



MASTERARBEIT | MASTER'S THESIS

Titel | Title

Dynamic Green Capabilities as Drivers of Reshoring

verfasst von | submitted by

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2026

Studienkennzahl lt. Studienblatt |
Degree programme code as it appears on
the student record sheet:

UA 066 915

Studienrichtung lt. Studienblatt | Degree
programme as it appears on the student
record sheet:

Masterstudium Betriebswirtschaft

Betreut von | Supervisor:

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Abstract

This study examines whether Dynamic Green Capabilities (DGC) serve as internal motivators for reshoring decisions by multinational enterprises (MNEs). Based on the (Natural) Resource-Based View and the Dynamic Capability (DC) framework, three hypotheses are tested using a panel dataset (years 2011 to 2025) of 926 publicly traded manufacturing MNEs with a two-stage residual inclusion approach. The results from the 11,032 observations show a positive and highly significant effect of DGC on the probability of reshoring. While no causal effects could be found for the first moderator International Organization for Standardization (ISO) 14000 certification, a positive and significant influence on the DGC-reshoring relationship was identified for the second moderator Environmental, Social, Governance (ESG) scores. The results show that the DGC effect holds when sustainability orientation is embedded in the corporate structure and corresponding internal structures and processes have been developed. This study contributes to the DGC and reshoring research by empirically testing DGC as a mechanism influencing reshoring.

Keywords: *Dynamic Green Capabilities, Reshoring, ESG, MNEs, Natural Resource-Based View*

Zusammenfassung

Diese Studie untersucht, ob die Dynamic Green Capabilities (DGC) als firmeninterne Motivatoren von Reshoring Entscheidungen multinationaler Unternehmen fungieren. Auf Basis des (Natural) Resource-Based View und des Dynamic Capabilities (DC) Frameworks werden drei Hypothesen anhand eines Paneldatensatzes (Jahre 2011 bis 2025) von 926 börsennotierten multinationalen Produktionsunternehmen mittels eines two-stage residual inclusion-Ansatzes getestet. Die Ergebnisse der 11.032 Beobachtungen zeigen einen positiven und hochsignifikanten Effekt von DGC auf die Reshoring-Wahrscheinlichkeit. Während für den ersten Moderator International Organization for Standardization (ISO) 14000 Zertifizierung kein kausaler Effekt festgestellt werden konnte, wurde bei dem zweiten Moderator Environmental, Social, Governance (ESG)-Wert ein positiver und signifikanter Einfluss ermittelt. Die Ergebnisse zeigen, dass DGC ihre Wirkung dann entfalten, wenn die Nachhaltigkeitsorientierung in der Unternehmensstruktur verankert ist und entsprechende interne Strukturen und Prozesse entwickelt wurden. Diese Studie leistet einen Beitrag zur DGC- und Reshoring-Forschung, indem sie DGC als Wirkmechanismus auf Reshoring empirisch testet.

Schlagerwörter: *Dynamic Green Capabilities, Reshoring, ESG, MNEs, Natural Resource-Based View*

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List of Abbreviations

CO ₂	Carbon dioxide
DC	Dynamic Capabilities
DGC	Dynamic Green Capabilities
ESG	Environmental, Social, Governance
IB	International Business
ISO	International Organization for Standardization
MNE(s)	Multinational enterprise(s)
NRBV	Natural Resource-Based View
OM	Operations Management
R&D	Research and Development
RBV	Resource-Based View
SDG	Sustainable Development Goals
SCM	Supply Chain Management
SM	Strategic Management
TCE	Transaction Cost Economics

1. Introduction

For several decades, the strategic goals of many firms included expanding and offshoring activities for cost-rationalization, organizational flexibilities, or access to cheaper labour (Di Mauro et al., 2018). Recently, demands have shifted and conditions that once made offshoring attractive are now vanishing (Yu et al., 2022). Rising wages in previous low-cost locations, repeated supply chain disruptions from COVID-19 pandemic, Brexit or full-scale invasion in Ukraine, have altered the strategic focus of global production and supply chain activities (Cosimato & Vona, 2021; Makri & Leri, 2023; Verbeke, 2020). In addition, regulatory initiatives such as the Agenda 2030 (United Nations, 2015), rising carbon pricing mechanisms, increasing political and consumer expectations, and the sustainability-conscious investors' growing knowledge pressure firms to address and reduce the environmental footprint of their supply chains (McIvor et al., 2025; Zhang et al., 2023). Against this backdrop, a rising number of manufacturing MNEs are reversing prior offshoring decisions and relocate their activities back or closer to their home countries. This phenomenon became popular in literature under the notion of *reshoring* (Fratocchi et al., 2016; Gray et al., 2013).

Firm's environmental sustainability issues have become increasingly important and are putting pressure MNEs to take action (Maksimov et al., 2022). To comply with stricter standards and align operations with the sustainability expectations of external stakeholders, firms strategically relocate their resources in proximity to the home country (Di Stefano et al., 2024; Fernández-Miguel et al., 2022). This presents a shift from competitiveness through mere cost-orientation (Porter, 1980), to a strategic logic in which environmental sustainability plays a central role. Although external issues and pressures apply within the same industry a heterogenous reshoring behaviour can be observed. Reshoring decisions differ in when, where, how and whether firms reshore (Cosimato & Vona, 2021; McIvor & Bals, 2021). This heterogeneity is the central motivation for this study. If sustainability pressures affect firms in similar ways, why do only some of them translate this pressure into a strategic decision to reshore? This study argues that the answer lies not in the external pressure itself, but in the availability of firm-internal, sustainability-oriented capabilities, termed *DGC* (Maksimov et al., 2022).

While the literature has identified various drivers explaining why firms reshore, ranging from cost corrections, resilience motivations, institutional pressures to strategic value creation (Makri & Leri, 2023; McIvor & Bals, 2021), a shift in explanatory focus is required to understand how and which firm-level mechanisms facilitate reshoring decisions, and to address heterogeneity. The DC perspective (Teece et al., 1997) is still an evolving, but promising lens to address the strategic mechanisms required to pursue reshoring activities (Makri & Leri, 2023). While this theory focuses on general capabilities, it leaves timely pressures from the natural environment out. In line with the rising demand from stakeholders to act responsible towards its natural environment, the DC framework has been therefore expanded with the sustainability lens, introducing the DGC framework by Maksimov et al. (2022). DGC are defined as the “ability to build complementary green competences and reconfigure organizationally embedded resources to pursue competitive advantage in a rapidly changing stakeholder environment” (Maksimov et al., 2022, p. 723). Incorporating the sensing-seizing-reconfiguring mechanism (Teece, 2007) into the sustainability-context, it can serve as a potential framework to explain the heterogeneity observed in reshoring.

Grounded on the Resource-Based View (RBV) (Barney, 1991; Wernerfelt, 1984), the Natural Resource-Based View (NRBV) (Hart, 1995) and the DC framework (Teece et al., 1997), this study examines to what extent DGC drive reshoring. Therefore, three hypotheses are tested to answer this study’s research question. First, DGC are expected to increase the reshoring probability, as firms with superior sensing, seizing and reconfiguring capabilities (Maksimov et al., 2022) are better positioned to recognize misalignments between offshore production and their sustainability goals. Second, this study proposes that ISO 14000 certification for environmental management systems negatively moderates this effect, because accreditation is expected to partially serves as a legitimization function (Bansal & Roth, 2000; Boiral, 2007). Therefore, it may substitute for the external pressures which might otherwise drive strategic restructuring. Third, a firm’s ESG score is expected to positively moderate the DGC-reshoring relationship as it represents a more thorough strategic sustainability orientation of the firm with complementary organizational architecture (Eccles et al., 2014), which can more effectively support reshoring than compliance alone.

The hypotheses are tested on a panel of 926 listed manufacturing MNEs headquartered in Europe and the United States. With 15-year time-series data including the period 2011

to 2025, this study covers 11,032 firm-year observations. Reshoring events are identified using an employment-based operationalization drawing on Bureau van Dijk ORBIS data, and DGC are operationalized through validated proxies for sensing, seizing and reconfiguring from LSEG Datastream.

This study makes several contributions to the literature. It advances the reshoring field by providing a large-scale empirical test of the DGC framework as an enabling mechanism for reshoring. This shifts the focus from why reshoring occurs to what mechanism drive reshoring (Fratocchi et al., 2016). Furthermore, the sustainability lens applied contributes to the strategic perspective of reshoring with sustainability-oriented intent. It extends the DGC findings by establishing reshoring as a new outcome domain for the framework, while showing that investing in DGC supports complex and investment intense operations. Further, it contributes to the understanding of the required commitment to sustainability, with respective long-term managerial vision (Eccles et al., 2014) by empirically testing the moderating roles of process-oriented certification (ISO 14000) and strategic sustainability indicator (ESG score).

The study is structured as follows. After the relevant literature on dynamic green capabilities and reshoring is analysed to provide a clear state-of-the-art overview and identify this study's research gap and research question, key theoretical lenses are introduced. After the development of hypotheses and the presentation of the empirical methodology, the findings are reported and discussed based on the theoretical frameworks and literature, followed by acknowledging limitations within this study and providing directions for future research.

2. Literature Review

The subsequent pages provide a brief overview over the relevant literature, structured along reshoring and DGC. The literature review for this study is based on a database search, including keyword and forward and backward citation search. Relevant findings and foundations are synthesized to provide a clear overview of the current state-of-the-art from reshoring, DC (Teece et al., 1997), and DGC (Maksimov et al., 2022). The first part focuses on the development of the reshoring research, starting from its early cost-corrective logic to the emerging sustainability-driven perspective. The second part examines the DGC literature. The key topics cover the theoretical foundations and the strategic implications for MNEs. In the end, both streams are synthesized, leading to the research gap.

2.1 Methodology

With a pre-defined set of keywords and keyword combinations, which represent this study's focal topics, a first structured search was conducted in Scopus. This set includes "reshoring", "re-shoring", "back-shoring", "backshoring", "nearshoring", "dynamic capabilities", "dynamic green capabilities", "green dynamic capabilities", "green capabilities", "environmental sustainability", "sustainability", "natural resource-based view", "resource-based view", "ESG", "ISO 14000", "ISO 14001", and "environmental certification". A licence restriction limited the full search possibility. Therefore, only papers published in the past 10 years were available. In line with this limitation, the first round resulted in a total of 109 papers. The search was further restricted by document type to be peer-reviewed journal articles and limited to the research domains of management, business, strategy, sustainability and decision making. Furthermore, the scientific paper "Global connectedness and dynamic green capabilities in MNEs" by Maksimov et al. (2022), published in an internationally recognized journal, was included as well, as it serves as the foundational paper for the DGC framework utilized in this study. This resulted in a starting literature consisting of 10 papers. The literature was further expanded through forward and backward citation searches and additional keyword searches in important academic databases, such as Web of Science, Google Scholar, the University of Vienna's library search portal (u:search) and SSRN. If articles addressed either reshoring drivers, DC, DGC or sustainability management, ideally in multinational

firms, and provided either a structured literature overview, theoretical foundation or empirical evidence relevant to this study's framework, they were included.

2.2 Reshoring

From the early 2010s, scholar's attention turned to MNEs reversing offshoring decisions and bringing operations back into or closer to the home country (Foerstl et al., 2016; Fratocchi et al., 2016; Makri & Leri, 2023; Pedroletti & Ciabuschi, 2023). In academic research, the widely adopted term *reshoring* was introduced in Gray et al.'s (2013) essay on reshoring in global supply chains. As the name implies, reshoring is related to the well-known strategic decision for offshoring. While offshoring refers to the shift of products, services or production processes outside the headquarters' country (Di Mauro et al., 2018), reshoring is the decision to reverse the offshoring operation and relocate activities closer or back to the home country (Foerstl et al., 2016; Fratocchi et al., 2016; Makri & Leri, 2023; Pedroletti & Ciabuschi, 2023). Although reshoring is a relatively new research field, it quickly caught scholars' attention. There is already evidence indicating that managers tend to reverse offshoring decisions within the first five years (Kinkel, 2014). This confirms reshoring as an integral part of global activities which is shaped by institutional (Wan et al., 2019), political (Kinkel, 2014) and market pressures (Cosimato & Vona, 2021).

Two publication peaks, in 2015 and in 2018, mark moments of growing attention in reshoring research (Makri & Leri, 2023). Reason here for could be, first, a reshoring momentum in the USA around that time (Gray et al., 2013). Second, the free access to secondary data on European companies engaging in reshoring provided by the European Reshoring Monitor made research easier, leading to this momentum (Makri & Leri, 2023). While the body of contributions is constantly growing, the literature remains fragmented across multiple managerial domains (Makri & Leri, 2023). This leads to theoretical tensions regarding the definition, whether reshoring is a corrective reaction or a proactive strategic decision, or the underdeveloped role of environmental sustainability orientation.

2.2.1 Definition of Reshoring

There are many definitions surrounding the notion of reshoring. Generally, reshoring describes the relocation of any operation that can be relocated, such as production or

sourcing activities, back into or closer to the home country (Foerstl et al., 2016; Fratocchi et al., 2016; Makri & Leri, 2023; Pedroletti & Ciabuschi, 2023). Related terms include *backshoring*, defined as the relocation of activities into the domestic country (Piatanesi & Arauzo-Carod, 2019) and *nearshoring*, referring to relocation of activities to a proximate, neighbouring or home country (Fratocchi et al., 2014; Piatanesi & Arauzo-Carod, 2019). Reshoring does not necessarily imply that the foreign plant will be closed, nor will relationships be cut. Reshoring can thus involve either a partial or a complete termination of foreign activities (Fratocchi et al., 2014).

The broad definitional scope and varying perception of reshoring lead to lack of clarity in the literature and poses a limitation for the field. Though the body of research is constantly growing, certain conditions of reshoring are still not clearly defined, such as ownership modifications. This means that reshoring can entail activities that are being insourced completely in-house with ownership modifications, or that processes or products are shifted to a local supplier, relocating the activity but without ownership change (Makri & Leri, 2023; McIvor et al., 2025). Therefore, to clarify the term reshoring within this study, this paper applies the definition by Brandon-Jones et al. (2017) which states that reshoring is the “return of manufacturing and service operations from previously offshored location to the headquarters’ country” (p.31).

2.2.2 State of the Art

The phenomenon of reshoring gained attention across multiple academic fields. Current literature analyses the phenomenon of reshoring primarily through lenses of international business (IB), operations management (OM), strategic management (SM) and supply chain management (SCM), utilizing fundamental theories such as Transaction Cost Economics (TCE) (Williamson, 1975), Resource-Based View (RBV) ((Barney, 1991; Wernerfelt, 1984), Internalization Theory (Buckley & Casson, 1976/1991) and Dunning’s Eclectic Paradigm (Dunning, 1988) (Makri & Leri, 2023). The state-of-the-art can be clustered into three broad areas: drivers and motivations for reshoring, the decision-making and implementation process, and the outcomes of reshoring (Boffelli & Johansson, 2020; Makri & Leri, 2023). Among these, the strongest attention has been given to answering the question of *why* reshoring occurs, seeking to identify drivers and motivators (Makri & Leri, 2023). The current empirical direction begins to approach *how* location decisions are made and implemented (Pedroletti & Ciabuschi, 2023). Though

this area remains understudied, a conceptual paper reveals the valuable contribution made within each step of the reshoring process (McIvor & Bals, 2021).

While each domain produces meaningful contributions, stand-alone domain knowledge differs considerably from the potential of cumulative, cross-domain knowledge (Barbieri et al., 2018; Boffelli & Johansson, 2020). The consequences of this fragmentation can also be seen in Makri and Leri's (2023) systematic literature review, which confirms that 62.3% of reviewed papers apply no theoretical perspective, but merely rely on previous findings. This implies that the theoretical tools available to the research field remain behind the empirical complexity of the phenomenon it studies.

Focusing mainly on why reshoring occurs is not enough to capture its complex nature, and more research is needed on how these decisions are made and finding explanations why comparable firms make different decisions. The following sections provide an overview on the development of the reshoring literature across its key streams, starting from the early cost-corrective logic to the emerging sustainability and capability focus.

2.2.2.1 The Foundational Tension in Reshoring

The first researchers approaching the phenomenon of reshoring were from the domains of OM and SCM and their findings are still central for the reshoring debate (Barbieri et al., 2018; Boffelli & Johansson, 2020). Kinkel & Maloca (2009) established the foundational argument in OM that reshoring is to be perceived as the correction of prior misjudgements, such as the underestimation of global production complexity at the time of offshoring. From this perspective, reshoring is viewed as a decision correction which in turn leads to short-term operational adjustments and consequential supply chain reconfigurations, rather than a strategic reorientation. In this sense, reshoring occurs because offshoring fails to deliver the promised synergies. Subsequent OM research focused on finding the origins of value creation threats which further explain the reversal of offshoring decisions by specifying operational mechanisms behind this corrective logic. In Stentoft, Olhager, et al.'s (2016) systematic literature review, based on 25 factors which were identified as most relevant for reshoring in literature, hidden costs, quality concerns and flexibility found to be central triggers. Potential firm-specific risks and performance failure thus should be mitigated (Boffelli & Johansson, 2020; Cosimato & Vona, 2021; Stentoft, Olhager, et al., 2016). Therefore, reversing offshoring decisions addresses potential operational failures by reintegrating capabilities, overcoming tacit

knowledge shortages, and improving cost control and financial investments (McIvor & Bals, 2021).

These key insights lead to continuous growth of empirical contributions across multiple research fields. The corrective logic has highlighted important empirical contributions and provides significant understanding, but cumulative, cross-domain knowledge should not be neglected (Boffelli & Johansson, 2020). Therefore, this framework shows its limitation, as it treats reshoring as an reactive phenomenon, driven by deterioration of prior conditions rather than a firm's proactive strategic orientation (Di Mauro et al., 2018). It fails to explain why firms with comparable challenges may make different strategic location decisions, nor why some firms might reshore in the absence of operational failure.

