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Sustainable futures: Toward institutionalizing green industrial policy

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Abstract

Although there have been substantial accomplishments in understanding environmental sustainability policy, there remains a paucity of research categorizing the mechanisms through which firm ownership architectures can be harnessed to advance green industrial policy (GIP). The purpose of this study is to examine how different types of ownership structures can be utilized as mechanisms for capitalizing on and championing GIP. By integrating the fragmented streams of research, this study advances a four-cell typology of GIP-firm ownership dimensions (privately-owned enterprises (POEs)/state-owned enterprises (SOEs) × intra-country/inter-country GIP), which sheds much-needed light on the long-term energy transition (ETs) pathway through institutional and industrial challenges. The analysis further enhances researchers' understanding of leveraging SOEs and POEs to neutralize uncertainties inherent in scaling up renewables and addressing the "pollution haven hypothesis." Directions for future research pertaining to ETs are outlined.

KEYWORDS
development, energy, green industrial policy, scaling-up renewables, technology policy

1 | INTRODUCTION

The dawn of the 21st century ushered in new streams of research on how organizations engage with the natural environment and obtain environmental sustainability credentials within the fields of strategy and international business (IB) (e.g., Aguilera et al., 2021; Ambec & Lanoie, 2008; Christmann, 2004; Lartey et al., 2021; Nippa et al., 2021). According to the International Monetary Fund (2022), around $5.9 trillion (i.e., 6.8% of GDP) was spent supporting the global fossil fuel industry in 2020 (including subsidies, tax breaks, and environmental damage not priced into the cost of fossil fuels) and is anticipated to surge to around 7.4% of global GDP by 2025. In developing countries, around half of the public resources are spent supporting growing fossil fuel consumption (International Monetary Fund, 2022; UN, 2022). In this direction, the 2023 United Nations (UN) Climate Change Conference (COP28) in Dubai, United Arab Emirates, sought to bring together around 200 nations, world leaders, policymakers, and different stakeholders to help chart a more innovative path toward tackling climate change and creating conditions for a greener and cleaner global economy (BBC, 2023; United Nations Framework Convention on Climate Change, 2024). By striving to transition away from fossil fuels to renewable energy sources such as wind and solar power in the wake of increasing incidences of extreme weather events, COP28 created conditions for greener industrial policies and business strategies to be formulated (BBC, 2023; United Nations Framework Convention on Climate Change, 2024).

In tandem with the global environmental sustainability challenges (Aguilera et al., 2021; Henderson & Loreau, 2023; Kolk & Pinkse, 2008; Schneidewind & Augenstein, 2012) is the projection that the world's population will reach 8.191 billion by 2025, 9.188 billion by 2040, and then around 9.709 billion by 2050 (Worldometers, 2023). To address the mismatch between the growing global population and

access to sustainable resources, including energy, governments around the globe are increasingly viewing renewable sources as quintessential resources for their economic advancements (Kumar et al., 2021). These challenges of environmental degradation and resource scarcity are viewed as an existential threat to humanity and necessitate transitioning to a green economy (Altenburg & Assmann, 2017; European Union, 2021). While much of the current research on green transitions has focused on the role of government policies (see Devika & Shankar, 2022; Erin Bass & Grøgaard, 2021), the role of firm ownership structures as a mechanism for delivering green industrial policy (GIP) has been relatively underexplored. Indeed, different firm ownership types can be an effective mechanism for delivering government policy (De Castro & Uhlenbruck, 1997). Yet, much of the current literature remains largely disjointed as such we lack a theoretical framework accounting for how different types of firms can be harnessed for energy transitions (ETs) toward a sustainable environment. This deficit in the current literature is particularly surprising given that combating climate change is seen as a strategic imperative for nations (see Kolk & Pinkse, 2008), and global warming is viewed as "an immediate threat to humanity" (Altenburg & Assmann, 2017, p. ix).

