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TESIS DOCTORAL

Understanding the connections between internationalization and business environmental strategy in the energy industry

Presentada por:

Efrén Gómez Bolaños

Dirigida por:

Prof. Dra. Nuria Esther Hurtado Torres

Prof. Dra. Blanca Luisa Delgado Márquez

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1. CAPITULO I. INTRODUCCIÓN

1.1. MARCO GENERAL DE LA TESIS

La sostenibilidad y en particular dar respuesta a la preocupación global por el cambio climático es uno de los principales desafíos actuales a los que se enfrentan las empresas internacionalizadas (Buckley, Doh y Benischke, 2017). El Acuerdo de París supuso un hito al conseguir un pacto vinculante que unió a multitud de países bajo un objetivo común orientado a reducir emisiones de gases de efecto invernadero (GHG) y adaptarse a los efectos del cambio climático. Multitud de países que juntos representan más del 70% del PIB mundial y de las emisiones de GHG ahora tienen objetivos de emisiones netas cero, generalmente para 2050. Esto supone un cambio drástico en la postura de las empresas involucradas en sectores considerados tradicionalmente como perjudiciales para el medio ambiente (The Economist, 2021).

La internacionalización de las empresas aumenta su exposición a las normas y actores de legitimación global (Marano & Tashman, 2012; Zhang, van Gorp, Ebbers, Zhou & Kievit, 2022), como las organizaciones no gubernamentales (ONG), multilaterales o internacionales que fiscalizan el impacto social y ambiental de las empresas a escala global (Marano & Kostova, 2016). Además, las empresas que operan en un contexto internacional se enfrentan a presiones institucionales de actores externos, como gobiernos, reguladores, mercados y la sociedad (p. ej., grupos de interés y asociaciones industriales), procedentes de los múltiples países donde operan. Estas presiones pueden variar entre países e incluso entrar en conflicto en cuanto a lo que se entiende por prácticas empresariales legitimadas (Meyer, Mudambi & Narula, 2011). En gran parte debido a las presiones externas relacionadas con la sostenibilidad, el rendimiento de las empresas en el actual panorama empresarial global se mide cada vez menos exclusivamente en términos de resultados económicos, y las medidas de rendimiento se desplazan hacia métricas que tienen en cuenta los objetivos de sostenibilidad social, económica y ambiental (Thu, Paillé & Halilem, 2019). Los diversos grupos de interés implicados, como gobiernos, organizaciones no gubernamentales (ONG), organizaciones intergubernamentales, accionistas y consumidores, demandan cada vez más que las empresas multinacionales (MNEs) aborden los problemas ambientales globales y que reconsideren el equilibrio entre los objetivos duales de rentabilidad a corto plazo y sostenibilidad a largo plazo (ONU, 2022).

En este contexto de complejidad, las empresas tienen que alinearse con las presiones institucionales que reciben para legitimarse y mantener su posición competitiva en sus entornos operativos (Delmas & Montes-Sancho, 2010; Suddaby, Bitektine & Haack, 2017). La legitimidad puede definirse como la "percepción generalizada o suposición de que las acciones de una entidad son deseables, apropiadas o adecuadas dentro de algunos sistemas socialmente construidos de normas, valores, creencias y definiciones" (Suchman, 1995: p. 574). Las empresas que obtienen legitimidad pueden considerarse más fiables, mejorar su capacidad para competir por recursos y beneficiarse de la buena voluntad de los grupos de interés en momentos de necesidad (Babiak & Trendafilova, 2011; Cormier & Magnan, 2015; Crane, 2018; Suchman, 1995).

Estudios recientes han realizado importantes contribuciones para comprender cómo las empresas responden a una mayor presión por la responsabilidad social y la sostenibilidad en sus operaciones globales (p. ej., Aragón-Correa, Marcus & Hurtado-Torres, 2016; Christmann & Taylor, 2001; Pinkse & Kolk, 2012). La literatura ha mostrado cómo las empresas internacionales buscan legitimidad en los mercados internacionales reforzando su divulgación ambiental (p. ej,, Aragón-Correa et al., 2016). También hay un debate abierto sobre en qué medida la internacionalización de las empresas fomenta un mayor esfuerzo por implementar prácticas ambientales, políticas y procedimientos y/o facilita conseguir un mejor desempeño ambiental (Christmann & Taylor, 2001; Suárez-Perales, Garces-Ayerbe, Rivera-Torres & Suarez-Galvez, 2017; Williamson, Symeou & Zyglidopoulos, 2022).

Desde un punto de vista medioambiental, las empresas enfrentan diferentes niveles de presiones institucionales en los países desarrollados y en los países menos desarrollados. En los países desarrollados, el mayor nivel económico permite el desarrollo de sistemas de bienestar más avanzados, lo que se traduce en que surgen grupos de interés cada vez más influyentes que presionan para incrementar la protección medioambiental en las normas desarrolladas por las empresas. Algunos estudios apoyan la hipótesis del paraíso de la contaminación (“pollution haven”), que sostiene que las empresas buscan oportunidades de negocio en el extranjero para aprovechar una legislación más laxa para exportar sus actividades contaminantes (p. ej., Li & Zhou, 2017). Sin embargo, otros autores argumentan que cuando las empresas extienden sus actividades a los mercados internacionales, pueden aprovechar las ventajas específicas de la empresa desarrolladas en su país de

origen, obteniendo así una ventaja cuando entran en nuevos mercados (Ramanathan, He, Black, Ghobadian & Gallear, 2017). Por lo tanto, las actividades de las empresas internacionales pueden tener efectos de contagio positivos en los países extranjeros porque la transferencia transfronteriza de prácticas ambientales ayuda a mitigar los vacíos institucionales y contribuye a la difusión de normas de comportamiento globales (Pinkse & Kolk, 2012).

Además, de acuerdo con la literatura de economía institucional, el marco institucional en el que tiene lugar la actividad económica es determinante para evaluar el resultado de esta (véase, por ejemplo, el debate existente sobre la relación entre el marco institucional y el crecimiento económico de los países reactivado por Robinson y Acemoglu (2012) o el de la paradoja verde, Najm (2019). Las empresas, como actores microeconómicos, también están integradas en contextos institucionales específicos cuyas características dependen de su país de origen. La literatura ha señalado que las empresas multinacionales de mercados emergentes (EMNEs) parten de un déficit de reputación y legitimidad en los mercados internacionales, en comparación con las de países desarrollados (DMNEs), debido a la credibilidad institucional limitada de sus países de origen (p. ej., Fiaschi, Giuliani & Nieri, 2017; Madhok & Keyhani, 2012; Zhang, 2022). Por lo tanto, debido a la credibilidad institucional limitada de sus países de origen, las EMNEs necesitarán aumentar sus esfuerzos para legitimarse al operar a nivel global (p. ej., Cuervo-Cazurra, Inkpen, Musacchio & Ramaswamy, 2014; Marano, Tashman, & Kostova, 2017; Tashman, Marano & Kostova, 2019; Arocena, Orcos y Zouaghi, 2023).

Por lo expuesto anteriormente, mejorar el conocimiento de la relación entre el comportamiento medioambiental de las MNEs y su nivel y alcance de internacionalización, así como el contexto institucional de sus países de origen y de acogida, es crucial para avanzar en el desarrollo sostenible y la gestión empresarial responsable. Por ello, este será el objetivo de esta tesis doctoral. Además, comprender cómo influyen las estrategias de internacionalización y los entornos institucionales de las MNEs en sus resultados medioambientales puede ayudar a los responsables políticos, los diferentes grupos de interés externos e internos a tomar decisiones con conocimiento de causa sobre la regulación y la inversión de estas empresas. Este conocimiento también puede ayudar a las MNEs a diseñar estrategias y prácticas medioambientales eficaces que se ajusten a sus objetivos de internacionalización y satisfagan las expectativas de sus stakeholders.

Esta tesis doctoral se centra en el sector de la energía, una industria esencial para el funcionamiento de la sociedad moderna, pero también una fuente importante de contaminación y de emisiones de gases de efecto invernadero (GHG). El sector de la energía ya representaba en 2018 alrededor del 40% de las emisiones mundiales de GHG (IEA, 2020), alcanzándose en 2021 el récord histórico de emisiones de CO2 relacionadas con la energía con 40,8 GtCO2eq. (IEA, 2022a). Además, el sector energético es responsable de otros tipos de contaminación, como la contaminación del aire y del agua, que tienen un impacto significativo en la salud humana y el medio ambiente.

Debido a su impacto medioambiental y a la especial sensibilidad que despierta en sus grupos de interés, el sector energético está en el punto de mira del debate público con gran cantidad de grupos de interés implicados, como gobiernos, reguladores, medios de comunicación, organismos internacionales, ONG, la industria y otros altos responsables de la toma de decisiones (Shahbaz et at., 2020). Consecuentemente, esta industria está inmersa en un proceso de cambio intenso esperándose que la capacidad instalada de energías renovables se incremente un 75% entre 2022 y 2027 y que se alcance un 38% de renovables en el mix energético en 2027 (IEA, 2022b). Estos cambios internos pasados y esperados del funcionamiento del sector junto con los cambios institucionales y competitivos provocados por la globalización del mercado y la desregulación han transformado enormemente el sector energético. Además, una proporción considerable de la industria energética está conformada por empresas que operan simultáneamente en varias regiones (América, Europa, Asia y Oceanía), por lo que se da una variada casuística de contextos institucionales referidos tanto al origen de las empresas como al destino de su internacionalización. Por lo anterior, el sector de la energía representa un contexto muy interesante para el estudio de los temas tratados en la tesis por la especial relevancia que tiene la sostenibilidad medioambiental del sector, su alto nivel de internacionalización y la naturaleza global de las presiones a que se enfrentan, así como por los diferentes niveles de desarrollo institucional de los países de los que proceden y a hacia los que se internacionalizan las empresas.

En conclusión, es de suma importancia comprender cómo gestionan las empresas multinacionales del sector energético su comportamiento medioambiental y cómo éste se relaciona con su nivel y alcance de internacionalización, así como con el contexto institucional de sus países de origen y de acogida. Al investigar la relación

entre el comportamiento medioambiental, internacionalización y los contextos institucionales, los responsables políticos y los diferentes grupos de interés externos e internos pueden tomar decisiones con conocimiento de causa, mientras que las MNEs pueden diseñar estrategias y prácticas medioambientales eficaces para satisfacer las expectativas de las partes interesadas y alinearse con los objetivos de internacionalización.

1.2. OBJETIVOS DE LA INVESTIGACIÓN

Esta tesis doctoral tiene como objetivo general entender la relación entre diferentes estrategias de internacionalización de las MNEs, las características institucionales de los entornos en los que desarrollan su actividad y su comportamiento medioambiental. De forma específica en esta tesis se analiza la relación entre las estrategias de internacionalización de las MNEs y distintos planteamientos medioambientales de las empresas: su gestión medioambiental (environmental management), su desempeño medioambiental (environmental performance), su innovación medioambiental (environmental innovation) o la divulgación de información medioambiental (environmental disclosure). Por otro lado, se analiza como el entorno institucional influye en estas relaciones, observando tanto el desarrollo institucional del país origen de las empresas como el de los países en los que desarrollan sus operaciones (mercado destino).

Este objetivo general se concreta en los siguientes objetivos específicos:

- Conocer la relación entre el nivel de internacionalización de las MNEs del sector energético y su gestión y desempeño medioambientales, así como estudiar la influencia que sobre estas relaciones tiene el nivel de desarrollo de los mercados destino.
- Comprender la relación entre la internacionalización de las MNEs del sector energético y su nivel de innovación medioambiental.
- Analizar cómo el desarrollo institucional del país origen de las MNEs energéticas puede influir en la capacidad de éstas para acceder y utilizar recursos y conocimientos de distintos países, y cómo esto puede repercutir en sus actividades de innovación medioambiental.
- Estudiar las similitudes y diferencias en los planteamientos medioambientales de las MNEs energéticas en función del nivel de desarrollo institucional de su país de origen. (EMNEs versus DMNEs).
- Profundizar en el conocimiento del papel que juega el nivel de desarrollo del país de origen en la influencia que tiene la diversificación internacional sobre la adopción de políticas de gestión medioambiental y sobre la divulgación de información medioambiental por parte de las MNEs energéticas.

1.3. ESTRUCTURA DEL TRABAJO DE INVESTIGACIÓN

Esta tesis doctoral se estructura en 5 capítulos cuyo contenido se describe sucintamente a continuación:

CAPÍTULO I: Describe el marco general de la tesis, se justifica el interés de la investigación desarrollada, se detalla el objetivo general y los objetivos específicos y se describe la estructura de la tesis.

CAPÍTULO II: Este capítulo se centra en estudiar la relación entre el nivel de internacionalización de las MNEs del sector energético y su gestión y desempeño medioambientales, así como la forma en que cambian estas relaciones según el nivel de desarrollo de los mercados destino. Por un lado, se analiza si una mayor internacionalización conduce a una mejor gestión medioambiental, que implica la aplicación de cambios en la estructura organizativa, las prácticas y los procedimientos para reducir el impacto de las operaciones de la empresa sobre el entorno natural. También se investiga si una mayor internacionalización está positivamente relacionada con un mejor desempeño medioambiental. Se indaga así sobre si las MNEs muestran una estrategia dual, en la que las empresas centran sus esfuerzos en señalizar un mayor compromiso medioambiental mejorando sus políticas y prácticas medioambientales internas de gestión medioambiental en lugar de mejorar efectivamente sus operaciones para conseguir un mejor desempeño medioambiental. Este enfoque de investigación es relevante porque la internacionalización es una estrategia clave para las empresas que conlleva ventajas e inconvenientes en función del tipo de estrategia elegida. Por lo tanto, es importante comprender el impacto potencial de la internacionalización en la gestión y los resultados medioambientales de las MNEs.

Por otro lado, en este capítulo se analiza si una mayor orientación de su nivel de internacionalización hacia países en desarrollo está relacionada con una mejor gestión medioambiental. Se trata de analizar si a medida que una empresa amplía sus operaciones internacionales en países en desarrollo, la MNE adopta mejores prácticas de gestión medioambiental. Esto se justificaría por las presiones institucionales en su país de origen a las que se enfrentan las empresas que deciden

operar en países en desarrollo, ya que tienen que cumplir la normativa medioambiental del país destino pero también responder a las demandas de sus grupos de interés del país origen y globales. Por último, se analiza también si una mayor orientación de su nivel de internacionalización hacia países en desarrollo está relacionado con un mejor desempeño medioambiental. Se pretende así examinar si las empresas están adoptando prácticas sostenibles al realizar negocios en países en desarrollo o si se están aprovechando de una normativa laxa y contribuyendo a la degradación del medio ambiente.

Los resultados muestran que el nivel de internacionalización de las empresas esta positivamente relacionado con su gestión medioambiental y con su desempeño, aunque en el caso del desempeño medioambiental esta relación es estadísticamente más débil. También se comprueba si estas relaciones cambian cuando la internacionalización de las empresas se orienta hacia los países en desarrollo. Se observa que la relación entre la internacionalización hacia países en desarrollo y una mejor gestión medioambiental es significativa.

CAPÍTULO III: Este capítulo busca profundizar en el conocimiento de la relación entre el nivel de internacionalización de las MNEs y su innovación medioambiental. La internacionalización permite a las MNEs acceder a recursos y conocimientos de distintos países que les pueden permitir mejorar su nivel de innovación medioambiental. Aquellas MNEs del sector de la energía que tienen un ámbito geográfico de internacionalización más amplio, también se enfrentan a diversos retos y normativas medioambientales en distintos países, lo que puede impulsarles a mejorar su innovación medioambiental para cumplir con estos requisitos.

En este tercer capítulo también se busca comprender cómo el desarrollo institucional del país origen de las MNEs energéticas puede influir en la capacidad de estas para acceder y utilizar recursos y conocimientos de distintos países, y cómo esto puede repercutir en su innovación medioambiental. Para ello, se examina cómo el nivel de desarrollo institucional en el país de origen de las empresas multinacionales de la energía modera la relación entre su nivel y alcance de internacionalización y su nivel de innovación medioambiental. De este modo se estudia si existe un efecto moderador positivo del nivel de desarrollo institucional del país de origen sobre la relación entre el nivel de internacionalización de las MNEs

y la innovación medioambiental. Esta relación permite conocer si la calidad institucional en el país de origen puede desempeñar un papel importante a la hora de facilitar la transferencia de conocimientos y recursos a las MNEs. Asimismo, se estudia si el nivel de desarrollo institucional del país de origen modera positivamente la relación entre el alcance de la internacionalización y la innovación medioambiental de las MNEs energéticas. En este caso se estudia si un mayor nivel de desarrollo institucional del país origen facilita a que las empresas con un mayor alcance de internacionalización puedan responder a la mayor variabilidad de retos y normativas medioambientales derivados de operar en un mayor número de países. Los resultados muestran apoyo empírico a la existencia de un efecto positivo del nivel y el alcance de la internacionalización sobre la innovación medioambiental. También se comprueba que, cuando operan fuera de su región de origen, las empresas multinacionales de países con mayor desarrollo institucional son más capaces de absorber los conocimientos adquiridos a escala mundial y de mejorar su innovación medioambiental que las MNEs de países con instituciones más débiles.

CAPÍTULO IV: En este capítulo se estudian las diferencias en el comportamiento medioambiental de las MNEs de países desarrollados y emergentes, analizando la adopción de políticas de gestión medioambiental y la divulgación de información medioambiental. Además, se analiza cómo influye el nivel de desarrollo institucional del país de origen de las empresas en la relación entre su diversificación internacional y la adopción de políticas medioambientales y la divulgación de información medioambiental.

Las EMNEs se enfrentan a un mayor nivel de déficit de legitimidad en países extranjeros debido a su desventaja de origen, "liability of origen" en comparación con las DMNEs. Por tanto, dada su desventaja, resulta interesante conocer si las EMNEs hacen un esfuerzo adicional para mejorar sus planteamientos medioambientales con el fin de legitimar sus operaciones en un contexto global. Por ello, se estudia la diferencia en el comportamiento medioambiental de las EMNEs y las DMNEs estudiando la adopción de políticas de gestión medioambiental así como la divulgación de información medioambiental.

Por otro lado, se analiza el papel del nivel de desarrollo del país de origen en la influencia que tiene la diversificación internacional sobre la adopción de políticas de

gestión medioambiental y sobre la divulgación de información medioambiental por parte de las MNEs energéticas. Es decir, se explora si la relación entre la diversificación internacional y las variables medioambientales mencionadas (adopción de políticas y divulgación de información medioambiental) es diferente en función del nivel de desarrollo del país de origen de las MNEs.

Los resultados revelan que las EMNEs muestran una mayor adopción de políticas de gestión medioambiental que las DMNEs. Además, de los análisis realizados se desprende que el comportamiento medioambiental de las EMNEs no cambia significativamente cuando estas aumentan su diversificación internacional, mientras que las DMNE muestran un fuerte aumento tanto en la divulgación de información medioambiental como en las políticas de gestión cuando su nivel de diversificación internacional es mayor.

CAPÍTULO V: En este último capítulo se recogen las principales conclusiones e implicaciones tanto teóricas como prácticas de la tesis doctoral. También se presentan las principales limitaciones de los trabajos y se plantean futuras líneas de investigación.

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2. CAPÍTULO II. DISENTANGLING THE INFLUENCE OF INTERNATIONALIZATION ON SUSTAINABILITY DEVELOPMENT: EVIDENCE FROM THE ENERGY SECTOR

2.1. INTRODUCTION

The global issue of climate change is one of the main current challenges facing internationalized firms (Buckley, Doh, & Benischke, 2017). Internationalization increases firm exposure to global norms and global legitimating actors (Marano & Tashman, 2012), such as multilateral or international nongovernmental organizations (NGOs) that monitor the social and environmental impact of firms on a global scale (Marano & Kostova, 2016). Furthermore, firms operating in international markets cope with the institutional pressures from external actors, such as governments, regulators, markets, and society (e.g., constituency groups and industry associations), located across the multiple countries where such firms operate. These pressures can vary across countries and even provide conflicting prescriptions for legitimate practices (Meyer, Mudambi, & Narula, 2011). In this context of complexity, firms need to comply with institutional pressures to attain legitimacy and maintain their competitive positions in their operating environments (Delmas & Montes-Sancho, 2010; Suddaby, Bitektine, & Haack, 2017). Legitimacy can be defined as the "generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed systems of norms, values, beliefs, and definitions" (Suchman, 1995: p 574). Firms that attain legitimacy may be considered more trustworthy, improve their ability to compete for resources and benefit from stakeholders' goodwill in times of need (Babiak & Trendafilova, 2011; Cormier & Magnan, 2015; Crane, 2018; Suchman, 1995).

Recent studies have made important contributions to understanding how firms respond to greater pressures for social responsibility and sustainability in their global operations (e.g., Aragón-Correa, Marcus, & Hurtado-Torres, 2016; Christmann & Taylor, 2001; Pinkse & Kolh, 2012). The literature has shown how MNEs seek legitimacy in international markets by reinforcing their environmental disclosure (e.g., Aragón-Correa et al., 2016). There is also an open debate regarding the extent to which MNEs' internationalization fosters a greater effort to implement environmental practices, policies and procedures and/or facilitates reaching better environmental performance records (Christmann & Taylor, 2001; Suárez-Perales, Garces-Ayerbe, Rivera-Torres, & Suarez-Galvez, 2017). Therefore, our study contributes to shedding light on this debate, analyzing whether and how a greater

firm internationalization influences firms´ environmental management and performance. The analysis of both variables is important because while environmental management represents the effort undertaken by firms to implement changes in the "organizational structure, the responsibilities, practices, procedures, processes and resources meant to achieve and maintain a specific environmental behavior that can reduce the impact caused by enterprise operations on the natural milieu" (Claver, López, Molina & Tari, 2017: p. 606), environmental performance refers to "the environmental impact that the enterprise's activity has on the natural milieu" (Claver et al., 2017: p. 606). Hence, the analysis of both variables helps us understand whether MNEs display a dual strategy in which internationalization affects environmental management and performance in different ways or if, on the contrary, the influence is similar on both variables.

Additionally, in this paper, we study whether these relationships are the same when the internationalization of MNEs is directed towards developing countries. From an environmental point of view, firms face different levels of institutional pressures that in developed and developing countries. In developed countries, wealth is a determinant of welfare schemes, which translates into general and specific social stakeholders influencing norms developed by firms in exchange for environmental protection. Some studies support the pollution haven hypothesis, which posits that firms search for business opportunities abroad in order to take advantage of lax laws and regulations to export their polluting activities (e.g., Li & Zhou, 2017). However, other authors argue that when firms expand their activities to international markets, they may be able to exploit the firm-specific advantages developed in their home country, therefore obtaining an advantage when they enter new markets (Ramanathan, He, Black, Ghobadian, & Gallear, 2017). Therefore, MNEs' activities may have positive spillover effects to foreign countries because the cross-border transfer of environmental practices helps fill institutional voids and contributes to the diffusion of global behavioral norms (Pinkse & Kolk, 2012). Our interest in analyzing the relationship between internationalization and environmental management and performance is relevant because it can shed light on the open discussion regarding the pollution haven hypothesis.