From a SM perspective, reshoring is reframed to a deliberate strategic response to shifting competition and internal vision. Di Mauro et al. (2018), in a multiple case study of reshoring firms, found that the focal motivation for reshoring is not the reversal of failed operations, as initially proposed by OM researchers, but rather the customer-perceived value differentiation. Reshoring is found to be driven by strategic considerations, such as protection of innovation potential, proximity of research and development (R&D) and manufacturing, brand repositioning and the “made-in” effect. Firms therefore do not only reshore because offshoring may have failed. They reshore because they actively observe the markets and find that domestic production became strategically more important. The domestic location thus gains importance when customers value the firm's efforts and country-specific characteristics prevail over offshoring benefits. These motivation appear more present among reshoring firms than efficiency or firm-related motivators (Fratocchi et al., 2016), contradicting the pure cost-corrective framing of reshoring. If operational failure was the dominant driver, efficiency motivators would lead. Instead, firms intentionally capture value through reshoring, implying a proactive strategic logic (Di Mauro et al., 2018). Location can then serve a resource, according to Barney's (1991) notion, and reshoring is an act of regaining such resource through reconfiguration driven by strategic intent. Lund and Steen (2020) further add a firm-level, knowledge-driven perspective to the firm's location preference, providing evidence for the intrinsic motivation to reshore. Their results show that firms actively seek fitting locations to advance their manufacturing technologies by evaluating region-specific capabilities, such as specialized human capital and manufacturing competences against their own

technologies. These findings show that reshoring can indeed occur in absence of operational failures. Reshoring is then a rather proactive decision to capture knowledge, resources and competitive advantage by co-evaluating multiple external and internal elements.

Importantly, these two perspectives, corrective and strategic, are not simply competing explanations but they rather reflect different conditions under which firms reshore. A comprehensive study bridging these assumptions is by McIvor and Bals (2021). They integrate RBV and TCE into a multi-theory framework that utilizes both logics simultaneously, showing that cost-reducing TCE drivers and value-creating RBV drivers co-exist in reshoring decisions. This makes a single-theory approach incomplete and aligns with prior scholars' call for integrative approaches (Barbieri et al., 2018; Boffelli & Johansson, 2020). Casadei and Iammarino (2023) provide empirical support for this co-existence by examining United Kingdom textile and apparel firms. Their results show that reshoring is often driven by a mix of quality problems (corrective logic) and innovation and sustainability aspirations (strategic logic). Approaching and explaining reshoring therefore requires a complex, multi-theoretical evaluation of the firm's current position.

Both logics reflect the decision how to respond to the same external conditions based on the available capacities. A firm may face rising cost or regulatory pressure and reshore only with the intention to cut those and restore its efficiency, but not to reorchestrate its general strategy. Another firm may instead treat external shifts as a signal to reposition itself strategically, provided it has the capabilities to read its environment and act on it according to the demand. The external environment itself therefore does not determine which logic applies, but rather the firms' existing abilities.

2.2.2.2 Influence of the External Environment on Reshoring

While the internal forces are important to produce outcomes, external forces influencing firm's operational possibilities should not be neglected. The attention on environmental shifts gained a momentum during the COVID-19 pandemic when supply chain disruptions showed how fragile extended global value chains can be. Reshoring was a consequential strategy to increase their resilience (Makri & Leri, 2023).

In addition to global supply chain issues, earlier cost-oriented (Porter, 1986) location decisions becomes increasingly insufficient. Initial motivators for offshoring into low-

wage countries like cost benefits, risk and responsibilities transfer, increase in flexibility, improvement of efficiency, revenue increase and less strict environmental regulations start to diminish. This is due to a closing benefit gap coming from rising wages in offshore locations (Temouri et al., 2023), increasing awareness about socio-economic inequalities and deteriorating working conditions in offshore locations, rising consumer expectations and attractive market conditions in home regions which make reshoring increasingly lucrative (Cosimato & Vona, 2021; Di Stefano et al., 2024; Foerstl et al., 2016; McIvor et al., 2025; Pedroletti & Ciabuschi, 2023; Piatanesi & Arauzo-Carod, 2019).

These changes indicated that the influence of the external environment on the enterprise can therefore, either stem from the home country itself, from the host country, or sometimes from both regions simultaneously. While shifts in host-country regulations affect firms similarly, the response appears to be not uniform. The available human capital, ownership mode, shareholder protection and environmental disclosures in the host country, and whether foreign directors sit on the board can influence the reshoring the reshoring decision. (Sena et al., 2023). In other words, the internal capabilities which the MNE possesses are important for addressing changing environments. When host-country push factors explain why firms consider leaving, it is the pull of an attractive home country that explains why they do.

Shifts within the host-country make reshoring a potential strategy, but it is the institutional, capital-related and economic conditions in the home-country that fosters the engagement with this option. Firm- and region-level capabilities therefore simultaneously determine whether strategic opportunities will be translated into action. The more the home country appears lucrative, the more a firm is willing to reshore, dependent on its institutional and cultural embeddedness (Wan et al., 2019). Similarly, the country-specific human capital resources play a significant role as well. Locations appear more attractive if the local capital complements the firm's existing resources (Lund & Steen, 2020). The home countries' resources can thus serve as pull mechanisms drawing MNEs back. Another push-and-pull force is environmental sustainability. It has received growing attention in literature, as it leads to tightening operating conditions, rising reporting expectations and stricter compliance requirements (Di Stefano et al., 2024).

2.2.2.3 Sustainability as a Reshoring Driver

Scholar's engagement with sustainability in the reshoring context emerged as a reflection of a broader shift in the environment. Increasing environmental regulations, Sustainable Development Goals (SDG)-aligned policy pressures, and shifting consumer expectations have levelled up sustainability from a concern to a central strategic variable in location decision (McIvor et al., 2025). Reshoring has thus turned to be a strategy that also occurs out of the willingness to tackle environmental issues and improve one's sustainability record (Di Stefano et al., 2024; Wiesmann et al., 2017).

From sustainability-driven reshoring, two perspectives, external pressure and internal capacities, can be derived to deal with ecological challenges. First, the external pressure perspective, focuses on the suppliers (McIvor et al., 2025). A rising number of offshore suppliers cannot comply with stricter European policies, leaving firms with difficult trade-offs. Either they rely on more costly local suppliers, transfer operations in-house or risk non-compliance with sustainability regulations (McIvor et al., 2025). Supply chain emissions and logistics-related carbon dioxide (CO₂) account for a great share of global CO₂ emissions. This reinforces the need for shorter and more sustainable supply chains (McKinnon et al., 2010). Fernández-Miguel et al. (2022) empirically show that reshoring and nearshoring can significantly reduce CO₂ emissions and supply risk in resource-intensive industries. Additionally, this allows to create socially complex supplier relationships, which in turn supports their sustainability goals instead of lax supplier relationships (Ashby, 2016).

The internal capacity perspective approaches sustainability as a strategic resource that enables reshoring in the first place. It treats it less as a pressure to respond to but more as an opportunity to develop valuable resources and capabilities. In that regard, McIvor et al. (2025), drawing on the NRBV and TCE, argue that sustainability-driven reshoring becomes actionable once firms develop needed capabilities for sustainable operations or find that the required capabilities are located in proximate locations. To realize sustainability benefits from reshoring, MNEs therefore require innovation capabilities (Martínez-Mora & Merino, 2020) and technological capabilities (Cosimato & Vona, 2021). Reshoring not only follows capability development, but it reinforces it too. Reshoring firms invest more in manufacturing innovation and reorganize their resources more extensively than offshored or stayed home firms (Stentoft, Mikkelsen, et al., 2016).

Internal capacity building can therefore function as a precondition for reshoring, but also as its outcome. Because the development of capabilities requires time and commitment (Teece, 2007), firms with early capability advantages may extend this advantage over time, widening the heterogeneity in reshoring behaviour studied throughout this chapter. In addition to these resources, green aspiration, or depth of green commitment, is an important factor for timing and success of green operations (Zhang et al., 2023). External and internal drivers therefore must co-exist with internal visions and long-term goals of the firm.

These perspectives must be channelled into correct processes to generate competitiveness. Approaching sustainability merely for legitimization can remain superficial (Bansal & Roth, 2000), because it remains a symbolic legitimization device which signals environmental responsibility to stakeholders, without real transformation potential (Boiral, 2007). In this case, ecological responsibility might not be substantially integrated into the strategic-decision making process. On the other hand, if used as a starting mechanism for future sustainable developments, they can be highly beneficial for the MNEs. An ISO 14000 certification can for example increase the environmental SCM investments and the compliance with external regulations (Wiengarten et al., 2013), credit offshore suppliers (Klassen & Vereecke, 2012), and facilitate global operations (Lartey et al., 2021). This suggests that obtaining a certificate could ease the introduction to first sustainability-driven restructuring steps, but it appears to facilitate rather offshore operations than green transformation such as reshoring. Deeper commitment to sustainability is required as it influences the internal architecture and organizational processes (Eccles et al., 2014).

The distinction between external pressures and internal capacities for sustainability-based reshoring is a growing topic in literature. Although sustainability is currently viewed primarily as a motive or a trigger for reshoring, evidence from research implies the firm's strategic commitment to sustainability is a necessary prerequisite (McIvor et al., 2025). Nevertheless, there is still a lack of application of supportive, firm-internal, strategic mechanisms for reshoring, reflecting an enterprise's sustainability orientation, such as DGC.

2.3 Dynamic Green Capabilities

The Dynamic Green Capabilities framework derives from the field of SM and has been developed to support managerial practices that approach green-related issues by introducing the idea of utilizing organizationally embedded resources (Maksimov et al., 2022). The framework is an extension of Teece et al.'s (1997) DC framework, a managerial approach to strategically address challenges in a fast-changing business environment by orchestrating a firm's resources and assets. DC are defined as the firm's "ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). They transform traditional processes into sustainable, flexible and resource-efficient routines (Bari et al., 2022; Xiao et al., 2023), extend operational flexibility in response to shifting market conditions (Asiedu et al., 2025), and enable firms to embed green practices for firm-specific, path-dependent, and difficult to replicate advantages (Bari et al., 2022; Chen, 2008; Lin & Chen, 2017). Moreover, the dynamic dimension is highly important as static approaches are insufficient for navigating uncertainties of a constantly evolving, highly complex and modern business ecosystem requiring fast learning and adaptation (Chen, 2008).

2.3.1 Definition of DGCs

DGC is a newly emerging construct, and its terminology and operationalization remains diverse. Scholars use terms such as "sustainable dynamic capabilities" (Bari et al., 2022), "sustainable business practices" (Lartey et al., 2021), "green dynamic capabilities" (Lin & Chen, 2017), "dynamic capabilities for sustainability" (Buzzao & Rizzi, 2021), "green capabilities" (Nkrumah et al., 2020), or "dynamic green capabilities" (Maksimov et al., 2022). This heterogeneity has led to different perceptions how to incorporate sustainability into the organisation, which Buzzao and Rizzi (2021) distinguish as follows. Sustainability is sometimes treated as an additional environmental condition which must be responded to with general DC. They help to adapt to the environment whereas sustainability is not perceived to influence the organization's core. Sustainability-specific DC perceive sustainability as a highly relevant, transformational force shaping firm's strategic sustainability goals, making them high-order capabilities. While both can be operationalized through the sensing-seizing-reconfiguring framework (Teece, 2007), for sustainability-related DC, the microfoundations should entail sustainability-related activities (Buzzao & Rizzi, 2021). Lin and Chen (2017) and

Maksimov et al. (2022) provide empirical examples for a green-related operationalization of green DC.

To set a clear path for this study, this study adopts Maksimov et al.'s (2022) definition for DGC because it underlies the theoretical framework and the empirical operationalization of DGC in this study. Maksimov et al. (2022) define DGC “as the ability to build complementary green competences and reconfigure organizationally embedded resources to pursue competitive advantage in a rapidly changing stakeholder environment” (p. 723). Green competences involve “green awareness, green knowledge, green skills, green abilities, green attitudes and green behaviour” (Cabral & Dhar, 2021, p. 92) and aim at protecting the eco-system to sustain its natural resources by reducing energy consumption, emissions and waste (Dlimbetova et al., 2015), and solving sustainability-related problems and opportunities (Vega-Marcote et al., 2015). In other words, developing DGC reflects a company's awareness of its social and ecological responsibility along with its proactive commitment to investment in green, path-dependent and organizationally embedded resources and competences. This allows the MNE to manage the requirements of the fast-changing stakeholder environment (Maksimov et al., 2022).

2.3.2 State-of-the-Art of DGC

The emerging empirical research on DGC can be clustered into two main areas. The first stream deals with the question why firms develop DGC focuses on the drivers of DGC development. The second looks at what once developed enables firms to do and how DGC translate opportunities and threats into green strategies to improve sustainability and performance outcomes.

2.3.2.1 Drivers and Preconditions for DGC Development

Several types of antecedents and conditions of DGC development appear consistently in research to help explain why firms incorporate sustainability into managerial processes and decision-making in the first place.

The first driver is stakeholder and market pressure. Through DGC and consequential green innovation (Asiedu et al., 2025; Singh et al., 2022), external green pressure from customers and competitors can effectively be mediated into greater firm performance

(Huang et al., 2024). This shows that DGC support the correct orchestration of operations for long-term competitiveness according to the expectations of the firm's environment. The second stream examines a firm's international engagement as a precondition for DGC development. Engagement can appear through multiple facets, such as international diversification or gaining access to global knowledge pools indirectly through an international environmental certification. Empirical evidence shows that the engaging with the environment and accessing knowledge pools can have a positive influence on DGC development (Maksimov et al., 2022). But expanding internationally drives DGC only when accompanied by learning orientation (Xiao et al., 2023). But expanding for knowledge and resources may not always be the correct solution. Superior sensing capabilities can also capture external shifts that result in abstaining from foreign activities (Verbeke, 2022), which can be especially prominent facing current green problems of cross-national operations (McIvor et al., 2025).

The sustainability literature emphasizes the measurable performance differences between firms that embed sustainability as a strategic priority and those that adopt it superficially. This leads to the importance of the depth of a firm's sustainability integration. Firms that voluntarily and proactively integrate sustainability into their core strategy show fundamentally different organizational processes, with long-term performance advantages, such as higher stock market returns and accounting performance (Eccles et al., 2014). Firms that show opportunistic sustainability engagement risk being perceived to pursue greenwashing, which can consequentially undermine their firm value (Chau et al., 2025). While international environmental certification, which requires environmental management systems, shows slightly greater support for DGC development compared to internationalization (Maksimov et al., 2022), it faces criticism for frequently functioning as a symbolic device that signals green orientation and compliance to external stakeholders without genuinely integrating sustainability. Firms whose sustainability engagement is primarily legitimization-driven therefore may possess the relevant competences without the organizational depth to act on them (Bansal & Roth, 2000; Boiral, 2007).

To develop proactive environmental strategies companies require strong organizational learning capabilities (Aguilera-Caracuel et al., 2012). Firms with deeply integrated ecological and social responsibility are more likely to develop DGC as valuable

organizational capabilities with matching firm governance, incentive structures and decision-making processes (Trujillo-Gallego et al., 2025). One way to assess the commitment for investing and dealing with social issues, is the ESG score which reflects a firm's environmental, social and governance performance (Hu et al., 2023). Higher ESG score partially function as a determinant of sustainable management performance that captures the depth of a firm's dynamic capabilities directed towards sustainability (Liang et al., 2022). While the green transformation is resource intensive, the predominant non-negative relationship between ESG and financial performance indicates rewarding behaviour from stakeholders (Friede et al., 2015).

Certainly, an active sustainability approach is complex. It involves embedding customers' eco-demands rather than dictating and imposing market offerings, doing the bare minimum, and passively adapting to changes (Bari et al., 2022; Chen, 2008; Makri & Leri, 2023; Maksimov et al., 2022). Even when firms are willing to engage, not all are able to develop the required DGC. Reconfiguration and relocation of resources, assets and activities often require strong commitment from top management, which makes DGC development human and financial capital-intensive (Chen, 2008; Maksimov et al., 2022; Teece, 2007). Additionally, firm size (Yook et al., 2018), organisational slack (Chu et al., 2025) and the complexity of capabilities (Trujillo-Gallego et al., 2025) serve as further boundary conditions, explaining why DGC remain asymmetrically distributed across firms. This makes them valuable, firm-specific resources to uphold the firm's performance (Teece et al., 1997).

2.3.2.2 DGC as a Mediator for Firm Performance

The previous section showed that DGC emerge where firms actively learn, engage and evolve. Additionally, DGC are often analysed in relation to green innovation, revealing a similar positive relationship for larger firms (Zhu et al., 2023), SMEs (Yousaf, 2021), knowledge-intense industries (Lin & Chen, 2017), or under varying sustainability pressures (Asiedu et al., 2025). DGC if successfully translated into green innovation before, result in green competitiveness and positive firm outcomes (Zhu et al., 2023). Dangelico et al. (2016) provide a more nuanced analysis of the transformational role of DGC for firm outcomes. Only the capacity to build and reconfigure resources translates directly into market performance. Other capabilities such as external and internal resource integration operate indirectly through innovation and eco-design. This is consistent with

Eisenhardt and Martin's (2000) argument that DC carry no direct value of their own. In other words, DGC appear to function less as a performance driver themselves and more as a precondition for potential value creation through strategic resource reconfiguration and knowledge utilization which ultimately produces the desirable performance effect (Asiedu et al., 2025).

A similar effect can be seen within SCM, where green supply chain capabilities, dependent on the embeddedness of sustainability into the core of the company as to influence the supply chain transformation (Nkrumah et al., 2020; Trujillo-Gallego et al., 2025). This draws back to the importance of sustainability integration. Many recent empirical findings show, that economic, environmental and social orientation are relevant for sustainability performance (Asiedu et al., 2025). Additionally, the depth of internalization and the adaptation of firm structures in response to external environmental sustainability demands influence the performance outcomes a firm can potentially generate (Trujillo-Gallego et al., 2025).

Genuine, green-oriented enterprises, whose goal is to increase their green and economic performance should thus be motivated to create complex DGC as they can drive meaningful restructuring events. So far, the literature has focused on certain areas of the value chain, whilst no study has empirically tested restructuring in the context of cross-border relocation of manufacturing activities as the output of DGC.