To address the aforementioned gap in the current literature, the purpose of the present study is to examine how different types of ownership structures can be harnessed as mechanisms for capitalizing on and championing GIP. The importance of scaling up renewables is further reinforced by the fact that global energy consumption is increasing, culminating in rising emissions of harmful greenhouse gases. Thus, the adoption of GIP offers an effective pathway to tackle climate change, which has been projected to cause a 2%–4% per annum reduction in economic growth in developing nations by 2040 and then up to 10% by 2100 (IPCC, 2007).

The study makes several contributions to literature. First, the study enriches the theoretical landscape pertaining to international business policy by integrating insights from the literature on industrial policy (Rodrik, 2007) and nonmarket strategy (Lawton et al., 2013; Wei et al., 2023) to demonstrate how different types of state-owned and privately-owned businesses can be mobilized toward the adoption and implementation of GIP. Additionally, in order to fully grasp the disparate and disintegrated streams of research on firm ownership structure and sustainability transition efforts, the study develops an integrative conceptualization accounting for the different roles of privately-owned enterprises (POEs) and state-owned enterprises (SOEs) toward neutralizing uncertainties inherent in scaling up renewables. Moreover, despite a burgeoning stream of research on ETs (Adebayo, 2024; Isoaho & Karhunmaa, 2019), much of the current literature has offered limited insights on pathway challenges and channels for delivery. This paper advances a new discourse on GIP by shedding light on the challenges toward a better understanding of policy uncertainties and institutional dysfunction inherent in driving pro-market reforms for greening and scaling up the nation's economy and industries.

The remainder of the article proceeds as follows. In the following section, a review of studies on specific characteristics, GIP, and nonmarket strategy is presented. After presenting the review of studies, we outline the key pillars of our conceptualization. This is then followed by an analysis of the four-cell typology of GIP-firm ownership dimensions. We then proceed to outline the implications for research, policy, and managers.

2 | CONCEPTUAL UNDERPINNINGS

The paper is grounded primarily on three important streams of research: firm-specific characteristics, GIP, and nonmarket strategy.

2.1 | Differentiating state-owned and privately-owned businesses

Past studies indicate that POEs and SOEs can be distinguished by key characteristics, including ownership structure, motives, sources of capital, and performance incentives and outcomes (Stan et al., 2014; Zhou et al., 2017). In addition to the vital role played by private sector firms in creating jobs and fostering market competition (Doganis, 2005), state-owned firms are also seen as effective agents for championing and implementing government policies, directives, and regulations (Shleifer, 1998; Zhou et al., 2017). Regarding ownership structure, SOEs are firms owned by the nation-state and typically controlled by political actors, such as government agencies, politicians, and politically appointed officials (Dewenter & Malatesta, 1997; Lazzarini, 2022). SOEs generally have privileged access to government resources and expertise (Doganis, 2005) and are vulnerable to interference from political actors (Dewenter & Malatesta, 2001; Lazzarini, 2022). In contrast, POEs are specifically designed to focus on shareholders' and investors' value and profit maximization (Bozec et al., 2002). Their activities are typically overseen by corporate boards (Adams & Ferreira, 2007; Pugliese et al., 2009).

Another distinguishing characteristic between POEs and SOEs is their sources of capital. For privately-owned firms, capital stems from private shareholders, such as private investors, individuals, and corporations, to whom they are accountable (Stan et al., 2014). In sharp contrast, SOEs are financed or controlled by the nation-state (Bruton et al., 2015; Cuervo-Cazurra et al., 2014; Musacchio et al., 2015; Musacchio & Lazzarini, 2014). Broadly speaking, SOEs enjoy preferential treatment and privileged access to government resources such as grants, subsidies, government-backed loans, tax breaks, contracts, and government financing (Doganis, 2005). In SOEs, the government can exercise direct control over managerial decision-making or delegate it to an independent board of directors, whereas in POEs, private owners exercise direct control and determine the strategic direction of the business (Doganis, 2005; Lazzarini, 2022).