Using data from MNEs in industries related to the production, transportation, innovation, handling and sale of energy products, we find answers to the proposed research questions. The energy and energy-related utilities industries are appropriate for the purposes of our study because institutional and competitive changes caused by market globalization and deregulation have greatly transformed them, exhibiting a high level of internationalization. According to the OECD, the energy supply industry needs to undergo an intense process of adaptation in the coming decades to achieve the emission goals because "80% of carbon emissions are related to energy supplies" (Martínez-Fernández, Sharpe, Hughes, & Avellaner de Santos, 2013: p. 12).

Our study offers new insights on the determinants of environmental management and performance within a more general understanding of firm behavior with regard to countrries´ economic development. Specifically, our paper adds new evidence to previous research that has highlighted that MNEs adapt their environmental management (practices, policies and standards) to the most demanding legislation in the countries in which they operate (e.g., Aragón-Correa et al., 2016; Bansal, 2005; Christmann & Taylor, 2001; Delmas & Montes-Sancho, 2011; Garces-Ayerbe, Rivera-Torres, & Murillo-Luna 2012; Pinkse & Kolh, 2012). Our findings suggest that more internationalized firms look to address institutional complexity and gain legitimacy in an international context by exhibiting a stronger effort to develop their environmental management. Internationalization increases the complexity of the environment in which a firm operates, so it may lead MNEs to implement practices, procedures, processes and resources aimed to achieve and maintain a similar environmental behavior across its international markets and to meet the environmental expectations of international stakeholders. However, our results do not prove the existence of a relationship between firm internationalization and better environmental performance records. Hence, MNEs' internationalization (both generally and towards developing countries in particular) translates into greater environmental effort but not into improved environmental performance rates. This evidence goes beyond that found by other authors who do not provide support for the pollution haven hypothesis (Aragón-Correa et al., 2016; Kathuria, 2018; Strike, Gao, & Bansal, 2006). These results are also ground-breaking because developing economies accounted for a growing share of cross-border business operations

(UNCTAD, 2018a), and thus, it is crucial to know the environmental management and performance of those firms deploying their activities in such markets. Finally, the context of our analysis (energy and energy-utilities sectors) also strengthens the relevance of the results of this paper because the environmental impact of the activities conducted by firms operating in these sectors is responsible for a considerable share of global environmental impacts (Markard, Raven, & Truffer, 2012; Moorhead & Nixon, 2015).

The structure of this paper is as follows. In the next section, we review the related literature and develop our hypotheses. Then, we present our data and methodology. Afterwards, we describe the results. Finally, we conclude by highlighting the main contributions as well as the limitations and future lines of research.

2.2. THEORY AND HYPOTHESES

Internationalization and the natural environment

International firms are exposed to the institutional pressures of all the countries in which they are present (Marano & Kostova, 2016; Meyer, Mudambi & Narula, 2011) together with global norms and global legitimating actors (Marano & Kostova, 2016; Marano & Tashman, 2012). Hence, firms need to deploy efforts aimed at attaining legitimacy and maintaining their competitive positions (Delmas & Montes-Sancho, 2010; Suddaby et al., 2017). Firms may use alternative practices to attain legitimacy in an international context, such as reinforcing their environmental disclosure (Aragón-Correa et al., 2016; Huang & Kung, 2010). Aragón-Correa et al. (2016) showed that top MNEs have better records of environmental disclosure, but their environmental performance is worse than that of other firms in the industry. These findings suggest that the top MNEs examined seek legitimation through their voluntary environmental disclosure, even though their environmental performance is worse than of other firms. Huang and Kung (2010) gathered environmental and financial information from a sample of 759 firms listed on the Taiwan Stock Exchange. They found a statistically significant positive relationship between stakeholders' expectations and claims and the environmental disclosure of firms, concluding that firms' motivation to disclose environmental information responds to their need to be legitimated by stakeholders' perceptions of their actions. Following Suchman (1995), we contend that

environmental disclosure can be assimilated to the search for pragmatic legitimacy (based on audience self-interest).

Other studies have noted that firms can seek moral legitimacy based on normative approval in foreign markets (Suchman, 1995) by increasing their environmental proactivity in international operations (Babiak & Trendafilova, 2011; Bansal, 2005; Bansal & Clelland, 2004; Chen, Ong & Hsu, 2016; Christmann & Taylor, 2001; Suárez-Perales et al., 2017). Christmann and Taylor (2001) showed that multinational firms go beyond local environmental standards by transferring advanced environmental technology to their subsidiaries, thus coping with the regulatory demands of the strictest countries in which they operate. In her study, Bansal (2005) analyzed a sample of Canadian firms in the forestry, mining and oil and gas industries. Her results showed that firms´ international experience has a significant positive relationship with corporate sustainable development. Another relevant finding of this study is that no time-related effects for international experience were found, so the influence of this variable is consistent in both the early and late stages of their internationalization process. Babiak and Trendafilova (2011) conducted a survey in which the participants believed that "addressing green management issues allowed them to simultaneously be good citizens and contribute to their business objectives" (p. 17). Chen et al. (2016) studied a sample of 63 publicly listed firms in the construction industry and found that higher levels of environmental strategy are associated with increased internationalization between the reactive and preventive firm strategy clusters. However, they did not find the same relationship for firms adopting the proactive environmental strategy approach. Nonetheless, they highlighted that firms aiming for a proactive environmental strategy are more prone to developing environmental innovations, which in turn could allow them to better plan their international portfolio and direct their business operations to countries in which they can exploit their environmental capabilities and take advantage of learning opportunities. In this vein, Suárez-Perales et al. (2017) contended that internationalized firms acquire know-how that allows them to implement advanced environmental strategies in line with the most demanding legislations worldwide.

It seems reasonable to conclude that a higher level of MNEs' internationalization increases firms´exposure to a wider range of stakeholders, global norms and global

legitimating actors that monitor firms' social and environmental impacts. Thus, to face the higher complexity of international markets and obtain environmental so-called moral legitimacy (Suchman, 1995) and meet stakeholders' environmental demands, firms will adopt environmental management policies and practices. Therefore, we posit the following:

> **Hypothesis 1a:** An MNE's higher level of internationalization is positively related to better environmental management.

Environmental management offers additional capacity to reduce waste and emissions in their processes and therefore may help achieve better environmental performance (Hartmann & Vachon, 2018). Developing these environmental capabilities could influence the costs and benefits of environmental compliance. Berchicci, Dowell and King (2012) showed that environmental technologies and more developed environmental capabilities are more effective in preventing pollution, thus enabling better environmental performance. Consequently, these environmental capabilities can reduce the need to take advantage of some countries' lax environmental standards to relocate their most polluting activities (Li & Zhou, 2017). Kennelly and Lewis (2002) showed that firms with a higher level of internationalization also exhibit better environmental performance scores. Sharfman, Shaft, and Tihanyi (2004) examined extensive literature on the topic, showing that firms with a higher level of internationalization find it more difficult to respond to the variety of demands and regulations with which they have to comply in host countries. Unfamiliar regulations in host countries and little knowledge of them entail higher litigation risks, as firms are more likely to accidentally break the law. They found that MNEs that adopt global environmental standards that match the strictest regulations of the countries in which they operate attain better environmental performance. Internationalization exposes firms to an even more thorough scrutiny by their stakeholders, which entails that firms go under a careful examination of their environmental impacts, increasing the likelihood of receiving negative assessments (Kostova & Zaheer, 1999; Marano, Tashman, & Kostova, 2017) and increases the need for moral legitimacy (Suchman, 1995). Therefore, we expect that a higher level of internationalization is positively related to environmental performance, as internationalization increases the risk that weak performance will

be used by activists and stakeholder groups to tarnish the reputation of firms. Hence, we posit the following:

> **Hypothesis 1b**: An MNE's higher level of internationalization is positively related to its environmental performance.

Internationalization in developing countries

Currently, international firms' operations in developing countries represent an important share of their global activities (UNCTAD, 2018a). MNEs and host countries have a reciprocal influence on each other, as firms can adjust their activities to host countries' demands and host countries may learn from foreign firms' experience. From an environmental point of view, the varying levels of institutional pressure that firms face in host countries pose a challenge to them, as they have to decide how to approach the different settings. For example, Tatoglu, Bayraktar, Sahadev, Demirbag and Glaister (2014) described this challenge as a dichotomy between more centrally driven environmental management policies and subsidiaries' autonomy to adapt environmental policies to their institutional framework. Both alternatives seem to have rational arguments in their favor.

Hence, MNEs could choose to behave in an opportunistic way by relocating their polluting activities to foreign countries with lax environmental regulations (Li, Zhang, Hu, Tao, Jiang & Kin, 2018). Developing countries often have weaker institutional settings than developed ones, so firms from developed countries will have a lower motivation to maintain the high environmental standards from their headquarters in developing countries. This phenomenon is commonly known as the "pollution haven hypothesis", which suggests that firms turn to developing countries when they expand their operations abroad so that they can take advantage of more tolerant regulations that allow them to reduce costs and invest less in pollution reduction measures (Li & Zhou, 2017). However, there is extensive evidence that refutes this hypothesis or at least does not fully support it. Developing countries often suffer from institutional voids that undermine foreign firms when they try to enter the market (Pinkham & Peng, 2017). To mitigate weaker institutional contexts, Tatoglu et al. (2014) argued that firms must consider trying to fill institutional voids by adopting voluntary environmental management practices in their host country subsidiaries. Thus, MNEs

can be instrumental in cross-border transfers of environmental best practices and help fill institutional voids by leveraging expertise acquired in another context (Pinkse & Kolk, 2012). Eskeland and Harrison (2003) found evidence confirming that foreign firms pollute less than domestic firms in developing countries, which suggests that firms do not move to developing countries to take advantage of lax regulations, as they still maintain higher environmental standards than local peers. Thus, MNEs self-regulate their environmental conduct when establishing environmental standards, highlighting firms' commitment to controlling their own conduct beyond what is required by law through voluntary environmental initiatives. Therefore, a higher level of environmental standards may be an effective tool to show their environmental commitment and achieve global moral legitimacy (Aguilera-Caracuel, Aragón-Correa, Hurtado-Torres, & Rugman, 2012; Christmann, 2004). In the same vein, Pinkse and Kolk (2012) noted that "since climate change is a global issue, the supranational context needs to be considered as well thus adding another level of complexity. In view of the global relevance of the issue, the multiple levels involved and the variety in policy approaches to climate change, MNEs cannot approach it on a country-by-country basis" (p. 337–338). Therefore, a higher level of internationalization in developing countries also positively influences firms to adopt environmental management policies and practices. Therefore, we propose the following hypothesis:

> **Hypothesis 2a**: An MNE's higher level of internationalization in developing countries is positively related to better environmental management.

Furthermore, expanding their operations into developing countries also exposes firms to more thorough scrutiny by their stakeholders (Delgado-Márquez & Pedauga, 2017). This increased exposure may bring about criticism from interest groups and careful examination of the firms' environmental impacts, thereby increasing the likelihood of receiving negative assessments (Kostova & Zaheer, 1999; Marano et al., 2017). The global relevance of environmental issues can cause a potential spillover effect because an incident or bad reputation in one market can easily be transferred to other markets. The increase in social, legal, and economic pressures and nongovernmental organizations' (NGOs´) activism have put MNEs in the spotlight as their polluting activities are closely examined, thus encouraging firms to improve

their environmental performance to reduce reputation-related risks and their associated financial costs (Dahlmann, Branicki, & Brammer, 2017; Ritala, Huotari, Bocken, Albareda, & Puumalainen, 2018).

Additionally, another powerful argument is that firms operating under strong business ethics may achieve better financial performance. Verschoor (1998) found that 26.8% of the 500 largest publicly traded firms in the U.S. were committed to ethical behavior. They obtained empirical evidence that the financial performance of these firms was higher in the *Business Week* ranking than that of the rest of the firms. Kim, Hoskisson, and Lee (2015) studied 436 publicly traded manufacturing firms from the developing economy of South Korea and found evidence that firms' internationalization into less developed host countries has a positive relationship with their profitability. In turn, profitability can influence environmental strategy because firms with better financial performance can afford environmental investments (e.g., Gallego-Alvarez, Ortas, Vicente-Villardón, & Álvarez Etxeberria, 2017). These results support those that argue that engaging in environmental actions can be positive for firms' competitiveness and are a significant argument against the pollution haven hypothesis.

In conclusion, MNEs that expand their operations into developing countries face more thorough scrutiny by their stakeholders, which intensifies the search for moral legitimacy. As firms' stakeholders are aware of their activities, international firms find fewer incentives to behave opportunistically by relocating their polluting activities to foreign countries with lax environmental regulations. Hence, a higher level of internationalization in developing countries may also improve firms' environmental performance as firms pursue global legitimacy. Therefore, we propose the following hypothesis:

> **Hypothesis 2b**: An MNE's higher level of internationalization in developing countries is positively related to its environmental performance.

2.3. DATA AND METHODOLOGY

The sample comprises firms from industries related to the production, transportation, innovation, handling and sale of energy products. The energy sector represents an ideal setting in which to analyze the relationship between firms' internationalization and their environmental issues for several reasons. First, institutional and competitive changes caused by market globalization and deregulation have greatly transformed the energy sector. A considerable proportion of the energy industry is populated by firms that operate simultaneously in various regions (Americas, Europe, Asia, and Oceania), exhibiting a high level of internationalization. Second, the energy sector faces sustainability challenges linked to massive natural resource utilization worldwide and consequent environmental implications (Markard et al., 2012). Third, the energy industry's environmental practices play a crucial role in solving environmental issues, e.g., just 32 energy firms from the Fortune Global 500 emitted 31% of the world's total greenhouse gases, including the emissions from the use of their products (Moorhead & Nixon, 2015). Furthermore, according to the OECD, the energy supply industry needs to go through an intense process of adaptation in the coming decades to achieve the emission goals because "80% of carbon emissions are related to energy supplies" (Martínez-Fernández et al., 2013: p. 12). Fourth, emerging markets are becoming center of global economic growth and pollution; while large developing countries typically garner the most attention, even small developing countries have become key international players in the energy industry (Cumming, Hou & Lee, 2016). Given our interest in addressing how internationalization towards developing countries affects environmental issues, the focus on the energy industry is deemed appropriate.

We analyzed a subset of MNEs from the energy and energy-related utilities industries using information available in the Thomson Reuters Eikon database. This source of data collects comprehensive information on firms' operations and computes numerous indicators of their environmental management practices and policies. Although designed primarily for professional purposes, the Thomson Reuters Eikon database is also used by academics with an interest in sustainability-related topics (Hartmann & Vachon, 2018). In this database, we identified the environmental and financial information of 2,919 firms in the energy sector and 1,013 firms in the energy-related utilities sector. Then, a number of firms that lacked information on their main

environmental indicators relevant for this work were discarded. Furthermore, MNEs that belong to a parent company already included in the data set were not considered because their operations are accounted for in the parent company's information. Lastly, only firms that reported the geographic origin of more than 60% of their revenue were considered. Thus, there remain 287 MNEs from the selected industries with environmental information for the last fiscal year available as of the date of retrieval (March 2018) and internationalization information for the previous year, which comply with the aforementioned requirements. The final sample makes up approximately 50% of the total revenue of firms of energy and energy-related utilities industries in the Thomson Reuters Eikon database. We lagged the independent and control variables by 1 year to rule out reverse causality.

Table 2.1 shows the composition of the sample based on MNEs' headquarters region, country of origin and industry. The regions with the most data points are America, Europe and Asia, with 126, 84 and 46 cases, respectively. On the other hand, only 1 firm from Africa and 30 firms from Oceania were included in our sample. Out of the 287 observations, 67 companies had their headquarters in the United States, which is the country of origin with the strongest presence in the sample. In terms of country representation in the sample, the United States is followed by Canada (43), Australia (26), the United Kingdom (20) and China (12).

Dependent variables

Environmental management is "the part of the management system that includes the organizational structure, the responsibilities, practices, procedures, processes and resources meant to achieve and maintain a specific environmental behavior that can reduce the impact caused by enterprise operations on the natural milieu" (Claver et al. 2017: p. 606). Therefore, as a measurement of environmental management, we used indicators of *environmental management practices and policies*, understood as the activities a firm undertakes to improve its environmental performance. These indicators provide information on whether a company engages in a series of environmental management practices or policies. A dummy variable was created for each of the considered environmental management practices and policies to represent if a firm has (value 1) or has not (value 0) implemented it.

Table 2.1. Sample composition

Headquarters Region			Sub-Industry		
			Energy	Energy-Utilities	Total
Africa	Country	Egypt	1	0	1
	Total		1	0	1
America	Country	Argentina	1	0	1
		Bermuda	3	1	4
		Brazil	4	0	4
		Canada	33	10	43
		Chile	1	2	3
		Colombia	1	3	4
		United States of America	56	11	67
	Total		99	27	126
Asia	Country	China	7	5	12
		Hong Kong	3	4	7
		India	4	1	5
		Indonesia	3	0	3
		Israel	1	0	1
		Japan	4	1	5
		Korea; Republic (S. Korea)	2	0	2
		Malaysia	4	2	6
		Singapore	0	1	1
		Taiwan	1	0	1
		Thailand	1	1	2
		United Arab Emirates	1	0	1
	Total		31	15	46
Europe	Country	Austria	1	1	2
		Belgium	0	1	1
		Cyprus	1	0	1
		Czech Republic	0	1	1
		Denmark	1	1	2
		Finland	1	1	2
		France	5	1	6
		Germany	1	3	4
		Greece	1	0	1
		Guernsey	1	0	1
		Hungary	1	0	1
		Ireland; Republic of	1	0	1
		Italy	2	0	2
		Jersey	1	0	1
		Luxembourg	1	0	1
		Netherlands	5	0	5
		Norway	6	0	6
		Poland	4	2	6
		Portugal	0	1	1
		Russia	8	1	9
		Spain	2	4	6
		Sweden	1	0	1
		Switzerland	2	1	3
		United Kingdom	15	5	20
	Total		61	23	84
Oceania	Country	Australia	23	3	26
		New Zealand	0	3	3
		Papua New Guinea	1	0	1
	Total		24	6	30
	TOTAL		216	71	**287**

The number of these actions that a company implements has already been used as a proxy for firms' environmental management (Hartmann & Vachon, 2018; Hawn & Ioannou, 2016). In line with previous literature, we compiled an index that represents the percentage of environmental management practices and policies that a company adopts out of the total number of practices and policies considered. The definitions of the environmental management practices and policies used in the study are shown in Table 2.2.

Table 2.2. Environmental Management Practices and Policies

Environmental Supply Chain Management: Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?
Energy Efficiency Policy: Does the company have a policy to improve its energy efficiency?
Water Efficiency Policy: Does the company have a policy to improve its water efficiency?
Emission Policy: Does the company have a policy to improve emission reduction?
Environmental Supply Chain Policy: Does the company have a policy to include its supply chain in the company's efforts to lessen its overall environmental impact?
Sustainable Packaging Policy: Does the company have a policy to improve its use of sustainable packaging?
Resource Reduction Policy: Does the company have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain
Environment Management Team: Does the company have an environmental management team?
Environment Management Training: Does the company train its employees on environmental issues?
Environmental Supply Chain Monitoring: Does the company conduct surveys of the environmental performance of its suppliers?

Environmental performance refers to "the environmental impact that the enterprise's activity has on the natural milieu" (Claver et al., 2017: p. 606), and it could also be assessed through emission reduction, waste elimination or resource conservation (Aragón-Correa et al., 2016; Hartmann & Vachon, 2018; Sharfman et al., 2004). Hartmann and Vachon (2018), using data from Asset4 (currently Thomson Reuters Eikon database), proposed the percentage of improvement in standardized-carbon emission reduction for each year as a proxy for environmental performance. In line with this, we chose the Thomson Reuters Environmental Social and Governance

Emissions Score (TRESG emission score) as a proxy for *environmental performance*. The TRESG emission score measures "a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes" (Thomson Reuters ESG Score Methodology, 2019). The percentile rank scoring methodology is adopted from the Thomson Reuters Eikon database to calculate the TRESG emission score, which includes metrics such as "estimated CO_2 Equivalents Emission Total", "Total Waste" or "Hazardous Waste", among others. This measurement of environmental performance is especially relevant in the context of this study because the focus is on energy and energy-related utilities industries. When interpreting the results of the models, it is important to keep in mind that higher values represent better performance.

Independent variables

The *internationalization* of a firm refers to the extent to which its activities are conducted outside the home country (Hitt, Tihanyi, Miller, & Connelly, 2006). Similar to other studies, we calculate an internationalization index as the ratio of foreign revenue to total revenue (Marano et al., 2017). The information was obtained from the variable "Countries of Risk Revenue Fraction by Country" in the Thomson Reuters Eikon database.

The *internationalization in developing countries* is calculated as the ratio of foreign revenue from developing countries to total foreign revenue. In this study, we explore the relationships between internationalization and both environmental management and environmental performance. To assess whether these relationships are affected when firms' growth is oriented towards developing countries, this variable was defined and incorporated into the analysis. Similar to the previous variable, in this case, the information is also obtained from the variable "Countries of Risk Revenue Fraction by Country" available in the Thomson Reuters Eikon database. To identify the degree of development of each country, we used the UNCTAD (2018b) classification.

Control variables

Control variables are added to the model to take into account a number of factors that have been previously confirmed to affect the dependent variables. *Firm size and financial slack* have been found to affect environmental activity in prior studies

(Aguilera-Caracuel et al., 2012; Aragón-Correa, 1998). Therefore, we included firm size and financial slack as control variables. Firm size was measured as the natural logarithm of total revenue. *Profitability* has been proven to positively affect firms' environmental strategy, as firms with superior financial performance have more resources to invest in environmental actions (e.g., Gallego-Alvarez et al., 2017). We measure profitability as return on equity (ROE). To control for *industry* effects, we use a dummy variable to represent two industry categories, energy (value 0) and energy-utilities (value 1). Furthermore, *R&D expense to total revenue* was considered in the analysis because it has been found to be related to environmental issues (Suárez-Perales et al., 2017). Finally, to control for *home country development*, we use a dummy variable to represent two categories according to the UNCTAD (2018b) classification, developing and emerging countries (value 0) and developed countries (value 1).

2.4. RESULTS

Table 2.3 presents Pearson correlation coefficients for all dependent, independent and control variables included in the models. The mean, standard deviation and minimum and maximum values for all variables are also reported. The correlation values between the control variables included simultaneously in all four models are relatively low. This suggests that there are no multicollinearity problems in our model; nevertheless, we tested our data set for this issue and other possible statistical issues that might distort the results.

The data were further analyzed with Stata 13 software to detect outliers, multicollinearity, and heteroskedasticity problems. No observations were noted as outliers per Cook's distance criteria. To check for multicollinearity, we computed the variance inflation factors (VIFs). All VIFs were lower than 1.15, which is much lower than the threshold of 10 generally accepted in previous literature (Kim et al., 2015; Strike et al., 2006). The Breusch–Pagan test revealed heteroskedasticity problems, so we corrected for this by using robust standard errors in the models. Ordinary least squares (OLS) regressions were used for our analyses. Table 2.4 displays the results of the OLS regression analyses performed.