2.4 Research Gap

In the last two decades, waves of reshoring activities caught scholars' attention, leading to a growing but fragmented body of literature across multiple managerial domains such as OM, SCM, IB and SM (Cosimato & Vona, 2021; Makri & Leri, 2023). While the reshoring literature has made important contributions to understand why firms reshore and identified several parameters, a critical shift in perspective is required to start ask what intrinsic motives drive reshoring, especially in the sustainability-oriented context.

Current research on reshoring is primarily based on findings regarding why reshoring occurs. The core assumptions mostly relate to operational failure and cost rationale and come from OM (Makri & Leri, 2023). Reshoring thus serves as a reactive approach, as offshoring either fell short of expectations, supply chains proved to be vulnerable, or coordination costs exceeded expectations (Kinkel & Maloca, 2009; McIvor & Bals,

2021). While this framing is valuable, other approaches are needed to explain why firms, with comparable operational challenges, make different decisions, or why firms reshore in the absence of operational failure. Here for, the SM and IB literature present insights by identifying value-driven and capability-based motivations (Fratocchi et al., 2016), as well as “made-in” effects, innovation proximity, brand repositioning and protection of firm-specific resources to strategic reshoring (Di Mauro et al., 2018; Fratocchi et al., 2016). While changes in the environment (Sena et al., 2023), and sustainability orientation of a firm can serve as strategic drivers for reshoring (Zhang et al., 2023), these studies do not operationalize on the internal structures required to explain what enables firms to recognize these changes and through which mechanisms they translate into reshoring. The DGC framework captures this gap.

The systematic review by Makri and Leri (2023) confirms that the DC framework appears in only 2.8% of reshoring studies. Martínez-Mora and Merino (2020) link sustainable innovation technology adoption to reduce water and chemical use with reshoring and find that reshoring can occur for sustainability-based process reasons. One of Martínez-Mora and Merino’s (2020) identified innovation drivers to decrease water waste corresponds to elements of the seizing dimension of the DGC operationalization (Maksimov et al., 2022). McIvor et al.’s (2025) study bridges capabilities with sustainability-driven reshoring through the NRBV lens. They propose promising relationships between sustainability capabilities and reshoring in their framework. Zhang et al. (2023) provide evidence for the strategic orientation and organizational excess resources of the company to be a driver for reshoring. Their study on the timing of reshoring in relation to the firm’s sustainability aspiration revealed that green oriented companies not only tend to reshore in general but do so quicker if their performance exceeds their own aspiration. Based on these findings, firms internal, embedded capabilities along with the commitment to a common sustainability goal are potential drivers for reshoring.

Reshoring is therefore an active strategic decision based on the firms’ abilities to perceive the environment, internalize the information and weigh opportunities against its own resources. This study contributes to the reshoring literature because while „the growing body of literature has laid the foundations and made essential contributions (...) [it] is however far from exhaustive“ (Pedroletti & Ciabuschi, 2023, p. 2). Therefore, this study empirically tests the DGC-reshoring relationship and includes two moderating variables to test for the effect of sustainable orientation on the outcome. Table 1 provides an

overview of the key findings of the reviewed literature. By illustrating whether and how sustainability and DGC were addressed in the studies, the underlying research gap can be presented more thoroughly. The results show that sustainability is often treated as an external pressure. Reshoring is then the mechanism to increase SDG performance (Di Stefano et al., 2024) or reduce the supply chain emissions (Fernández-Miguel et al., 2022). While, as discussed above, a wave of studies turns towards the strategic orientation of the company (Martínez-Mora & Merino, 2020; McIvor et al., 2025; Zhang et al., 2023) this study turns to the relationship between DGC as an independent driver and reshoring to provide empirical evidence.

Table 1: Summary of the key reshoring studies discussed in this paper.

Author (Year)	Domain	Theoretical lens	Key Findings	Role of Sustainability	DGC as driver
Theoretical Framework/Meta-Synthesis					
Barbieri et al. (2018)	IB/OM/SCM	Systematic Literature Review	57 reshoring articles; Decision-making and implementation process remain understudied	Mentioned	No
Boffelli & Johansson (2020)	SCM/OM	Literature Review: Meta-Synthesis	14 reshoring case studies; Linking offshoring and reshoring via contingencies, decision-making, implementation, outcomes	No	No
Cosimato & Vona (2021)	SCM/OM	Systematic Literature Review	Systematic literature review jointly approaching reshoring, sustainability and digital innovation	Central	No
Fratocchi et al. (2016)	IB	Framework (RBV, OLI, TCE, Internalization)	Value-driven & country-specific reshoring motives prevail over efficiency motives	No	No
Foerstl et al. (2016)	SCM/OM	Conceptual Framework	Combines TCE and Organizational Buying Behaviour to explain	No	No

			reshoring and external/organizational drivers		
Makri & Leri (2023)	IB/OM/SM/SCM	Systematic Literature Review	Systematic Review of 106 reshoring articles; drivers dominate literature compared to decision-making and implementation; 62.3% apply no theoretical perspective	Mentioned	No
Martínez-Mora & Merino (2020)	SM/OM	Reshoring drivers' framework	Sustainable technological innovation enables reshoring by making it cost-competitive in advances economies	Central	Implied
McIvor & Bals (2021)	SM/IB/SCM	Multi-theory framework (Eclectic Paradigm, RB), TCE)	Cost-reducing and value-creating drivers co-exist in reshoring; Single theory analysis insufficient	Mentioned	No
Pedroletti & Ciabuschi (2023)	IB/OM/SCM	Bibliometric & Content Analysis	Analysis of 135 articles; Propose conceptual framework with 5 themes; Identify sustainability as emerging cross-cutting theme	Mentioned	No
Piatanesi & Arauzo-Carod (2019)	Economic Geography	Descriptive Literature Overview	Synthesize existing empirical evidence on backshoring determinants	Mentioned	No
Stentoft, Olhager et al. (2016)	OM	Systematic Literature Review	25 reshoring factors clustered into seven categories	No	No
Wiesmann et al. (2017)	OM/SCM	Systematic Literature Review	Drivers and Barriers into 5 clusters; No consensus on unified theory of reshoring	Mentioned	No
General Reshoring Research					
Brandon-Jones et al. (2017)	SM/OM	Efficient Market Hypothesis	Reshoring announcements generate positive abnormal stock returns	No	No

Casadei & Iammarino (2023)	IB/OM/SCM	TCE, RBV, OLI	Mix of quality correction and sustainability/innovation aspirations for reshoring; Internationalization non-linear process	Secondary	No
Di Mauro et al. (2018)	IB/SM	RBV, TCE	Reshoring because of made-in effect, R&D proximity, brand repositioning; strategic shift from cost to value	Mentioned	No
Kinkel (2014)	OM	TCE, Co-evolutionary perspective	Around 80% of backshoring is short-term correction, around 20% is long-term strategic adaption; Reshoring driver depend on ownership	No	No
Kinkel & Maloca (2009)	OM	TCE (for reshoring); Internationalization Theory, Eclectic Paradigm (for offshoring)	Reshoring because of location misjudgements; Production flexibility, delivery, quality problems underestimated	No	No
Lund & Steen (2020)	Economic Geography	Global Production Networks (GPN), Strategic Coupling	Advanced manufacturing technology drives reshoring only when regional capabilities present	No	No
Sena et al. (2023)	SM/IB	Stakeholder Theory	Foreign directors on minority-owned subsidiaries' boards drive reshoring, amplified by environmental disclosure and weak shareholder protection	Secondary	No
Stentoft, Mikkelsen et al. (2016)	SCM	Supply Chain Innovation	Firms that reshored show higher innovation investments and more extensive resource	No	DC Implied

			reorganization than offshore or stay-home firms		
Temouri et al. (2023)	IB	TCE	Wage-cost sensitivity (not protectionism) drives reshoring from EU subsidiaries	No	No
Wan et al. (2019)	IB	Institutional Theory, Extended RBV	Reshoring motives differ significantly across home countries	No	No
Sustainability-oriented Reshoring Research					
Ashby (2016)	OM/SCM	Social Network Theory	In-depth case study of UK small-medium-sized enterprises; socially complex, localised supply chain relationships support sustainability-driven reshoring	Central	No
Di Stefano et al. (2024)	IB	SDG Framework	Reshoring generates positive SDG effects in home country, negative in host country	Central	No
Fernández-Miguel et al. (2022)	SCM/SM	Transdisciplinary Approach	Reshoring/nearshoring significantly reduces CO ₂ emissions and supply risk	Central	No
McIvor et al. (2025)	SM/SCM	NRBV + TCE	Sustainability-driven reshoring requires sustainability capabilities	Central	Implied
Zhang et al. (2023)	SM/IB	Behavioral Theory of the Firm	Environmental performance feedback relative to firm's aspirations influences reshoring timing	Central	No

DCG has already been demonstrated to be a potential driver of reconfigurations, such as supply chain transformation, and the respective managerial capabilities (Nkrumah et al., 2020; Trujillo-Gallego et al., 2025). Green SCM adoption represents a meaningful step which goes beyond product-level reconfiguration, as it includes the whole value chain process, including manufacturing (Nkrumah et al., 2020). Reshoring can be understood

as a continuation of this progress, framing reorchestration as where the production activities will take place. This can be achieved by applying Teece et al.'s (1997) sensing-seizing-reconfiguring framework, adapted by Maksimov et al. (2022) to sustainability context, to the reshoring context. DGC capture a firm's ability to sense the environmental shifts which were earlier identified within the reshoring literature, seize them by weighing domestic opportunities against offshore threats, and reconfigure firm internal operations. The restructuring event is the outcome of improving the reconfiguration strategies through reshoring. Verbeke (2022) already recognized that "superior sensing could (...) lead to abstaining from particular types of foreign involvement" (p. 575). For green-capability firms this implies that recognizing the increasing misalignments of offshore productions with the ecological, social, and governance requirements and the lucrative domestic production, should consequentially lead to reshoring.

In addition, this study adds boundary conditions under which the DGC-reshoring relationship holds. In section 2.1.2.3, certification has been argued to frequently operate as a credibility signal to external stakeholders without genuine strategic sustainability integration (Bansal & Roth, 2000; Boiral, 2007). The ESG score, by contrast, reflects the depth of a firm's capability-based sustainability integration (Liang et al., 2022). The comparison between a credibility-based moderator (ISO 14000) and capability-based (ESG score) moderator will provide insights about the extent to which complementing green orientation and structures are required.

This study therefore makes several contributions to the literature. In response to Fraticelli et al.'s (2016) invitation to identify firm-level conditions that explain differing patterns of reshoring across comparable firms, first, this study shifts the question from why reshoring occurs to how reshoring can be driven. Therefore, the DGC framework (Maksimov et al., 2022), utilizing the sensing-seizing-reconfiguring framework (Teece, 2007) is applied. This study tests this relationship toward reshoring empirically. Second, it integrates two previously disconnected literatures, DGC and reshoring. This extends the application of DGC to strategic location decision-making. Third, it examines two boundary conditions, ISO certification and the ESG score. By capturing the distinction between compliance and strategic integration of sustainability, this study tests whether the extent of commitment determines green strategic outcomes. Fourth, this supports the DC argument, that resources alone are insufficient if not complemented by DC (Teece et al., 1997).

Therefore, following research question will be investigated:

To what extend do Dynamic Green Capabilities drive Reshoring?

3. Theoretical Lenses

This chapter introduces the theoretical foundations underlying this study's research question. One key theoretical lens in the reshoring literature is the Resource-Based View (RBV) (Barney, 1991; Wernerfelt, 1984), which addresses reshoring to be a deliberate, strategic relocation intent (McIvor & Bals, 2021). This foundational theory was later expanded to include two important aspects relevant to this study's context, leading to the development of two additional key theories. First, the Natural Resource-Based View (NRBV) (Hart, 1995) which introduced the concept of sustainability orientation. Later, dynamic markets lead to the increasing importance of respective capabilities, giving rise to the framework of DC (Teece et al., 1997), from which the DGC framework derives (Maksimov et al., 2022).

3.1 (Natural) Resource-Based View

Initially, the RBV (Barney, 1991; Wernerfelt, 1984) served as a theoretical framework in SM to companies in generating and sustaining competitive advantage. Before the introduction of the RBV, for a great period of time, the major focus in managerial literature has been on external factors influencing a firm's competitive position, such as timing, commitment level (Lieberman & Montgomery, 1988), or niche dominance (Porter, 1980). The fundamental idea of RBV is to turn the strategic perspective back inwards and, in order to achieve competitive advantage, shift the focus on firm-specific competences and resources. Competitive advantage therefore does not stem from external factors dictating a firm position only, but rather from internal, managerial decisions, processes, routines as well as human, financial and physical assets, resources and capabilities. Resources, defined by the RBV, must follow specific characteristics. They ought to be valuable, non-substitutable, rare and not easy to imitate. In other words, they must contribute to a firm's value generation, there should be no other alternative to accomplish them, they must be rarely distributed and be difficult to trade (Barney, 1991; Barney et al., 2001; Hart, 1995). In addition, resources must also be tacit and socially complex. Both requirements are people intensive and skill dependent which makes them idiosyncratic and therefore long-term beneficial for companies (Barney, 1991). Newbert (2008) empirically examined the two characteristics value and rareness, and found positive evidence for the firm performance, providing theoretical validation and support. While this theory has laid the foundation for resource-oriented strategies, the focus

remains on the company's internal activities only. While growth is an important component, it must not come at the expense of the socio and ecological well-being. The company must act in an eco-responsible manner such that today's generation needs are met without comprising those of future generations (Dyllick & Hockerts, 2002). Long-term profits can therefore only be achieved if sustained across generations.

The Natural Resource Based View (NRBV) was introduced by Hart (1995) as an extension to the RBV, including constraints from the biophysical and natural environment in which enterprises operate. It combines internal and external factors crucial for competitive success, emphasizing the need to build economic sustainable processes and capabilities to be able to incorporate the natural environment into firm's decision-making. Therefore, Hart (1995) identified three strategic capabilities to address environmental issues: *pollution prevention*, *product stewardship* and *sustainable development*. Pollution prevention targets the minimization of emission and waste while criticizing the inefficient usage of resources. Expensive retrospective pollution control requires upfront improvements of manufacturing activities to lower the overall costs. Voluntary codes of conduct make this strategy more effective as they signal transparency and legitimacy. Product stewardship focuses on the whole value chain and the proactive integration of the stakeholder environment into the product development process. This requires cross-functional management skills and stakeholder networks which can generate access to limited resources and positive reputation. Sustainable development stresses the irreversible impact of firm growth on the eco-system. This pillar emphasizes to create shared, long-term oriented vision. The resulting ambition drives technological and product innovation through collaborations to strengthen the future position in the market, making it a rare resource. While these pillars are independent, they should be ideally developed simultaneously.

In their 15-year retrospective NRBV development summarization, Hart & Dowell (2011) observe that most literature focused on elaborating the influences and strategies on pollution prevention, while focusing on the benefits of going sustainable. This approach unfortunately focuses on the short-term financial performances overlooking Hart's (1995) original idea which emphasizes ecological and social responsibility with long-term orientation regarding investments in and reconfigurations of green activities. Focusing on one pillar in isolation will consequently not lead to desired competitive advantages as

they were introduced to connect the firm with its environment which has been a fundamental step towards environmental consciousness in business operations.

After Hart's (1995) publication, a growing body of research provided strong empirical support for the link between environmental responsibility and competitive advantage. Pursuing environmental sustainability develops key capabilities that enable a company to integrate stakeholders, drive innovation and foster organizational learning (Sharma & Vredenburg, 1998). Stakeholder integration is a crucial step as it reinforces knowledge and skill transfer between all parties involved and in turn increases organizational learning, strengthens the firm's environmental strategy (Buysse & Verbeke, 2003), and create rare capabilities (Yunus & Michalisin, 2016). This leads to an important notion that implementing best practices does not guarantee competitive advantage. They must be complemented and supported by heterogeneous firm resources and capabilities to support the organizational vision (Christmann, 2000). This applies similarly to green capabilities, which are developed to enhance performance (Menguc et al., 2010). If the environmental ethics of the enterprise aligns with its internal sustainable practices, green innovation will further contribute to the firm performance and strengthen its competitive position (Chang, 2011). This shows that mere development of capabilities and resources is insufficient. They must be coherent with the firm's strategic goals to realize economic performance. Therefore, if an enterprise pursues environmental responsibility, it must be embedded in the firm's culture, learning systems, and structures, supporting Hart's (1995) theoretical proposition.

Managing RBV-based resources does create superior, but only short-term competitive advantage (Augier & Teece, 2007). For long-term success, the firm must continuously adapt to its constantly changing stakeholder environment, as demands are shifting as well. Static, sustainable resources are therefore insufficient to respond to these dynamic markets. They must be complemented with DC to be long-term profitable (Teece et al., 1997). The NRBV framework has proved well-applicable for improving DC for environmental strategies, such as circular economy (Coppola et al., 2023). The three pillars of the NRBV combined with the sensing-seizing-reconfiguring framework from the DC (Teece, 2007) therefore confirm their co-creating role in achieving competitive advantage. Similar concepts were proposed for sustainable SCM operations (McDougall & Wagner, 2022). McIvor et al. (2025) used the NRBV to approach the topic of reshoring and identified multiple sustainability drivers for value creation.

The fundamental ideas of the NRBV framework provide meaningful strategic implications by connecting the business with its environment. The value-creating potential from applying the ideas of NRBV and DC shows that global, dynamic markets require relevant frameworks to support strategic activities, turning the focus from static resources towards dynamic competences.

