidiaries, M&As, and the organization, it was found that positive climate actions by subsidiaries and MNEs also encourage each other to do better, although this depends on the region. It is clear from the studies that the right kind of collaboration on climate action can have a positive effect on the entire MNE, and that these findings are unique specifically in the MNE context.

A key part of collaborative action is the supply chain, with various topics impacting the companies in terms of channel structures (Rong et al. 2021), green purchasing (Hsu et al. 2014), and profitability (Singh & Gupta 2014). In fact, Khoi et al. (2016, 51) states that "applying green supply chain management is one of a few business strategies that enterprises can adopt to achieve success and contribute to the sustainability of the world". As around 80% of company emissions come from the supply chain (GHG protocol 2020), the clear focus on the topic in the studies examined is justified. Furthermore, it is found that the global value chain emissions are, in fact, often underestimated, further highlighting the large impact (Zhu et al. 2021).

Some of the main findings are that domestic sourcing by MNEs contributes to less polluting (Niu et al. 2020), that the process design phase is crucial for being green (Singh & Gupta 2014), that advanced practices should include eco-design and green purchasing (De Sousa Jabbour et al. 2013), and that the aspects that affect climate performance the most are those attributes concerned with product remanufacturing, recyclability, and waste minimization attributes (Mogeni & Kiarie 2016). Hsu et al. (2014, 668) also suggest that subsidiaries need to allocate enough resources for climate activities like green purchasing not only in knowledge but also financial, human resource, as well as information technology capabilities, expanding the importance of the supply chain to other functions of the organization.

Yan et al. (2023b, a) summarize that MNEs must be able to work as global agents to reduce emissions throughout the value chain due to the large possibilities for impact. The studies examined suggest that there are several concrete ways that MNEs' supply chains can be improved to become more climate friendly, ranging from their design to waste minimization.

Although some studies have explored collaboration with different institutions and other MNEs (Akhtar et al. 2020; Okorie 2024), this aspect of collaborative action

has received surprisingly little attention, despite its significant potential impact. As one example, Akhtar et al. (2020) suggest emerging economies' MNCs benchmark and adopt best practices from competitors in developed markets. While international collaboration with various parties in the same industry or region to collectively identify and implement best practices together can be instrumental for achieving targets set, it remains underemphasized in existing literature.

To summarize and to answer the question of what action MNEs can take on their journey to becoming more climate friendly, previous research presents several avenues. Administrative, applicative, communicative, and collaborative actions are all presented, with it being clear that multiple approaches are required in order to have impact as an MNE. Especially as examining collaborative actions, several of the studies highlight that there are certain actions that are MNE specific; ones that are crucial for the MNE to thrive in the global context, but not as relevant for other companies not battling with the same challenges.

5.3 Outcomes

Especially in the start of 2010s, when climate action in MNEs wasn't as common as today, several studies focused on justifying why to partake in action with the impact it can make (see, for example, Chakrabarty & Wang 2013). Many of the studies confirm that MNEs operate in a similar way than any large company, for example, Kejar et al. (2020) proving that climate activity is, in fact, profitable as it has a "significant positive impact on the financial performance" of the studied multinational oil and gas companies in Nigeria, as well as having an effect on financial performance in general (Chen et al. 2016).

However, multiple studies find outcomes that specifically MNEs can achieve, for instance, green technologies enhancing sustainability across the organization (Obamen et al. 2019), and the sustainability actions having a strong effect on MNE offshoring activities (Lartey et al. 2021), sales effectiveness, as well as product leadership (Chakrabarty & Wang 2013). Attah-Boakye (2021) found that in emerging countries by adopting green technology both the value of a firm and its CO2 footprints are impacted in a positive light. Furthermore, Timothy and Yazdanifard (2014) found that green marketing also impacts MNE competitiveness. Lin et al. (2019) found that MNEs with more environmental capabilities are less likely to face entry barriers and strict scrutiny, thus justifying the actions taken. Kolk and van Tulder (2003) also find that when engaging in reporting, the MNEs are able to achieve bargaining power within the home country they have operated in.

A common finding is also that the reason why any action is taken in organizations is due to regulations by companies impacting the emission reports in a positive way, also seen from other studies outside MNEs. For instance, Amoah and Eweje (2020) found that all actions taken merely reflect regulatory compliance and obligations.