Table 2.3. Correlation matrix and descriptive statistics

Variables	1	2	3	4	5	6	7	8	9	10
1. Environmental management										
2. Environmental performance	.674**									
3. International revenue	.015	-.046								
4. Intl. revenue developing countries	.053	-.087	.147*							
5. Industry	.095	-.014	-.165**	-.075						
6. Firm size	.517**	.501**	-.187**	-.082	.131*					
7. Profitability	.167**	.144*	-.053	.106	.104	.316**				
8. Home country development	-.109	-.016	.149*	-.196**	-.086	-.146*	-.147*			
9. R&D Expense to Total Revenue	-.079	-.078	.054	.050	-.103	-.195**	-.095	.075		
10. Financial slack	-.108*	-.149*	.059	-.018	-.135*	-.315**	-.048	.085	.008	
Min	.000	.000	.000	.000	.000	13.408	-4.683	.000	-.007	.070
Max	1.000	99.583	1.000	1.000	1.000	26.444	.883	1.000	1.149	41.41
Mean	.497	54.270	.469	.402	.247	21.463	-.009	.780	.015	2.299
Standard deviation	.310	29.474	.326	.334	.432	2.259	.379	.415	.077	4.062

† p < 0.1

* p < 0.05

** p < 0.01

Table 2.4. Results of OLS regression analysis

Independent Variables	**Dependent variables**			
	E. Management	E. Performance	E. Management	E. Performance
	Model 1a	Model 1b	Model 2a	Model 2b
Internationalization	.123* (.050)	2.947 (4.829)	-	-
Intl.in developing countries	-	-	.093† (.049)	-3.756 (4.726)
Industry	.038 (.037)	-4.911 (3.619)	.031 (.037)	-5.480 (3.597)
Firm size	.076*** (.008)	6.892*** (.771)	.076*** (.008)	6.736*** (.769)
Profitability	-.008 (.043)	-.429 (4.267)	-.016 (.045)	.097 (4.300)
Home country development	-.039 (.039)	3.410 (3.760)	-.012 (.039)	3.068 (3.811)
R&D Expense to Total Revenue	.121 (.208)	4.478 (20.142)	.106 (.209)	5.146 (20.149)
Financial slack	.005 (.004)	.014 (.398)	.006 (.004)	-.007 (.398)
Constant	-1.195*** (.184)	-96.584*** (17.824)	-1.176*** (.185)	-89.892*** (17.910)
Observations (N)	287	287	287	287
R^2	.289***	.261***	.283***	.262***

† p < 0.1

*. p < 0.05

**. p < 0.01

***. p < 0.001

Model 1a (R^2=0.289, p<0.001) supports Hypothesis 1, as there is a significant positive linear relationship between internationalization and environmental management at a p=0.014 significance level (b=0.123, p=0.014). Regarding the control variables, firm size (b=0.076, p<0.001) was found to have a positive significant effect on environmental management, whereas the coefficients for the rest of the control variables did not reach a minimum significance level of p<0.1.

Model 1b (R^2=0.261, p<0.001) does not confirm a positive linear relationship between internationalization and environmental performance (b=2.947, p>0.1), thus rejecting Hypothesis 2. Firm size (b=6.892, p<0.001) shows a positive significant effect on environmental management. The coefficients of the rest of the control variables are found to be nonsignificant.

In Model 2a (R^2=0.283, p<0.001), we replace internationalization with internationalization in developing countries as an independent variable. The regression provides statistically significant evidence of a positive linear relationship between internationalization in developing countries and environmental management (b=0.093, p<0.1), supporting Hypothesis 2a. The control variables have a similar behavior to that of the previous models. Only firm size (b=0.008. p<0.001) is found to have a positive significant effect on environmental management, while again the rest of the control variables are found to be nonsignificant.
Lastly, Model 2b (R^2=0.262, p<0.001) rejects Hypothesis 2b because it does not provide statistically significant evidence of a positive relationship between internationalization in developing countries and environmental performance (b=-3.756, p>0.1). Firm size (b=6.736, p<0.001) has a positive significant effect on environmental performance, whereas the rest of the coefficients for control variables are not statistically significant.

However, to better understand the effects of firms' internationalization towards developing countries on their environmental performance, we performed a one-way ANOVA. Three groups of firms were considered based on the terciles of the degree of internationalization towards developing countries that they fall into. Terciles were deemed adequate to analyze if there are significant variations in the environmental management and performance of firms among the three groups, especially between

firms with high and low internationalization towards developing countries. Table 2.5 shows the results of the one-way ANOVA using Tukey's HSD post hoc test.

Table 2.5. One-way ANOVA analysis for internationalization in developing countries

Dependent Variables	1st Tercile - Low INTL		2nd Tercile Mid - INTL		3rd Tercile High - INTL		ANOVA	Tukey's HSD		
	Mean (s.d.)	N	Mean (s.d.)	N	Mean (s.d.)	N	F-value (p)	1-2	2-3	1-3
Environmental Management	.453 (.306)	96	.531 (.309)	95	.506 (.312)	96	1.570 (.210)	n.s.	n.s.	n.s.
Environmental Performance	54.371 (30.444)	96	57.576 (28.049)	95	50.898 (29.792)	96	1.228 (.294)	n.s.	n.s.	n.s.

n.s.: non-significant; s.d.: standard deviation

The analysis shows no significant differences in the environmental management and performance between firms with different levels of internationalization towards developing countries.

2.5. DISCUSSION

The existing literature has failed to find consensus on how MNEs' internationalization and their environmental management and performance affect each other. Our findings shed light on the details relationships by offering an innovative approach to analyze whether these relationships change when firms move their operations abroad to developing countries. Our models showed that MNEs' internationalization and environmental management are positively related. We provide support to the line of research that has found a relationship between environmental management and MNEs' internationalization (e.g., Bansal, 2005; Delmas & Montes-Sancho, 2011). Firms with a significant share of their business in foreign countries face institutional complexity and seek legitimacy in an international context by exhibiting a stronger effort to develop environmental management. The higher visibility of firms engaging in international operations exposes them to a more thorough scrutiny of their activities by their stakeholders (Yu, Lo & Li, 2017), and in these circumstances, firms improve their environmental policies and practices even without having better environmental performance (Aragón et al., 2016), which could be seen as merely search for pragmatic legitimacy (Suchman, 1995).

Our results show how the relationship between internationalization and environmental management remains significant when firms' internationalization is

oriented towards developing countries. These findings are important because, according to the information in the World Investment Report of the UNCTAD (2018a), "developing economies accounted for a growing share of global FDI inflows in 2017, absorbing 47 percent of the total, compared with 36 percent in 2016" (p. 2). Therefore, MNEs can be instrumental in cross-border transfers of environmental best practices and help fill institutional voids by leveraging expertise acquired in other contexts. Thus, a higher level of environmental management may be an effective tool to achieve global legitimacy when firms have a higher volume of their operations in developing countries. These results do not support the pollution haven hypothesis, following the line of previous research (Aragón-Correa et al., 2016; Kathuria, 2018; Strike et al., 2006).

Nonetheless, we do not find evidence proving the existence of a positive relationship between stronger internationalization and better environmental performance in the context of MNEs operating in the energy sector. Following Schuman's (1995) seminal works on legitimacy, we contend that this result may be in line with a potential dual strategy displayed by these firms. Put differently, MNEs, when going more international, focus their environmental efforts on deploying more environmental management rather than attaining better environmental performance records. This phenomenon poses an interesting crossroad for future analyses.

The findings in this paper allow practitioners and scholars to explore a new perspective from which to study environmental management and internationalization. First, our paper contributes new insights into the factors that may affect MNEs' decisions to implement environmental management. Among these, we can cite firms´ internationalization strategy and the level of economic development of the targeted countries. Managers must be aware that expanding to developing countries implies more intense environmental management within the firm, as this international expansion can also serve to consolidate a solid green image of the firm. In other words, managers should see the internationalization strategy towards developing countries as an opportunity to establish an environmental management strategy that goes beyond the national standards, given that climate change is a global issue that should not be addressed on a country-by-country basis.

Second, our analysis can be especially relevant because it was performed on a sample of MNEs in energy-related sectors, which are responsible for a major share of global GHG emissions, therefore these sectors have a substantial environmental impact (Moorhead & Nixon, 2015), and need to undergo an intense process of adaptation in the coming decades to achieve the emissions goals (Martínez-Fernández et al., 2013). Furthermore, we must acknowledge that our focus on the energy industry may also be seen as a drawback for our analyses, given the impossibility of directly extrapolating our conclusions to other sectors characterized by different, among others, dynamics, industry structures and levels of regulations, among other factors. In fact, the deregulation processes undergone by the energy sector over the last few years have shaped changing legitimacy trajectories of both conventional and new energy technologies. While fossil fuel technologies dominate the sector, which accounts for nearly 70% of all greenhouse gas emissions (IEA, 2014), conventional energy technologies are rapidly losing their legitimacy (Patala, Korpivaara, Jalkala, Kuitunen, & Soppe, 2019). An example of this legitimating loss can be found in the 2015 Paris climate change conference, known as COP21, in which 195 countries committed to work to achiever zero net emissions in the second half of the century. Hence, we call for additional empirical studies that test the total or partial generalization of our findings across industries. Nevertheless, we understand that an industry-specific approach to this issue is appropriate, as environmental actions and international business opportunities vary between industries.

Finally, while governments and supra-institutions establish environmental policies and agreements with underwhelming objectives and compliance, we find evidence that more internationalized firms have the goodwill to operate responsibly in a more proactive way in terms of adopting environmental policies and practices, even though these efforts are not translated into a significant decrease in their environmental emissions. Therefore, no conclusions can be drawn either for or against the pollution haven hypothesis in terms of environmental performance, highlighting the complexity of the topic and the need for further research into the environmental behavior of international firms to clarify the ongoing controversy.

Our analysis is subject to some limitations. We performed our analysis on cross-sectional data. Further research could be conducted over a longitudinal panel data sample and could reveal trends in the evolution of firms in time. Additionally, although the Thomson Reuters Eikon database is considered a reliable source of information and offers extensive insights into a very large number of firms, it can only include the information that firms are willing to disclose. Future research could aim to obtain a more complete sample by matching different databases. The use of the Thomson Reuters Emission Score as a proxy for environmental performance presents a limitation as well. Although it "*measures a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes*" (Thomson Reuters, 2019) and is therefore appropriate for our analyses, it is not possible to customize its components. Finally, the variable "Countries of Risk Revenue Fraction by Country", which we used to calculate the independent variables of our analysis, was available only for that year. This prevented us from performing a data panel analysis. Moreover, future research could examine the moderating effect of MNEs' home country on the relationship between internationalization and environmental management and performance.

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3. CAPITULO III. INTERNATIONALIZATION AND ENVIRONMENTAL INNOVATION IN THE ENERGY SECTOR: EXPLORING THE DIFFERENCES BETWEEN MULTINATIONAL ENTERPRISES FROM EMERGING AND DEVELOPED COUNTRIES

3.1. INTRODUCTION

Largely due to external sustainability-related pressures, firm performance in the current global business landscape is less and less measured exclusively in terms of economic results, with performance measures shifting towards metrics that take into account social, economic, and environmental sustainability goals (Thu et al., 2019). Various stakeholders, such as governments, non-governmental organizations (NGOs), intergovernmental organizations, shareholders and consumers, increasingly demand multinational enterprises (MNEs) to address global environmental issues and to "reconsider the balance between the dual objectives of short-term profitability and long-term sustainability" (OECD, 2012: 4).

To a large extent caused by the economic activity across the globe, climate change has been a great concern for scientists and activists for decades. However, the Paris Agreement showed, for the first time, a binding arrangement that brought all nations together for a common cause to undertake ambitious efforts to combat climate change and adapt to its effects. Countries accounting for over 70% of world GDP and greenhouse gases (GHG) now have targets for net-zero emissions, typically by 2050. And there has been a dramatic shift in the attitude of firms engaged in sectors traditionally considered as environmentally damaging (The Economist, 2021).

The energy sector, and the activities undertaken by its constituents, is considered to be particularly environmentally-sensitive, mainly attributable to the use of fossil fuels. To give an example, it is estimated that 35% of the global GHG emissions stem from the operations of the energy sector (Intergovernmental Panel on Climate Change, 2014; International Energy Agency, 2018). As a result, energy firms face additional challenges and pressures to implement measures and changes in their operations to meet the international sustainability goals as set in the United Nations Sustainable Development Goals (UN SDGs) (International Energy Agency, 2019). Driven by governments, the SDGs entail additional demands on the business community in terms of innovations aimed at developing new solutions as well as applying their skills and specialist knowledge to innovate and create new materials, products and processes to help governments achieve the SDGs. In this context, the development of environmental innovations can be an effective means to respond to social and environmental demands, while at the same time attempting to boost economic growth (Dibrell et al., 2015). Environmental innovation involves the

integration of corporate social responsibility (CSR) within the firm's core activities and enables firms to develop new sustainable products and services that can improve their financial results, reduce their environmental impact, and create business value (Pan, Shina, and Chen, 2021). Furthermore, the energy sector is becoming more and more global with a considerable number of firms expanding outside their home countries and regions. Thus, studying the factors that contribute to higher levels of MNEs' environmental innovations in this sector is especially interesting, as environmental improvements in the operations of these firms can have a considerable positive effect on tackling climate change.

Thus, in this study we seek to understand whether the level and scope of internationalization favor the development of environmental innovations by energy MNEs and how the institutional frameworks in the MNEs' home countries can condition the extent to which internationalization influences the development of environmental innovations. We analyze both the level and scope of internationalization, allowing us to identify how the different internationalization paths affect environmental innovations. The *level* of internationalization shows the relative weight of firms' international operations, that is "the strategic importance that a firm assigns to serving foreign markets" (Marano et al., 2016: 1080), and the *scope* of foreign operations reflects the heterogeneity of internationalization across regions (Kolk et al., 2014). Drawing on innovation literature and institutional theory, we argue that MNEs' exposure to multiple stakeholders and heterogeneous knowledge sources during their internationalization process may both pressure and enable them to develop environmental innovations (e.g., Horbarch et al. 2012).

Additionally, in line with the institutional economics literature, the institutional framework in which the economic activity takes place is determinant in evaluating the expected output (see e.g., the ongoing debate on the relationship between the institutional framework and countries' economic growth re-activated by Robinson and Acemoglu, 2012 and the green paradox by Najm, 2019). Firms, as micro economic actors, are also embedded in institutional contexts particularly framed by their home country. Therefore, in this paper we also explore how this macro-level construct, the MNEs' home country institutional development, may influence the connection between the international activities carried out by MNEs and their environmental innovation. In doing so, this paper provides new insights to researchers with regard to the relationship between internationalization and environmental innovation.

This study seeks to make several contributions. First, our findings point to the process of international expansion as being compatible with sustainable development in energy firms. We break down the internationalization concept and analyze the influence that the level of firms' internationalization, on the one hand, and the scope of their internationalization, on the other hand, have on these firms' environmental innovation. The analysis of both dimensions is of special relevance given the opportunities and challenges that energy MNEs encounter through their internationalization paths and the potentially different effects of these on firms' environmental innovation. By analyzing the scope of internationalization, we address recent calls to study the effects of firms' internationalization outside their home region on their sustainable operations (Arranz et al., 2019). We provide insights into how energy MNEs with a higher level of internationalization and a more global scope are exposed to increasing stakeholder pressure for better environmental behavior and more heterogeneous knowledge sources, which in turn may facilitate the development of environmental innovations.

Second, through an institutional theory lens, our findings highlight the importance of considering the MNEs' home country institutional development when analyzing their environmental innovation. We find that energy MNEs from more institutionally developed countries are better-equipped to absorb the knowledge sourced through their global operations and to improve their environmental innovation when expanding outside their home region, whereas energy MNEs from less institutionally developed countries struggle with added complexity and demonstrate lower levels of environmental innovation. While developed country MNEs that operate across various regions also face an added challenge in having to manage and absorb the knowledge acquired from diverse institutional environments, they are well-equipped to do so and thus can better leverage the learning opportunities presented by their global operating environment (e.g. Golini and Gualandris, 2018; Savino et al. 2017).

This paper has several implications for policy makers and managers of energy sector MNEs. As the world becomes increasingly concerned about the rising global temperatures and the drivers behind them (e.g., increasing GHG emissions), firms in the energy sector confront additional challenges and pressures to implement changes in their operation models to meet the UN SDGs. Our study finds that internationalization can be good for environmental innovation. While energy MNEs can be viewed as a part of the polluting problem, they can also be a part of the

solution. Our in-depth analysis of the differences between MNEs from developing and developed countries offers further insights to guide policy designs directed at firm internationalization. The results of this paper highlight that there is room for energy MNEs to increase their international engagement aimed at consolidating their environmentally-sustainable commitment. This is especially relevant for MNEs based in developing economies, as their average internationalization figures are considerably lower than those of their peers from more economically-developed countries. However, these emerging country MNEs only seem to benefit from internationalization when it is within their home region. Our findings may help MNEs and regulators in developing countries evaluate the pros and cons of different methods for increasing the firms' international footprint. Furthermore, our results suggest that the existence of a robust institutional ecosystem at the national level can be a powerful driver of environmental innovations for firms and, thus, can help combat climate change. For this reason, policymakers may contemplate reviewing policy schemes directed at strengthening specific institutional pillars at the national level so as to provide energy MNEs with the adequate innovative ecosystems.

The paper proceeds as follows. To integrate prior literature regarding internationalization, home country, and environmental innovation, we first explore the relevant literature before presenting the research hypotheses. We follow this section with a description of the sample that we were able to obtain, include details of the research methods, and present the results of our analyses. Finally, we discuss the findings, policy implications, limitations, and future research opportunities.

3.2. THEORETICAL FRAMEWORK AND HYPOTHESES

3.2.1. INTERNATIONALIZATION AND ENVIRONMENTAL INNOVATION

MNEs are exposed to pressures across the international markets that they operate in, and this has been highlighted as one of the main drivers of these firms' development of environmental innovation (Kassinis and Vafeas, 2006; Rennings, 2000; Sharma and Henriques, 2005). Compared to innovation in general, environmental innovation encompasses some additional elements since it responds to the environmental demands of stakeholders by contributing to sustainable

development (Bossle et al., 2016; Pan et al., 2021). As MNEs' levels of internationalization increase and a wider range of stakeholders are involved, there is a higher risk that these may engage in unfavorable assessments of the MNEs' environmental impacts (Marano et al., 2017). For instance, corporate scandals can increase stakeholder activism and draw the attention of different actors, which can drive MNEs and their suppliers to improve their social and environmental practices (Daudigeos et al. 2020). In the energy sector, empirical evidence shows that companies operating in this industry "have greater exposure relating environmental concerns than other sectors - such as the financial and insurance, consumer goods, and telecommunications sectors" (Shahbaz et al., 2020:3). Hence, energy MNEs are more and more being assessed in terms of the sustainability of their operations, with environmental behavior becoming one of the key aspects influencing firm legitimacy to gain stakeholders' recognition in international contexts.

Thus, internationalization has a persuading effect on energy MNEs to develop environmental innovations. As firms become more international, the nature and intensity of stakeholder pressures are broadened, implying an elevated risk of suffering unfavorable assessments that can damage the firm's reputation. In this context, we propose that energy MNEs respond to stakeholders' green demands through environmental innovation to achieve legitimacy and overcome liabilities of foreignness to successfully become embedded in their host countries. Therefore, we present the following hypothesis:

> **H1a.** Energy MNEs with a higher level of internationalization exhibit higher levels of environmental innovation.

MNEs can either focus their internationalization fundamentally on their home region and exhibit a limited internationalization outside of it, or they can develop a more global internationalization strategy by increasing their operations outside the home region. Operating on a more global scale increases firms' learning opportunities and gives them access to more resources and diversified capabilities to develop environmental innovations (Cuervo-Cazurra et al., 2018; Golini and Gualandris, 2018). MNEs access broader knowledge from around the world and draw from different

national systems of innovation. These heterogeneous types of knowledge from different locations may be combined advantageously, increasing firms' "knowledge portfolio", which fosters the development of innovations (e.g., Cassiman and Golovko, 2011; Lundan and Li, 2019).

Nevertheless, when firms internationalize outside their 'home region', they face more complex environments as the multiplicity and diversity of institutional environments increases, stemming from a higher institutional distance between home and host countries. Some works suggest that many internationally dispersed sources of knowledge may not allow firms to communicate and coordinate in an effective manner (Kotabe et al., 2007). Moreover, due to institutional differences between countries, MNEs may struggle to gain access to valuable knowledge sources in foreign countries and to understand and absorb such knowledge (Savino et al., 2017). For instance, some studies have shown that when firms operate in highly diverse institutional environments abroad, the costs of managing and absorbing knowledge end up diminishing their innovation output (Wu, 2013).

Overall, we propose that a more global scope of internationalization allows energy MNEs to reach higher levels of environmental innovation, despite the added challenge they face in managing and absorbing the knowledge acquired from geographically, institutionally, and culturally distant countries. Global MNEs are therefore exposed to more heterogeneous knowledge, compared to firms that primarily operate in their home region, and they have more learning opportunities that increase the firms' competencies to generate environmental innovations. Therefore, we propose the following hypothesis:

> **H1b.** Energy MNEs with a more global scope of internationalization exhibit higher levels of environmental innovation.

3.2.2. THE ROLE OF HOME COUNTRY INSTITUTIONAL DEVELOPMENT

The level of institutional development in the home country can play a determining role in the ability of MNEs to absorb the knowledge acquired in their international operations and transform it into new products, processes or technologies. A firm's

home country provides a set of rules, institutions, and conventions that shape the framework in which the firm develops its approach to domestic business and its international strategy (North, 1990). Firms' strategies are therefore conditioned by the economic resources, infrastructure, and labor quality available in their home countries (Wan and Hoskisson, 2003). Specifically, some research has highlighted the role of institutions – especially governments and other public policymakers – as key enablers for the development of environmental innovations (e.g., Carrillo-Hermosilla et al., 2010; Liao et al., 2019).

Some scholars in the innovation literature have proposed that the institutional development of firms' home countries reinforces the relationship between their internationalization and innovation (Chittoor et al. 2015; Xie and Li, 2018). Innovation-related institutions, such as research institutes and universities, and effective market intermediaries in the home country can help developed country MNEs to adapt, recombine, and build on the knowledge acquired from foreign markets (Xie and Li, 2018).

Other studies that analyze emerging country firms show how the low institutional development at home may hinder their innovation due to the increased costs and uncertainty that the existing institutional voids create for the firms present in them (Khanna and Palepu, 1997). When operating in foreign markets, firms from emerging countries face competitive disadvantages compared with their developed country peers due to their home countries' political and economic unpredictability and the lack of trustworthy market intermediaries (e.g., Marano et al., 2017; Xie and Li, 2018). Emerging market MNEs lack the capabilities and incentives required to reconcile the acquired knowledge when operating at high levels of internationalization in increasingly distant and diverse environments (Wang and Ma, 2018; Wu, 2013). Wang and Ma (2018) and Wu (2013) found an inverted U-shaped relationship, suggesting that there is a threshold in the level of internationalization after which firms from less developed countries fail to effectively transform the knowledge acquired abroad into innovation. However, other studies suggest that emerging country MNEs may acquire capabilities in their home countries that enable them to benefit more from internationalization than firms from developed countries. Cuervo-Cazurra and Genc (2008) noted that since developing country MNEs are familiar with institutional voids and have the management expertise necessary to conduct business in such conditions, they may find it easier to expand internationally into other less developed

countries. Firms from emerging countries may engage in international operations to escape the institutional voids in their home countries, and those international operations help them gather knowledge that can boost their innovation (Marano et al., 2017; Nuruzzaman et al., 2019).