3.2 Dynamic Capabilities (Sensing, Seizing, Reconfiguring)

DC were first introduced by Teece and Pisano (1994) and, based on the later work by Teece et al. (1997), the DC research flow started to continuously increase (Barreto, 2010). The idea of DC arose as an extension of the RBV, which was initially proposed by Barney (1991) and Wernerfelt (1984). The RBV's focus mainly lies on the aspect of owning static resources where firms are perceived as a bundle of resources. These resources are heterogeneously distributed across firms and when being complementary in nature they contribute to the firm's competitive advantage (Eisenhardt & Martin, 2000; Wernerfelt, 1984). The DC framework challenges the idea that owning resources alone is enough to maintain a firm's competitive advantage. RBV-based competencies do create a superior advantage, but only short-term (Augier & Teece, 2007). To be successful in the long run, a company must continuously adapt to its ever-changing stakeholder environment. Therefore, the DC framework extends the RBV and includes the ideas of dynamism, innovation and change (Teece et al., 1997).

Teece et al. (1997) define capabilities as the ability of “adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment” (p. 515). The aspect of dynamism is defined as “the capacity to renew competences so as to achieve congruence with the changing business environment” (Teece et al. 1997, p. 515). In short this means that by building DC a business develops and modifies firms-specific competences and resources in order to act upon rapid changes in the environment to achieve and sustain its competitive advantage long-term. This highly intensive process requires long-term commitment, as DC are path-dependent and idiosyncratic (Teece, 2007). Missing out on relevant competences might cost the company time to catch-up to competition, leading to fall back in competitiveness (Teece et al., 1997). This implies, that today's options and the degree of know-how is strongly dependent on past decisions and learnings. Competences and soft assets cannot be replicated, taught in short-period

or bought into the company through contracting. They are developed through firm's unique managerial processes, interactions, experiences and structures, and require constant learning and effective routines (Teece et al., 1997).

To make DC more applicable in managerial decision processes, the sensing-seizing-reconfiguring framework was introduced (Teece, 2007; Teece et al., 1997). The three sub-capabilities sensing, seizing, reconfiguring focus on organizational routines, processes and managerial cognition. They allow the enterprise to exploit its existing resources and assets by sensing new opportunities and threats, seize them by learning and integrating knowledge and create new innovations, and be able to reconfigure firm capacities accordingly to adapt to or shape the business environment (Teece, 2007). This requires being continuously innovative, intentional (Augier & Teece, 2007) and having entrepreneurial top managers (Heubeck, 2024; Teece, 2007), as DC are higher order capabilities (Buzzao & Rizzi, 2021). While the idiosyncratic view of DC is being challenged in literature by proposing that commonalities exist across firms (Eisenhardt & Martin, 2000), other scholar's argue that the best practice assumption for DC cannot be compared to ordinary capabilities, as DC promote evolutionary thinking and prospective approaches (Kay et al., 2018).

Throughout time, the DC framework found support for its fundamental ideas and remains to be the widely applied lens when it comes to analysing strategic behaviour within rapidly changing conditions (Leemann & Kanbach, 2022). DC are often applied in manufacturing context, as these industries face high velocity and disruption risks (Leemann & Kanbach, 2022). The dynamic nature of DC allows firms to cope with external uncertainties by strengthening their supply chain resilience and business strategies (Irfan et al., 2022). Some of the identified capabilities which need to be developed here for are structural, technical, cultural capabilities (Irfan et al., 2022), supply chain capabilities supported by digital transformation and innovation (Li et al., 2024), and collaboration with external supply chain partners (Gani et al., 2023). Especially in cross-border operations, dealing with multiple institutional organizations, suppliers and different consumers, DC can facilitate global activities (Pitelis et al., 2024). DC thus enable companies to integrate stakeholder knowledge, enhance internal structures to pursue business strategies, strengthening the value chain activities, even internationally, generate valuable innovation and maintain competitiveness. First studies also apply DC in the sustainability context and find valuable potential for realizing

sustainable strategies (Coppola et al., 2023; McDougall & Wagner, 2022; McIvor et al., 2025).

The NRBV provides key ideas what kind of resources and strategies a firm needs to be sustainable and act responsible (Hart, 1995). But as a resource-based view, it remains largely static providing insights about which resources should be held, but not the processes through which environmentally oriented firms integrate stakeholder expectations and turn them into action (Teece et al., 1997). The sensing-seizing-reconfiguring framework (Teece, 2007) becomes relevant here, because it provides the required framework to help understand the ongoing mechanisms (Coppola et al., 2023; McDougall & Wagner, 2022; McIvor et al., 2025). However, the general DC theory does not explicitly account for the natural environment in which the firm operates, nor the explicit resources and processes that are required to be able to manage the knowledge. Thus, the DGC (Maksimov et al., 2022) has been developed, which accounts for both, the natural environment and the required capabilities.

Global current shifts can result in green enterprises' misalignments with the eco-sufficient demands (McIvor et al., 2025). Strategies such as reshoring are one way to counteract (Cosimato & Vona, 2021; Makri & Leri, 2023). This study argues that to be able to realize such complex relocation decision it requires sensing, seizing, and reconfiguration capabilities. Applying the DGC framework to reshoring can provide evidence how important embedded capabilities are to be able to perceive the environmental pressures, internalize them through green processes, and through a correct reorchestration of resources be able to translate them into reshoring. Supported by previous propositions linking the NRBV with reshoring (McIvor et al., 2025), this study applies a process-oriented theory to empirically provide evidence for DGC facilitating reshoring decisions. Based on the theoretical foundations examined in this chapter, and the literature review, three hypotheses will be developed in the following section.

4 Hypothesis

To test the theoretical assumptions which were derived from the state-of-the-art of DGC and reshoring, combined with the theoretical foundations of the NRBV and DC, three hypotheses will be developed in the following.

4.1 The positive effect of Dynamic Green Capabilities on Reshoring

DGC are expected to increase the probability of reshoring through the sensing-seizing-reconfiguring mechanism that defines them (Teece, 2007). Each microfoundation can be mapped on a distinct step in the reshoring decision, from recognizing the problems with offshore production to physically relocating it. While sustainability-related pressures affect offshore operations broadly, not every firm responds to them in the same way (Sena et al., 2023; Zhang et al., 2023). Based on the discussion within the literature review, the ability to approach reshoring relies also on internal capabilities. The idiosyncratic and path-dependent nature of DC makes them not automatically present (Teece et al., 1997). They are rather developed through sustained stakeholder and market pressure (Huang et al., 2024), the firm's engagement intensity with changes and their learning-orientation (Xiao et al., 2023). This study therefore argues that firms with DGC are better positioned to recognize when sustainability disadvantages from offshored activities increase and to translate the sensed changes into a reconfiguration of organizationally embedded manufacturing or production resources through reshoring.

Sensing refers to the managerial ability to “scan, search, and explore (...), both ‘local’ and ‘distant’” (Teece, 2007, p. 1322) markets to identify and shape opportunities, threats and shifts. This results not only in growth decisions but can lead to abstaining from international activities through repositioning of resources and divesting (Verbeke, 2022). The reshoring literature has already identified a wide range of internal as well as external drivers that can trigger cross-border relocation into the home country (McIvor et al., 2025). Some reasons are the decreasing profitability of offshore activities, environmental regulations, fairer wages and better working conditions (Cosimato & Vona, 2021), fragile and risky supply chains (Makri & Leri, 2023), greater energy consumption, as well as higher emissions and waste from offshore facilities and elongated supply chains (McKinnon et al., 2010). Along with major shifts in the ecological awareness of society, government and politicians the demand for sustainable products, services and local

production rises. This results in struggles to contract offshore suppliers that can uphold to required sustainability standards (McIvor et al., 2025). Therefore, applied to reshoring, sensing is the capability that allows green-oriented firms to detect when offshore operations no longer align with the eco-requirements, thus when the environmental changes are acknowledged to pose threat and opportunities. On the contrary, firms without DGC would not recognize the increasing environmental challenges as quickly or at all, which would not even initiate an analysis and respective action and would therefore lead to less reshoring events.

Recognizing a misalignment is highly important, as it sets the whole process in motion in the first place, but it must be further evaluated to make meaningful strategic decisions. Seizing, the following step, involves mobilizing, collecting, integrating and sharing knowledge needed to act on the detected opportunities (Teece, 2007). In sustainability context, this can mean imposing policies and standards to which value creation must hold (Hart, 1995). Green enterprises typically strive to optimize or at least maintain their ecological footprint (Cosimato & Vona, 2021). The location of manufacturing facilities influences a company's sustainability performance based on their supply chain emissions (McKinnon et al., 2010). The ecological-driven pressure from stakeholders can lead MNEs to relocate their facilities to the headquarters' country. Doing so requires weighing the trade-off between switching to possibly more costly local suppliers, a complete transfer of operations in-house or the failing to meet the requirements (McIvor et al., 2025). The increasingly diminishing host-country and attractive home-country conditions could support the cost of relocation (Lund & Steen, 2020; Martínez-Mora & Merino, 2020; Wan et al., 2019). Furthermore, following the RBV logic, location can be a resource itself, as domestic production generates competitive advantage through for example the "made-in" effect (Di Mauro et al., 2018), or improved supply chain eco-balance (Fernández-Miguel et al., 2022). For green MNEs with DGC the assessment of home- and host-country changes should point toward the strategic decision to reshore, setting the foundation for the last mechanism, reconfiguring.

Reconfiguring is the microfoundation through which sensing and seizing translate into action. It is the mechanism most directly relevant to the reshoring decision itself. While sensing and seizing identify issues and how they can be approached, it is the reconfiguring step that determines whether this information results in the relocation of activities (Teece, 2007), because only action-oriented capabilities translate directly into outcomes

(Dangelico et al., 2016). Reshoring can therefore be a direct expression of the reconfiguring capability, which refers to the firm's ability to reorganize its embedded resources (Teece, 2007) and can be extended to where the production physically takes place.

The realization of reshoring may face several boundaries as it is a complex, time-consuming, financially intense mechanism and requires managerial resources and human capital (Chen, 2008; Maksimov et al., 2022; Teece, 2007). For sustainability-driven reshoring this means that enterprises require sustainability capabilities to facilitate reshoring (McIvor et al., 2025). In literature, reshoring has been approached as a strategy to foster innovation which decreases environmental harm (Martínez-Mora & Merino, 2020), while utilizing elements of the operationalization of DGC by Maksimov et al. (2022). This supports the potential relation between all DGC elements and reshoring.

Especially for green MNEs which aim at constantly updating green knowledge and minimizing their environmental impact, the above-mentioned reasons should lead to the relocation of manufacturing activities back into the home-country. MNEs lacking supportive DGC will, on the other hand, fail to act on it, leaving the decision at the level of intention. Therefore, this paper hypothesizes that MNEs with DGCs tend to relocate their activities back into the home country as they are aware of shifts and environmental sustainability issues in the global market:

H1: Dynamic Green Capabilities are positively associated with the Reshoring probability.

4.2 ISO 14000's Negative Moderating Effect on Reshoring

International environmental certifications, such as ISO 14000 certification grants firms access to global green knowledge pools, which can support environmental management system and DGC development (Maksimov et al., 2022). It seems reasonable to expect that it would also strengthen the relationship between DGC and reshoring. This study argues the opposite, based on the certification's expected weakening effect on firms' incentive to act.

Certifications face criticism as to function as a legitimization that is obtained for creating positive image and satisfying external expectations (Boiral, 2007). Because legitimization-driven sustainability approaches lack deep commitment, they rarely produce strategic transformation (Bansal & Roth, 2000). Furthermore, they increase compliance with

external regulations (Wiengarten et al., 2013), and facilitate offshore operations (Lartey et al., 2021). This study argues that the positive effects in offshore locations result in fewer capacities for the reshoring decision and partially absorb the external pressure imposed on MNEs due to green compliance. Certification therefore is neither necessary nor sufficient for reshoring as it allows to satisfy multiple stakeholders demands through a single, externally verified set of actions. Consequently, once the firm has secured the credibility the pressure from external actors, that would otherwise push firms to act on their DGC through reconfiguration, is partially absorbed.

While ISO certification may support the development of DGC and product-level changes, this study argues that it reduces the incentives for more intense reconfiguration operations. Therefore, the relationship between DGC and reshoring is stronger when green certification is absent pushing firms to translate their green capabilities into visible actions rather than signalling them through accreditations.

H2: ISO 14000 has a negative moderating effect on the relation between Dynamic Green Capabilities and Reshoring probability.

4.3 ESG Scores Positive Moderating Effect on Reshoring

ESG is a widely used non-financial indicator of a firm's environmental, social and governance performance, drawing on disclosure and assessment and reflecting the external evaluation of a firm's sustainability performance (Hu et al., 2023). This study argues that the ESG score is a tool to capture the depth of ecological intentions which in turn foster reshoring decisions of green-oriented MNEs.

A firm's ESG score can be associated with the depth of internalization of sustainability matters into the firm's strategic intentions. Firms that have voluntarily adopted sustainability policies early on, show fundamentally different organizational processes than firms that did not (Eccles et al., 2014). To adopt an ESG strategy and translate it into practice, firm-specific capabilities are required, not just the strategic intention (Liang et al., 2022). And those that possess this depth tend to act on it. Firms whose environmental performance exceeds their own aspiration level reshore earlier than those falling short (Zhang et al., 2023). This shows that sustainability depth influences location choices, more so in favour to proximity. Obtaining a high ESG score therefore goes beyond

complying and shows long-term vision. It can in fact translate into complex operations to support the green strategic orientation of the MNE.

Motivated by the pillars of ESG, the environmental dimension can be further improved through reshoring. Scholars found that transportation accounts for a great part of the overall emission of a product (McKinnon et al., 2010). Green MNEs with major sales markets located in the West should consider relocating their manufacturing facilities closer or into the domestic market when promoting green products towards their customers. Not only would that decrease the supply chain emissions but also increase the robustness and flexibility of the supply chain (Cosimato & Vona, 2021). The social and governance dimensions of ESG can be further supported with fair humanitarian conditions, diversity, social engagement and transparency in home countries (McIvor et al., 2025). The focus on corporate social responsibility, directed at internal and external stakeholder, can in turn facilitate the development of green DC (Xiao et al., 2024).

In addition, financial markets appear to reflect firm efforts to approach sustainability. Initial attempts, increase a firm's value because early sustainability investments are cheap and yield quick returns. But once the costs of deeper transformation set in, the value drops. Only after a firm overcomes a threshold of showing real commitment with a genuine level of ESG integration, the value rises again. This non-linear trend reflects stakeholder trust, growth options and competitive advantage which accompany ESG performance (Chau et al., 2025). High ESG score show long-term restructuring potential. These efforts result in a non-negative relationship between ESG and financial performance (Friede et al., 2015), suggesting that markets consistently reward action over mere disclosure.

Firms with DGC that reshore are therefore expected to possess deeply embedded green routines, structures, processes and visions, which enable them to handle the process. This study argues that a high ESG score captures the strategic orientation of a firm. A high ESG score thus encourages rather than substitutes for reshoring according to the green core value of the enterprise. Therefore, this paper hypothesizes that the deeply incorporated sustainability orientation, reflected by a high ESG score of a company, positively influences the reshoring decision:

H3: ESG score positively influences the relationship between Dynamic Green Capabilities and Reshoring probability.

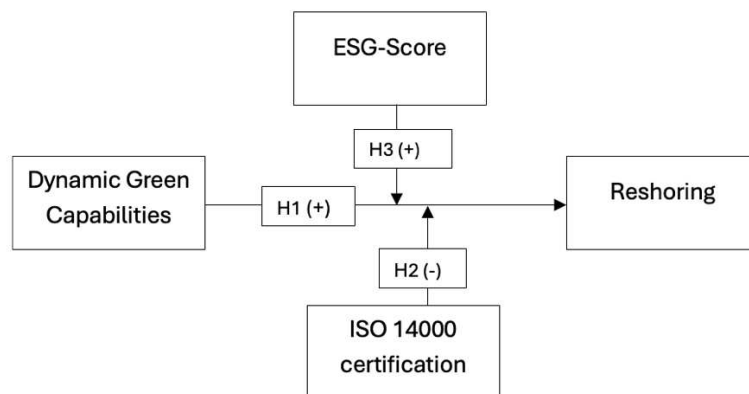


Figure 1: Relationship between hypotheses H1, H2 and H3

5 Methodology and Data

This chapter outlines the data description and the empirical approach used to test the hypotheses and help answer this study's research question. A quantitative research method was applied which allows to draw causal relationship between the variables. The operationalization of the DGC and the control variables followed Maksimov et al.'s (2022) approach, while reshoring was operationalized based on Zhang et al. (2023). Additionally, two moderating variables were included. All relationships were tested using the two-stage residual inclusion regression to address endogeneity concerns.

5.1 Research Design

To test the proposed hypotheses, this study adopts a quantitative research method, using secondary data from internationally recognized and in academic research widely applied data sources. This approach offers several advantages. It allows using large-scale firm- and country-level data, supporting the application of statistical controls for confounding variables, and enabling testing the relationship with a higher degree of precision and replicability. The data used for this analysis investigates the causal relationship between firms' DGC and their reshoring decision. It frames reshoring as the result of firm-specific capability-building processes, rather than a standardized sequence of actions. Therefore, this study's approach aligns with Teece's (2007) idiosyncratic, path-dependent, firm-unique, stakeholder dependent perspective on DC (Buzzao & Rizzi, 2021).

By employing regression analysis within a panel data framework, the study aims to identify whether firms with DGCs are more likely to engage in reshoring activities than firms that have not developed such capabilities. The regression model is structured to capture dynamic effects over time, allowing for inference and the ability to observe how developing DGC influences strategic relocation decisions. This methodological approach strengthens the reliability and generalizability of the findings.

5.2 Data sample

The firm-level data on DGC, ISO 14000, ESG score and control variables stem from LSEG Datastream (Refinitiv). LSEG Datastream is the largest financial time series database, covering major asset classes for 175 countries with 120 years of information. It additionally provides access to firm-level ESG Data, exhibiting a company's management

of and exposure to ESG issues. LSEG Datastream's sources are internationally recognized for their methodological transparency, high-quality data, and rigorous validation processes. Peer-review methodologies are being employed, datasets are being updated regularly, and collaborations with national statistical offices ensure accuracy and reliability (*Datastream Macroeconomics Analysis*, n.d.). Only variables with clear definitions and consistent time-series coverage were included in the analysis. This enhances robustness and credibility.