To summarize, the impact of climate action is clear, indicating that there are several different reasons why MNEs engage in climate actions ranging from financial to brand related topics. Most of the driving force is found to be due to external factors such as living up to the expectations of financial performance, as

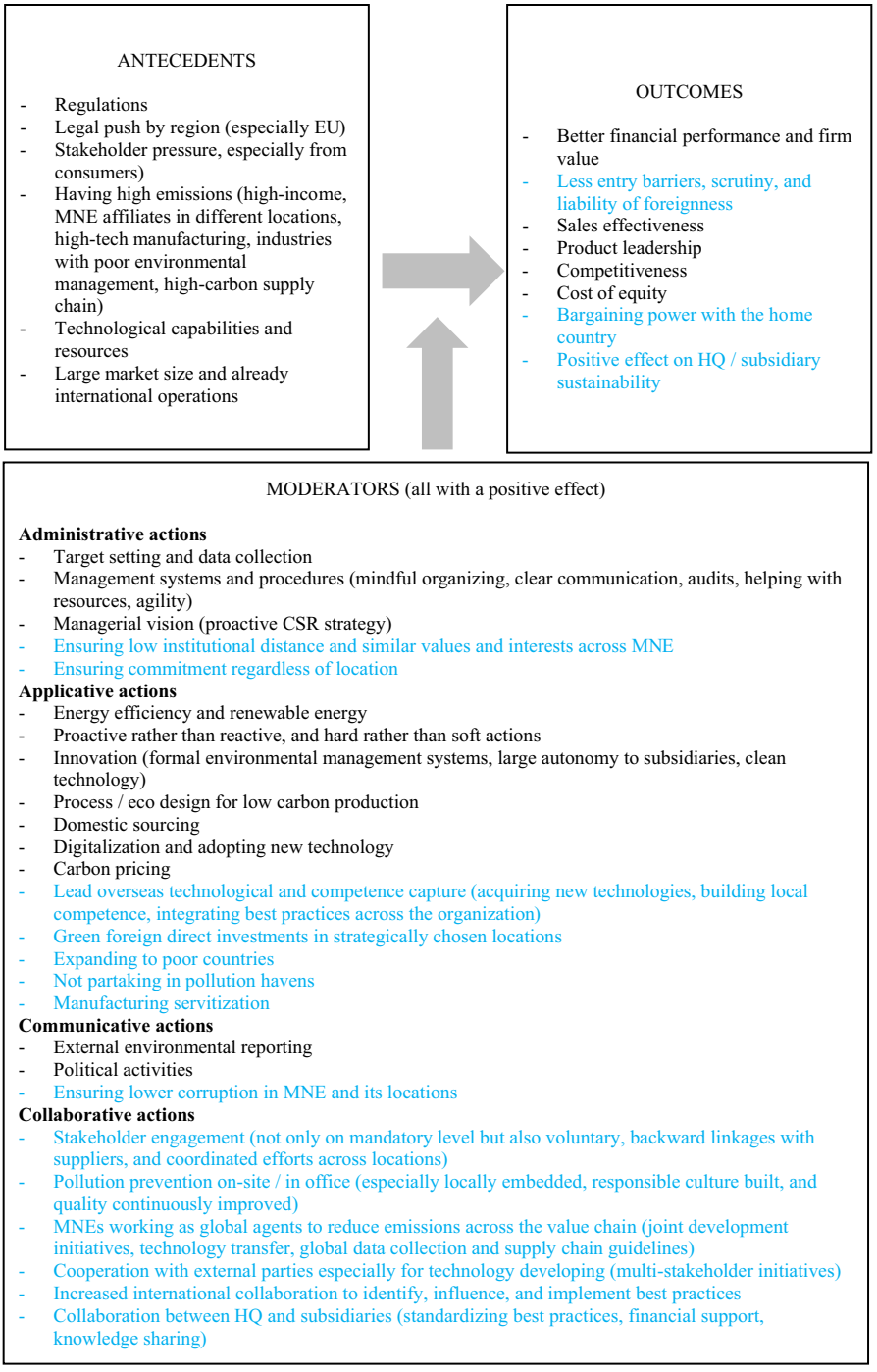

Fig. 5 Summary of MNE's climate change action: an integrative framework based on the identified studies

in all companies also outside the MNE context. Simultaneously, also MNE specific outcomes, such as less entry barriers and liability of foreignness are found in the studies,

5.4 Synthesis

To summarize the findings of the themes presented above, a multilevel framework of the phenomenon of climate action in MNEs is presented in Fig. 5, following the approach of Zahoor et al. (2020).