Overall, we propose that energy MNEs from more institutionally developed countries have advantages that stem from having access to more efficient market intermediaries and from operating under more stringent standards and regulations at home that can help them better assimilate the knowledge obtained from the variety of sources available through internationalization. Furthermore, MNEs from developed countries are exposed to more stringent environmental regulations and pressures than their peers from less developed countries and they are accustomed to having to cope with stronger stakeholder scrutiny and the need to attain legitimacy. Thus, since these firms are better equipped to reconcile internationally dispersed, heterogeneous knowledge, we expect developed country MNEs to be more effective than MNEs from less institutionally developed countries in coping with the complexity of a more global business context. Developed country MNEs have an advantage in the absorption of globally acquired knowledge, allowing them to improve their level of environmental innovation to a greater extent. So, the role that home country institutional development plays in energy MNEs' environmental innovation processes may be much more significant when the international context in which firms operate gets more global. Therefore, we present the following hypotheses:

H2a. The level of home country institutional development positively moderates the relationship between energy MNEs' **level** of internationalization and environmental innovation.

H2b. The level of home country institutional development positively moderates the relationship between energy MNEs' **scope** of internationalization and environmental innovation.

3.3. RESEARCH METHODOLOGY

3.3.1. SAMPLE AND DATA SOURCES

We used multiple sources of data to compile our sample and collect data for a period of eight years, from 2011 to 2018. To build our database, we first gathered data on firms in the energy and energy-related utility sectors with information in the Refinitiv Eikon database (formerly Thomson Reuters Eikon). We combined this data with information obtained from Bureau van Dijk's Orbis database. Specifically, we obtained data on the location and number of subsidiaries for the firms in our sample. We then excluded those firms that did not have foreign subsidiaries and we also dropped observations with missing values on environmental innovation and international revenue.

Our sample, after taking into account the one-year lag in our explanatory variables, is an unbalanced panel data set consisting of 1,404 firm-year observations of 270 MNEs with information for the years between 2011 and 2018. Lastly, we obtained country-level data on institutional development from the World Bank. Our sample includes energy MNEs from across the globe, which allows us to study the effect that the institutional development of these firms' home countries may have on the relationships between the firms' level and scope of internationalization and their environmental innovation. See Table 3.1 below for a breakdown of sample firms by their home region.

Table 3.1. Sample firms by home region (n=270).

Region of headquarters	% of firms
Africa	0.72%
North America	37.18%
Americas (excluding North America)	5.78%
Asia	18.77%
Europe	27.08%
Oceania	10.47%
Total	100.00% (270)

During the period 2011-2018 covered in this paper, the energy market witnessed a number of transformations worldwide, which makes this time interval adequate for our analyses and entails important policy issues that are at the core of the link between the model proposed and its policy implications. These transformations, combined with volatile energy prices and occasional shocks, create complex scenarios policymakers should keep an eye on to formulate long-term strategies for a resilient energy sector (International Energy Agency, 2021).

The first is the rise in the use of renewable energy, strongly rooted on a virtuous circle of technological progress and cost reduction; this has resulted in an increased competitiveness of the renewable sources of energy (particularly electricity generation) and the possibility to directly compete with fossil fuels (Alizadeh, Soltanisehat, Lund, & Zamanisabzi, 2020). At the policy level, there is a pressing need to increase the renewable capacity of countries, which should be based on economic stimulus packages to tackle the consequences of short-term shocks such as that caused by COVID-19 and its subsequent economic downturn.

A second trend relates to the decarbonization process, whose speed significantly differs among countries (Tvinnereim & Mehling, 2018). Within the framework of the 2015 Paris Agreement, decarbonization is at the core of the international energy debate because carbon dioxide emissions have the capacity to cause irreversible consequences on climate change. While the COVID-19 external shock has resulted in a decrease of GHG and non-GHG emissions, policy actions should be designed to promote policies and strategies by governments and businesses to keep such reduction sustainable in the long term.

Oil resiliency can be identified as a third trend in the energy sector, with oil still being the dominant energy use and production in many developing regions. Urgent policy actions are needed to reverse the situation of this energy source confined to the transport and petrochemical sectors (Ullah, Chishti, & Majeed, 2020). Finally, gas is experiencing the fastest growth among fossil fuels. This is particularly relevant in terms of policy implications, as gas covers broad sectors of the economy, with steel and petrochemical production and manufacturing accounting for almost half of its expected growth (Kan, Chen, Meng, & Chen, 2020).

3.3.2. VARIABLES

Our dependent variable, *environmental innovation*, was operationalized by Thomson Reuters' proprietary Environmental Innovation Score, which "reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products" (Thomson Reuters, 2019: 16). The environmental, social, and governance data available at Refinitiv Eikon database (formerly Thomson Reuters Eikon) is considered to be a reliable source for scientific analyses and has been used in recent studies analyzing firms' environmental impacts (e.g., Maksimov et al., 2019; Shahbaz et al., 2020). Arundel and Kemp (2009: 34) argue that the measurement of environmental innovation should be broadened from mere environmentally motivated innovations to include "innovation in or oriented towards resource use, energy efficiency, greenhouse gas reduction, waste minimization, reuse and recycling, new materials and eco-design". The environmental innovation score developed by Refinitiv Eikon database (formerly Thomson Reuters Eikon), which is calculated using 20 metrics, includes some of these parameters, such as Boolean values (true or false) on the disclosure of reports on eco-design products, recycling initiatives, the environmentally responsible use of products, and technologies for use in renewable energy, as well as the environmental R&D expense to sales ratio.

Our first independent variable, *the level of internationalization,* was measured by dividing the international revenue of a firm by its total revenue, following other studies in international business (e.g. Tashman et al., 2019). The data for the level of internationalization was obtained by analyzing the revenues that MNEs disclose and break down into geographic segments, available in the Refinitiv Eikon database (formerly Thomson Reuters Eikon).

The *scope of internationalization* reflects how global a firm's international presence is in terms of the extent to which its business is located outside its home region. We measured this variable as the ratio of foreign subsidiaries outside the home region divided by total subsidiaries. Following Jeong and Siegel (2020), the regions that we considered for this calculation were Africa, North America, non-North America Americas, Asia, Europe, and Oceania. We obtained data on the number and geographic locations of subsidiaries of the MNEs in the sample from Bureau van

Dijk's Orbis database. Several measures for the level of internationalization and scope of internationalization have been operationalized in previous research based on the number of countries, the number of regions or the number of foreign subsidiaries, among others (e.g., Hitt et al., 2006; Kolk et al., 2014). Thus, considering the objective of this study, we adopted a revenue-based measure and a subsidiary-based measure to test our research questions about the level and scope of internationalization, respectively.

The moderating variable, *home country institutional development*, was measured using as a proxy the Worldwide Governance Indicators (WGI) by the World Bank (Demirbag et al. 2017). The WGI consist of six dimensions that measure regulatory quality, political stability, control of corruption, voice and accountability, government effectiveness, and the rule of law (Kaufmann et al., 2010). Following the method used by other authors (Marano et al., 2017), we used principal component analysis to arrive at a single value for each country and year (see Appendix for the values obtained for each country and year analyzed).

We included various control variables that are frequently employed to explain MNEs' environmental approaches and innovation: firm size, profitability, firm age, whether the firm is listed in a stock exchange, state ownership, financial slack, and sub-industry. We measured *firm size* by computing the natural logarithm of the total sales, because previous works have shown it to be a determinant of environmental issues (Leyva-de la Hiz et al., 2018; Marano et al., 2017) and innovation (e.g., Chittoor et al., 2015; Xie and Li, 2018).

We used return on assets (ROA) to proxy *profitability*, which has been shown to positively impact environmental innovation (Leyva-de la Hiz et al., 2018). *Firm age* was measured by the number of years since the company was established (Liao et al., 2019). We used binary variables for both *state ownership* (Liao et al., 2019) and *publicly traded* companies, with the value 1 representing firms that are state-owned or publicly traded. *Financial slack* was measured as the ratio of total current assets to total current liabilities (Berrone et al., 2013). Lastly, we included 13 *sub-industry* dummy variables to represent the 14 subindustries included in the sample based on the Global Industry Classification System (GICS). Table 3.2 includes the definitions and data sources for all variables used in the study and Table 3.3 reports the distribution of sample firms by subindustries.

Table 3.2. Definitions and data sources for the variables used in the analysis

Variables	Definition	Source
Environmental innovation	A firm's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products	Thomson Reuters Eikon database
Level of internationalization	The ratio of international revenue to total revenue	Thomson Reuters Eikon database
Scope of internationalization	The ratio of foreign subsidiaries outside the home region to total subsidiaries	Bureau van Dijk's Orbis database
Home country institutional development	Six dimensions of Worldwide Governance Indicators (WGI) that measure regulatory quality, political stability, control of corruption, voice and accountability, government effectiveness, and the rule of law	Authors' calculations
Firm size	The natural logarithm of the total sales.	Thomson Reuters Eikon database
Profitability	Return on assets (ROA)	Thomson Reuters Eikon database
Firm age	The number of years since the company was established	Thomson Reuters Eikon database
Industry	14 subindustries based on the Global Industry Classification System (GICS)	Thomson Reuters Eikon database
Publicly traded	Binary variable with the value 1 representing firms that are publicly traded	Thomson Reuters Eikon database
State owned	Binary variable with the value 1 representing firms that are stated-owned	Thomson Reuters Eikon database
Slack	The ratio of total current assets to total current liabilities	Thomson Reuters Eikon database

Table 3.3. Sample firms by subindustry (n=270).

GICS subindustry name	% of firms
Coal	8.66%
Electric Utilities	13.36%
Independent Power Producers	3.97%
Integrated Oil & Gas	6.50%
Multiline Utilities	1.08%
Natural Gas Utilities	2.89%
Oil & Gas Drilling	3.61%
Oil & Gas Exploration and Production	17.69%
Oil & Gas Refining and Marketing	14.44%
Oil & Gas Transportation Services	3.25%
Oil Related Services and Equipment	18.05%
Renewable Energy Equipment & Services	4.33%
Renewable Fuels	0.72%
Uranium	1.44%
Total	100.00% (270)

3.3.3. METHOD AND RESULTS

We used Stata 13.1 in our statistical analyses. We ran a number of tests on our data to better select the statistical methods for our analyses. In order to do so, we first needed to make assumptions about the relationship between the individual-level effect and the regressors. The individual-level effect is either correlated or uncorrelated with the regressors, resulting in what are known as the fixed effects model (FE) and the random effects model (RE), respectively. Statistical tests can be used to determine whether an FE or RE approach is better suited for estimating our models. While the Hausman test could be used to determine this (Baum, 2006; Wooldridge, 2013), the RE estimator is not fully efficient in estimating models with heteroskedasticity or serial correlation. Thus, we tested for the presence of heteroskedasticity, cross-sectional dependence and serial correlation in our models.

First, the results of the modified Wald test for groupwise heteroskedasticity in fixed effect regression models showed the presence of heteroskedastic errors ($\chi2$ =0.000, df=277, p=0.000). Second, the Pesaran test indicated the presence of cross-sectional dependence (CD=14.096, p=0.000). Finally, the Wooldridge test for autocorrelation in panel data revealed first-order autocorrelation issues (F=202.806, p=0.000). Consequently, the choice between a fixed effects and random effects model was based on a Sargan-Hansen test of overidentifying restrictions with the robust option (Schaffer and Stillman, 2006). This test indicated that fixed effects models should be used (Sargan-Hansen statistic 31.100, $\chi2$=7, p<0.001). In light of this, we estimated the models using cross-sectional time series feasible generalized least squares (FGLS) regression, which allows for heteroskedasticity and autocorrelation correction (e.g., Slangen and Beugelsdijk, 2010).

Table 3.4. Descriptive statistics

Var	Observations	Mean	Std. Dev	Min	Max
Environmental innovation	1411	52.350	25.770	.17	99.80
Level of internationalization	1411	0.520	0.347	.00	1.00
Scope of internationalization	1411	0.230	0.267	.00	1.00
Home country institutional development	1411	1.163	0.792	-.81	2.08
Firm size	1411	21.83	2.274	12.06	26.89
Profitability	1411	0.011	0.127	-1.35	.76
Firm age	1411	35.037	28.902	0	173
Industry	1411	7.130	3.689	1	14
Publicly traded	1411	.978	.147	0	1
State owned	1411	.085	.279	0	1
Slack	1411	1.992	2.697	.08	52.03

We lagged all explanatory variables by one year to mitigate the possibility of reverse causality. The descriptive statistics and correlation coefficients for our variables are reported in Table 3.4 and Table 3.5, respectively.

Table 3.5. Correlation coefficients

		1	2	3	4	5	6	7	8	9	10	11
1	Environmental innovation	1										
2	Level of internationalization	**.118**	1									
3	Scope of internationalization	**.095**	**.251**	1								
4	Home country institutional development	.044	**.243**	.042	1							
5	Firm size	**.328**	**-.155**	-.012	**-.324**	1						
6	Profitability	**.066**	**-.082**	**-.053**	**-.174**	**.378**	1					
7	Firm age	**.151**	**.091**	**.064**	.045	**.245**	**.065**	1				
8	Industry	**.059**	**.217**	**.201**	**.299**	**-.115**	**-.055**	-.017	1			
9	Publicly traded	.042	**-.058**	**-.063**	-.025	-.002	-.017	**.071**	.000	1		
10	State owned	-.039	**-.160**	-.014	**-.299**	**.210**	**.102**	-.031	**-.204**	-.006	1	
11	Slack	**-.095**	**.087**	-.018	**.119**	**-.410**	**-.053**	**-.091**	**.138**	.026	**-.054**	1

In bold $p<0.05$

We built four models in total. In the first model (Model I), we included only the control variables. In the second model (Model II), we added both independent variables, level of internationalization and scope of internationalization, to test their effect on the dependent variable, environmental innovation. The third and fourth models tested for the moderating effects of home country institutional development on the relationship between the level of internationalization and environmental innovation (Model III) and between the scope of internationalization and environmental innovation (Model IV). The regression results are shown in Table 3.6.

Model I (Table 3.6) shows a positive, significant effect of home country institutional development on environmental innovation. Larger and older firms have higher levels of environmental innovation, while profitability and financial slack are not significant in the model. The dummy variable for publicly traded firms has a positive significant coefficient while state ownership has a negative coefficient.

Table 3.6. Regression results (dependent variable: environmental innovation).

	Model I		Model II		Model III		Model IV	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Level of internationalization			2.163**	0.830	3.574**	1.432	2.403**	0.790
Scope of internationalization			8.308***	2.000	8.415***	1.669	3.655	2.268
Firm size	0.065***	0.141	0.769***	0.163	0.699***	0.161	0.859***	0.172
Profitability	-0.963	0.661	-1.518†	0.832	-1.264	0.792	-1.780*	0.910
Firm age	0.072***	0.0157	0.064***	0.014	0.070***	0.015	0.052**	0.016
Industry effects	Included		Included		Included		Included	
Publicly traded	1.660*	0.800	1.447†	0.862	1.505†	0.860	1.726*	0.844
State owned	-2.126†	1.172	-5.171***	1.375	-5.036***	1.436	-3.832**	1.485
Slack	-0.001	0.016	0.051	0.046	0.045	0.045	0.058	0.048
Home country institutional development	1.119*	0.467	1.155**	0.441	1.574**	0.567	-0.147	0.536
Level of internationalization x home country institutional development					-1.158	0.940		
Scope of internationalization x home country institutional development							5.158**	1.425
Constant	22.422***	3.207	18.781***	3.747	19.418***	3.724	17.271***	3.871
χ^2 ($p > \chi^2$)	1,773.800 (0.000)		1,754.720 (0.000)		1,716.080 (0.000)		2,010.100 (0.000)	

†p<0.10. *p<0.05. **p<0.01. ***p<0.001.

n=270

1,404 observations

Model II (Table 3.6) shows that there is a positive link between higher levels of internationalization and MNEs' environmental innovation (b=2.163, p<0.01), thus providing support for hypothesis H1a. Similarly, the coefficient of the scope of internationalization in Model II is positive and significant (b=8.308, p<0.001), supporting the hypothesis that MNEs' with a more global scope of operations show higher levels of environmental innovation (Hypothesis H1b). Hence, our results suggest that higher levels of internationalization have a persuading effect on energy

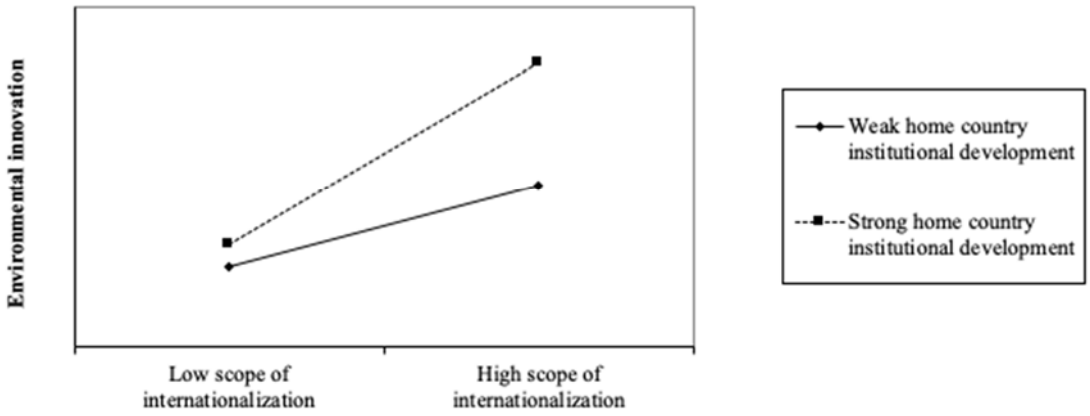
MNEs to develop environmental innovation, since international visibility broadens the nature and intensity of stakeholder pressures (Carrillo-Hermosilla et al., 2010; Horbach et al. 2012; Rennings, 2000). Our results also show that more global contexts allow energy MNEs to access a greater breadth and depth of technological capabilities to develop environmental innovation, although these internationally dispersed sources of knowledge may also cause challenges for these firms by increasing complexity and hindering effective communication and coordination (Kotabe et al., 2007).

In Model III (Table 3.6) we tested for the effect of home country institutional development on the relationship between the level of internationalization and environmental innovation. In this case, the coefficient for the interaction term is not significant, therefore not supporting Hypothesis 2a.

In Hypothesis 2b, we theorized that home country institutional development would positively moderate the relationship between MNEs' scope of internationalization and their environmental innovation. In Model IV, the interaction coefficient for home country institutional development and the scope of internationalization is positive and significant (b=5.158, p<0.01). The slopes of the studied relationships and the differences depending on the institutional development of the MNEs' home country are shown in Figure 3.1, which points to some interesting findings. The analysis of slopes (Aiken and West, 1991) for Hypothesis 2b shows that the effect of an increase in the scope of internationalization on environmental innovation is different depending on whether MNEs enjoy strong or weak levels of home country institutional development. The results show that for both low and high values of home country institutional development, the values of environmental innovation increase with more global scopes of internationalization. However, MNEs with weak home country institutional development show lower levels of environmental innovation than firms from more institutionally developed countries for both low and high scope of internationalization. Also, the increase in environmental innovation with a broader scope of internationalization is weaker for firms from less institutionally developed countries. Thus, environmental innovation is greater for firms with higher home country institutional development and a higher degree of operations outside the home region. This result is in line with that predicted in Hypothesis 2b. Thus, our results support the idea that the level of institutional development of MNEs' home countries can play a determinant role – by shaping the resources available in an

economy in general and for firms in particular (e.g. Spencer, 2008) – in the ability of MNEs to process the knowledge obtained in their global operations and transform it into environmental innovation.

Figure 3.1. Interaction of the MNEs' home country institutional development on the relationship between their scope of internationalization and environmental innovation.



3.3.4. FURTHER ANALYSES ON DEVELOPED AND EMERGING MARKET MNES

When interpreting the interaction graph in Figure 3.1, we notice a clear variation in how the scope of internationalization affects environmental innovation in MNEs from countries with weaker versus stronger institutional development. Furthermore, the first moderation hypothesis (H2a) did not yield significant results.

Thus, we performed additional analyses to better understand the different effects that the level and scope of internationalization may have on environmental innovation in developed and emerging country MNEs. To do so, we first split the sample into two groups of firms based on their home countries' economic development status, according to the United Nations Conference on Trade and Development (UNCTAD) classification of countries (UNCTAD, 2018). The first group includes all MNEs in our original sample that have their headquarters in developed countries (1,049 observations) while the second group comprises MNEs from the countries that the UNCTAD considers developing and transition economies (355 observations), which we hereafter refer to as emerging countries (see the full list of countries in Appendix). Table 3.7 shows the descriptive statistics for the split sample by home

country institutional development (developed country firms versus developing country firms). We then ran Model V-a (developed countries) and Model V-b (emerging countries) to test the effects of the level and scope of internationalization on MNEs' environmental innovation in each of the samples (Table 3.8).

Table 3.7. Descriptive statistics of the sample split by home country institutional development

	Developing countries					Developed countries				
Var	Obs	Mean	Std. Dev	Min	Max	Obs	Mean	Std. Dev	Min	Max
Environmental innovation	355	53.569	25.480	.610	99.190	1049	51.772	25.815	.170	99.800
Level of internationalization	355	.393	.314	.000	1.000	1049	.566	.347	.000	1.000
Scope of internationalization	355	.213	.265	.000	1.000	1049	.237	.267	.000	1.000
Home country institutional development	355	.117	.795	-.810	1.820	1049	1.516	.367	.000	2.080
Firm size	355	22.671	1.825	16.820	26.890	1049	21.564	2.341	12.060	26.880
Profitability	355	.045	.102	-.700	.510	1049	-.001	.132	-1.350	.760
Firm age	355	33.144	27.458	.000	154.000	1049	35.831	29.390	.000	173.000
Industry	355	5.490	3.678	1.000	12.000	1049	7.650	3.521	1.000	14.000
Publicly traded	355	1.000	.000	1.000	1.000	1049	.970	.169	.000	1.000
State owned	355	.203	.403	.000	1.000	1049	.046	.209	.000	1.000
Slack	355	1.593	1.572	.100	1.820	1049	2.130	2.979	.080	52.030

Table 3.8. Additional analyses on developed vs emerging market MNEs (dep. var.: environmental innovation).

	Developed country MNEs Model V-a		**Emerging country MNEs Model V-b**	
	Coef.	S.E.	Coef.	S.E.
Level of internationalization	1.384	0.922	6.710**	2.421
Scope of internationalization	17.544***	2.051	-30.858***	4.624
Firm size	1.231***	0.199	1.881***	0.519
Profitability	-2.558*	1.099	-2.853	2.550
Firm age	0.446**	0.017	-0.073	0.046
Industry effects	Included		Included	
Publicly traded	1.807†	0.961	Omitted	
State owned	4.117	3.757	2.375	2.493
Slack	0.035	0.054	0.864**	0.310
Home country institutional development	2.961**	1.201	-0.485	1.730
Constant	3.261	5.183	2.767	11.103
χ^2 ($p > \chi^2$)	3,190.310 (0.000)		252.690 (0.000)	

†p<0.10. *p<0.05. **p<0.01. ***p<0.001.