To test for reshoring, data on subsidiaries and parent companies has been collected from the Bureau van Dijk ORBIS (Moody's Analytics). It provides one of the largest cross-country company databases, including ownership, hierarchies, financial and employment information for more than 625 million companies globally. This allows to trace subsidiaries back to their respective parent company across countries and time. The data is standardized and relies on cross-references from 170 independent information providers (*Orbis Database*, n.d.). Further, ORBIS is used in reshoring research (Delis et al., 2019; Zhang et al., 2023), making it suitable for this study's analysis.

This study focuses on listed MNEs whose headquarters are located in 15 European Union (EU) countries, Norway, the United Kingdom and the United States (US). On a firm-level basis, time-series data has been collected for the years 2011 to 2025. Furthermore, as the focus within this study lies on reshoring of manufacturing and production activities, only MNEs that engage in manufacturing activities (LSEG Datastream - NAICS Industry Name: Manufacturing; ORBIS – NACE two-digit code: 10-33) are taken into consideration for further investigation. To ensure that only MNEs are observed within the study, only firms with an international sales percentage of total sales greater than zero are included. Using foreign sales to total sales ratio is a widely applied approach to measure the level of multinationalism of a firm (Bae et al., 2008). After dropping missing values for our variables of interest, the final sample consists of 926 MNEs and a total of 11,032 observations (see Table 2). Due to partially missing values within the panel data, the analysis is conducted with an unbalanced data set.

Table 2: Observation Matrix DGC - Reshoring

DGC	Reshoring After DGC		Total
	0	1	
No DGC (0)	9899 (881 firms)	313 (40 firms)	10212 (920 firms)
DGC (1)	624 (143 firms)	196 (26 firms)	820 (169 firms)
Total	10523 (881 firms)	509 (46 firms)	11032 (926 firms)

Note: N observations (N firms) shown in each cell.

5.3 Variables

The DGC framework grounds on and incorporates the idea of sensing, seizing, reconfiguring of organizationally embedded resources (Maksimov et al., 2022). To test the relationship between DGCs and reshoring, proxies for the three pillars of DGCs are operated on. Reshoring is constructed by comparing the parents' activities and the activities of their subsidiaries based on the number of employees. For subsidiary activities, this study focuses on manufacturing activities (NACE two-digit codes: 10-33) and some non-financial operations (NACE two-digit codes: 58, 62, 63, 69, 70-74, 78, 82) to more cautiously incorporate operating activities only (Zhang et al., 2023). To mitigate risk of reverse causality, this study introduces a time relative constraint, which, in case of a realized reshoring event, checks that it must happen after the development of DGC. Otherwise, the reshoring event will be excluded. Hence, the year of DGC development must be smaller than the year of a realized reshoring event. Additionally, two moderating variables are incorporated, and all final regression results are controlled for country-fixed effects, and year-fixed effects.

5.3.1 Dynamic Green Capabilities

The independent variable DGC constitutes of the three sub-categories sensing, seizing and reconfiguring, and is operationalized based on the work of Maksimov et al. (2022, p. 729). Because the microfoundations capture a distinct stage of the DGC process, each sub-category requires indicators that reflect their specific position within the sequence.

Sensing is the constant observation of the business eco system. It includes recognizing and scanning changes in the stakeholder environment in terms of opportunities and threats (Teece, 2007). To capture the extent of green sensing of a business, the variable used shows whether a company is “aware that climate change can represent commercial risks and/or opportunities” (ESG code: ENERDO089). This proxy is a behavioural indicator about whether the firm has already acknowledged and processed the present external environment signals, rather than being merely exposed to them. This awareness can then trigger a re-evaluation of resources, leading to internalization of activities and restructuring of the business architecture.

Seizing is the step that follows sensing and mirrors the extent of how the firm approaches the sensed opportunities, especially with regard to the capacities available to address these opportunities and create further advantage. This requires knowledge acquisition, integration and sharing, innovation as well as policy adaptation (Teece, 2007). Unlike sensing, seizing requires that the firm has resources that can already be committed towards a response. Adopting policies signals that resources and routines have been allocated internally to address the sensed topics. This moves the firm from mere recognition to action. To assess whether a firm seizes green changes, which is also in line with Hart’s (1995) first pillar pollution prevention, multiple indicators are examined in terms of environment-oriented policies and capacities. First, this study checks whether the company has “a policy to improve emission reduction” (ESG code: ENERDP0051). Second, whether the company has “a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain” (ESG code: ENRRD01V). Third, whether a company has the “capacity to reduce the environmental costs and burdens for its customers and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products” (ESG code: TRESGENPIS). The final score for seizing is the average score from the three variables and will be used for further analysis. As the proxies are binary variables, a Tetrachoric Alpha Test is conducted to test for internal validity. The results of 0.97 and an eigenvalue of 2.47 indicate common factors underlying the three variables and show high internal consistency and satisfactory reliability.

Reconfiguration reflects a company’s implementation of the seized actions through restructuring. While formal commitments and innovation ideas of seizing lay foundation for actual resource reallocation, it does not capture the evidence of action. Therefore,

actual product- and service-level changes are appropriate proxies to represent a tangible and realized result of redirecting R&D, design and production towards environmental goals and a smaller ecological footprint. This also corresponds to Hart's (1995) second pillar product stewardship, which demands the integration of environmental pressures into product and design. Therefore, a standardized and continuous final score is calculated using variables which reflect (1) whether the company reports about at least one product line or service that is designed to have positive effects on the environment or which is labelled and marketed as such (ESG code: ENPIDP019), (2) about specific products which are designed for reuse, recycling or the reduction of environmental impacts (ESG code: ENPIDP069), and (3) whether the company reports on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as biodiversity of protected and sensitive areas (ESG code: ENERDP019). These variables aim to capture the extent of the MNEs' efforts to reconfigure resources such that their impact on the environment and the climate is minimized, as previously sensed. As the proxies are binary variables, a Tetrachoric Alpha Test is conducted to test for internal validity. The results of 0.77 and an eigenvalue of 1.77 indicate common factors underlying the three variables and hence show internal consistency and satisfactory reliability. These proxies follow Teece's (2007) sequential logic moving from environmental awareness to committed policy response to realized reconfiguration of resources.

5.3.2 Reshoring

The dependent variable is reshoring. Reshoring means reversing previous offshoring decisions by bringing back activities and services into the headquarters country (Fratocchi et al., 2016; Gray et al., 2013). It can involve either a partial or a complete termination of foreign activities (Fratocchi et al., 2014), which in any case includes a decrease in employment rate. Therefore, to construct the reshoring variable, this study uses the operationalization defined by Delis et al. (2019). Their approach has been applied in reshoring literature dealing with MNEs before (Zhang et al., 2023). It combines subsidiaries and parent company employment data which has been drawn from Bureau van Dijk ORBIS. The analysis will be based on predefined industry classifications (NACE two-digit codes) which have been discussed in section 5.3.

Whether a company has reshored in year t is defined through two steps. In the first step the focus lies on employment changes within the subsidiary. A foreign subsidiary of the parent company must realize a drop in its number of employees (ORBIS: EMPL) by no less than 10% in year $t-1$. To overcome any concerns that the decline in the subsidiary is reason to unrelated matters apart from reshoring such as downsizing or divesting, the parent company must show an increase in their number of employees (ORBIS: EMPL) in year t , $t+1$ or $t+2$. Only if both conditions apply, it is assumed that the MNE has reshored. The three-year window accounts for the realistic lag between the initialisation of the reshoring decision and the observable effect at the parent company.

5.3.3 Moderating Variable 1: International Environmental Certification (ISO 14000)

International Environmental Certification provides access to internationally accepted environmental management tools. These tools aim to approach environmental issues and support firms in increasing their environmental performance. Therefore, this study analyses whether “the company claim to have an ISO 14000 or EMS certification” (ESG Code: ENERDP073). This certification entails not only norms and supporting documents but also includes the ISO 14001, which certifies a firm’s Environmental Management Systems. Obtaining such certification verifies that a company’s procedures and routines are green.

5.3.4 Moderating Variable 2: Environmental, Social, Governance Score (ESG Score)

For many MNEs reshoring reflects the commitment to approach environmental and social issues. Incorporation the natural environment in a firm’s long-term vision highly reflects the firm’s commitment to sustainable development (Hart, 1995). To test whether this genuine commitment to sustainability concerns, reflected by the ESG score, supports MNEs with DGC to realize their decision to reshore, as well as to see if greener MNEs tend to reshore more, the ESG Score of a company (ESG Code: TRESGS) is included as a moderating variable.

5.3.5 Control Variables

To exclude effects on our dependent variable and to ensure that the obtained results are not biased, confounded or misleading, the following control variables are included. The results are controlled for 1-year logged amount of winsorized price-to-book ratio and return on equity, and the leverage ratio, degree of product diversification, logged amount of sales, logged assets, and logged number of employees. Financially stable MNEs with diversified product portfolios and slower growth potential are expected to invest their resources and assets more into the strategic sustainability decisions (Maksimov et al., 2022). All control variables have been sourced from LSEG Datastream.

Table 3 summarizes all variables which are used for further analysis. The logic for sensing, seizing, reconfiguring proxies, as well as the control variables were adopted from Maksimov et al.'s (2022) study. For the reconfiguration dimension, the study substituted the original proxy Take-back and Recycling Initiative indicator (ENPIDP047) with Biodiversity Impact Reduction (ENERDP019), as this study argues that the new proxy positively reflects the study's underlying NRBV (Hart, 1995) lens. Given the limited number of reshoring events, the satisfactory internal consistency of the chosen proxies, and the fact the original combination would yield 18.6% fewer DGC-positive firm-year observations, the substituted proxy was used for further analysis.

Table 3: Variables, their Definitions and Sources

Variable	Metrics	Source
	<u>Dynamic Green Capabilities</u>	
Sensing	ENERDO089: Is the company aware that climate change can represent commercial risks and/or opportunities? - development of new products/services to overcome the threats to climate change to the existing business model of the company - some companies take climate change as a business opportunity and develop new product/services	LSEG Datastream
Seizing	ENERDP0051: Does the company have a policy to improve emission reduction - in scope are the various forms of emissions to land, air or water from the company's core activities - processes, mechanisms or programs in place as to what the company is doing to reduce emissions in its operations	LSEG Datastream

	- system or a set of formal, documented processes for controlling emissions and driving continuous improvement ENRRD01V: Does the company have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain? TRESENPIS: Environmental innovation category score reflects a company's capacity to reduce the environmental costs and burdens for its customers and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.	
Reconfiguring	ENPIDP019: Does the company report one at least one product line or service that is designed to have positive effects on the environment or which is labeled and marketed? - in focus are the products and services that have positive environmental effects, or marketed as which solve environmental problems ENPIDP069: Does the company report on specific products which are designed for reuse, recycling or the reduction of environmental impacts? - products that have been specifically designed with the goal of being recycled, reuse or which are disposed of without negatively impacting the environment - there must be some discussion of environmental concerns during the product design ENERDP019: 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 biodiversity of protected and sensitive areas?	LSEG Datastream
	<u>Reshoring</u>	
Year of Reshoring	A company has reshored in year t if: (1) A decrease of no less than 10% in the number of employees within the subsidiary in t-1 (2) In t, t+1 or t+2 an increase in the number of employees in the parent company	Bureau van Dijk ORBIS
	<u>Moderating Variables</u>	
International Environmental Certification (ISO 14000)	ENERDP073: Does the company claim to have an ISO 14000 or EMS certification? -any of the individual site that has the ISO-14001 certification is qualifies information - merely stating adherence or ISO 14000 or following ISO 14000 policies does not qualify, certification is required	LSEG Datastream
ESG Score	TRESGS: Refinitiv's ESG Score is an overall company score based on the self-reported information in the environmental, social and corporate governance pillars.	LSEG Datastream
	<u>Control Variables</u>	

Assets	Logged Total Assets (WC02999) (1-year lag)	LSEG Datastream
Price-to-book	Market capitalization over book value (PTBV) (logged, 1-year lag) (winsorized)	LSEG Datastream
Return on equity	Pretax profit over equity (WC08301) (1-year lag) (winsorized)	LSEG Datastream
Leverage ratio	Total liabilities over total equity (WC08221) (1-year lag)	LSEG Datastream
Product diversification	The extent to which the firm's sales are diverse across product segments (1-year lag)	LSEG Datastream
Sales	Logged Amount of sales (WC01001) (1-year lag)	LSEG Datastream
Number of Employees	Logged number of employees (1-year lag) (WC07011)	LSEG Datastream

Note: Operationalization adapted from Maksimov et al. (2022). One proxy variable was substituted to reduce the loss of DGC firm-year observations.

5.4 Estimation Approach

The dependent variable in this study, which captures the reshoring decision of a company, is dichotomous. Therefore, a logistic regression with fixed effects and robust standard errors is applied to test the models. This controls for unobserved heterogeneities across time and countries, which could bias the results. To test the models, all final regressions are conducted with fixed year-effects and fixed country-effects. The constant term absorbs any between firm or country variations, leaving only internal changes over time within the sample. Robust standard errors stabilize the error terms on firm-level. The model approach estimates the reshoring probability of a firm.

Further, this study tests DGC for endogeneity. Reasons can be unobserved time- or country-variant factors which influence the development of DGC but do not affect the reshoring decision. To address this possibility, an instrument is constructed. It reflects the proportion of peer firms having DGC within the same industry and country. Firm's development of DGC development is likely shaped by the decisions undertaken by peers through shared industry norms, competitive pressure, and common supplier networks. Thus, the instrument is assumed to correlate with the independent variable only but not the dependent variable. In other words, the peer's DGC proportion has a direct effect on the DGC development of the focal firm, but no direct influence on the firm's reshoring decision as the decision requires idiosyncratic capabilities thus depends on the firm's own DGC. With this instrument, a two-stage residual inclusion (2SRI) approach is conducted.

If the instrument is significant in the first and second stage, the option for the standard OLS approach is excluded as endogeneity is present. Compared to the two-stage least squares (2SLS) approach, the 2SRI directly utilizes the first stages' residuals as the endogeneity control. Therefore, no additional instrument creation for the interaction terms is needed. The 2SRI is applied in line with past studies (Maksimov et al., 2022).

The first stage regression is controlled for firm-fixed effects and year-fixed effects, the second stage regression incorporates country-fixed effects and year-fixed effects. The first stage regression applies an OLS regression, whereas the second stage conducts a logistic regression. In logistic regression firm-fixed effects would exclude a great number of observations of firms that never experienced within-firm variation, such as the development of DGC. This would bias the sample, and a large part of the control group would be lost. Therefore, the second stage includes country-fixed effects and year-fixed effects, to control for institutional, regulatory and macroeconomic factors between countries and years, which could influence reshoring decisions. This issue does not concern the OLS regression. Further, this stage focuses on the development of firm-internal, firm-specific, over time accumulated capabilities. Therefore, the control is firm- and year-oriented.

The baseline estimation model is as follows:

$$\begin{aligned} \text{Reshoring}_{it} = & \alpha_0 + \alpha_1 \text{DGC}_{it-1} + \alpha_2 \text{Firm-level controls}_{it-1} + \alpha_3 \hat{u}_{it-1} \\ & + \mu_{it} + \gamma_{it} + \varepsilon_{it} \end{aligned}$$

Incorporating the moderators ESG Score and International Environmental Certification, the models are as follows:

$$\begin{aligned} \text{Reshoring}_{it} = & \alpha_0 + \alpha_1 \text{DGC}_{it-1} + \alpha_2 \text{ISO 14000}_{it-1} + \alpha_3 (\text{DGC} \times \text{ISO 14000})_{it-1} \\ & + \alpha_4 \text{Firm-level controls}_{it-1} + \alpha_5 \hat{u}_{it-1} + \mu_{it} + \gamma_{it} + \varepsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{Reshoring}_{it} = & \alpha_0 + \alpha_1 \text{DGC}_{it-1} + \alpha_2 \text{ESG Score}_{it-1} + \alpha_3 (\text{DGC} \times \text{ESG Score})_{it-1} \\ & + \alpha_4 \text{Firm-level controls}_{it-1} + \alpha_5 \hat{u}_{it-1} + \mu_{it} + \gamma_{it} + \varepsilon_{it} \end{aligned}$$

where i represents the firm, t denotes the index year, $\hat{u}$ is the residual obtained from the first-stage regression of DGC on the instrument, μ_{it} indicates the country-fixed effects,

γ_{it} the year-fixed effects and ε_{it} denotes the error term. To ensure reliability of the regression coefficients, the Pearson Correlation Matrix is calculated and complements the analysis with a Variance Inflation Factor (VIF) calculation. The unit of analysis within this study is the firm-year level. As shown in the model, the explanatory variables are lagged by one year and the number of observations in the regression outcomes may decrease due to missing values for the explanatory variables.

6 Results

This chapter presents the empirical findings of this study. First, an overview of the final sample composition is provided, followed by the descriptive statistics. The regression analysis is discussed and evaluated against the hypotheses, including in-depth analysis of the moderating variables' roles. Finally, all models are being tested against a series of robustness checks to verify the reliability of the main findings.

6.1 Sample Analysis

The tables for the year, country and industry distributions for the following sample analysis can be taken from Appendix A (Tables A1 to A3). The total sample includes 11,032 firm-year observations from 926 firms. 509 firm-year observations (4.6%) correspond to reshoring events based on DGC development. The data covers the period 2011 to 2025 and shows a slight, but continuous increase in the number of reshoring events, from 26 in 2011 to 44 in 2024, followed by a drop to 37 in 2025. Geographically, the US dominates with 6,459 observations (58.6%), followed by the United Kingdom (1,035; 9.4%) and Germany (806; 7.3%). The highest absolute number of reshoring events are also found in the US (306), followed by Germany (62), United Kingdom (50) and France (43). Austria, Belgium, Finland, Ireland, Italy, Norway, Poland, Portugal, and Spain do not report a single reshoring event. At the industry level, NACE 26 (Manufacture of computer, electronic and optical products) represents the largest group with 2,601 observations (23.6%), followed by NACE 28 (Manufacture of machinery and equipment n.e.c) (1,536; 13.9%) and NACE 20 (Manufacture of chemicals and chemical products) (1,049; 9.5%). All remaining industries are represented with shares between 0.3% and 7.4%. The highest absolute reshoring events are recorded in NACE 29 (Manufacture of motor vehicles, trailers and semi-trailers) (121), NACE 21 (Manufacture of basic pharmaceutical products and pharmaceutical preparations) (108) and NACE 20 (Manufacture of chemicals and chemical products) (60).