The *antecedents* affecting climate change action in MNEs, the *outcomes* of climate action that come out of it, as well as the *moderating* factors in between the antecedents and outcomes influencing the magnitude of the outcome are all presented in Fig. 5. The moderators are futher split into the different types of actions as presented before. Additionally, Fig. 5 highlights in blue color which elements of the framework are unique to MNEs, either higlighted so in the studies examined or not found in previous studies made on the topic in a wider perspective.

As can be seen from Fig. 5, there are several actions MNEs can take to reach the wanted outcomes, and especially in terms of moderators, several of the actions are unique to MNEs specifically, not highlighted in previous literature reviews. The figure functions as an overall view to bring together the various themes discussed throughout this chapter, with the details of each finding being presented earlier in this chapter in more detail.

6 Discussion

6.1 Theoretical contributions

The present study answers the need for a coherent understanding of the current research on climate change in MNEs. The research question of "What does previous research indicate about climate change action in MNEs?" has been examined thoroughly, and the findings of the study are threefold.

First, the findings reveal that the literature behind climate change in MNEs is relatively new, with a third of the studies conducted only in the past three years compared to the twenty years prior. The increased importance of SDG13 and climate action in MNEs is recently highlighted, inviting both businesses and academics to focus on the topic more in the future.

Second, this study adds a distinct perspective on MNEs' climate action, identifying the unique emphasis on moderators, particularly collaborative actions, that differentiate MNEs from other organizations. Building on studies that address common antecedents (e.g., regulatory pressure and resource availability) and outcomes (e.g., enhanced competitiveness) in climate action, this analysis shows that MNEs face unique complexities in selecting and executing climate strategies. Specifically, MNEs are positioned as global agents responsible for reducing emissions throughout the value chain, a role that calls for context-specific,

collaborative, and applicative actions not thoroughly explored in previous literature reviews.

This study identifies additional MNE-specific considerations, such as investment locations, sourcing choices, and pollution management, all of which require nuanced approaches due to their complex operating environments. Practical examples include globally coordinated initiatives led by headquarters, site-specific pollution prevention measures, and partnerships with third parties to advance sustainable technologies where internal capabilities are limited. This research underscores the need for MNEs to navigate the broader climate action landscape with tailored actions that go beyond traditional approaches.

Thirdly, while applicative and collaborative actions are highlighted, this literature review finds that most of the studies still remain at a high-level, reactive perspective, focusing on general concepts such as "process design", rather than indicating how to move forward concretely. Although elements like innovation capability and green technology adoption are identified as critical antecedents, moderators, and beneficial outcomes (such as product leadership), there is a notable gap in guidance on which specific technologies MNEs should adopt or how to implement them organization-wide. This indicates a need for future research to dive deeper into proactive innovation strategies.

The absence of concrete guidelines may stem from the reality that, while the climate challenge is widely recognized, many MNEs are still in the planning or initial stages of carbon reduction. Consequently, clear best practices are scarce, leaving less mature companies to rely on broad investments, like stakeholder engagement. As MNEs advance toward fulfilling their climate commitments and begin taking more definitive actions, research must keep pace, providing insights on emerging best practices and actionable frameworks for meaningful climate impact.

In line with Gainer-Brown and Malekpour (2019), researchers globally agree that achieving the SDGs cannot be attained by 2030 by simply continuing on the current path, and therefore, although compliant reporting and planning are good first steps, a further understanding is still required from the technology perspective to allow for proactive action. Potential streams for future research are presented below.

Conversely, the need for MNEs to navigate complex actions and implement additional measures can naturally lead to slower decision-making and execution. With many MNEs are struggling to reach their reduction targets (Bricheux et al. 2023), this study further confirms what is known: reducing emissions in large companies is difficult. However, as a vast amount of actions are already identified that are proven to reach the outcomes and goals set (see Fig. 5), it is on the MNEs to take responsibility and plan for the future accordingly.