For MNEs from developed countries, Model V-a shows that their level of internationalization does not have a significant effect on their environmental innovation, whereas for emerging country firms (Model V-b) the level of internationalization is positively related to environmental innovation (b=6.710, p<0.01). So, although MNEs from emerging countries appear to benefit from their international operations and increase their environmental innovation with higher levels of internationalization (Model V-b), we find no evidence of this occurring for MNEs from developed countries (Model V-a). We contend this may be because MNEs from developed countries, when intensifying their presence in international markets through increased foreign sales, have a better departure point in the sense of being accustomed to environment-related stakeholder pressures in their home countries. Thus, they do not perceive a pressing need to develop additional environmental approaches to cope with these pressures, as they have already responded (totally or partially) to the strict green demands of domestic stakeholders.

On the other hand, there is empirical evidence of a positive relationship between developed country MNEs' scope of internationalization and their environmental innovation (b=17.544, p<0.001). Interestingly, emerging country MNEs show better levels of environmental innovation when their scope of internationalization is *low* (-30.858, p<0.001). As the scope of internationalization increases and they become more global, these firms exhibit worse environmental innovation records. Thus, a more global operating environment appears to affect developed and emerging market MNEs in opposite ways. Whereas firms from developed countries may increase their environmental innovation by successfully combining the disperse knowledge elements acquired in more global contexts, firms based in emerging countries seem to struggle in doing so and, in fact, exhibit lower levels of environmental innovation.

3.4. CONCLUSION AND POLICY IMPLICATIONS

The energy sector, directly or indirectly causing a large portion of global greenhouse gas emissions and air pollution (International Energy Agency, 2021), is in the spotlight of the public debate between a myriad of stakeholders, such as governments, regulators, media, international agencies, NGOs, industry and other top

decisionmakers (Shahbaz et at., 2020). Hence, our aim in this paper was to contribute to existing research on the sustainable development of the energy sector by uncovering the roles that MNEs' internationalization (in terms of level and scope) and the institutional frameworks in their home countries play in enhancing environmental innovations at the firm-level. This section addresses our conclusions, policy implications, the paper's limitations, and future research avenues.

3.4.1. CONCLUSION

Overall, our findings show that internationalization is a significant driver of environmental innovation for MNEs and that the strength of this effect is contingent upon the MNEs' home country institutional development. First, operating with a higher level (more international revenues) and a more global scope (higher presence outside the home region) of internationalization is associated with better environmental innovation records for MNEs in the energy sector. The development of environmental innovations can be considered as a suitable mechanism to attain environmental legitimacy in international markets while simultaneously increasing competitiveness.

Second, the level of institutional development in the MNEs' home countries strengthens the influence of the scope of internationalization on environmental innovations, but does not affect the relationship between the level of internationalization and environmental innovations. As a broader international scope entails a higher degree of complexity in terms of managing a wider variety of locations, something not necessarily applicable to a higher level of internationalization, we contend that the home country institutional development may enforce the MNEs' ability to cope with the diversity of knowledge bases inherent in operating across diversified international locations. Our findings suggest that MNEs from countries with stronger institutions may be better equipped to deal with diverse sources of knowledge and translate them into environmental innovations than their peers from countries with lower institutional development. Nonetheless, when disaggregating the sample by the level of home country institutional development, some counterintuitive findings arise. On the one hand, the observed positive direct influence of the level of internationalization only holds for MNEs based in emerging countries and no significant result is found for their peers located in developed countries. We contend this may be due to the learning opportunities from expanding

business operations abroad. As developed countries usually lead in environmental approaches and issue the most demanding green regulations worldwide, MNEs headquartered in these economies usually do not need to undertake such strong innovative efforts when expanding their operations to other countries. This facilitates a relaxation effect in the short term, which, in turn, can hinder the attainment of the UN SDGs in the medium term. The opposite holds for MNEs from emerging economies that depart from a pressing need to enhance their environmental innovation to show their ability to compete in the international arena. On the other hand, the positive direct impact of the scope of internationalization on environmental innovations holds true for MNEs based in developed countries but there is an opposite (negative) effect for MNEs based in emerging countries. We argue that this negative effect may be due to the difficulties that emerging country MNEs experience in coping with the liability of foreigness and institutional voids, which hinder these firms' ability to translate new information into environmental innovations that are competitive in the international arena.

Third, it is rather surprising that the average level of environmental innovations displayed by the firms comprising the sample is not only quite similar but also slightly superior in the case of MNEs from emerging economies. This evidence lead us to conclude that reaching similar standards in terms of environmental innovation is a possibility for MNEs all over the world. However, home country institutional development seems to play a role in the way that goal is reached: MNEs from emerging economies benefit from increasing their international activities close to home, while MNEs based in developed countries benefit from expanding their activities outside their home region.

These results signal to two crucial actors for achieving the UN SDGs: an efficient functioning of internationalization efforts at the firm level and national policies aimed at building solid institutional frameworks for pursuing energy MNEs' environmental sustainable goals. At the same time, our findings pave way for future research studies to explore the design of public policies aimed at stimulating formulas aimed at the most strategic international expansion of firms that help them deploy their top competences to continue the development of worldwide green innovations, a milestone to tackle the climate change (The Economist, 2021).

3.4.2. POLICY IMPLICATIONS

The results presented in this paper offer some straightforward implications to guide regulators in enabling and promoting the sustainable development of MNEs operating in the energy sector. First, the theoretical implication from the findings is that micro-level (firm) internationalization and macro-level (country) institutional ecosystem work in favor of MNEs' environmental innovation, justifying the compatibility of environmental management and institutional theories in explaining MNEs' behaviors. Policymakers may revise international codes for advancing the sector in terms of environmental sustainability commitment while pursuing economic goals.

Second, the empirical findings offer a route for energy MNEs to guide their environmental innovation commitment: increasing the level and scope of international activities. Firm governance mechanisms and policymaking are a priority in motivating energy MNEs to operate in an environmentally sustainable way. Governmental policies from developed countries should encourage the expansion of their MNEs to several regions (more global scope of international activities) but in emerging countries such policies should rather promote a more geographically concentrated internationalization (less global scope of international activities). Our study helps MNEs from developed and emerging countries to manage their internationalization strategies to help enhance their environmental innovations in the global market. Specifically, our findings may assist emerging country MNEs in evaluating the pros and cons of different formulae for expanding their international footprint. These results are also relevant because emerging economies account for a growing share of cross-border business operations.

Third, there is plenty of room for energy MNEs to improve their internationalization engagement aimed at consolidating their environmentally-sustainable commitment. The average score for both level (0.520) and scope (0.230) of internationalization in our sample is considerably low overall, in MNEs from both developed and emerging countries. In the context of rising GHG emissions, the results indicating that internationalization can be good for environmental innovation offers an interesting perspective given that energy MNEs can be viewed not only as a part of the polluting problem but also as a crucial piece for mitigating it. MNEs with higher starting standards may provide an interesting policymaking benchmark for low-scoring

firms. This is particularly relevant for firms based in emerging economies, whose average internationalization figures are much lower.

Fourth, the indicator of environmental innovation may serve to better evaluate the pros and cons of MNEs' investments in environmental innovations. Although MNEs are considered by various stakeholders to be one of the main actors contributing to unsustainability concerning the environment and society (Burritt et al., 2020), environmental innovations of these firms can be an effective means to respond to social and environmental demands and obtain legitimacy while improving their competitive position in the international markets. The average level of environmental innovations displayed by the firms comprising the sample is not only quite similar between MNEs based in developed and in emerging countries but also slightly superior in the case of MNEs from emerging economies.

Fifth, one of the key implications of our findings is that the institutional framework in MNEs' home countries is an important factor in the relationship between internationalization and environmental innovations. The role of the institutional framework has been highlighted in the economic literature as a crucial variable for economic growth. This paper extends this view by showing that a solid institutional ecosystem at the national level may act as a powerful booster of environmental innovations whenever MNEs leave their home region. Given the highly global context of the energy sector, policymakers may consider revising the public policies aimed at strengthening certain institutional pillars at the national level to provide energy firms with the adequate innovative ecosystems.

Sixth, our results help policymakers improve their understanding of the differences between emerging country MNEs and developed country MNEs in terms of their ability to assimilate the heterogeneous knowledge sources available abroad that enable them to develop environmental innovation. MNEs from emerging economies benefit from increasing their international activities close to home, while MNEs based in developed countries benefit from expanding their activities outside their home region. Emerging country governments may find it fruitful to implement policies and support mechanisms or improve the existing ones to aid domestic firms in their internationalization process, as this may help local firms to boost their environmental innovation levels with the consequent positive spillover effects at home. The detailed analysis of the differences between MNEs from emerging and

developed home countries offers additional insights for a roadmap to guide policy designs aimed at firm internationalization.

Seventh, the quality of home market institutions is an important contingency for MNEs' ability to derive internationalization-based environmental benefits. There is one main policy implication that is especially likely to influence MNEs' strategies: foreign direct investment (FDI) policies. On the one hand, instead of pursuing a "the-more-FDI-the-better" approach, governments should use mechanisms to attract "sustainable FDI" to increase benefits in host countries and meet SDGs. Sustainable FDI entails investments that, "while being commercially viable, involve best efforts toward making a reasonable contribution to the economic, social and environmental development of host countries, and take place in the context of fair governance mechanisms" (Sauvant & Gabor, 2021: 262).

Finally, the adoption of the UN SDGs in 2015 established, for the first time, a target to ensure access to affordable, reliable, sustainable and modern energy for all (SDG7). According to the International Energy Agency (IEA), based on existing and announced policies, the world is not on course to achieve the outcomes of the UN SDGs most closely related to energy: to achieve universal access to energy (SDG 7), to reduce the severe health impacts of air pollution (part of SDG 3) and to tackle climate change (SDG 13). Future policy actions should be aimed at the decentralization (here the role of geospatial analysis is important in order to determine the areas in which decentralized systems are in some cases more cost-efficient than centralized grids), digitalization (e.g., artificial intelligence may enable digital energy systems to manage electricity demand remotely) and flexibility (a cornerstone of electricity security) of energy systems. Actively engaging with the dialogue on the SDGs can help businesses achieve their own goals in tandem with those set by governments.

3.4.3. LIMITATIONS AND FUTURE RESEARCH AVENUES

Our study extends existing literature and enhances our understanding of the association between internationalization, environmental innovation and national institutional ecosystems. However, we would like to highlight a few limitations. First, the sample is limited to MNEs from the energy sector. Thus, this may not allow for the generalization of results to other sectors, nor to energy firms that only operate within their domestic market. Considering that we analyzed a longitudinal data set of

MNEs from across the world, we believe that our findings contribute to a better understanding of the interactions between internationalization, home country institutions and environmental innovation among firms in high-polluting sectors. However, future studies could test the validity of our conclusions in other environmentally sensitive industries. Second, our study focuses on firm level (internationalization and environmental innovation) and macro level (national institutional ecosystems) factors and does not incorporate other pressures that may likewise affect MNEs' behavior. For instance, regulatory pressures (i.e., regulated versus non-regulated industries) could provide interesting insights into the different behaviors of other firms and the potential to extrapolate our results. Third, this paper provides a unidirectional analysis between internationalization and environmental innovation. However, the relationship between environmental innovation and internationalization may be bidirectional in that more innovative firms seeking to market their products or services to a wider audience expand their operations abroad. To mitigate the possibility of reverse causality, we used a one-year lag in our statistical models. In any case, the exploration of a bidirectional relationship may constitute a prolific research avenue.

Finally, further research could take a closer look at some contextual country factors. On the one hand, there are significant differences among emerging countries in variables that may be influential for innovation (e.g., human development index and the availability of technological clusters in the area) or the quality of public institutions (e.g., democratic development index). On the other hand, it can be of interest to address how those countries that belong to an area of economic integration may behave more or less similarly in terms of their MNEs' environmental innovation accomplishments. Both contextual analyses may be useful to draw guidelines for policymakers.

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3.6. APPENDIX. MEASURES FOR COUNTRY-LEVEL INSTITUTIONAL DEVELOPMENT COMPUTED USING PRINCIPAL COMPONENTS ANALYSIS OF WORLDWIDE GOVERNANCE INDICATORS AND UNCTAD CLASSIFICATIONS.

	2012	2013	2014	2015	2016	2017	UNCTAD classification
Australia	1.76	1.72	1.80	1.74	1.74	1.73	Developed
Austria	1.66	1.68	1.70	1.64	1.58	1.61	Developed
Belgium	1.48	1.51	1.44	1.45	1.42	1.33	Developed
Bermuda	1.21	1.21	0.00	0.00	0.00	0.00	Developed
Brazil	0.06	-0.01	-0.02	-0.12	-0.14	-0.19	Developing
Canada	1.77	1.76	1.85	1.85	1.87	1.88	Developed
Chile	1.32	1.31	1.34	1.23	1.16	1.06	Developing
China	-0.60	-0.59	-0.47	-0.45	-0.39	-0.31	Developing
Colombia	-0.30	-0.29	-0.22	-0.17	-0.16	-0.17	Developing
Cyprus	1.19	1.11	1.12	1.08	0.99	0.99	Developed
Czech Republic	0.95	0.95	1.03	1.07	1.06	1.11	Developed
Denmark	1.94	1.96	1.93	1.93	1.87	1.88	Developed
Finland	2.04	2.02	2.04	1.98	1.96	1.99	Developed
France	1.31	1.29	1.28	1.25	1.20	1.25	Developed
Germany	1.61	1.62	1.77	1.73	1.71	1.68	Developed
Greece	0.29	0.37	0.29	0.26	0.21	0.22	Developed
Hong Kong	1.60	1.56	1.70	1.72	1.60	1.64	Developing
Hungary	0.72	0.71	0.60	0.59	0.52	0.56	Developed
India	-0.37	-0.35	-0.28	-0.18	-0.17	-0.11	Developing
Indonesia	-0.42	-0.37	-0.21	-0.29	-0.17	-0.16	Developing
Ireland	1.56	1.56	1.70	1.68	1.58	1.53	Developed
Israel	0.74	0.74	0.81	0.88	0.93	0.86	Developed
Italy	0.54	0.56	0.53	0.54	0.55	0.57	Developed
Japan	1.38	1.45	1.55	1.53	1.54	1.54	Developed
Luxembourg	1.88	1.87	1.89	1.92	1.88	1.85	Developed
Malaysia	0.35	0.40	0.57	0.47	0.40	0.36	Developing
Mexico	-0.12	-0.15	-0.22	-0.24	-0.27	-0.34	Developing
Netherlands	1.88	1.84	1.89	1.86	1.88	1.88	Developed
New Zealand	1.97	1.97	2.07	2.08	2.06	2.08	Developed
Norway	1.95	1.98	1.96	1.97	1.97	2.03	Developed
Poland	0.93	0.92	0.99	0.97	0.84	0.76	Developed
Portugal	1.03	1.06	1.07	1.18	1.19	1.22	Developed
Russia	-0.80	-0.77	-0.71	-0.78	-0.75	-0.69	Transition
Singapore	1.72	1.69	1.78	1.81	1.82	1.83	Developing
South Africa	0.23	0.27	0.25	0.23	0.23	0.19	Developing
South Korea	0.84	0.85	0.88	0.81	0.87	0.93	Developing
Spain	0.98	0.92	0.90	0.90	0.98	0.91	Developed
Sweden	2.00	1.98	1.95	1.95	1.95	1.92	Developed
Switzerland	1.92	1.89	2.05	2.00	2.00	1.98	Developed
Taiwan	1.06	1.06	1.19	1.22	1.24	1.25	Developing
Thailand	-0.26	-0.29	-0.28	-0.30	-0.28	-0.24	Developing
United Kingdom	1.53	1.55	1.65	1.71	1.61	1.56	Developed
United States	1.40	1.35	1.39	1.41	1.41	1.43	Developed

4. CAPÍTULO IV. ENVIRONMENTAL SUSTAINABILITY AND LEGITIMATION IN A GLOBAL CONTEXT: EMERGING-MARKET MNES VERSUS DEVELOPED-COUNTRY MNES

4.1. INTRODUCTION

Emerging market multinational enterprises (EMNEs) are growing in importance in the global economy. Today, emerging market firms represent close to 35% of the Fortune Global 500 list of the largest companies worldwide. As Marano, Tashman and Kostova (2017) highlighted, it is expected that by 2025, approximately 50% of the Fortune Global 500 companies will be from emerging and developing economies as opposed to 5% in 2000. The growing presence of EMNEs in global markets is a fact corroborated by supranational organizations such as the United Nations Conference on Trade and Development (UNCTAD). In the ranking published by UNCTAD in 2020, 10% of the world's top 100 non-financial MNEs, ranked by foreign assets, are from China. The growing weight of EMNEs in the global economy has stimulated a lively debate among international business scholars regarding how EMNEs are catching up and contending other global peers (e.g. Contractor, 2013, Munjal, Requejo, & Kundu, 2019; Ramamurti & Williamson, 2019), which are the motivations, instruments and trajectories that foster EMNEs' internationalization (Sun, Wang & Luo, 2018) and how these firms can attain and maintain their legitimacy in this global context (e.g. Doh, Husted & Yang, 2016; Kolk & Curran, 2017; Tashman, Marano & Kostova, 2019).

MNEs need to attain organizational legitimacy in foreign countries so that they have a 'social license to operate' in a global context (Park, 2018). Organizational legitimacy is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed systems of norms, values, beliefs, and definitions" (Suchman, 1995: 574). Global stakeholders "can provide or withhold their 'social license to operate' from an organization, depending on the degree to which they perceive it as a legitimate and accepted part of the community" (Stevens, Xie & Peng, 2016, 951). The literature has pointed out that EMNEs start from a deficit of reputation and legitimacy in international markets, compared to DMNEs, due to the limited institutional credibility of their home countries (e.g., Fiaschi, Giuliani, & Nieri, 2017; Madhok & Keyhani, 2012). So, due the limited institutional credibility of their home countries, EMNEs will need to increase their efforts to become legitimized when operating globally (e.g., Cuervo-Cazurra, Inkpen, Musacchio, & Ramaswamy, 2014; Marano, et al. 2017; Tashman et al., 2019).

In this study we examine one such practice that can help MNEs achieve global legitimacy, environmental sustainability. Nowadays, an increasing range of

stakeholders put pressure on MNEs for them to move towards more environmental sustainability. For example, the Annual Report on the OECD Guidelines for Multinational Enterprises 2019 showed that there is a significant increase in the number of environment-related specific instances submitted to National Contact Points (NCPs): "As of the end 2019, approximately 20% of specific instances submitted to NCPs relate to environmental impacts" (OECD, 2020: 21). In this sense, responding to institutional concerns regarding the natural environment has been deemed an effective way of increasing legitimation in an international context (e.g. Aragón-Correa, Marcus, & Hurtado-Torres, 2016; Bansal & Roth, 2000; Babiak & Trendafilova, 2011; Kolk & Fortanier, 2013) because higher levels of environmental sustainability can help to ensure the long-term survival of MNEs (e.g., Kostova & Zaheer, 1999; Scherer, Palazzo, & Seidl, 2013) and allow MNEs to improve their reputation through an appropriate environmental commitment (e.g. Moon & Deleon, 2007).

Consequently, considering the significance of EMNEs in the global economy at the time and their relevance in global environmental challenges such us climate change, we set out to understand more about the extent to which the modus operandi used by EMNEs to attain environmental legitimacy differs from that of developed-country multinational enterprises (DMNEs). We focus our analysis on understanding the potential differences between EMNEs and DMNEs when it comes to their level of implementation of environmental management policies and environmental disclosure and we further analyze if and how the international diversification of MNEs may affect the environmental behavior of both EMNEs and DMNEs. We believe that understanding these relationships will give us a more complete picture of how EMNEs face climate change challenges and about the similarities and differences with respect to DMNEs. We conduct our analysis in the context of the energy and utility sectors. Our hypotheses are tested on an unbalanced panel dataset consisting of 289 MNEs from 49 countries, with information for a period of eight years, from 2011 to 2018.

With this paper we seek to contribute to the literature in various aspects. First, we build on existing research and dive deeper into the ins and outs of the way environmental sustainability actions are used by MNEs from developed and emerging markets to legitimate their operations. In particular, we found that the adoption of environmental management policies is higher in EMNES versus DMNEs. We consider that adopting such policies helps EMNEs distance themselves from the stereotypes

about their home countries, in an attempt to overcome their liability of origin and obtained legitimacy in a global context. Second, our study expands previous research by examining the influence of international diversification in the level of environmental management policies and environmental disclosure of EMNEs and DMNEs, concluding that DMNEs improve to a greater extent their environmental behavior and environmental reporting as they become more international.

The rest of this paper is organized as follows. Next, we present theoretical background and hypotheses. We then describe the research methodology and our results. We conclude by discussing the contributions and limitations of our study and future research directions.

4.2. THEORETICAL BACKGROUND AND HYPOTHESES

4.2.1. EMNES' INTERNATIONALIZATION

A number of authors have highlighted how the patterns of internationalization of EMNEs and DMNEs seem to be converging (Wang and Li-Ying, 2014), and that as EMNEs become more experienced, their modus operandi does not greatly differ from those of DMNEs (Cuervo-Cazurra, 2012). However, despite this convergence, EMNEs operating in foreign countries have been found to face competitive disadvantages compared with their developed country peers due to their home countries' shortcomings, which include lower levels of development and effectiveness of market institutions (e.g., Marano et al., 2017; Xie & Li, 2018). These home country disadvantages partly stem from a low or "weak" institutional quality as these countries "fail to ensure effective markets or even undermine markets (as in the case of corrupt business practices)" (Meyer, Estrin, Bhaumik, & Peng, 2009: 63). In fact, emerging markets suffer from institutional voids as they "lack strong formal institutions enabling the effective functioning of markets, such as governance mechanisms that prevent corruption, protect property rights, ensure the rule of law and provide adequate public investments and infrastructure" (Kostova & Marano, 2019: 105). Furthermore, the absence of trustworthy formal institutions causes emerging markets to rely on informal institutions in relation to business networks, corruption, and particularism (Meyer & Peng, 2005).

Existing work on EMNEs' internationalization has drawn attention to the increasing weight of EMNEs in global markets (e.g., Marano, et al, 2019). There has been a sharp

increase in EMNEs' foreign investments motivated by the institutional weakness of their home country environment, where access to certain key resources and the ability to develop strategic capabilities can be very limited. EMNEs may engage in international operations to escape the institutional voids in their home countries given that internationalization can help them acquire complementary assets and capabilities that can compensate their competitive disadvantages (Cuervo-Cazurra & Ramamurti, 2017; Zyglidopoulos, Williamson, & Symeou, 2016). For example, their international operations help EMNEs gather knowledge that can boost their technological, innovation, and managerial capabilities (Luo & Tung, 2007; Marano et al., 2017; Meyer, Ding, Li & Zhang, 2014, Nuruzzaman Singh, & Gaur, 2020). In this way, EMNEs increasingly rely on cross-border acquisitions and partnerships in countries that are substantially institutionally distant from their home countries to augment their strategic capabilities (Ramamurti & Williamson, 2019). Recent research has noted that by integrating and balancing exploitation and exploration strategies in their internationalization (ambidexter internationalization), EMNEs can improve their corporate sustainability (Ciasullo, Montera, Cucari, & Polese, 2020).