One of the most fundamental differentiators is that SOEs are primarily designed to have a much broader objective, including catering to government needs, regional economic development, delivering essential government services, and achieving social objectives such as job creation, wealth redistribution, and reducing unemployment

(Dewenter & Malatesta, 2001; Doganis, 2005). Indeed, governments in developing nations often leverage SOEs as symbols of national identity, fortify their national security, and use them as mechanisms for promoting "public interest" activities (Ramamurti, 1987). Such firms can become a mechanism for politicians to demonstrate their power at home and abroad, that is, "flying the national flag," where they divert manpower and financial resources toward enhancing their reputation rather than benefiting citizens (Amankwah-Amoah & Debrah, 2014). Furthermore, state ownership has often been adopted and preserved as a means of mitigating market failure and accomplishing noneconomic goals (Goldeng et al., 2008; Grout & Stevens, 2003). Studies indicate that SOEs tend to perform "special missions" imposed by governments and generally prioritize social welfare goals, such as job creation, ensuring full employment, and social welfare, which are fundamentally different from POEs (Stan et al., 2014; Uhlenbruck & Castro, 1998; Zhou et al., 2017). In many nations in the global south, especially developing nations in Africa, Asia, and Latin America, SOEs continue to play a pivotal role in how national economies function (Bruton et al., 2015). Thus, SOEs tend to have financial and nonfinancial incentives captured under a broader goal of delivering social goods.

2.1.1 | Performance incentives/outcomes

Given that SOEs are susceptible to government political interference and exist to perform purely social functions, POEs tend to seek profit maximization (García-Canal & Guillén, 2008; Lazzarini & Musacchio, 2018). POEs are owned and managed by individuals and corporations whose primary purpose is to maximize profits for their shareholders (Doganis, 2005; Zhou et al., 2017). Past studies indicate that SOEs may excel in delivering essential government services but tend to operate in a highly bureaucratic manner (Dewenter & Malatesta, 2001; Lazzarini, 2022). Previous research has demonstrated that performance monitoring of SOE managers tends to be weaker relative to privately-owned firms (Dharwadkar et al., 2000).

Relative to private firms, SOEs tend to exhibit characteristics such as high levels of inefficiency, bureaucratic structures, overstaffing, poor leadership, slow decision-making processes, and resource misallocation (Cuervo-Cazurra et al., 2014; Doganis, 2005). Moreover, governments may require SOEs to avoid laying off workers during a recession (Lazzarini & Musacchio, 2018). As demonstrated by Doganis (2005), overstaffing, frequent changes in management, and political interference that typify SOEs often culminate in a culture that stifles innovation and the adoption of new ideas. The limited competitive environment that governments often create for SOEs is likely to lead to higher prices and lower quality products and services for consumers (Goldeng et al., 2008). Thus, SOEs may be compelled by the government to prioritize nonfinancial and social goals over financial performance.

State and private ownership can also be viewed as a continuum, where firms owned by the state may possess different levels of control, management, and involvement (Lazzarini & Musacchio, 2018; Teodorovicz et al., 2023). Consequently, state-owned firms may adopt and exhibit features of private firms (Bruton et al., 2015). Privatization of SOEs occurs when the government transfers its firm control and ownership to private investors, often in tandem with pro-market reforms such as deregulation (De Castro & Uhlenbruck, 1997; Uhlenbruck & Castro, 1998). In keeping with a worldwide trend, when considering SOEs (domestic or foreign-owned), there can be a diverse range of management, organizational structures, and decision-making processes (Li et al., 2018). The dichotomy between SOEs and POEs may require reconsideration in light of the observation that many SOEs are not fully state-owned. For instance, in domestic markets, SOEs tend to enjoy several advantages such as preferential treatment, access to government subsidies and resources, and tax relief, enabling them to outcompete rival firms. Conversely, POEs in domestic contexts have greater autonomy and flexibility and may face limited or no political interference in management.