6.2 Descriptive Statistics

The descriptive statistics and pairwise correlation matrix for the panel sample of 11,032 observations can be seen in Table 4. The correlation between sales (log) and assets (log) is the highest with 0.960. Therefore, the Variance Inflation Factor (VIF) test is conducted to exclude possible multicollinearity. The results indicate multicollinearity issues for sales

(log) (17.929) and assets (log) (14.351) (see Appendix B, Table B1). To address this issue, the firm-level control $\ln(\text{sales})$, with the highest VIF value of 17.929, will be excluded from further analysis to mitigate possible confounding results. The final regression analysis is based on the updated correlation matrix (see Table 4) and new VIF (see Appendix B, Table B2). This study acknowledges the high correlation between employees and assets, with a value of 0.856. Nonetheless, this will not be addressed any further, as the new VIF results (without sales (log)) are between 1.176 and 4.380 (see Appendix B, Table B2) and indicate no further multicollinearity issues. To further reduce concerns about multicollinearity, all continuous variables are mean-centred and used for reporting the results. In this studies sample, the MNE's have an average return on equity of 10.4% which is distributed across all industries. But the representation of industries is not quite equally distributed. Therefore, the sample stability is tested by removing the exceptionally high represented industry NACE 26 from our model. This does not affect our results much (see Appendix C).

Table 4: Summary Statistics and Correlation Matrix

Nr	Variable	Mean	SD	Min	Max	Correlations											
						1	2	3	4	5	6	7	8	9	10	11	12
1	Reshoring	0.058	0.233	0.000	1.000												
2	DGC	0.101	0.301	0.000	1.000	0.261											
3	Peer DGC	0.079	0.165	0.000	1.000	0.067	0.333										
4	Assets (log)	15.000	1.834	8.764	20.190	0.416	0.316	0.080									
5	Sales(log)	14.722	1.842	5.505	19.804	0.402	0.302	0.087	0.960								
6	Employees (log)	8.756	1.722	2.639	13.436	0.336	0.301	0.107	0.856	0.887							
7	PTB	3.871	4.311	-7.721	26.840	0.063	-0.033	-0.056	-0.009	0.002	-0.058						
8	ROE	12.102	27.350	-125.618	105.148	0.092	0.055	0.018	0.271	0.348	0.302	0.257					
9	Leverage Ratio	32.700	22.009	0.000	231.960	0.117	0.121	0.075	0.367	0.371	0.388	0.205	0.094				
10	Product Diversification	0.762	0.492	-2.858	2.133	0.064	0.153	0.055	0.360	0.381	0.402	-0.082	0.113	0.182			
11	ESG	0.006	0.983	-2.417	2.052	0.279	0.374	0.146	0.698	0.685	0.645	0.014	0.223	0.246	0.315		
12	ISO14000	0.637	0.481	0.000	1.000	0.061	0.179	0.124	0.359	0.376	0.393	-0.087	0.149	0.165	0.146	0.448	

N = 11032; Pearson correlation coefficients reported.

6.3 Regression Analysis

Table 5 reports the regression results of the logistic regressions. The basic OLS models (1a to 1c) represent the fixed-effects OLS model with control variables but without endogeneity correction. The more complex model shows improvements of the proposed

effect. For all models where peer DGC is used as an instrument (2a to 2c), the residual reveals to be significant. The instrument therefore proves to be useful to mitigate the endogeneity effect for the estimation, as otherwise, the effects would be underestimated.

This study further addresses the adapted reconfiguring proxy in this study compared to Maksimov et al.'s (2022) original DGC proxy specification. Therefore, the 2SRI regression analysis has been also conducted with the original proxies and yielded similar results in terms of direction and significance (see Appendix D). This confirms that the substitution does not drive this study's findings, supporting the validity and robustness of the reported results.

Table 5: Regression results for all models. OLS (1a to 1c) and 2SRI (2a to 2c).

	OLS (No Endogeneity Correction)			2SRI (Endogeneity Corrected)		
	1a	1b	1c	2a	2b	2c
DGC	0.982*** (0.165)	1.331** (0.444)	-0.603 (0.538)	1.967*** (0.245)	1.933*** (0.500)	-0.014 (0.597)
Assets (log)	2.243*** (0.110)	2.333*** (0.123)	2.264*** (0.121)	2.233*** (0.111)	2.280*** (0.122)	2.372*** (0.123)
Employees (log)	-0.402*** (0.103)	-0.506*** (0.118)	-0.499*** (0.118)	-0.457*** (0.106)	-0.539*** (0.119)	-0.554*** (0.116)
PTB	0.134*** (0.017)	0.135*** (0.018)	0.132*** (0.018)	0.137*** (0.018)	0.131*** (0.018)	0.142*** (0.018)
ROE	-0.005 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)
Leverage Ratio	-0.009* (0.004)	-0.009* (0.004)	-0.009* (0.004)	-0.012** (0.004)	-0.011** (0.004)	-0.012** (0.004)
Product Diversification	-0.304* (0.141)	-0.348* (0.149)	-0.301* (0.150)	-0.320* (0.144)	-0.359* (0.152)	-0.317* (0.149)
ESG		-0.099 (0.133)				-0.289* (0.134)
DGC × ISO 14000		-0.170 (0.462)			0.246 (0.500)	
ISO			-0.389* (0.174)		-0.458* (0.184)	
DGC × ESG			1.352*** (0.375)			1.713*** (0.412)
Residuals DGC (Endogeneity Test)				-2.036*** (0.352)	-2.022*** (0.389)	-2.300*** (0.386)
Observations	9989	7442	7442	9989	7445	7761
Pseudo R ²	0.595	0.577	0.582	0.603	0.586	0.594
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

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

1a-1c: OLS standard logit without endogeneity correction. 2a-2c: 2SRI (Two-Stage Residual Inclusion) logit correcting for endogeneity of DGC. Significance of Residuals DGC confirms endogeneity and justifies 2SRI. Standard errors clustered by firm.

6.3.1 Baseline Model: DGC effect on reshoring probability

The first hypothesis in this study proposes that DGC have a positive effect on a firm's reshoring probability. Model 2a, consisting of 9,989 firm-year observations and a Pseudo- R^2 of 0.603, shows that DGC has a positive and highly significant effect on reshoring ($\beta = 1.967$, $SE = 0.245$, $p < 0.001$). The coefficient of 1.967 corresponds to an odds ratio of $e^{1.975} \approx 7.15$. Thus, MNEs with greater dynamic sustainability capabilities have higher odds of approximately 7.15 times, to engage in reshoring compared to MNEs without DGC. This aligns closely with the data from Table 2, where firms without DGC reshore in only about 3.1% of firm-year observations, compared to 23.9% reshoring events among firms with DGC. The marginal effect calculation reveals a 5.58% ($p = 0.031$) higher reshoring probability of MNEs with DGC than without. Interestingly, compared to the 1a OLS model ($\beta = 0.982$), the 2SRI estimate is larger, suggesting that the OLS underestimates the true effect of DGC on reshoring due to endogeneity bias. The residual from stage one is negative and highly significant ($SE = 0.475$, $p < 0.001$) (see Appendix E), confirming the presence of endogeneity and the necessity of the 2SRI approach.

The analysis of firm-level controls shows that firm size (assets) is positively associated with reshoring ($p < 0.001$), consistent with the idea that larger firms possess greater resources to be able to absorb opportunities and threats and handle intense strategic decisions (Maksimov et al., 2022; Teece et al., 1997). On the contrary, the number of employees and leverage ratio are negatively significant. Thus, labour intensity and financially constraints create greater barriers for relocation as firms are less likely to commit capital, which aligns with the theoretical framing that reshoring is a human capital and financial-intensive decision (McIvor & Bals, 2021). The price-to-book variable is significantly positive, indicating that growth-oriented firms facing sustainability pressure in aligning their practices with external sustainability requirements, are more likely to reshore (Fratocchi et al., 2016). Product diversification shows a marginal negative effect ($p < 0.05$), showing that greater organizational complexity in product lines may hinder reshoring decisions. Return on equities show no significant effect. Taken together, H1 is supported.

6.3.2 Moderator Model 1: International Environmental Certification Model (ISO 14000)

The second hypothesis proposes that having an international environmental certification, such as the ISO 14000, negatively moderates the effect between DGC and the firms reshoring probability. Model 2b, including 7,445 firm-year observations with a Pseudo- R^2 of 0.586, shows a slightly positive but insignificant result ($\beta = 0.246$) for the interaction term DGC x ISO, and therefore does not support the proposition. Meanwhile, the DGC remain positive and significant ($\beta = 1.933$, $p < 0.001$). Based on the available evidence, this study cannot confirm that ISO 14000 certification significantly weakens, nor strengthens the positive effect of DGC on reshoring. Additionally, the direction of the estimated coefficient contradicts with the hypothesized negative moderation.

The observation matrix (see Table 6) provides further descriptive context. While the reshoring rate for non-DGC firms is quite similar (3.51% for non-certified and 3.86% for certified), it diverges for MNEs with DGC to 24.8% for certified firms, and 16.1% for non-certified MNEs. This aligns with the regression results indicating a positive tendency for reshoring for certified firms. To provide a clearer picture of the reshoring probabilities, the marginal effects will be calculated. For ISO certified MNEs, the probability to reshore when possessing DGC compared to MNEs without DGC increases in about 8.82 percentage points ($p = 0.026$). For non-certified firms, the reshoring probability is 5.09 percentage points ($p = 0.05$) higher with DGC than without. Thus, the ISO 14000 certification might account for a higher probability of 3.73 percentage points, but illustrating these outcomes with a plot (see Figure 2) shows that both slopes increase similarly, with highly overlapping 95% confidence intervals at the units of analysis. While the estimate is more precisely and robustly among ISO-certified firms, likely due to the larger sample size, the difference between the groups remains indistinguishable. The results from the marginal effects as well as from the regression model thus should not be excluded but rather interpreted cautiously. The wide intervals indicate the limitation from the small number of reshoring events relative to non-reshoring observations, giving a boundary condition of this analysis. An increase in the number of observations could overcome the limitations faced within this analysis.

Table 6: Observation matrix (DGCxISO) - Reshoring

DGC	ISO Certification	Reshoring		
		Reshoring = 0	Reshoring = 1	Total
No DGC (0)	<i>Without ISO14000</i>	2776 (512 firms)	101 (15 firms)	2877 (527 firms)
	<i>With ISO14000</i>	4282 (571 firms)	172 (23 firms)	4454 (594 firms)
	Subtotal	7058 (860 firms)	273 (26 firms)	7331 (886 firms)
DGC (1)	<i>Without ISO14000</i>	73 (22 firms)	14 (4 firms)	87 (26 firms)
	<i>With ISO14000</i>	551 (129 firms)	182 (23 firms)	733 (152 firms)
	Subtotal	624 (143 firms)	196 (26 firms)	820 (169 firms)

Note: N observations (N firms) shown in each cell.

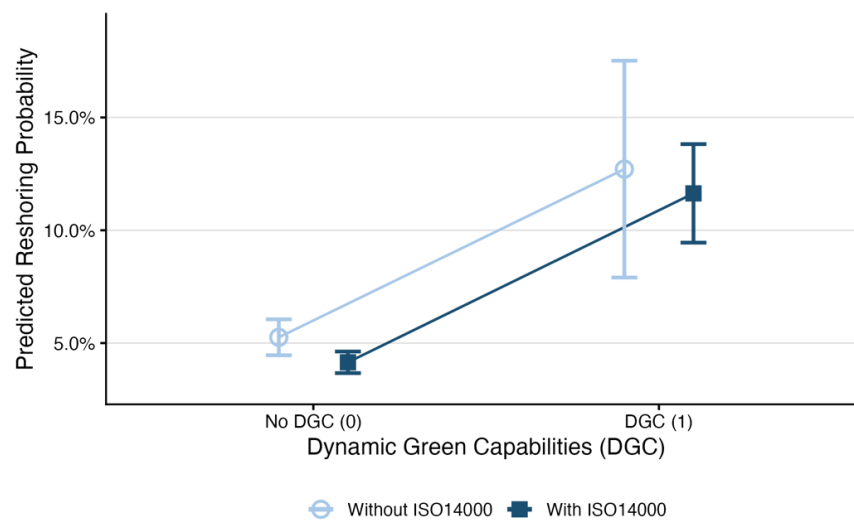


Figure 2: Plot on the predicted reshoring probability at No DGC (0) and DGC (1) for MNEs with and without ISO 14000 certifications. Including 95% confidence intervals.

All control variables remain largely stable in terms of direction and significance compared to the baseline model. The first-stage residual remains highly significant, confirming endogeneity and validity of the 2SRI approach for this model. Country and year fixed effects are included. Although the direction contradicts the hypothesis, the results lack sufficient evidence and significance. Therefore, H2 cannot be supported.

6.3.3 Moderator Model 2: ESG Score Model

The third hypothesis proposes that an MNE's ESG score positively moderates the relationship between DGC and reshoring. The results from Model 2c, containing 7,761 observations with a Pseudo- R^2 of 0.594, provide support for the third hypothesis. The interaction term DGC x ESG is positive ($\beta = 1.713$) and highly significant ($p < 0.01$), where the coefficient corresponds to an odds ratio of $e^{1.713} \approx 5.6$. This implies that for each one-standard-deviation increase in a firm's ESG score, the odds to reshore are approximately 5.6 times higher for MNEs with DGC than for those without such capabilities. DGC therefore do not drive reshoring unconditionally, but their effect is related to the firm's environmental orientation. Compared to the OLS estimate (model 1c), the 2SRI coefficient is slightly larger, consistent with the downward bias in OLS due to present endogeneity.

The observation matrix (see Table 7) provides further descriptive support for the argument. MNEs were divided into three groups based on their standardized ESG level. High ESG includes MNEs with more than one standard deviation above the mean, Mean ESG group is one standard deviation of the mean, and Low ESG MNEs have an ESG score which is one standard deviation below the mean. Among MNEs with DGC, the reshoring rates rise strongly as the ESG level increases, starting from 5.5% at mean ESG to 35.2% at high ESG. By contrast, MNEs without DGC show weaker gradients, with reshoring rates starting from 0.4%, to 2.9% and 13.2%, at low, mean and high ESG respectively. These patterns align with the ESG hypothesized moderation logic of ESG.

Table 7: Observation matrix (DGCxESG) - Reshoring

DGC	ESG Level	Reshoring		
		Reshoring = 0	Reshoring = 1	Total
No DGC (0)	<i>Low ESG</i>	1601 (445 firms)	6 (2 firms)	1607 (447 firms)
	<i>Mean ESG</i>	4831 (720 firms)	142 (23 firms)	4973 (742 firms)
	<i>High ESG</i>	952 (182 firms)	145 (24 firms)	1097 (206 firms)
	Subtotal	7384 (864 firms)	293 (32 firms)	7677 (895 firms)
DGC (1)	<i>Low ESG</i>	1 (1 firms)	0 (0 firms)	1 (1 firms)
	<i>Mean ESG</i>	294 (97 firms)	17 (9 firms)	311 (106 firms)
	<i>High ESG</i>	329 (71 firms)	179 (25 firms)	508 (96 firms)
	Subtotal	624 (143 firms)	196 (26 firms)	820 (169 firms)

Note: N observations (N firms) shown in each cell. ESG groups: Low < mean-1SD <= Mean <= mean+1SD < High.

The group effects are further brought into a perspective through a marginal effects calculation at the three ESG levels. The results reveal a similar pattern as the observation matrix. While a 5.07 percentage point increase for high level ESG MNEs ($p = 0.0535$) can be observed, the low and mean ESG levels reveal a negative slope of -3.40 and -0.03 percentage points respectively, but with non-significant results. One reason can be that no event at low ESG levels is observed, and a small number of observations for mean ESG MNEs. Thus, the marginal effects must be interpreted cautiously. Still, the directions confirm the regression results and align with the odd ratio prediction. While an increase in the number of reshoring events will provide a clearer picture, these results indicate an important ESG influence on the actionability of DGC and the reshoring probability.

Figure 3 illustrates these effects graphically by plotting the 95% confident interval levels at the DGC levels of interest. For MNEs without DGC the predicted reshoring probabilities are nearly identical across all three ESG groups while MNEs with DGC demonstrate highly divergent slopes, confirming the interaction effect. The confidence intervals especially at the mean and high ESG levels are wide and overlap, reflecting the limited number of observations. This again confirms the boundary condition for this analysis. An increase in the number of observations could overcome the limitations faced here. The results are robust to an additional winsorizing test (see Table 8). Excluding extreme ESG score values on the 1% level does not affect the results.