However, it is also worth noting that EMNEs may acquire capabilities in their home countries that enable them to benefit more from internationalization than DMNEs. Although EMNEs face high risks and challenges in foreign countries, they are also more flexible and resilient than their DMNE peers, especially when entering less developed economies. (Cuervo-Cazurra & Genc, 2008; Kostova & Marano, 2019; Landau, Karma, Richter & Uhlenbruck, 2016). Cuervo-Cazurra and Genc (2008) noted that since EMNEs are familiar with institutional voids and have the management expertise necessary to conduct business in such conditions, they may find it easier to expand internationally into other less developed countries. Ramamurti & Williamson (2019) noted that DMNEs may find it more challenging to enter less developed countries because they lack a deep understanding of the preferences, needs and use habits of customers in these countries. On the other hand, EMNEs have "needed to learn how to produce products with adequate quality at a lower cost" (pp. 164) to satisfy consumers in emerging markets. Furthermore, EMNEs exhibit several competitive advantages based on cost innovation and on their capacity for optimizing products and processes for emerging markets (Zyglidopoulos et al., 2016) or on simplified administrative procedures established by the home country government (Ciasullo et al., 2020).

In conclusion, EMNEs´ home country institutional voids can translate into a variety of disadvantages for EMNEs to face the challenges posed by international markets because of having worse access to certain resources, difficulty in developing certain strategic capabilities, and greater uncertainty and inefficiencies that they have to handle in their home countries. Conversely, EMNEs may have advantages over DMNEs derived from lower costs, higher flexibility and resilience and better management capabilities to conduct business in more uncertain contexts. Thus, internationalization allows EMNEs, on the one hand, to make use of some competitive advantages in foreign countries and, on the other hand, to avoid the problematic conditions of the home country (escape-based internationalization) and acquire new strategic resources and reduce their institutional and market constraints at home.

4.2.2. EMNES' LEGITIMATION IN A GLOBAL CONTEXT

EMNEs face more significant legitimacy problems and reputational deficits in foreign countries than DMNEs (Park, 2018; Zyglidopoulos et al., 2016) because their home country institutional voids may compromise perceptions of legitimacy of EMNEs (Fiaschi, Giuliani, & Nieri, 2017; Kolk & Curran, 2017; Marano et al., 2017; Moore, Bell, Filatotchev, & Rasheed, 2012). Meanwhile, DMNEs enjoy an 'a priori' legitimation because stakeholders tend to link the firm to the characteristics of its home country. DMNEs have advantages that stem from having access to more efficient market intermediaries and from operating under more stringent standards and regulations at home (Kolk & Curran, 2017). So, EMNEs in international markets face not only a liability of foreignness – referring to the disadvantages borne in the host country by all international firms as a consequence of operating outside of their institutional context- but also the additional disadvantage of liability of origin (Czinkota, Kaufmann & Basile, 2014; Ramachandran & Pant, 2010). This liability of origin implies "a credibility and legitimacy deficit in the eyes of host country stakeholders who are even more circumspect due to inefficient or missing knowledge of foreign emerging-market multinational firms, their quality and safety standards" (Madhok & Keyhani, 2012, 31). As an example, it should be noted how "companies based in the BRIC countries are among the companies with the lowest levels of consumer trust. Brazil, China, Russia, India, and Mexico had trust levels well below 50 percent (38 percent, 36 percent, 35 percent, 34 percent, and 31 percent, respectively), in stark contrast to

countries like Sweden, Canada, Germany and Switzerland that registered up to 76 percent (Marano et al., 2017).

A growing number of works have shown that EMNEs require an extra effort to enter developed countries (Cuervo-Cazurra, Inkpen, Musacchio, & Ramaswamy, 2014; Luo & Tung, 2007; Wang, Luo, Lu, Sun, & Maksimov, 2014) and face more legitimation challenges compared to DMNEs due to their "liability of origin" (Meyer et al., 2014; Marano et al., 2017). Foreign stakeholders often might consider that emerging markets have lax environmental or labor standards and that EMNEs rely heavily on corrupt governments (Jaffe & Nebenzahl, 2006). As a consequence, these foreign stakeholders may exhibit unfavorable attitudes toward EMNEs given their environmental and social reputation (Dunning & Lundan, 2008; Kang & Yang, 2010). Even though these foreign stakeholders are aware of the diversity of emerging country characteristics, they still have a general negative perception of EMNEs (Zyglidopoulos et al., 2016). Luo and Tung (2007) noted that this negative perception persists partially because EMNEs are usually unknown entities before entering foreign countries and foreign stakeholders fill this gap in their knowledge with negative perceptions associated with their home country. For example, Kolk and Curran (2017) showed that Chinese firms were more vulnerable in the European Union not only because they were foreign, but also because of their Chinese nationality. Chinese firms developed rather complex strategies to address these liabilities in the eyes of host country stakeholders and institutions, such as collective actions, thereby improving their corporate image and legitimacy.

4.2.3. HYPOTHESES

Nowadays, environmental natural issues are a challenge shared by companies in both developed and developing countries. Minimizing the environmental impact of their global operations, through better environmental management policies, environmental performance, or the disclosure of more environmental information can be effective tools to ensure the global legitimation of MNEs (e.g., Aragón-Correa, et al., 2016; Bansal & Roth, 2000; Babiak & Trendafilova, 2011; Kolk & Fortanier, 2013) and, in particular, of EMNEs (Kolk & Curran, 2017). These strategies improve their reputation by showing customers, investors and civil society an appropriate environmental commitment and allows MNEs to achieve environmental legitimation in a global context (e.g., Moon & Deleon, 2007).

Environmental protection initiatives have been analyzed as a dimension of CSR in prior studies on EMNEs. These studies have found that one common strategy used by EMNEs to attain global legitimacy is the adoption of CSR initiatives (e.g., Fiaschi, et al, 2017; Montiel, Husted & Christmann, 2012; Tashman et al., 2018). Montiel, Husted and Christmann (2012) noted that the adoption of CSR initiatives helps EMNEs to address the illegitimacy problem due to their liability of origin by helping them decouple their corporate image from that of their home country and changing the perception that foreign stakeholders have about them to that of a trustworthy partner. Tashman, Marano and Kostova (2018) showed that the internationalization of EMNEs reduces their propensity to engage in CSR decoupling. EMNEs are confronted with an increasing exposure to global stakeholders with strong expectations about effective engagement with CSR and therefore they will avoid implementing a symbolic CSR strategy in which CSR performance is underestimated in relation to CSR disclosure. On another note, Fiaschi, Giuliani and Nieri (2017) showed how the involvement of Latin EMNEs with CSR policies in place in CSR irresponsibility events is lower when they expand into countries with high levels of freedom of speech and press. They found that in order to reduce CSR irresponsibility two conditions must be met; first, explicit CSR policies must be implemented by firms and second, media and other information outlets should exert a relevant pressure on firms involved in CSR irresponsibility.

In conclusion, EMNEs face a higher level of legitimacy deficit in foreign countries due to the liability of origin than DMNEs, so it seems reasonable to expect that EMNEs will make an extra effort when it comes to their environmental sustainability so that they can catch up with DMNEs and legitimate their operations in a global context, hence trying to overcome their deficiencies in regards to their reputation and legitimacy caused by their liability of origin.

These efforts in relation to environmental sustainability can be aimed at disclosing more environmental information with the objective of seeking public endorsement of the organization and its practices by outside audiences or may involve a substantial improvement of environmental sustainability through real action to develop organizational capabilities, such as establishing environmental management policies (Hawn & Ioannou, 2016). Disclosing more information allows to increase firms' overall transparency and knowledge about their products, structure and policies for external stakeholders. As for the establishment of environmental management policies, these

can be a valuable tool to reduce waste and emissions in firms' processes and may help MNEs achieve better environmental performance (Hartmann & Vachon, 2018; Kraus, Rehman, & García, 2020; Solovida & Latan, 2017).

While putting in place environmental management policies implies a substantial improvement of environmental sustainability, disclosing more environmental information can be considered as a symbolic environmental legitimation technique (e.g., Ellimäki, Gómez-Bolaños, Hurtado-Torres & Aragón-Correa, 2021). We argue that EMNEs do not engage in symbolic environmental actions only to achieve legitimacy by increasing their environmental disclosure, but instead their additional efforts translate into a substantial improvement of environmental sustainability as they implement environmental management policies that help them tackle the foreign stakeholders' unfavorable attitudes toward EMNEs given their environmental reputation. These substantial improvements of environmental sustainability would favor them by reducing the risk of involvement in environmental scandals, thus avoiding the harmful repercussions of these events in their global reputation. So, we expect EMNEs to show a higher level of environmental sustainability compared to DMNEs, which may involve a wider adoption of environmental management policies as well as reaching higher levels of environmental disclosure. Thus, we propose the following hypotheses:

H1a. EMNEs have a wider adoption of environmental management policies compared to DMNEs.

H1b. EMNEs have higher levels of environmental disclosure than DMNEs.

An inherent characteristic of MNEs is the institutional complexity they face as MNEs are embedded across heterogeneous locations and institutional environments, they necessarily face the inconveniences of institutional complexity "whenever they confront incompatible prescriptions from multiple institutional logics" (Greenwood, Raynard, Kodeih, Micelotta & Lounsbury, 2011: 318). Higher levels of internationalization increase the range of stakeholders involved, in turn increasing institutional complexity and reinforcing the risks of them engaging in adverse

institutional attribution when assessing the firms (Kostova & Zaheer, 1999; Marano et al., 2017). Internationalization can increase corporate scandals and stakeholder activism and draw the attention of different actors, which can drive MNEs and their suppliers to improve their environmental sustainability (Daudigeos, Roulet & Valiorgue, 2020). In addition, internationalization increases firms' exposure to global norms and legitimizing actors, such as multilateral or international non-governmental organizations (NGOs) (Marano & Kostova, 2016) and also exposes MNEs to different knowledge and practices for environmental issues that may not be present in their home countries (Kostova, et al, 2008). However, other scholars have found that the increased complexity that stems from higher levels of internationalization limits the reputational risks of poor environmental performance because monitoring systems are not always adequate across multiple regions, and global MNEs are difficult to track due to the complexity of their operations (Strike, Gao & Bansal, 2006). Consequently, external agents can encounter difficulties in distinguishing different levels of environmental sustainability in global markets and thus they will be unable to reward firms' improved environmental sustainability with additional legitimation. Park (2018) found that internationalization drives EMNEs to grow in sustainability strengths but also in sustainability concerns. EMNEs' overall corporate sustainability strengths can increase because managers become aware of the foreign stakeholders' pressures but institutional distance, organizational decoupling and relational problems between different units of EMNEs cause sustainability concerns to increase as the firm's internationalization keeps growing.

Considering that higher levels of internationalization imply greater complexity, the disadvantages of EMNEs associated with the institutional voids of their home country may suggest differences with respect to DMNEs, in terms of their lower capacity to manage the greater complexity and to take advantage of new knowledge derived from higher level of internationalization. Moreover, this added complexity entails additional costs of coordination, integration, and exchange of knowledge and resources among geographically dispersed markets in order to ensure efficient operations (Kostova & Roth, 2003). Therefore, although EMNEs make greater efforts in terms of improving their environmental sustainability when they operate in a global context, given that DMNEs have superior capacities to manage institutional complexity, it is expected that the positive influence of the level of internationalization on environmental management policies and environmental disclosure will be greater

in DMNEs versus EMNEs. In other words, the adoption of environmental management policies and environmental disclosure will make the modus operandi of EMNEs and DMNEs converge as the level of international diversification increases up until a certain level. This will also imply that from a certain level of international diversification, the DMNEs will present higher levels of environmental sustainability. Thus, we propose the following hypotheses:

H2a. The level of development of home countries strengthens the positive influence of international diversification on the adoption of environmental management policies so that for higher levels of internationalization DMNEs increase their environmental management policies to a greater extent than EMNEs.

H2b. The level of development of home countries strengthens the positive influence of international diversification on environmental disclosure so that for higher levels of internationalization DMNEs increase their environmental disclosure to a greater extent than EMNEs.

4.3. METHODOLOGY

4.3.1. SAMPLE AND DATA SOURCES

Our hypotheses were tested on MNEs in the energy and utility sector; 208 MNEs from developed and 81 MNEs from emerging markets. This population is appropriate for our study because it encompasses DMNEs and EMNEs with internationalization experience in both emerging and advanced economies. Thus, they have had significant exposure to institutional pressures in different contexts for adopting environmental management policies and environmental disclosure. Furthermore, they come from 49 countries in five continents, implying that a wide range of institutional contexts are covered. Table 4.1 shows the distribution of the sample across countries and their average levels of environmental management policies, environmental disclosure and international diversification.

Table 4.1. Distribution of the sample across countries and mean values of environmental management policies (EMP), environmental disclosure (ED) and international diversification (ID)

Country	Freq.	%	Means		
			EMP	ED	ID
Argentina	2	0.69	0.73	0.06	0.74
Australia	27	9.34	0.27	0.10	0.50
Austria	2	0.69	0.80	0.34	1.38
Belgium	1	0.35	0.42	0.22	0.00
Bermuda	3	1.04	0.10	0.05	1.15
Brazil	4	1.38	0.55	0.25	0.76
Canada	41	14.19	0.35	0.17	0.66
Chile	6	2.08	0.64	0.31	0.84
China	14	4.84	0.46	0.18	0.44
Colombia	3	1.04	0.71	0.21	1.39
Cyprus	1	0.35	0.60	0.14	0.00
Czech Republic	1	0.35	0.58	0.36	1.85
Denmark	1	0.35	0.75	0.47	3.44
Egypt	1	0.35	0.15	0.19	0.18
Finland	2	0.69	0.85	0.45	2.26
France	6	2.08	0.73	0.31	1.96
Germany	2	0.69	0.41	0.26	0.55
Greece	1	0.35	0.89	0.40	1.09
Guernsey	1	0.35	0.53	0.16	0.59
Hong Kong	7	2.42	0.61	0.25	0.70
Hungary	1	0.35	0.87	0.60	2.16
India	4	1.38	0.67	0.37	1.25
Indonesia	6	2.08	0.59	0.20	0.52
Ireland; Republic of	1	0.35	0.50	0.14	1.61
Israel	1	0.35	0.12	0.00	0.87
Italy	4	1.38	0.88	0.48	2.39
Japan	6	2.08	0.66	0.39	1.09
Jersey	1	0.35	0.53	0.22	1.61
Korea; Republic (S. Korea)	6	2.08	0.60	0.35	1.16
Luxembourg	1	0.35	0.71	0.34	2.77
Malaysia	4	1.38	0.28	0.05	1.04
Mexico	1	0.35	0.55	0.20	0.30
Netherlands	5	1.73	0.48	0.19	2.51
New Zealand	1	0.35	0.25	0.25	0.00
Norway	7	2.42	0.54	0.15	0.63
Papua New Guinea	1	0.35	0.62	0.24	0.22
Poland	5	1.73	0.41	0.30	0.49
Portugal	1	0.35	0.91	0.48	2.02
Russia	10	3.46	0.53	0.23	0.60
Saudi Arabia	1	0.35	0.16	0.31	2.38
Singapore	1	0.35	0.74	0.27	1.45
South Africa	3	1.04	0.48	0.14	1.65
Spain	10	3.46	0.83	0.40	1.65
Sweden	1	0.35	0.41	0.11	2.47
Switzerland	2	0.69	0.54	0.25	2.47
Taiwan	2	0.69	0.76	0.32	0.36
Thailand	5	1.73	0.66	0.30	0.82
United Kingdom	11	3.81	0.50	0.14	1.08
United States of America	61	21.11	0.39	0.17	0.81
Total:	289	100			

We relied on several sources of data to compile our sample and collect data. To build our database, we first gathered data on all publicly traded firms in the energy and energy-related utility sectors with information in the Refinitiv Eikon database. We enriched this data with Bureau van Dijk's Orbis database, which we used to obtain data on the location and number of subsidiaries for the MNEs in our sample. We then excluded firms that did not have foreign subsidiaries and we also dropped observations with missing values on environmental management policies or environmental disclosure. Lastly, we obtained country-level data on institutional development from the World Bank. After merging the data, our sample contained an unbalanced panel dataset including 289 MNEs in the energy and utility sectors with information for a period of eight years, from 2011 to 2018.

The energy and energy-related utility sectors provide an ideal context for our study because the energy sector is becoming more and more global with a considerable number of EMNEs and DMNEs expanding outside their country. It provides an interesting setting for our study on how their home countries and levels of internationalization may influence the firms' environmental management policies and environmental disclosure. In addition, energy sector firms' operations have a very high environmental impact, mainly attributable to the use of fossil fuels. It is estimated that 35% of the global greenhouse gas emissions stem from the operations of the energy sector (Intergovernmental Panel on Climate Change, 2014). Thus, energy firms are closely watched by environmental activists and interest organizations (Ruka & Rashidirad, 2019) and it is essential to discern to what extent EMNEs and DMNEs are committed to environmental sustainability.

4.3.2. MEASUREMENTS

Dependent variables

Environmental management policies was operationalized using a set of 10 policy-related environmental parameters provided by the Refinitiv Eikon database (Appendix A). A dummy variable was created for each of the considered environmental management practices and policies to represent if a firm has (value '1') or has not (value '0') implemented it. We constructed a measure of environmental management policies by computing the ratio of items reported to the total number of environmental matters considered. This measurement has been used as a proxy for

firms' environmental management in previous literature (e.g., Hartmann & Vachon, 2018; Hawn & Ioannou, 2016).

Environmental disclosure was operationalized using a set of 23 reporting-related environmental parameters provided by the Refinitiv Eikon database (Appendix B). We measured whether a firm reported on each of the environmental issues with binary items ('0' if the firm did not report on a specific environmental issue, '1' if it did). Similar to the environmental management policies variable described above, we constructed a measure of environmental disclosure by computing the ratio of items reported to the total number of environmental matters considered. Our approach followed the method used by previous literature to measure CSR disclosure (e.g., Hawn & Ioannou, 2016; Marano et al., 2017). Appendix B details the 23 environmental issues considered to build this variable.

Independent variables

To discern if an MNE should be classified as an EMNE or a DMNE we used as a proxy their level of home country institutional development. We defined emerging and developed countries in accordance with the United Nations Conference on Trade and Development (UNCTAD) classifications. Our variable takes the value '1' if the MNEs' country of origin is developed and '0' otherwise.

To measure *international diversification* we used an entropy measure that reflects both the extent and geographic distribution of MNEs' international presence based on the number of subsidiaries each firm has in different foreign countries (see Hitt, Tihanyi, Miller, & Connelly, 2006). We collected information from Bureau van Dijk's Orbis database on the country locations and establishment dates of all subsidiaries of the MNEs in our sample. Orbis has also been used in prior studies to measure firms' international orientation (e.g., Pisani, Garcia-Bernardo, & Heemskerk, 2020). For each sample firm, we included all foreign subsidiaries in which the firm was the global ultimate parent company, owning at least 50% of the entity either directly or indirectly. Then, we then applied the following formula from Hitt, Hoskinson and Kim (1997) to compute international diversification:

$$International\ diversification = \sum_i \left[P_i * \ln\left(\frac{1}{P_i}\right) \right],$$

where P_i is the percentage of foreign subsidiaries a firm has in country i, and $\ln(1/P_i)$ is the weight given to each country. We considered a total of 108 countries, including all countries in which at least one of the sample firms had a subsidiary.

Control variables

We included several control variables to control for firm-level characteristics, such as firm size, profitability, organizational slack, state ownership and subindustry. All of these variables have been previously found to be relevant in the analysis of environmental sustainability (e.g., Ellimäki et al, 2021). We measured firm size by computing the natural logarithm of total annual sales and we measured firm profitability using return on assets (ROA). We controlled for organizational slack, calculated by dividing a firm's total current assets with its total current liabilities and we included a dummy variable indicating whether the firms were state owned. Even though our sample is composed of MNEs in a single sector – energy and utilities –, there are various subindustries within the sector that have their own unique characteristics. Thus, to control for the potential effect of subindustry, we included subindustry dummy variables in our models, representing the 14 subindustries of the energy and utilities sector. These subindustries are based on the NAICS classification and refer to the 4-digit industry codes and are shown in Table 4.2.

Table 4.2. Subindustries of the energy and utilities sector

GICS subindustry name	% of firms
Coal	8.66%
Electric Utilities	13.36%
Independent Power Producers	3.97%
Integrated Oil & Gas	6.50%
Multiline Utilities	1.08%
Natural Gas Utilities	2.89%
Oil & Gas Drilling	3.61%
Oil & Gas Exploration and Production	17.69%
Oil & Gas Refining and Marketing	14.44%
Oil & Gas Transportation Services	3.25%
Oil Related Services and Equipment	18.05%
Renewable Energy Equipment & Services	4.33%
Renewable Fuels	0.72%
Uranium	1.44%
Total	**100.00% (270)**

4.4. RESULTS

Our hypothesis testing is based on the estimation of different linear regression models using Stata software (StataCorp, 2019). More specifically, we used random-effects panel regression models to test our hypotheses. To test for the presence of heteroskedasticity, we performed a *lrtest* which was not significant [LR chi2(283) = -1466.34, p=1], concluding that there were no heteroskedasticity issues. Furthermore, we tested for serial correlation in the idiosyncratic error term in the panel-data model using the Wooldridge test implemented in Stata by Drukker (2003), and in this occasion the null hypothesis of no serial correlation was rejected [F (1,269) =134.076, p=0.000]. Thus, we followed recommendations from the technical notes of the Stata manual (StataCorp, 2021) and estimated our models using the *vce(cluster id)* option, or its equivalent *vce(robust)*, because "clustering on the panel variable produces an estimator of the VCE that is robust to cross-sectional heteroskedasticity and within-panel (serial) correlation" (StataCorp, 2021), where VCE refers to variance-covariance matrix of the estimators.

The descriptive statistics and correlations among the variables included in this study are presented in Table 4.3. Our results showed a positive and significant correlation between the two dependent variables and the level of international diversification. In contrast, the correlations between the dependent variables and the country's level of development were negative and statistically significant.

Table 4.3. Descriptive statistics and correlations

	1	2	3	4	5	6	7	8
1.Environmental management policies	1							
2. Environmental disclosure	0.764***	1						
3. Organizational slack	-0.116***	-0.106***	1					
4. Firm profitability	0.158***	0.158***	-0.0232	1				
5. Size (log of sales)	0.545***	0.589***	-0.235***	0.379***	1			
6. State ownership	0.115***	0.121***	-0.0275	0.105***	0.205***	1		
7. Developed/Emerging	-0.170***	-0.0879***	0.0418	-0.146***	-0.176***	-0.235***	1	
8. Internationalization	0.348***	0.271***	-0.0818***	0.0475*	0.322***	-0.0150	0.131***	1
Mean	0.487	0.218	2.451	0.006	21.640	0.086	0.720	0.940
Std. Dev.	0.295	0.207	9.277	0.147	2.414	0.281	0.449	0.786

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.4 shows the results obtained in Models I and II. In Model I the dependent variable is Environmental management policies, while in Model II the dependent variable is Environmental disclosure. For each of these main models, we computed three sub-models. In the first one we incorporated the control variables considered in our study, while in the second one we added the variables required to test the first set of hypotheses (H1a and H1b). Finally, the third sub-model incorporated the multiplicative term required to test the moderation hypotheses presented in Hypotheses 2a and 2b.