Nonetheless, POEs are more likely to be confronted by regulatory constraints and bureaucratic hurdles that are difficult to overcome (Doganis, 2005). SOEs are also more likely to face political boycotts in foreign countries. It is worth noting that state-owned multinational companies tend to be publicly traded corporations with professional management practices, contemporary corporate governance mechanisms, and financial reporting practices often associated with POEs (Musacchio et al., 2018; Musacchio & Lazzarini, 2014). Additionally, governments can subsidize SOEs to commit financial resources and manpower to new areas or local technologies with the potential to stimulate local industries in the future (Lazzarini & Musacchio, 2018). Although many predicted the demise of SOEs around the world, they remain a potent force (Bruton et al., 2015). Figure 1 depicts the conceptual model and features of government intervention policy encompassing structural transformation and three key parties (i.e., governments, SOEs, and POEs).

2.2 | Nonmarket strategy and environmental management

The nonmarket strategy (NMS) literature provides a theoretical underpinning for a better understanding of GIP. NMS refers to firms' actions and engagements aimed at cultivating and utilizing relationships with political actors, such as governments and regulators, to shape or modify the political, social, and regulatory conditions for their benefit (Baron, 1995; Boso et al., 2023; Lawton et al., 2013; Wei et al., 2023). Rooted in the notion of nonmarket strategies is the suggestion that firms are not immune to the broader political context in which they operate, which can be harnessed to enhance their competitiveness (Baron, 1995; Katic & Hillman, 2023). NMS encompasses political engagement activities such as campaign contributions, lobbying, and political donations (Baron, 1995; Katic & Hillman, 2023; Lawton et al., 2013; Wei et al., 2023). Corporate political activity is a subset of NMS that focuses specifically on actions by firms to influence political actors, shape public policy formulation processes and outcomes (Adomako et al., 2023; Baron, 1995; Boso et al., 2023), and mitigate