6.2 Future reseach agenda

As explained above, there is an evident call for investigating especially the moderators that are related to technology and that enable for proactive actions. Utilizing technology in combatting climate change has been a focus of some literature over the past five years, nevertheless the studies focusing on climate

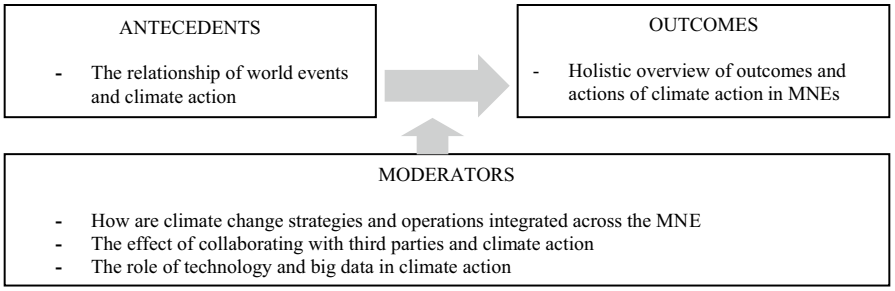

Fig. 6 Potential research questions for future studies

change and MNEs which were examined in this article only touched upon this topic. The literature can be considered very new in itself, with Beier et al. (2022, 1), for instance, stating that "the potentials of big data for corporate environmental protection are hardly dealt with in the scientific literature", and Leal Filho et al. (2022) finding that AI can be very helpful in climate research. Despite being a new subject, there is some literature on automated sustainable production and manufacturing to state a few examples (see, for example, Edwards 2021; Haseeb et al. 2019), but as proven in this study, the MNE view is neglected, thus highlighting future opportunities.

In addition, to further answer why there is a lack of proactive measures, the author suggests the necessity to turn towards various third parties. As MNEs around the world have set Science-Based Targets (SBT) to reduce emissions and report emissions to third parties like the Carbon Disclosure Project (CDP) (Luu & Rowlands 2021), the relationship between integrating climate actions across MNEs and collaborating with these third parties like SBT and CDP would be very timely to investigate. There are already suggestions, for instance, that companies that take action due to intrinsic and proactive reasons are considered more advanced compared to those that purely report compliance-based results (Kearney 2022). Could this also be the case specifically for MNEs? Although there are a few studies that have been conducted on the topic of MNEs and CDP reports (like the one from Gasbarro et al. (2017)), they are only again from the perspective of the drivers and risks for MNEs, functioning as antecedents, rather than the measures taken and moderated throughout the organization, and what outcomes are evident aftwerwards. The domain therefore poses a considerable number of opportunities for future researchers.

In addition, there is a clear research gap in accounting for the different effects between external policies, relations, and frameworks and MNE climate action. For instance, the recent developments in United States' politics may largely affect how climate topics are viewed in the country (Fiorino 2022). Therefore, a more considerate analysis of improving climate change dimensions amid the global situation is needed. A future research agenda is presented in Fig. 6.

In terms of various methods, both qualitative and quantitative studies are clearly visible in the studies (almost a 50–50 division) as are also different industries and

regions. Therefore, when considering future studies, the gap is rather a matter of the topics as a whole instead of the methodological or perspective focal points.

6.3 Managerial contributions

The study outlines various antecedents, moderators, and outcomes that MNEs can consider when developing their carbon strategies and actions. This literature review uniquely combines the research on climate actions particularly in MNEs, offering a broad view of actions specifically relevant for such companies, while highlighting where complexity needs to be considered. Due to MNEs' global reach, diverse regulatory landscapes, and intricate supply chains, a standardized approach to climate action is insufficient, necessitating tailored strategies that accommodate these differences. The long list of applicative and collaborative actions presented in Fig. 5 are especially interesting for practitioners wanting to get ahead. Examples include leading overseas technological and competence capture by integrating the foreign innovations to sustain competitive advantage on a global scale, backward linkages with suppliers to closely manage the local suppliers' practices, and collaboration with the headquarters and the subsidiary by, for instance, joint research initiatives and technology transfer.