Table 4.4. Regression Results

VARIABLES	Model I: Environmental Management Policies			Model II: Environmental Disclosure		
	Model I.1	Model I.2	Model I.3	Model II.1	Model II.2	Model II.3
Organizational slack	-5.21e-05 (0.000118)	-5.06e-05 (0.000117)	-5.08e-05 (0.000118)	0.000139** (6.30e-05)	0.000139** (5.84e-05)	0.000140** (5.84e-05)
Firm profitabilility	-0.0530* (0.0279)	-0.0423 (0.0274)	-0.0431 (0.0274)	-0.0326* (0.0175)	-0.0256 (0.0169)	-0.0263 (0.0170)
Size (log of sales)	0.0142 (0.00869)	0.00898 (0.00828)	0.00860 (0.00830)	0.0328*** (0.00380)	0.0299*** (0.00367)	0.0295*** (0.00367)
State ownership	0.0156 (0.0521)	-0.00576 (0.0430)	0.00163 (0.0452)	-0.0353 (0.0289)	-0.0232 (0.0261)	-0.0209 (0.0263)
Developed/Emerging		-0.109*** (0.0324)	-0.253*** (0.0563)		0.0208 (0.0175)	-0.0207 (0.0267)
Internationalization		0.138*** (0.0201)	0.00216 (0.0504)		0.0400*** (0.0101)	0.00154 (0.0217)
Developed x international diversification			0.169*** (0.0550)			0.0482** (0.0238)
subindustry dummies	Included	Included	Included	Included	Included	Included
Constant	0.125 (0.185)	0.206 (0.172)	0.308* (0.184)	-0.499*** (0.0840)	-0.471*** (0.0800)	-0.435*** (0.0825)
Observations	1,828	1,828	1,828	2,053	2,053	2,053
Number of id	284	284	284	284	284	284

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

While the results of Model I.2 showed that Hypothesis H1a is confirmed, Hypothesis H1b was not confirmed (Model II.2). In Model I.2, the coefficient for the variable *Developed* was negative and statistically significant (b=-0.109, p<0.01). Since the variable *Developed* takes the value 1 if the country of origin is developed and 0 otherwise, we conclude that, as stated in Hypothesis H1a, on average EMNEs implement higher levels of environmental management policies than DMNEs. In the case of Model II.2, linked to Hypothesis H1b, the coefficient for *Developed* did not reach statistical significance (b=0.0208, p>0.1), so H1b could not be confirmed with our

analysis. Regarding the moderating role of the level of international diversification raised in Hypotheses H2a and H2b, our results confirmed both hypotheses. As can be seen in Models MI.3 and MII.3, the estimated coefficients for the interaction term of the variables considered in the moderation relationship were statistically significant in both cases. To obtain a clearer view of the nature of the interaction, we plotted the interaction terms obtaining the representation shown in Figure 4.1 and Figure 4.2.

Figure 4.1. Adjusted means plot for the moderating effect: Environmental management policies

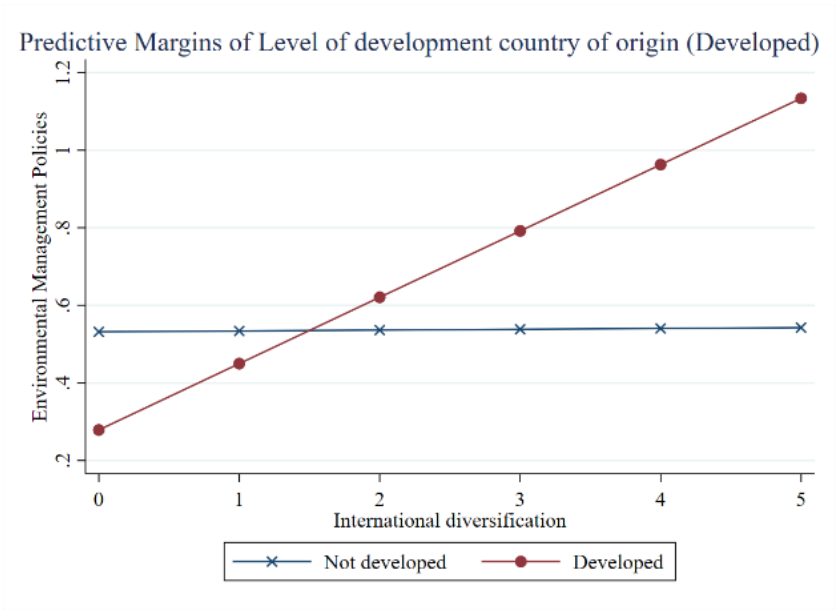

Figure 4.2. Adjusted means plot for the moderating effect: Environmental disclosure

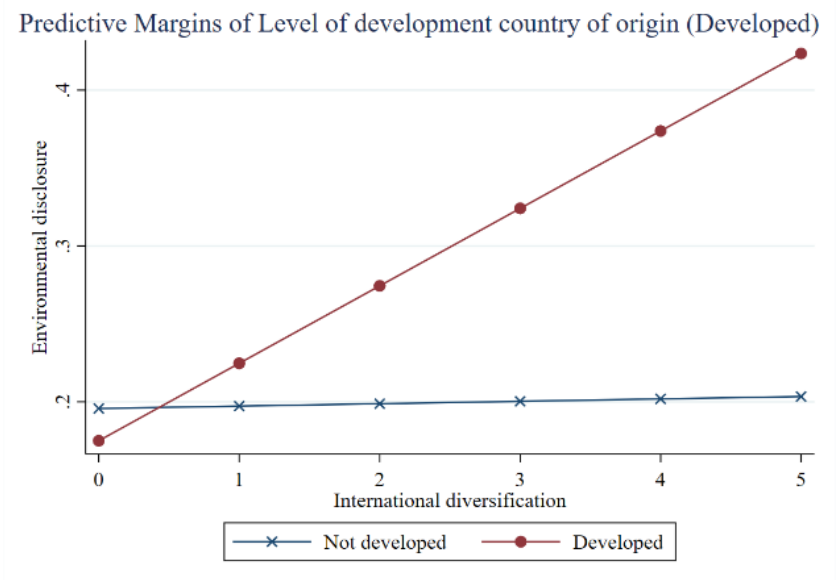

Figure 4.1 above shows that when the level of international diversification increases, DMNEs (red line) increase their environmental management policies to a greater extent than EMNEs (blue line). Similarly, Figure 4.2 shows how, as the level of international diversification increases, DMNEs increase their environmental disclosure to a greater extent than EMNEs. Therefore, both hypotheses H2a and H2b were confirmed.

4.4.1. ROBUSTNESS TESTS

We analyzed the robustness of the results obtained by seeing how the results are affected when one or more of the variables previously identified as potential determinants of dependent variables are omitted. To test the robustness of our baseline model, we followed recommendations of Neumayer and Plümpler (2017) and applied a sensitivity analysis to the explanatory variables. To implement this analysis, we used the *checkrob* module for Stata (Barslund, 2007) that estimates a set of regressions where the dependent variable is regressed on core variables (which are included in all regressions), and all possible combinations of other "non-core" or secondary variables. Additionally, subindustries were used as a control variable in all the estimated models. Since we used two models in which the dependent variables are different, the sensitivity tests were carried out independently for each of them. On the other hand, sensitivity tests were carried out for both of the models used to test the first two hypotheses and the hypotheses related to the moderating role of the level of international diversification.

Tables 4.5 and 4.6 present the results obtained after the sensitivity analysis, both for the core variables and for the secondary variables of two models related to formulated hypotheses. The first three columns show the maximum, minimum, and mean of the point estimate over all possible regressions performed. Column (4) shows the average standard deviation of the point estimates. Columns (5)– (7) contain the main results from the analysis. They reflect, respectively, the share of regressions where the point estimate is significant at the .05 level, the share with a positive point estimate (not necessarily significant), and finally the share of regressions with a negative point estimate. Column (8) gives the average t-value over all regressions and Column (9) reports the total number of estimated models.

Table 4.5. Robustness check Model I

Model I.2 (Hypothesis H1a)

a) Sensitivity test for core variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Developed/Emerging	-.1073	-.1142	-.1107	.0368	1	0	1	3.006	16
Internationalization	.1442	.1380	.1413	.0174	1	1	0	8.087	16

b) Sensitivity test for secondary variables

T-var	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Organizational Slack	-.000	-.0000	-.0000	.0001	0	0	1	.5158	8
Firm profitability	-.0371	-.0425	-.0399	.0250	0	0	1	1.5926	8
Size (log of sales)	.0091	.0077	.0084	.0049	0	1	0	1.6983	8
State ownership	.0028	-.0059	-.0017	.0608	0	.5	.5	.0690	8

Model I.3 (Hypothesis H2a)

c) Sensitivity test for core variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Developed/Emerging	-.2521	-.2554	-.2533	.0513	1	0	1	4.9376	16
Internationalization	.0134	.0021	.0077	.0467	0	1	0	.1634	16
Moderation Term	.1689	.1639	.1665	.0495	1	1	0	3.3684	16

a) Sensitivity test for secondary variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Organizational Slack	-.0000	-.0000	-.0000	.0001	0	0	1	.5315	8
Firm profitability	-.0398	-.0432	-.0417	.0253	0	0	1	1.6456	8
Size (log of sales)	.0087	.0074	.0080	.0049	0	1	0	1.6216	8
State ownership	.0099	.0014	.0054	.0611	0	1	0	.0860	8

Table 4.6. Robustness check Model II

Model II.2 (Hypothesis H1b)

d) Sensitivity test for core variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Developed/Emerging	.0244	.0062	.01476	.0202	0	1	0	.7579	16
Internationalization	.0610	.0385	.0500	.0108	1	1	0	4.5602	16

e) Sensitivity test for secondary variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Organizational Slack	.0001	-.0002	-.0000	.0000	.5	.5	.5	2.0087	8
Firm profitability	.0171	-.0255	-.0042	.0141	0	.5	.5	1.4750	8
Size (log of sales)	.0299	.0284	.0291	.0027	1	1	0	10.4996	8
State ownership	.0050	-.0246	-.0101	.0336	0	.5	.5	.42826	8

Model II.3 (Hypothesis H2b)

a) Sensitivity test for core variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Developed/Emerging	-.0153	-.0472	-.0320	.0294	0	0	1	1.065	16
Internationalization	.0119	.0010	.0065	.0262	0	1	0	.2420	16
Moderation term	.0621	.0446	.0543	.0275	.675	1	0	1.975	16

b) Sensitivity test for secondary variables

Variable	(1) Max	(2) Min	(3) Mean	(4) AvgSTD	(5) PercSigni	(6) Perc+	(7) Perc-	(8) AvgT	(9) Obs
Organizational Slack	.0001	-.0002	-.0000	.0000	.5	.5	.5	2.0032	8
Firm profitability	.0154	-.0262	-.0054	.0142	0	.5	.5	1.4221	8
Size (log of sales)	.0294	.0280	.0287	.0027	1	1	0	10.3821	8
State ownership	.0073	-.0224	-.0077	.0335	0	.5	.5	.4259	8

The data in Table 4.5 shows that the core variables were remarkably robust in both analyzed models (Model I.2 and Model I.3). None of the variables showed sign changes in any combination with the secondary variables. Focusing on Model I.2, the

home country institutional development variable was always negative and significant, at the 1% level as mean (AvgT=3.006), in all cases (Hypothesis H1a). Regarding Hypothesis H2a, we also observed that there was no change of sign in the coefficient of the interaction term, which was statistically significant 100% of the time (AvgT=3.3684; $p<0.01$ as mean). If we focus on the sensitivity analyses for Model II (Table 4.6), the results were robust as no sign changes were observed in the core variables. The results of the sensitivity analysis were consistent with the lack of confirmation of Hypothesis H1b (AvgT=0.7579; $p>0.1$). Regarding Hypothesis H2b, the results obtained with the sensitivity analysis indicated that the conclusions are quite robust. No sign changes were detected in the coefficient linked to the interaction term, which was statistically significant in 67.5% of the models estimated through the sensitivity analysis (AvgT=1.975; $p<0.05$).

4.5. CONCLUSIONS AND DISCUSSION

From a general point of view, in recent years the international business landscape has sharply changed in favor of EMNEs, as they increase their share of global business across multiple sectors. In particular, the energy and utilities sector has undergone a major transformation in the last decade and has become increasingly global. With increasing visibility in the eyes of global stakeholders, the sustainability of the sector and its constituents' operations has gained momentum (IEA, 2020). However, not all MNEs feel the same amount of pressure when it comes to good environmental behavior. In this paper we attempted to better understand how the home country institutional context of MNEs affects their environmental management policies and disclosure and how the international diversification of these MNEs' operations may affect the existing underlying relationships.

Using an unbalanced panel data set of 289 MNEs for a period of eight years, we showed that EMNEs adopted a wider range of environmental management policies than DMNEs. At the same time, we discovered that the level of development of the home country moderated the relationship between international diversification and environmental management policies, so that this relationship is stronger for DMNEs versus EMNEs. In addition, while we could not draw conclusions about the differences between DMNEs and EMNEs regarding environmental disclosure, we did

find that for DMNEs the positive effect of international diversification on their disclosure of environmental information is stronger than for EMNEs.

Regarding our contributions to the literature, first, we add to the literature on institutional voids and EMNEs by providing new insights on how environmental sustainability can be a common strategy used by EMNEs to attain global legitimacy (e.g., Marano et al, 2017; Montiel et al., 2012; Tashman et al., 2019). This previous research includes the environmental sustainability in their analyses as a dimension of CSR. However, they highlight the conflicts of interests that can arise by the social and environmental demands of different groups of stakeholders in the way that addressing one group's demands may hurt the others'. In this way, our work adds new evidence to the existing literature by studying specifically similarities and differences between EMNEs and DMNEs in two relevant dimensions of environmental sustainability: environmental disclosure and the adoption of environmental management policies. We find that EMNEs reach higher levels of implementation than EMNEs regarding environmental management policies. Furthermore, both EMNEs and DMNEs do similar efforts to communicate their environmental sustainability to external stakeholders to achieve public endorsement. Thus EMNEs exposure to international markets induces them to develop a global player identity (Marano et al, 2017) adopting higher levels of environmental sustainability that allow them to maintain their legitimacy in a global context. However, the fact that EMNEs start their internationalization endeavors with a legitimacy deficit because of their liability of origin may lead them to be more concerned about being perceived as a "green-washed" firm, so that in order to avoid it, they will try to be not only more transparent but also to implement more environmental management policies. Second, our study expands previous research by examining the moderating effect of home country on the relationship between international diversification and environmental management policies and environmental disclosure of EMNEs and DMNEs. So, we find that although all MNES face a complex institutional context when their level of international diversification increases, they have a different response depending on their home country, showing higher level of environmental management policies and environmental disclosure for DMNEs versus EMNEs.

Our findings show how both levels of environmental disclosure and environmental management policies stay almost constant as EMNEs become more international, while for DMNEs we observe a significant increase in both indicators with higher

international diversification. In light of these results, we can infer that DMNEs feel more pressure to improve their environmental behavior as they internationalize than EMNEs and have superior capacities to manage institutional complexity which implies greater levels of internationalization. EMNEs show only a very slight change in their behavior for both environmental disclosure and management policies as they expand to new foreign countries, suggesting that despite entering new countries, the pressure they feel from their stakeholders remains fairly constant, despite the addition of new stakeholder groups from host countries. Third, our work is relevant for the business sustainability literature as it focuses on one of the most polluting business sectors worldwide, as is the energy industry, responsible for a great share of the global greenhouse gas emissions. We included the home country perspective in our analyses, providing insights into the influence of the level of development of MNEs' home countries on their environmental behavior. So, both EMNEs and DMNEs face the increased demand for transparency in a global context in relation to environmental sustainability and, in addition also enhances their environmental management policies to obtain global environmental legitimation.

Policymakers could put in place measures in order to increase the sustainability of MNEs, specially from emerging countries as they show worse capacities to manage institutional complexity than DMNEs in more international environments. Including environmental requirements that involve looking at MNEs global operations instead of only the local projects in order to obtain permission to operate in a country could help make MNEs more sustainable globally, opening doors for sustainability leaders. These types of policies should only be implemented at supranational levels, with a gradual rollout and a strong consensus in order not to hinder EMNEs' growth as compared to DMNEs. On the other hand, incentivizing internationalization may help policymakers in developed countries make their MNEs more sustainable, as DMNEs have shown to have higher levels of environmental management policies and disclosure when their operations are more international.

Despite its contributions, this work has some limitations. First, the analyses focus on the energy sector, which has a high degree of regulation, and therefore, although it is very relevant from a sustainability point of view, it may not be possible to extrapolate the results to other industries. Second, we cannot completely discard the possibility of reverse causality, so it could be that DMNEs that have higher levels of environmental disclosure and management policies have a better chance of

successfully diversifying internationally, since their better environmental behavior helps them attain legitimacy in foreign countries facilitating their entry. Finally, we conducted the study with two relevant indicators of environmental sustainability but the addition of other sustainability perspectives to the analysis could help achieve a more comprehensive picture of the relationships studied.

Potential avenues for future research include deepening our knowledge into the different environmental behaviors of DMNEs and EMNEs when they expand abroad. Exploring the causes of the improvement in environmental disclosure and management policies observed in DMNEs and *not* in EMNEs when they internationalize could provide interesting findings. A starting point can be to analyze in which host countries do DMNEs and EMNEs have their operations and pointing out the differences between them that may cause the decoupling between the environmental behavior of DMNEs and EMNEs. On the other hand, we could explore if it is the home country of MNEs the one that is most relevant in their environmental behavior, as it could be that DMNEs' home country stakeholders exert pressure on them as they expand to less developed countries with lower environmental standards. For EMNEs we did not observe differences in their environmental behavior for different levels of internationalization, which may be caused by multiple factors that require additional research as could be that EMNEs meet local environmental demands with specific local measures, but they do not make these policies or actions extensive to the rest of their operations if they can avoid it.

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4.7. APPENDIX A. ENVIRONMENTAL MANAGEMENT POLICIES

Environmental Supply Chain Management: Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?
Energy Efficiency Policy: Does the company have a policy to improve its energy efficiency?
Water Efficiency Policy: Does the company have a policy to improve its water efficiency?
Emission Policy: Does the company have a policy to improve emission reduction?
Environmental Supply Chain Policy: Does the company have a policy to include its supply chain in the company's efforts to lessen its overall environmental impact?
Sustainable Packaging Policy: Does the company have a policy to improve its use of sustainable packaging?
Resource Reduction Policy: Does the company have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain
Environment Management Team: Does the company have an environmental management team?
Environment Management Training: Does the company train its employees on environmental issues?
Environmental Supply Chain Monitoring: Does the company conduct surveys of the environmental performance of its suppliers?

4.8. APPENDIX B. BREAKDOWN OF ITEMS USED FOR MEASURING THE VARIABLE "ENVIRONMENTAL DISCLOSURE"

Biodiversity Impact Reduction	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
Emissions Trading	Does the company report on its participation in any emissions trading initiative?
NOx and SOx Emissions Reduction	Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulfur oxides) or NOx (nitrogen oxides) emissions?
VOC or Particulate Matter Emissions Reduction	Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC) or particulate matter less than ten microns in diameter (PM10)?
VOC Emissions Reduction	Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC)?
Particulate Matter Emissions Reduction	Does the company report on initiatives to reduce, substitute, or phase out particulate matter less than ten microns in diameter (PM10)?
Waste Reduction Initiatives	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
e-Waste Reduction	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out e-waste?
Environmental Restoration Initiatives	Does the company report or provide information on company-generated initiatives to restore the environment?
Staff Transportation Impact Reduction	Does the company report on initiatives to reduce the environmental impact of transportation used for its staff?
Environmental Expenditures Investments	Does the company report on its environmental expenditures or does the company report to make proactive environmental investments to reduce future risks or increase future opportunities?
Environmental Partnerships	Does the company report on partnerships or initiatives with specialized NGOs, industry organizations, governmental or supra-governmental organizations, which are focused on improving environmental issues?
Toxic Chemicals Reduction	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?
Green Buildings	Does the company report about environmentally friendly or green sites or offices?
Environmental Supply Chain Partnership Termination	Does the company report or show to be ready to end a partnership with a sourcing partner, if environmental criteria are not met?
Land Environmental Impact Reduction	Does the company report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?
Environmental Products	Does the company report on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labeled and marketed?
Eco-Design Products	Does the company report on specific products which are designed for reuse, recycling or the reduction of environmental impacts?
Environmental Assets Under Management	Does the company report on assets under management which employ environmental screening criteria or environmental factors in the investment selection process?
Organic Products Initiatives	Does the company report or show initiatives to produce or promote organic food or other products?
Product Impact Minimization	Does the company reports about take-back procedures and recycling programmes to reduce the potential risks of products entering the environment or does the company report about product features or services that will promote responsible and environmentally preferable use?
Take-back and Recycling Initiatives	Does the company reports about take-back procedures and recycling programs to reduce the potential risks of products entering the environment?
Product Environmental Responsible Use	Does the company report about product features and applications or services that will promote responsible, efficient, cost-effective and environmentally preferable use?

5. CAPÍTULO V. CONCLUSIONES

En este capítulo se realiza una síntesis de los resultados y conclusiones derivados de los trabajos presentados en los tres capítulos centrales de la tesis doctoral. Se presentan los resultados más relevantes obtenidos y se discuten sus implicaciones prácticas y teóricas enfatizando su importancia en el campo de estudio. También se abordan las limitaciones de la investigación y se proponen recomendaciones para futuras investigaciones.

5.1. CONCLUSIONES DEL TRABAJO DE INVESTIGACIÓN E IMPLICACIONES ACADÉMICAS

La aportación principal del trabajo de investigación desarrollado en esta tesis, y que está presente en cada uno de los trabajos de investigación desarrollados, reside en el estudio combinado e interrelacionado de la internacionalización de las MNEs, sus planteamientos medioambientales y las características de los entornos institucionales donde estas empresas desarrollan su actividad. A continuación recogemos las conclusiones de cada una de las tres investigaciones recogidas en los capítulos II, III y IV.

El capítulo II presenta varias conclusiones. Primero, los resultados alcanzados confirman que la internacionalización de las MNEs del sector energético y sus planteamientos medioambientales, en términos de gestión medioambiental están positivamente relacionadas. Estos resultados muestran que las empresas con mayores niveles de internacionalización, y, por tanto, que hacen frente a una mayor complejidad institucional, buscan legitimidad en este contexto internacional haciendo un mayor esfuerzo por mejorar sus planteamientos medioambientales, en términos de gestión medioambiental. Además, su mayor internacionalización también incrementa su visibilidad, exponiéndolas a un escrutinio más exhaustivo de sus actividades por parte de los grupos de interés de los diferentes países donde desarrollan sus actividades (Yu, et al., 2017). En estas circunstancias, las MNEs mejoran sus políticas y prácticas ambientales incluso sin tener un mejor desempeño medioambiental, lo que podría considerarse como una mera búsqueda de legitimidad pragmática (Aragón et al., 2016; Suchman, 1995).