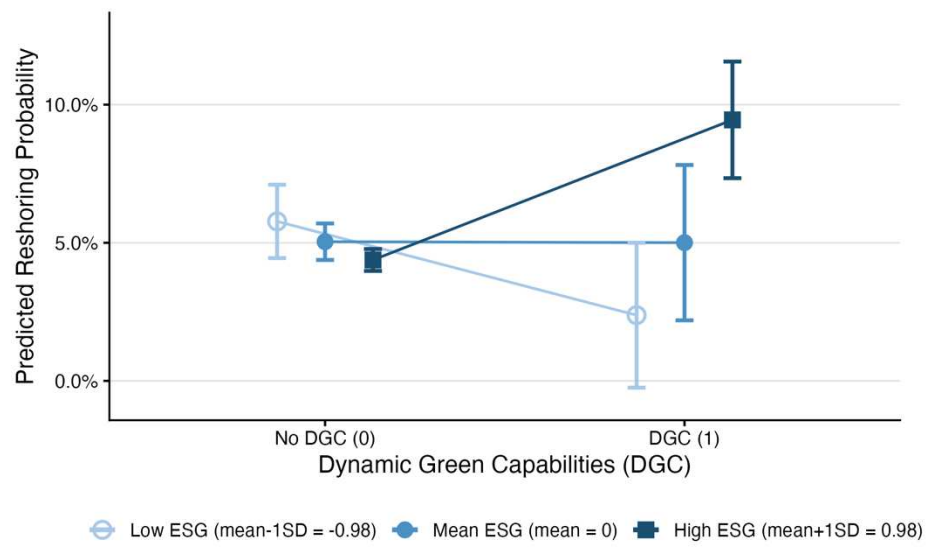


Figure 3: Plot of the predicted reshoring probability at No DGC (0) and DGC (1) for MNEs with low ESG (mean – 1SD), mean ESG, and high ESG (mean + 1SD). Including 95% confidence intervals

Table 8: Robustness Test: Winsorizing ESG Scores (excluding at 1% and 99% level)

	ESG (original)	ESG (winsorized)
DGC	-0.014 (0.597)	-0.066 (0.615)
Residuals DGC	-2.300*** (0.386)	-2.305*** (0.387)
esg_std	-0.289* (0.134)	
Assets (log)	2.372*** (0.123)	2.372*** (0.123)
Employees (log)	-0.554*** (0.116)	-0.553*** (0.116)
PTB	0.142*** (0.018)	0.142*** (0.018)
ROE	-0.005 (0.003)	-0.005 (0.003)
Leverage Ratio	-0.012** (0.004)	-0.012** (0.004)
Product Diversification	-0.317* (0.149)	-0.317* (0.149)
DGC × ESG	1.713*** (0.412)	
ESG (winsorized)		-0.293* (0.134)
DGC × ESG (winsorized)		1.766*** (0.429)
Observations	7761	7761
Pseudo R ²	0.594	0.594
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes

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

Standard errors clustered by firm.

The first-stage residual remains highly significant, confirming endogeneity and the validity of the 2SRI approach. All controls remain consistent in direction and significance relative to the 1a model. Country and year fixed effects are included. Thus, H3 is supported.

6.4 Robustness Checks

To ensure reliability of the research findings, several robustness checks are discussed in the following section.

The regression results regarding robustness tests concerning outliers can be seen in Appendices F and G. First, to mitigate concerns regarding outliers, all variables are winsorized at the 1% level, top and bottom (Maksimov et al., 2022). This gives us consistent results for all model variables and controls in terms of direction, magnitude and significance. Additionally, a subsample analysis of listed European MNEs only is conducted by excluding the biggest contributor in terms of geography (Maksimov et al., 2022). Excluding the US observations from the sample which make up 58.6%, reduces the subsample size to 3,529 observations. No significant changes can be observed across all models and the most respective control variables. The only control variable changing is the number of employees, which becomes positive and significant. Otherwise, the results remain largely consistent with unaffected key variables, confirming that the main results are not dependent on regional characteristics.

As for the second robustness check, the reshoring threshold definition (initially 10%) is relaxed to a 5% decrease in the number of employees in one of the foreign subsidiaries and tighten it to 15% (Zhang et al., 2023). The results for all models remain stable across both alternative definitions for all variables and controls. Thus, the findings are not sensitive to the specified reshoring operationalization used in the analysis.

Third, alternative MNE definitions are being applied (Maksimov et al., 2022). The threshold for the MNE definition will be increased from foreign sales of total sales being greater than 0 to $FSTS \geq 0.05$ and $FSTS \geq 0.1$. Across all threshold definitions, the direction, magnitude and significance of all key variables remain stable (see Appendix F). This confirms, that the results are not affected by the used MNE definition.

Combined, the robustness checks confirm the reliability and stability of the main findings against alternative outlier treatment, geographic subsamples, reshoring definitions and MNE classifications.

7. Discussion

This study examines whether DGC function as an enabling mechanism for reshoring decisions among listed manufacturing MNEs. Further, two boundary conditions are included, testing the degree of internalization of sustainability into the firm's processes for reshoring decisions. This study's analysis grounds on the frameworks and previous findings from the NRBV and the DC. Three hypotheses were derived and tested on a panel of 926 MNEs covering the period 2011 to 2025. The findings provide strong support for the central claim that DGC constitute a firm-level driver of reshoring. The nuanced and diverging results from ISO 14000 certification and the firm's ESG score deepen the understanding of the green engagement required for reshoring. The following sections discuss the results in relation to prior theory and draw theoretical and managerial implications.

7.1 DGC as Driver of Reshoring

The baseline finding confirms that MNEs owning DGC are significantly more likely to engage in reshoring than those without. The results are robust against alternative specifications and multiple robustness checks. Additionally, stronger results from the 2SRI were observed compared to standard OLS, underscoring the importance of accounting for the endogeneity. This indicates that while firms' competitive advantage depends on the available internal capacities as proposed by the DC (Teece et al., 1997), the threats from the external environment and the decisions from industry peers strongly influence the focal firm's decision-making outcomes.

For the DC framework, the results support the theoretical logic of Teece's (2007) sensing-seizing-reconfiguring framework. Interpreted through a sustainability lens (Maksimov et al., 2022), firms with DGC are better positioned to sense regulatory tightenings, shifting stakeholder expectations, growing misalignments between offshore production conditions and domestic sustainability requirements, and the strategic moves initiated by competitors. Seizing enables firms to absorb and integrate green knowledge, allowing them to evaluate reshoring not merely as a cost correction, but as a proactive green reconfiguration. Reconfiguring finally translates the strategic evaluation into operational restructuring that reshoring requires. This connects to Verbeke's (2022) argument, which states that great sensing capabilities can lead to refraining from forms of foreign

involvement. Especially, based on environmental harms coming from offshore operations discussed in this study, Verbeke's (2022) argument is supported within the sustainability context. In line with McIvor et al.'s (2025) framework, DGC through a NRBV lens, revealed to drive reshoring.

DGC thus are an important mechanism to translate not only ecological and social demands from the firm's environment, but also the firm internal vision according to its green processes. These internal structures are not only maintained through DGC but constantly developed and improved. While previous contribution positioned DGC as a mediating tool to generate knowledge, promote R&D and enhance performance outcomes, the results propose a further outcome, expanding the operational value of DGC. They are an important resource to realize complex and intense activities. Not only do DGC spot misalignments or opportunities, but they facilitate the whole process of actively approaching these. The results provide expand the understanding of reconfiguration of product-level processes with the geographic-scope. While environmental shifts and challenges impose constraints to firm's operational choices, such as supplier issues (McIvor et al., 2025), DGC provide more operational flexibility reflected by the diverging results in reshoring probability. Whether the MNEs do not want to, or cannot, remains a question here.

Analysing the control variables gives further conditions under which the relationship hold. Firm size (assets) is positively associated with reshoring which is consistent with the notion that resource-rich firms are able to deal with financial and operational complexity of strategic relocation. Growth-oriented companies (price-to-book) further enhance reshoring, probably due to stronger stakeholder pressure to align with sustainability expectations. Labor intensity (number of employees), by contrast, negatively affects reshoring probability. This is consistent with the transaction cost logic in the reshoring literature. Such firms likely face greater barriers in relocating their workforce due to institutional, legal and logistical costs. The negative leverage effect confirms that financial constraints reduce the likelihood of committing capital to restructuring-intensive strategies.

7.2 Sustainability-orientation as the Moderating Role

The second hypothesis proposed that ISO 14000 negatively moderates the DGC-reshoring relationship, based on the legitimation logic introduced by Boiral (2007) and

Bansal and Roth (2000). The regression results show a positive but statistically insignificant interaction coefficient. Whether the MNE is ISO 14000 certified, thus has environmental management systems, or not, shows little detectable effects on the reshoring probability. First insights hint towards ISO 14000 as a potential influence on the reshoring probability, but the positive difference cannot be causally confirmed and remains a descriptive observation. The third hypothesis introduces the ESG score as a positive moderating influence on the DGC-reshoring relationship, reflecting the firm's sustainability-orientation, hence long-term vision. The ESG level revealed to have a reinforcing influence on the reshoring outcome of an MNE. Low ESG MNEs have a -3.40 percentage point effect on the DGC-reshoring relationship, whereas high ESG MNEs show a +5.07 percentage point effect. While these group differences are not significant at the 5%-level, their overall significance from the regression provides not only support for this study's proposition but further highlights the importance of the complementary competences available within the firm. The high-ESG level itself does not seem to enhance the probability to reshore compared to the baseline model. Rather it provides similar results to it. On the contrary, mean and low ESG levels show a drop from the baseline probability. This provides evidence for the hypothesis, that the integration of sustainability into the business underlies a certain threshold to enable reshoring. Below this, DGC may face frictions as they exist in conflict with the absence of a sustainability-oriented strategy which could otherwise justify costs of reshoring.

The observed tension contributes to a longstanding debate within the DC literature. Eisenhardt and Martin (2000) argue that DC reveal common features across firms functioning as best practices, whereas Teece et al. (1997) emphasizes their idiosyncratic and firm-specific value, dependent on the particular context they are embedded. This study's findings reveal that the DGC's effect on reshoring depends on the firm's sustainability-orientation rather than holding uniformly across firms, providing support to Teece et al.'s (1997) view. DGC do not function as a universally applicable best practice but as a capability whose strategic value is realized only within a compatible organizational context and the firm's unique orientation.

This resonates with Christmann's (2000) insight that strategic practices generate competitive advantage only when complemented with aligned capabilities. Applied to this study's context, DGC alone are insufficient drivers. They require an appropriate strategic architecture, as otherwise barriers for transformation can arise from top management

(Teece, 2007). Both, ISO 14000 and ESG are widely used indicators of corporate environmental commitment, but their operating principles appear to diverge when applied to complex, long-term operations, such as reshoring. While certifications can support the first steps to green commitment (Maksimov et al., 2022), reflected through the higher yet insignificant reshoring probability, being truly actionable requires going further. While the results are positive and point to the efforts of being more environmental conscious, the effect of ISO 14000 is not only weaker, compared to the ESG score, but cannot be causally explained. In Bansal and Roth's (2000) framework, ISO-certified firms appear to operate through a legitimation motive. In other words, where ISO certification serves as a symbolic commitment to satisfy stakeholder expectations, the MNE lacks the required resources for reconfiguration to relocate manufacturing activities across borders. But if sustainability is already embedded in the firm's broader core values and visions, hierarchical frictions can be reduced as firms with deep strategic sustainability integration show fundamentally different organizational processes, governance structures and orientations fostering transformation (Eccles et al., 2014). ESG can thus be seen as a reinforcing mechanism for reshoring as it promotes constant adaption and improvement of systems and processes to align them with the natural, socio environmental, and governance demands. They facilitate companies to act strategically and economically rational while remaining aware for external shifts, which aligns with the core ideas from the NRBV (Hart, 1995). If the internal structures miss a basic common vision, the results will remain either intentionally or at the lower level.

In line with the environmental lens of NRBV (Hart, 1995) and the capability lens from the DC framework (Teece et al., 1997), deep commitment to sustainability will generate valuable, rare, unique and difficult to replicate resources and capabilities which foster capturing competitive advantage through reshoring. In summary, DGC are a necessary but not stand-alone condition for sustainability-driven reshoring. Their effectiveness is dependent on the broader strategic orientation of the firm. This positions DGC and ESG as mutually reinforcing elements of the strategic system.

7.3 Theoretical Contribution

This study makes several theoretical contributions to the reshoring literature as well as the fields of SM and sustainability research. First, it contributes to the reshoring literature by introducing DGC as an empirically tested mechanism for sustainability-driven

reshoring. This provides a capability-based explanation on why firms facing identical external sustainability pressures make different strategic location decisions. Second, this study contributes to the DGC literature by extending the application of the framework to a strategic, sustainability-oriented location decision and adding reshoring as a new outcome domain for the framework. Third, by positioning DGC as a dynamic, environmentally driven extension of the NRBV, this study supports the claim, that resources must be complemented with dynamic aspects to remain strategically flexible (Augier & Teece, 2007; Teece et al., 1997). By aligning the operationalized DGC proxies combined with the ESG score to the three pillars introduced by Hart (1995), this study introduces managerial processes and firm-specific capabilities required for sustainability-oriented strategies. Fourth, by empirically contrasting two conceptually distinct sustainability signals, ISO 14000 certification and the ESG score, this study provides insights for the legitimization versus strategic approach to sustainability. This study shows that for a green capability-based reshoring decision the depth of sustainability integration into the firm's structures influences the probability to realize this decision.

As highlighted by Makri and Leri's (2023) systematic literature review, the DC lens appears in only 2.8% of reshoring studies. This study's findings approach this understudied area in the reshoring literature empirically and demonstrates that DGC actively translate a firm's willingness to improve environmental performance into reshoring. By treating reshoring as a direct consequence of the independent DGC mechanism, this study extends the role of DGC within the capability literature.

7.4 Managerial Implications

This study's findings can be further translated into managerial implications for green manufacturing MNEs dealing with sustainability strategies and global manufacturing decisions. The positive effect of DGC on reshoring suggests that firms seeking reshoring as a strategic sustainability response need to invest in DGC to being able operate complex environments. This involves building sensing mechanisms that capture external shifts in domestic and foreign locations, establish seizing routines that process these signals into information for strategic evaluation by introducing policies, and reconfigure resources to enable an appropriate response. Based on their idiosyncratic nature, investing in required capabilities will thus provide the MNE with valuable competitive advantages (Teece et al., 1997).

This requires shifting away from short-term visions and cost-oriented thinking. Investing in meaningful capabilities will support the MNE in the long run with policies and meaningful transformations regarding products and design. As this study's results shows, complex green decisions are supported by equally complex resources within the MNE. This requires going beyond the minimum expectations and doing what is needed. Ecological equity, and sufficiency are as important as effectiveness and they must co-exist (Dyllick & Hockerts, 2002). The natural environment is constantly changing, and one's participation in it should be dynamic as well.

Therefore, MNEs must align their strategic orientation with their strategic intentions (Christmann, 2000). Genuine integration of sustainability into the green MNE's business is necessary and requires corresponding business ethics (Chang, 2011), and a sustainability-oriented organizational architecture (Eccles et al., 2014; Teece, 2007). While formal environmental certification can facilitate the development of DGC (Maksimov et al., 2022), it does not necessarily support the strategic shifts a company might intend. As the results show, formal certification should not be treated as a sufficient strategy for reshoring. ISO 14000 can be understood as a starting point for building environmental management routines. A more profound way to successfully realize environmental strategies would be to invest in constant growth and adaption to the social, ecological and governance demands, as the positively moderating role of ESG score proposes. The firm's consequential common vision will provide the respective competitive advantages, because while both appear green from the outside, only genuine commitment can support transformative strategies such as reshoring.

7 Limitation and Further Research

Despite the contributions outlined in the previous chapter, this study is subject to a number of limitations that are acknowledged in the following. The first limitation concerns the operationalization of DGC. Following Maksimov et al. (2022), DGC are operationalized through a composite of binary ESG data proxies capturing sensing, seizing and reconfiguring sub-dimensions. While the Tetrachoric Alpha Test confirms acceptable internal consistency for all variables, they only capture whether a firm does something, but not how effectively these capabilities are deployed nor how deeply they are organizationally embedded. Thus, the proxies lack depth and quality. Future research should explore richer capability operationalizations, including survey-based assessments, or case-comparative approaches to complement the large-scale panel evidence.

Second, the reshoring variable, while constructed following established approaches in the literature (Delis et al., 2019; Zhang et al., 2023) relies on employment-based changes in subsidiaries and parent companies as proxies for manufactory reshoring. This approach may not capture all forms of reshoring, such as third-party domestic suppliers. Furthermore, to better exclude the possibility of other forms of restructuring events, the reshoring definition could be enhanced with additional proxies, for example simultaneous asset relocation, patent releases, or utilizing official reshoring announcement data. Additionally, as reshoring is treated as binary variable, future research could extent the analysis to timing, scale and form of reshoring.

Third, the ISO 14000 moderation cannot be confirmed statistically and therefore lacks causal evidence. Future research should incorporate larger samples. This could provide more decisive evidence on whether certification amplifies, substitutes or has no effect on the DGC-reshoring relationship. Further this would benefit revealing more precise results for the in-depth analysis conducted within this study, such as identifying group characteristics of different ESG levels and ISO 14000. In addition, as DGC and reshoring appear to be influenced by green innovation, it would be interesting to include this as a moderating or mediating variable to find further explanations for factors influencing the DGC process and outcome. This would link both research domains even further and enrich the theoretical frameworks.

Fourth, the geographic scope is focused on Europe and the US, excluding other important geographic areas. Future research should seek to extend the geographic coverage,

including emerging reshoring regions. Especially markets like East Asia, that were main offshore locations in the past could provide more insight in the push and pull power of host and home countries.

Fifth, the methodology faces some limitations. The most pronounced is the rare occurrence of reshoring events, impacting the informative value of results. Second, the time-constraint imposed between DGC and reshoring to address reverse causality reduces but does not eliminate all unobserved influences. Third, the panel is unbalanced. Future research should apply additional techniques, for example rare-events logit (King & Zeng, 2001), include country-level controls such as environmental regulation shifts to capture potential external causes driving reshoring, or opt for data sources with more complete panel data.

8 Conclusion

This study argued that reshoring depends on the DGC present within the enterprise to explain why manufacturing MNEs, facing comparable sustainability pressures, differ in whether they reshore. These sustainability-oriented capabilities facilitate reorchestrating resources according to strategic intents, based on the sensing-seizing-reconfiguring framework, adapted to green issues. To test this argument, three hypotheses were derived.

The hypotheses were tested on a panel of 926 listed manufacturing MNEs headquartered in Europe, Norway, the United Kingdom and the US, covering 11,032 firm-year observations between 2011 and 2025. Reshoring was operationalized using employment data from parent companies and respective subsidiaries, which was taken from Bureau van Dijk ORBIS. For the DGC operationalization, LSEG Datastream data was used. Further, the two moderating variables ISO 14000 and ESG score were included to reflect the MNEs commitment to sustainability. The fixed effects 2SRI regression was applied to address endogeneity and test the relationship.