Given that climate action in MNEs is still emerging – evident from the high level and reactive nature of past findings – MNEs aiming to be frontrunners should consider investing in proactive enablers, such as technology solutions, to gain a competitive edge. Investing in these technologies not only drives transparency and accountability but also enables more agile and responsive climate strategies that are essential in the rapidly changing regulatory landscape.

Moreover, MNEs often have the resources and influence to set industry-wide standards, making it imperative for them to adopt pioneering strategies that can cascade throughout their value chains and into smaller firms within their ecosystems. Building on previous studies highlighting collaborative actions in terms of engaging with the value chain and third parties, the opportunity to engage in multi-stakeholder initiatives, such as cross-sector partnerships and industry-wide coalitions, must also be highlighted. Collaborating in these broader networks allows MNEs to share best practices, co-develop innovative solutions, and contribute to shaping global climate standards. This approach not only accelerates their own climate progress but also positions them as leaders in the global push for sustainability, enhancing their reputational capital. Ultimately, for MNEs, taking the lead in climate action is not just about risk mitigation—it is about seizing an opportunity to redefine competitive advantage in a world that increasingly values sustainability as a whole.

7 Conclusion

Overall, this article systematizes previous literature to present the current understanding of climate action in MNEs, one which has not been systematically presented to the extent this paper provides. Snyder (2019) suggests that some

conclusions that arise from systematic literature reviews include finding constants across studies as well as future avenues for studies.

This study found that the speed of new research on the topic has increased largely over the past years while gaining a highlighted focus on specifically on carbon emissions and the actions to reduce them. The study also found that while certain climate actions are presented as universal, MNEs also take action on topics particularly relevant to such companies, especially related to collaborative actions. Additionally, previous literature on the topic depicts a reactive picture of climate change in MNEs, with these companies only engaging in climate action (often meaning reporting) when regulations and stakeholders require. Although several actions are laid out in the studies, concrete best practices for moving forward are lacking, with the actions staying at a rather high level. This study attempts to solve this challenge by presenting a framework depicting a broad overview of the concrete actions MNEs can consider when embarking on their climate journey, based on previous research. Furthermore, as we look into the future, technology related solutions as well as the results of collaborative actions still need to be investigated further.

This article provides several future avenues of research for academics, while also highlighting to managers that focusing on forward-looking perspectives and wider actions may potentially work as a competitive advantage due to the limited focus on them so far. However, further studies are still needed on the topic, with possible future research avenues including implementing the actions throughout the organization as well as utilizing modern innovation.

This paper has limitations regarding the methodology, for example only accepting articles in the English language. Mitigation of liabilities and bias was constantly attempted throughout the paper.

Appendix A

Criteria to exclude studies in addition to the criteria opened up in article:

1. A term meant something else than what this research is about. For instance, the word MNC can also refer to metallic nitrogen-doped carbon used in chemical research
2. The search terms were used in a different context. For instance, a "business *climate* change", a "changing *environment*", or "*multinational* perspective" on a completely different subject would not be relevant for the study.
3. Although having the same search terms in the title, the focus of the study was different. For instance, a study focusing merely on social aspects and diversity in sustainability but also having the word environment in the title would not be selected for this research, as it would not be relevant for the study.
4. The paper was, for example, a review of another article, or did not mention any methodology, therefore not contributing new theoretical findings to the matter at hand.

Appendix B

Descriptive analysis.

The studies show that specific journals, regions, and industries were also highlighted. The most common journal of publication was the Journal of Cleaner Production, while the rest of the studies being about fifty-fifty split in journals focusing on environmental challenges, and in outlets focusing on business (like the *Journal of Business Ethics*). Most studies were in journals with only one or two relevant publications, showing that the topic has still not received a wide coverage.

Asia, Africa, and developing countries in general were the most common focus regions, highlighting the perspective of MNEs having a lot of responsibility in these countries. In terms of industries, the most common ones were pollution-intense industries such as oil and gas, mining, and construction. This reflects the underlying assumptions of multinational corporations bringing negative impact into the world as a whole, as suggested in several studies (see, for example, Ben-David et al. 2021; Duan & Jiang 2021).

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11301-024-00475-4.

Funding Open Access funding provided by University of Turku (including Turku University Central Hospital).

Data availability The data set regarding the articles analyzed in this study is available as a separate file (DOI pending).

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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