Segundo, los resultados del trabajo presentado en el capítulo II muestran cómo la relación entre internacionalización y planteamientos medioambientales, en términos de gestión medioambiental, sigue siendo significativa cuando la internacionalización de las empresas del sector energético se orienta hacia países en desarrollo. Entender este aspecto es relevante dado que, según la información del World Investment Report de la UNCTAD (2022), las economías en desarrollo representan una parte cada vez mayor de las entradas mundiales de FDI, absorbiendo en 2021 el 53% del total (p. 2), frente al 36% en 2016. Este resultado es de especial relevancia puesto que las MNEs pueden ser decisivas en las transferencias transfronterizas de mejores prácticas medioambientales y ayudar a llenar vacíos institucionales aprovechando la experiencia adquirida en otros contextos. Además, una mejor gestión medioambiental puede ser una herramienta eficaz para lograr la legitimidad global cuando las MNEs tienen un mayor volumen de sus operaciones en países en desarrollo. Por lo tanto, estos resultados no apoyan la hipótesis del "pollution haven" o paraíso de la contaminación y se suman a trabajos previos de gran impacto en la literatura donde se cuestiona dicha hipótesis (Aragón-Correa et al., 2016; Kathuria, 2018; Strike et al., 2006).

Tercero, los resultados alcanzados en este capítulo II no avalan la existencia de una relación positiva entre una mayor internacionalización y un mejor desempeño medioambiental entre las MNEs que operan en el sector energético. En línea con los trabajos seminales de Suchman (1995) sobre la legitimidad, este resultado puede estar en consonancia con una posible estrategia dual mostrada por estas empresas. Dicho de otro modo, la mayor internacionalización de las MNEs hace que centren sus esfuerzos en mejorar sus políticas internas de gestión medioambiental, en lugar de mejorar su desempeño medioambiental.

Las conclusiones de este trabajo tienen importantes implicaciones académicas puesto que aportan una nueva perspectiva desde la que estudiar la gestión medioambiental y la internacionalización, analizando la internacionalización de las MNEs, así como su orientación internacional hacia países menos desarrollados. Por un lado, en este capítulo se aporta nueva evidencia sobre los factores que pueden impulsar la decisión de las empresas de aplicar políticas de gestión medioambiental como, por ejemplo, contar con una estrategia de internacionalización o el nivel de desarrollo económico de los países a los que se dirigen. Por otro lado, mientras que los gobiernos y las instituciones supranacionales establecen políticas y acuerdos

medioambientales con objetivos y niveles de cumplimiento poco satisfactorios, del análisis realizado en este capítulo se desprende que las MNEs más internacionalizadas presentan una mejor disposición a operar responsablemente de forma más proactiva en cuanto a la adopción de políticas y prácticas medioambientales, aunque estos esfuerzos no se traduzcan en una mejora de su desempeño medioambiental. Por lo tanto, no se pueden extraer conclusiones que avalen o refuten la hipótesis del *pollution haven* en términos de desempeño medioambiental, lo que pone de relieve la complejidad del tema y la necesidad de seguir investigando el comportamiento medioambiental de las empresas internacionales.

En el trabajo presentado en el capítulo III se concluye que una mayor internacionalización impulsa la innovación medioambiental de las MNEs y que la fuerza de este efecto guarda relación con el desarrollo institucional de su país de origen. Este resultado, pone de manifiesto que un mayor nivel de internacionalización y un alcance más global se asocian a un desarrollo mayor de innovaciones medioambientales de las MNEs del sector energético. Estos resultados implican avances en la línea de investigación que relaciona el desarrollo de innovaciones medioambientales y las estrategias de internacionalización. Además, dado que la innovación medioambiental puede considerarse un mecanismo adecuado para alcanzar la legitimidad medioambiental en los mercados internacionales, es de especial relevancia analizar esta relación con datos de panel, tal y como se realiza en esta investigación.

En este capítulo III también se concluye que el nivel de desarrollo institucional en los países de origen de las MNEs refuerza la influencia del alcance de la internacionalización en el desarrollo de la innovación medioambiental, pero éste no afecta a la relación entre el nivel de internacionalización y la innovación medioambiental. Este resultado pone de manifiesto que el desarrollo institucional del país de origen puede reforzar la capacidad de las MNEs para hacer frente a la diversidad de bases de conocimiento propias de operar con una alta diversificación internacional (p.ej., Golini & Gualandris, 2018; Savino et al., 2017). Por tanto, los resultados sugieren que las MNEs de países con instituciones más sólidas están mejor equipadas que sus homólogas de países con un menor desarrollo institucional para hacer frente a la diversidad de fuentes de conocimiento a las que se accede al

diversificarse internacionalmente y traducirlas en innovaciones medioambientales (Liao et al., 2019;Xie & Li, 2018).

Es importante señalar que en este capítulo III, se obtienen algunas conclusiones, a priori contraintuitivas, al desagregar la muestra según el nivel de desarrollo institucional del país de origen de las MNEs. Por un lado, la influencia directa positiva observada del nivel de internacionalización sobre la innovación medioambiental sólo se mantiene para las MNEs con sede en países emergentes y no se encuentra ningún resultado significativo para sus homólogas situadas en países desarrollados. Estos resultados pueden deberse a las oportunidades de aprendizaje que ofrece la expansión de las operaciones empresariales en el extranjero. Dado que los países desarrollados suelen ser líderes en términos medioambientales y operan bajo las normativas ecológicas más exigentes del mundo, las MNEs con sede en estas economías no suelen tener que realizar esfuerzos innovadores tan intensos cuando amplían sus operaciones a otros países (Xie & Li, 2018). Lo contrario ocurre con las MNEs de economías emergentes que parten de una necesidad acuciante de mejorar su innovación medioambiental para demostrar su capacidad de competir en el ámbito internacional.

Por otra parte, el efecto positivo del alcance de la internacionalización sobre las innovaciones medioambientales se observa para las MNEs de países desarrollados, pero existe un efecto opuesto (negativo) para las MNEs con sede en países emergentes. Se puede entender que este efecto negativo se da debido a las dificultades que experimentan las EMNEs para hacer frente a la desventaja de su país origen, que obstaculizan su capacidad para traducir la nueva información en innovaciones medioambientales que sean competitivas en el ámbito internacional (Wang & Ma, 2018).

Por último, sorprende que el nivel medio de innovación medioambiental mostrado por las EMNEs que componen la muestra no sólo sea bastante similar, sino también ligeramente superior al de las DMNEs. Estos resultados sugieren que alcanzar niveles similares innovación medioambiental es posible para las MNEs de todo el mundo. Sin embargo, el desarrollo institucional del país de origen parece influir en la forma de alcanzar ese objetivo: Las EMNEs parecen beneficiarse de aumentar sus actividades internacionales cerca de casa, mientras que las DMNEs se benefician de ampliar sus actividades fuera de su región de origen.

Estos resultados tienen importantes implicaciones teóricas al señalar a dos actores cruciales para la consecución de la mejor sostenibilidad medioambiental de las MNEs del sector energético: por un lado, un funcionamiento eficiente de los esfuerzos de internacionalización a nivel de empresa y, por otro lado, unas políticas nacionales dirigidas a construir marcos institucionales sólidos para la consecución de los objetivos de sostenibilidad medioambiental de las MNEs energéticas. Los resultados obtenidos en este capítulo pueden constituir una base importante para futuros estudios que exploren el diseño de políticas públicas de estímulo orientadas a la expansión internacional más estratégica de las empresas, que les ayuden a desplegar sus mejores competencias para continuar con el desarrollo de innovaciones verdes a nivel mundial.

Las conclusiones del capítulo IV permiten mejorar el conocimiento sobre cómo afecta el contexto institucional del país de origen de las MNEs a sus políticas de gestión medioambiental y a la divulgación de información medioambiental. Además, los resultados de este capítulo aportan evidencia sobre cómo la diversificación internacional de las operaciones de las MNEs puede afectar a las relaciones subyacentes existentes. Por ello, en el capítulo IV, las principales conclusiones extraídas giran en torno a las diferencias y similitudes de las EMNEs frente a las DMNEs en lo que respecta a las políticas de gestión medioambiental y a la divulgación de información medioambiental.

En primer lugar, podemos concluir que las EMNEs tienen un desarrollo más avanzado de sus políticas medioambientales frente a las DMNEs. Sin embargo, tanto las EMNEs como las DMNEs llevan a cabo esfuerzos similares para comunicar su sostenibilidad medioambiental a los grupos de interés externos con el fin de lograr el respaldo público. En segundo lugar, los resultados han mostrado que el nivel de desarrollo del país de origen modera la relación entre la diversificación internacional y la implementación de políticas de gestión medioambiental, de modo que esta relación es más fuerte para las DMNEs que para las EMNEs. En tercer lugar, en cuanto a la divulgación de información medioambiental, los resultados muestran que para las DMNEs el efecto positivo de la diversificación internacional sobre su divulgación de información medioambiental es mayor que para las EMNEs.

En cuanto a las implicaciones y contribuciones a la literatura de este capítulo IV, destacamos que este trabajo se suma a la literatura sobre vacíos institucionales y

EMNEs proporcionando nuevas perspectivas sobre cómo el desarrollo de planteamientos medioambientales puede ser una estrategia común utilizada por las EMNEs para legitimar sus operaciones en un entorno global. Las investigaciones previas han analizado la responsabilidad social corporativa (CSR), incluyendo la sostenibilidad medioambiental como una de sus dimensiones (Marano et al, 2017; Montiel et al., 2012; Tashman et al., 2019). Sin embargo, los conflictos de interés que pueden surgir por las demandas sociales y ambientales de los diferentes grupos de interés, hace especialmente relevante analizar de forma separada la dimensión relacionada con la sostenibilidad medioambiental, tal y como se analiza en esta tesis doctoral.

Podemos señalar que esta investigación añade una nueva perspectiva a la literatura existente al estudiar específicamente las similitudes y diferencias entre las EMNEs y las DMNEs en dos dimensiones relevantes de la sostenibilidad medioambiental: la divulgación de información medioambiental y la adopción de políticas de gestión medioambiental. Así, la exposición de las EMNEs a los mercados internacionales las induce a desarrollar una identidad de actor global (Marano et al., 2017) adoptando mayores niveles de sostenibilidad medioambiental para mantener su legitimidad en un contexto global. Sin embargo, el hecho de que las EMNEs inicien sus esfuerzos de internacionalización con un déficit de legitimidad debido a la desventaja de su país origen puede llevarlas a tener una mayor preocupación porque sus acciones medioambientales se perciban como "greenwashing" por lo que, para evitarlo, tratarán no solo de ser más transparentes, sino también de aplicar más políticas de gestión medioambiental.

Las investigaciones desarrolladas en esta tesis constituyen un avance significativo sobre la literatura previa puesto que se analiza el papel que juegan las características del país de origen en la relación entre la internacionalización y las políticas de gestión medioambiental y divulgación medioambiental de las EMNEs y las DMNEs. Aunque todas las MNEs se enfrentan a un contexto institucional complejo cuando aumenta su nivel de diversificación internacional, tienen una respuesta diferente dependiendo del nivel de desarrollo de su país de origen, mostrando un mayor nivel de políticas de gestión medioambiental y de divulgación medioambiental para las DMNEs frente a las EMNEs.

Por último, hay que destacar que las investigaciones recogidas en esta tesis doctoral son relevantes para la literatura sobre sostenibilidad medioambiental empresarial, ya que se centran en uno de los sectores empresariales más contaminantes de todo el mundo, como es la industria energética, responsable de una gran parte de las emisiones mundiales de gases de efecto invernadero. Además, la inclusión de la perspectiva del país de origen en nuestros análisis, nos permite comprender mejor la influencia del nivel de desarrollo de los países de origen de las MNEs en su comportamiento medioambiental. Así pues, tanto las EMNEs como las DMNEs se enfrentan a una mayor demanda de transparencia en un contexto global en relación con la sostenibilidad medioambiental y, además, también se les exige la mejora de sus políticas de gestión medioambiental para obtener una legitimación medioambiental global.

5.2. IMPLICACIONES PRÁCTICAS

Como principales implicaciones para los responsables de la gestión de las empresas podemos señalar en primer lugar, la necesidad de que los directivos sean conscientes de que el diseño de una adecuada estrategia de internacionalización puede ser una oportunidad para mejorar su estrategia medioambiental, estableciendo estándares que van más allá de las normas nacionales.

En segundo lugar, los resultados tienen una relevancia especial para las MNEs del sector energético. Como es conocido, estas empresas son responsables de gran parte de las emisiones globales de GHG, por lo que este sector tienen un impacto medioambiental sustancial (Moorhead & Nixon, 2015) y necesita someterse a un intenso proceso de adaptación en las próximas décadas para alcanzar los objetivos globales de emisiones (Martínez-Fernández et al., 2013). Las conclusiones obtenidas en esta tesis doctoral pueden ayudar a las MNEs energéticas a evaluar los pros y los contras de las distintas fórmulas para ampliar su presencia internacional.

En tercer lugar, destaca el amplio margen existente para que las MNEs energéticas mejoren su compromiso con la internacionalización con el fin de consolidar su compromiso con la sostenibilidad medioambiental. El nivel y el alcance de la internacionalización en nuestra muestra es reducido, tanto en las DMNEs como en las EMNEs. En el contexto del aumento de las emisiones globales de GHG, los

resultados que indican que la internacionalización puede ser buena para mejorar ciertos planteamientos medioambientales ofrecen una perspectiva interesante a tener en cuenta por los reguladores públicos así como por los directivos de las empresas del sector de la energía. De este modo las MNEs del sector de la energía pueden considerarse no sólo parte del problema contaminante, sino también una pieza crucial para mitigarlo. Las MNEs con estándares medioambientales de partida más elevados pueden constituir una referencia interesante para la elaboración de políticas en el caso de las empresas con peores estándares. Esto es especialmente relevante para las empresas con sede en economías emergentes, cuyas cifras medias de internacionalización más bajas. Además, podemos apuntar que aunque diversas partes interesadas consideran que las MNEs son uno de los principales agentes que contribuyen a la insostenibilidad en lo que respecta al medio ambiente y la sociedad (Burritt et al., 2020), las innovaciones medioambientales de estas empresas pueden ser un medio eficaz para responder a las demandas sociales y medioambientales y obtener legitimidad al tiempo que mejoran su posición competitiva en los mercados internacionales.

En cuarto lugar, los resultados presentados en esta tesis ofrecen también implicaciones directas para orientar a los reguladores públicos, gobiernos e instituciones supranacionales, en cuanto a favorecer el desarrollo sostenible de las MNEs que operan en el sector energético. Las políticas gubernamentales de los países desarrollados deberían fomentar la expansión de sus MNEs a varias regiones (mayor alcance global de las actividades internacionales), pero en los países emergentes parece funcionar mejor que dichas políticas promuevan una internacionalización menos dispersa geográficamente (menor alcance global de las actividades internacionales). De este modo, nuestro estudio ayuda a los reguladores públicos de los países desarrollados y emergentes a considerar las formas de gestionar sus estrategias de internacionalización para contribuir a potenciar sus innovaciones medioambientales en el mercado global.

En quinto lugar, hay que destacar cómo en los últimos años se ha observado un marcado cambio en el panorama empresarial internacional a favor de las EMNEs, a medida que aumentan su cuota de negocio mundial en múltiples sectores. En particular, el sector de la energía ha experimentado una gran transformación en la última década y se ha vuelto cada vez más global. Con una visibilidad cada vez mayor a los ojos de los stakeholders globales, la sostenibilidad del sector energético y las

operaciones de sus integrantes ha cobrado relevancia (IEA, 2020). Sin embargo, no todas las MNEs sienten la misma presión en cuanto a tener un buen comportamiento medioambiental. Por ello, los resultados obtenidos son relevantes dado que las economías emergentes representan una parte cada vez mayor de las operaciones empresariales transfronterizas.

En sexto lugar, dado el contexto altamente global en el que se desarrolla la actividad del sector energético, los responsables políticos pueden considerar la revisión de las políticas públicas dirigidas a reforzar ciertos pilares institucionales a nivel nacional para proporcionar a las empresas energéticas los ecosistemas innovadores adecuados. La calidad de las instituciones del mercado nacional es un factor importante que influye en la capacidad de las MNEs para obtener beneficios medioambientales derivados de la internacionalización. Los gobiernos deben reflexionar sobre sus políticas de inversión extranjera directa (FDI) apoyando una FDI sostenible que implique inversiones que, "siendo comercialmente viables, hagan todo lo posible por contribuir razonablemente al desarrollo económico, social y medioambiental de los países receptores, y tengan lugar en el contexto de mecanismos de gobernanza justos" (Sauvant y Gabor, 2021: 262). El análisis realizado de las diferencias entre las empresas multinacionales de países emergentes y desarrollados ofrece información útil para orientar el diseño de políticas dirigidas a la internacionalización de las empresas. Las conclusiones de los análisis realizados pueden ayudar a los responsables políticos a comprender mejor las diferencias entre las EMNEs y las DMNEs en cuanto a su capacidad para asimilar las fuentes de conocimiento heterogéneas a las que se tiene acceso al operar en el extranjero y que pueden facilitar el desarrollo de innovaciones medioambientales. A los gobiernos de los países emergentes les podría resultar provechoso aplicar políticas y mecanismos de apoyo o mejorar los existentes para ayudar a las empresas nacionales en su proceso de internacionalización, ya que esto puede ayudar a las empresas locales a impulsar sus niveles de innovación medioambiental con los consiguientes efectos indirectos positivos en el país origen.

En conclusión, los responsables políticos podrían poner en marcha medidas para aumentar la sostenibilidad de las MNEs, especialmente de los países emergentes, ya que muestran peores capacidades para gestionar la complejidad institucional que las DMNEs en entornos más internacionales. Este tipo de políticas deberían aplicarse a nivel supranacional, con un despliegue gradual y un fuerte consenso para no

obstaculizar el crecimiento de las EMNEs en comparación con las DMNEs. Por otro lado, incentivar la internacionalización puede ayudar a los responsables políticos de los países desarrollados a hacer que sus MNEs sean más sostenibles, ya que las DMNEs han demostrado tener mayores niveles de políticas de gestión medioambiental y de divulgación de información cuando sus operaciones son más internacionales.

5.3. LIMITACIONES Y FUTURAS LÍNEAS DE INVESTIGACIÓN

Ningún trabajo de investigación queda exento de limitaciones, por lo que a continuación se señalan las principales limitaciones de esta tesis doctoral.

En primer lugar, el hecho de que nuestra muestra sea MNEs del sector de la energía dificulta extrapolar las conclusiones a empresas de otros sectores con diferentes niveles de regulación, internacionalización y planteamientos medioambientales. En particular, los procesos de desregulación experimentados por el sector energético en los últimos años han configurado trayectorias de legitimidad cambiantes tanto de las tecnologías energéticas convencionales como de las nuevas. Mientras que las tecnologías de combustibles fósiles dominan el sector, responsable de un alto porcentaje de las emisiones de gases de efecto invernadero globales, las tecnologías energéticas convencionales están perdiendo rápidamente su legitimidad (Patala, et al., 2019). Por tanto, aunque parece apropiado tomar un enfoque sectorial de esta cuestión, tal y como se ha llevado a cabo en esta tesis, hay que tener en cuenta que no es posible extrapolar de manera directa e inmediata los resultados a otros sectores sin hacer análisis adicionales que tengan en cuenta sus particularidades.

En segundo lugar, los análisis presentados en esta tesis están sujetos a algunas limitaciones. En el capítulo II, se ha realizado el análisis a partir de datos transversales. Sería útil comprobar si se mantienen los resultados sobre una muestra longitudinal de datos de panel y revelar tendencias en la evolución de las empresas en el tiempo. Esta tesis doctoral ofrece un análisis unidireccional entre la internacionalización y los planteamientos medioambientales. Sin embargo, la relación entre estas dos variables puede ser bidireccional. Aunque para mitigar la posibilidad de causalidad inversa, se ha utilizado un desfase de un año en nuestros

modelos estadísticos, la exploración de una relación bidireccional puede constituir una futura vía de investigación.

En tercer lugar, aunque la base de datos Refinitiv Eikon (antes Thomson Reuters Eikon) se considera una fuente de información fiable para medir los diferentes planteamientos medioambientales de las empresas, sólo facilita información completa sobre empresas de gran tamaño y con cotización pública. Además, hay que añadir que aunque en todos los trabajos presentados en esta tesis se utilizan medidas de las variables de gestión medioambiental e internacionalización similares a las ya utilizadas previamente en la literatura, estas medidas tienen sus limitaciones y es interesante de cara a futuras investigaciones considerar nuevos indicadores que den otras perspectivas de las relaciones estudiadas.

Futuras investigaciones podrían tratar de ampliar la muestra de empresas del sector energético e incorporar indicadores adicionales para medir tanto la internacionalización como el desempeño medioambiental, la innovación medioambiental, las políticas medioambientales y la divulgación de información medioambiental. La mejora continua de la base de datos Refinitiv Eikon, con la incorporación de nuevos indicadores, así como la consulta de otras bases de datos permitiría el desarrollo de estas investigaciones.

En cuarto lugar, la tesis se centra en factores a nivel de empresa (internacionalización y planteamientos medioambientales) y a nivel macroeconómico (nivel de desarrollo institucional a nivel nacional) y no incorpora otras presiones que pueden afectar igualmente al comportamiento de las MNEs en sus planteamientos medioambientales. Por ejemplo, se podría analizar en futuros trabajos las presiones normativas con una muestra multisectorial estudiando los sectores regulados frente a los no regulados, obteniendo así datos interesantes sobre los diferentes comportamientos de otras empresas y la posibilidad de extrapolar los resultados obtenidos.

Por último, en futuras investigaciones se podrían examinar más detenidamente algunos factores contextuales de cada país. Por un lado, existen diferencias significativas entre los países emergentes en variables que pueden ser influyentes para la innovación (por ejemplo, el índice de desarrollo humano y la disponibilidad de clusters tecnológicos en la zona) o la calidad de las instituciones públicas (por ejemplo, el índice de desarrollo democrático). Por otro lado, puede ser de interés

abordar cómo aquellos países que pertenecen a un área de integración económica pueden comportarse de forma más o menos similar en cuanto a los logros de sus MNEs en materia de innovación medioambiental. Ambos análisis contextuales pueden ser útiles para definir líneas de actuación para los responsables políticos.

Además, entre las posibles vías de investigación futura se podría profundizar en los diferentes comportamientos medioambientales de las DMNEs y las EMNEs cuando se expanden en el extranjero. Explorar las causas de la mejora de las políticas de divulgación y gestión medioambiental observada en las DMNEs pero no en las EMNEs cuando se internacionalizan podría aportar conclusiones interesantes. Un posible punto de partida puede ser analizar hacia qué países de acogida dirigen sus operaciones las DMNEs y las EMNEs señalando las diferencias que pueda haber entre ellos y buscando la posible relación con la disociación entre el comportamiento medioambiental de las DMNEs y las EMNEs.

5.4. BIBLIOGRAFÍA UTILIZADA EN EL CAPÍTULO

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