The results show that DGC drive reshoring. MNEs with DGC show approximately seven times higher odds of reshoring than MNEs without DGC (H1). The inclusion of two moderators provided further insights into the sustainability-orientation of a company as a reinforcement to realize intense restructuring. Therefore, the ESG score was utilized to reflect genuine strategic orientation of an MNE. The results show that a high ESG score strengthens the relationship between DGC-reshoring, whereas low ESG scores weakens it (H3). International environmental certification ISO 14000 showed no significant impact on the relationship (H2). Although this study hypothesized a negative impact, the coefficient pointed in the opposite direction. Further studies should address this limitation. All models proved robust against outlier treatment, geographic subsamples, alternative reshoring thresholds and MNE definitions.

The hypotheses were only partially confirmed. H1 and H3 found strong empirical evidence. This aligns with the theoretical assumptions that reshoring is a strategic form of resource reconfiguration and requires embedded, complex as well as knowledge-intensive competencies and a complementing strategic orientation. No support was found for H2. The assumed substitution logic of pressure from external stakeholders could not be confirmed, nor its supportive effect.

Overall, this study provides meaningful contributions to the existing literature of reshoring and DGC. It extends the DC lens in reshoring (Makri & Leri, 2023), and provides a large-scale empirical test of the DGC framework applied to the cross-domain topic of reshoring. By shifting the focus from the reason of reshoring to how it can be supported, DGC are presented as a valuable mechanism for strengthening the strategic decision. Linking DGC with reshoring extends the DGC framework to a new outcome dealing with cross-border relocation activities.

Still, several research questions remain open. The binominal proxies of DGC capture whether firms apply and possess relevant policies and processes, but not the depth of embeddedness or effectiveness of these capabilities. More detailed data, such as survey- or case-based measures of capability depth, would address this limitation. Further, the reshoring measure is based on employment changes solely. Additional metrics for reshoring or direct reshoring announcement data could capture the complex nature of reshoring better. The small number of reshoring events limits the moderation analysis and should be enriched in future research. Finally, the geographic scope was limited to countries from the EU, Norway, the United Kingdom and the US. This leaves the question unanswered whether the observed dynamics apply to emerging markets, or markets with different institutional and regulatory pressures. This could provide information about their role as offshoring destinations with their own increasing sustainability pressures.

As environmental changes will further increase the pressure on global value chains, the question will not be who recognizes them, but who develops the necessary DGC to meet the global call for responsibility towards the natural environment.

AI-Disclaimer:

The artificial intelligence tool Claude Sonnet 5 was used during the preparation of this paper to support translation and language refinement. The use of AI was limited to assisting the writing process. All final content, source selection, interpretation of findings, citation decisions, and academic judgments were contributed by the author.

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Appendix

Appendix A

Table A1

Industry Distribution of the Firm-Year Observations

Industry (NACE)	Industry Distribution - baseline		
	Reshoring After DGC		Total
	0	1	
10	417	15	432
11	176	30	206
12	30	0	30
13	118	0	118
14	120	10	130
15	128	0	128
16	60	0	60
17	262	0	262
18	11	0	11
19	76	52	128
20	998	51	1,049
21	597	106	703
22	226	0	226
23	294	0	294
24	396	3	399
25	370	0	370
26	2,541	60	2,601
27	469	4	473
28	1,522	14	1,536
29	395	120	515
30	390	44	434
31	106	0	106
32	821	0	821
Total	10,523	509	11,032

Source: Data based on LSEG Datastream & Orbis, cleaned

Table A2**Year Distribution of the Firm-Year Observations**

Year	Year Distribution - baseline		
	Reshoring After DGC		Total
	0	1	
2011	578	26	604
2012	607	28	635
2013	625	28	653
2014	634	30	664
2015	642	30	672
2016	658	32	690
2017	677	32	709
2018	695	32	727
2019	726	32	758
2020	758	33	791
2021	776	39	815
2022	808	43	851
2023	828	43	871
2024	827	44	871
2025	684	37	721
Total	10,523	509	11,032

Source: Data based on LSEG Datastream & Orbis, cleaned

Table A3

Country Distribution of the Firm-Year Observations

Country	Country Distribution - baseline		
	Reshoring After DGC		Total
	0	1	
Austria	100	0	100
Belgium	150	0	150
Denmark	157	15	172
Finland	248	0	248
France	569	43	612
Germany	744	62	806
Ireland	124	0	124
Italy	245	0	245
Luxembourg	19	3	22
Netherlands	226	15	241
Norway	70	0	70
Poland	11	0	11
Portugal	28	0	28
Spain	67	0	67
Sweden	627	15	642
United Kingdom	985	50	1,035
United States	6,153	306	6,459
Total	10,523	509	11,032

Source: Data based on LSEG Datastream & Orbis, cleaned

Appendix B

Table B1

Multicollinearity Test Results: Initial VIF Results with Sales (Log)

Variance Inflation Factors (VIF)	
Variable	VIF
Sales (log)	17.929
Assets (log)	14.351
Employees (log)	5.137
ISO 14000	2.284
ROE	1.327
ESG	1.308
Leverage Ratio	1.282
Product Diversification	1.218
PTB	1.208
DGC	1.177

Note: VIF > 10 indicates multicollinearity concerns.

Table B2

Multicollinearity Test Results: VIF Results After Dropping Sales (Log)

Variance Inflation Factors (VIF)	
Variable	VIF
Assets (log)	4.380
Employees (log)	4.294
ISO 14000	2.284
ESG	1.306
Leverage Ratio	1.282
ROE	1.220
Product Diversification	1.213
PTB	1.208
DGC	1.176

Note: VIF > 10 indicates multicollinearity concerns.

Appendix C

Robustness Check: Dropping the Industry with the Highest Share in Observations (NACE26)

	Baseline	ISO	ESG
DGC	1.749*** (0.273)	1.703** (0.536)	-0.271 (0.657)
Residuals DGC	-1.911*** (0.387)	-1.835*** (0.438)	-2.180*** (0.427)
Assets (log)	2.283*** (0.124)	2.269*** (0.137)	2.368*** (0.138)
Employees (log)	-0.183 (0.112)	-0.203 (0.133)	-0.267* (0.131)
PTB	0.161*** (0.020)	0.151*** (0.020)	0.163*** (0.020)
ROE	-0.012*** (0.004)	-0.010* (0.004)	-0.011** (0.004)
Leverage Ratio	-0.024*** (0.005)	-0.023*** (0.005)	-0.024*** (0.005)
Product Diversification	-0.324* (0.159)	-0.380* (0.170)	-0.343* (0.168)
ISO		-0.737*** (0.210)	
DGC × ISO 14000		0.281 (0.534)	
ESG			-0.185 (0.157)
DGC × ESG			1.710*** (0.447)
Observations	7623	5725	5954
Pseudo R ²	0.627	0.614	0.618
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

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

Standard errors clustered by firm_id. Fixed effects: country-level, year.

Appendix D

Robustness Check: DGC as Driver of Reshoring Using the Proxy Specifications as Proposed by Maksimov et al. (2022, p. 729)

	OLS (No Endogeneity Correction)			2SRI (Endogeneity Corrected)		
	1a	1b	1c	2a	2b	2c
DGC (Alternative Reconfiguring Proxy)	0.829*** (0.157)	1.449*** (0.347)	-0.457 (0.448)	1.424*** (0.206)	1.569*** (0.403)	-0.298 (0.480)
Assets (log)	2.360*** (0.113)	2.478*** (0.127)	2.399*** (0.124)	2.372*** (0.115)	2.425*** (0.125)	2.545*** (0.128)
Employees (log)	-0.474*** (0.108)	-0.579*** (0.123)	-0.569*** (0.122)	-0.552*** (0.112)	-0.642*** (0.125)	-0.634*** (0.123)
PTB	0.136*** (0.018)	0.140*** (0.019)	0.134*** (0.018)	0.142*** (0.018)	0.137*** (0.019)	0.149*** (0.019)
ROE	-0.004 (0.003)	-0.003 (0.004)	-0.003 (0.004)	-0.004 (0.003)	-0.003 (0.004)	-0.004 (0.004)
Leverage Ratio	-0.008 (0.004)	-0.008 (0.004)	-0.007 (0.004)	-0.010* (0.004)	-0.010* (0.004)	-0.011** (0.004)
Product Diversification	-0.055 (0.140)	-0.061 (0.147)	-0.008 (0.148)	-0.002 (0.141)	0.008 (0.149)	0.023 (0.147)
ESG		-0.195 (0.133)				-0.370** (0.135)
DGC × ISO 14000		-0.531 (0.358)			0.013 (0.413)	
ISO			-0.523** (0.173)		-0.487* (0.194)	
DGC × ESG			1.154*** (0.332)			1.577*** (0.362)
Residuals DGC (Endogeneity Test)				-1.586*** (0.341)	-1.630*** (0.384)	-1.868*** (0.375)
Observations	10032	7485	7485	10032	7488	7804
Pseudo R ²	0.620	0.604	0.609	0.625	0.611	0.617
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

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

1a-1c: OLS standard logit without endogeneity correction. 2a-2c: 2SRI (Two-Stage Residual Inclusion) logit correcting for endogeneity of DGC. Standard errors clustered by firm.

Note: This table replicates this study's main analysis using Maksimov et al.'s (2022, p. 729) original reconfiguration specification, which included Take-back and Recycling Initiative (LSEG Datastream: ENPIDP047), instead of this study's adapted proxy, Biodiversity Impact Reduction (LSEG Datastream: ENERDP019).

Appendix E

First Stage Regression Results Confirming Importance of Empirical Approach

	Stage 1
Peer DGC	0.475***
	(0.017)
Assets (log)	0.007
	(0.006)
Employees (log)	-0.008
	(0.007)
PTB	-0.000
	(0.001)
ROE	-0.000*
	(0.000)
Leverage Ratio	-0.000***
	(0.000)
Product Diversification	0.013*
	(0.006)
Observations	12067
Adj. R ²	0.553
Firm Fixed Effects	Yes
Year Fixed Effects	Yes

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

Standard errors clustered by firm_id. Fixed effects: firm-level, year.

Appendix F

Results for the Robustness Check to Test Against Alternative MNE Definitions

	Main Analysis (FSTS > 0)			FSTS >= 0.05			FSTS >= 0.10		
	Baseline	ISO	ESG	Baseline (>= 0.05)	ISO (>= 0.05)	ESG (>= 0.05)	Baseline (>= 0.10)	ISO (>= 0.10)	ESG (>= 0.10)
DGC	1.967*** (0.245)	1.933*** (0.500)	-0.014 (0.597)	1.990*** (0.245)	1.931*** (0.500)	-0.015 (0.597)	1.990*** (0.245)	1.931*** (0.500)	-0.015 (0.597)
Residuals DGC	-2.036*** (0.352)	-2.022*** (0.389)	-2.300*** (0.386)	-2.067*** (0.352)	-2.019*** (0.389)	-2.294*** (0.386)	-2.067*** (0.352)	-2.019*** (0.389)	-2.295*** (0.386)
Assets (log)	2.233*** (0.111)	2.280*** (0.122)	2.372*** (0.123)	2.296*** (0.115)	2.279*** (0.122)	2.371*** (0.123)	2.296*** (0.115)	2.279*** (0.122)	2.371*** (0.123)
Employees (log)	-0.457*** (0.106)	-0.539*** (0.119)	-0.554*** (0.116)	-0.541*** (0.110)	-0.538*** (0.119)	-0.553*** (0.116)	-0.541*** (0.110)	-0.539*** (0.119)	-0.553*** (0.116)
PTB	0.137*** (0.018)	0.131*** (0.018)	0.142*** (0.018)	0.138*** (0.017)	0.131*** (0.018)	0.142*** (0.018)	0.138*** (0.017)	0.131*** (0.018)	0.142*** (0.018)
ROE	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)
Leverage Ratio	-0.012** (0.004)	-0.011** (0.004)	-0.012** (0.004)	-0.011** (0.004)	-0.011** (0.004)	-0.012** (0.004)	-0.011** (0.004)	-0.011** (0.004)	-0.012** (0.004)
Product Diversification	-0.320* (0.144)	-0.359* (0.152)	-0.317* (0.149)	-0.292* (0.144)	-0.359* (0.152)	-0.317* (0.149)	-0.292* (0.144)	-0.359* (0.152)	-0.317* (0.149)
ISO		-0.458* (0.184)			-0.458* (0.184)			-0.458* (0.184)	
DGC × ISO 14000		0.246 (0.500)			0.246 (0.500)			0.246 (0.500)	
ESG			-0.289* (0.134)			-0.288* (0.134)			-0.288* (0.134)
DGC × ESG			1.713*** (0.412)			1.711*** (0.412)			1.711*** (0.412)
Observations	9989	7445	7761	9984	7444	7760	9982	7443	7759
Pseudo R2	0.603	0.586	0.594	0.604	0.586	0.594	0.604	0.586	0.594
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Standard errors clustered by firm. Fixed effects: country, year.

Note: Left to right: foreign sales of total sales increased from >0%, to ≥ 5%, and ≥ 10%.

Appendix G

Robustness Checks Against Alternative Model Specifications

	Main Analysis			Excl. US			Winsorized			Reshoring (5% Drop)			Reshoring (15% Drop)		
	Baseline	ISO	ESG	Baseline (ex. US)	ISO (ex. US)	ESG (ex. US)	Baseline (wins.)	ISO (wins.)	ESG (wins.)	Baseline (5%)	ISO (5%)	ESG (5%)	Baseline (15%)	ISO (15%)	ESG (15%)
DGC	1.967*** (0.245)	1.933*** (0.500)	-0.014 (0.597)	3.400*** (0.468)	6.556* (2.820)	2.127 (1.099)	2.023*** (0.245)	1.957*** (0.506)	0.014 (0.617)	1.828*** (0.241)	1.870*** (0.506)	-0.157 (0.595)	2.015*** (0.246)	1.916*** (0.502)	0.174 (0.588)
Residuals DGC	-2.036*** (0.352)	-2.022*** (0.389)	-2.300*** (0.386)	-3.391*** (0.615)	-3.503*** (0.799)	-4.670*** (0.784)	-2.117*** (0.351)	-2.088*** (0.390)	-2.363*** (0.387)	-1.910*** (0.353)	-1.902*** (0.391)	-2.084*** (0.386)	-2.053*** (0.351)	-2.048*** (0.387)	-2.324*** (0.385)
Assets (log)	2.233*** (0.111)	2.280*** (0.122)	2.372*** (0.123)	1.815*** (0.249)	2.047*** (0.294)	2.388*** (0.318)	2.348*** (0.115)	2.387*** (0.124)	2.476*** (0.125)	2.292*** (0.113)	2.346*** (0.124)	2.426*** (0.125)	2.079*** (0.107)	2.108*** (0.118)	2.210*** (0.120)
Employees (log)	-0.457*** (0.106)	-0.539*** (0.119)	-0.554*** (0.116)	1.032*** (0.312)	1.290*** (0.387)	1.279*** (0.359)	-0.548*** (0.109)	-0.625*** (0.121)	-0.631*** (0.119)	-0.465*** (0.106)	-0.552*** (0.119)	-0.574*** (0.117)	-0.304** (0.103)	-0.359** (0.120)	-0.392*** (0.117)
PTB	0.137*** (0.018)	0.131*** (0.018)	0.142*** (0.018)	0.085 (0.049)	0.129* (0.061)	0.143* (0.059)	0.148*** (0.018)	0.144*** (0.018)	0.153*** (0.018)	0.135*** (0.018)	0.132*** (0.018)	0.142*** (0.018)	0.139*** (0.017)	0.132*** (0.018)	0.143*** (0.017)
ROE	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)	0.003 (0.009)	-0.003 (0.011)	-0.002 (0.010)	-0.006 (0.003)	-0.005 (0.003)	-0.005 (0.003)	-0.006 (0.003)	-0.004 (0.003)	-0.005 (0.003)	-0.007* (0.003)	-0.005 (0.003)	-0.006 (0.003)
Leverage Ratio	-0.012** (0.004)	-0.011** (0.004)	-0.012** (0.004)	-0.022** (0.008)	-0.020* (0.009)	-0.032** (0.010)	-0.015*** (0.004)	-0.015*** (0.004)	-0.016*** (0.004)	-0.012** (0.004)	-0.012** (0.004)	-0.012** (0.004)	-0.010** (0.004)	-0.010* (0.004)	-0.011* (0.004)
Product Diversification	-0.320* (0.144)	-0.359* (0.152)	-0.317* (0.149)	-0.195 (0.296)	-0.144 (0.364)	-0.598 (0.342)	-0.342* (0.147)	-0.380* (0.155)	-0.339* (0.152)	-0.377** (0.144)	-0.415** (0.152)	-0.375* (0.150)	-0.441** (0.143)	-0.478** (0.152)	-0.439** (0.149)
ISO		-0.458* (0.184)			-2.085** (0.780)			-0.437* (0.185)			-0.432* (0.185)			-0.588** (0.185)	
DGC x ISO 14000		0.246 (0.500)			-2.801 (2.800)			0.274 (0.505)			0.155 (0.506)			0.332 (0.503)	
ESG			-0.289* (0.134)			-1.690*** (0.423)						-0.229 (0.136)			-0.279* (0.136)
DGC x ESG			1.713*** (0.412)			1.840** (0.699)			1.745*** (0.431)			1.673*** (0.406)			1.590*** (0.405)
ESG (winsorized)									-0.298* (0.135)						
Observations	9989	7445	7761	3529	2477	2572	9989	7445	7761	10224	7580	7907	9998	7454	7770
Pseudo R2	0.603	0.586	0.594	0.717	0.741	0.739	0.606	0.589	0.597	0.610	0.594	0.603	0.594	0.578	0.584
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Standard errors clustered by firm. Fixed effects: country, year.

Note: Left to right: Main analysis, excluding US subsample, winsorizing all variables of interest, increasing the reshoring threshold to a 5% drop of number of employees in subsidiaries, and 10% drop of number of employees in subsidiaries.