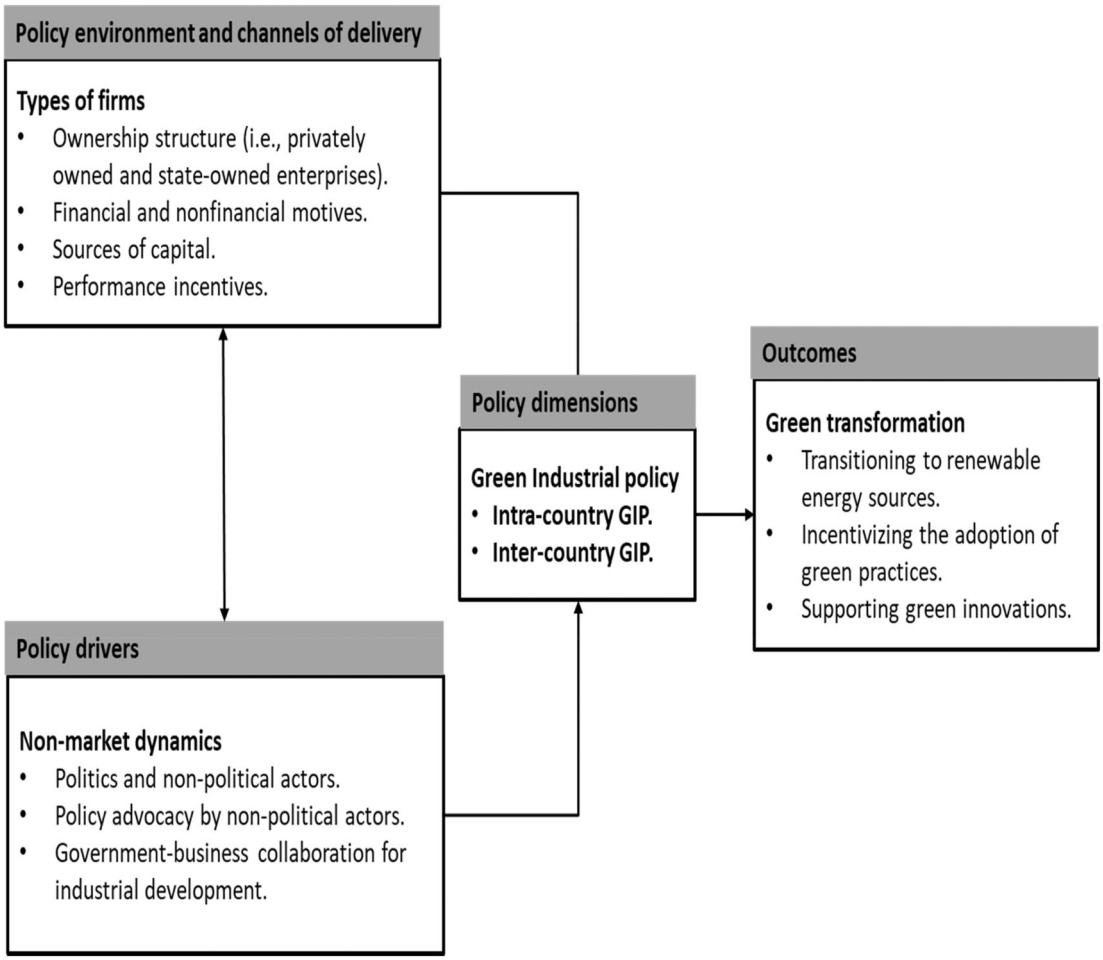

FIGURE 1 A model linking green industrial policy features to green transformation.

the effects of unfavorable policy changes (Henisz & Zelner, 2012; Wei et al., 2023).

The international nonmarket context extends beyond domestic market dynamics to encompass a myriad of challenges and country-specific features, including political and economic conditions (Kobrin, 2015). When operating in international markets, firms face numerous challenges in managing intricate political relationships between focal firms and various host governments, nongovernmental organizations, and other important stakeholders (Kobrin, 2015; Zheng et al., 2022). As demonstrated by Doh et al. (2015), the presence of nongovernmental organizations and their diverse global interests has further amplified the complexity of bargaining between multinational enterprises (MNEs) and host governments. Indeed, nongovernmental organizations have historically played a vital role in championing issues such as environmental protection, human rights, and climate change, exerting pressure on MNEs and host governments to act in a socially responsible manner (Figueira et al., 2023).

Saha et al. (2023) emphasize the importance of collaborating with collective actors, such as trade associations, chambers of commerce, and industry groups, as well as individual actors, to enable firms to gain access to information, resources, and expertise. Collective actors, like trade associations and lobby groups, can be leveraged to gain legitimacy and promote industry reputation (Saha et al., 2023). Accordingly, harnessing nonmarket strategies for success may entail tailoring firm strategies to local conditions. In light of these challenges, Kobrin (2015) questions the feasibility and benefits of implementing a "global" or "one-size-fits-all" nonmarket strategy, given the diverse range of political actors imposing different demands and pressures on firms. He further contends that despite the increasingly integrated and interconnected global economy, the nonmarket environment continues to "remain fragmented, grounded in national sovereign territoriality" (Kobrin, 2015, p. 263). Thus, achieving an international nonmarket strategy is difficult due to political, social, and regulatory institutional differences across countries. Entrenched in the adoption and implementation of GIP is the pivotal role of political actors ("non-market actors") (Bach & Allen, 2010), such as government officials, political leaders, ministers, governors, mayors, legislators, policy-makers, and activists, who provide the baseline or sets of prescribed behaviors to which organizations can adhere to accumulate legitimacy and social acceptance (Amankwah-Amoah et al., 2022).

Broadly speaking, political actors possess some degree of latitude to influence policy (Josselin & Wallace, 2001; Wijninga et al., 2014). Past studies indicate that firms engaging in environmental management can be motivated by regulation and public relations to adopt

green initiatives such as emission reductions, resource conservation, and the adoption of renewable energy. Indeed, other actors such as the World Bank and Transparency International play a decisive role in influencing state policy and decision-making processes, as well as business practices in countries (Wijninga et al., 2014). Such political engagement and connections can ease the path for organizations to secure government contracts (Ridge et al., 2017; Sojli & Tham, 2017) and help to reduce levels of regulatory scrutiny and penalties (Fisman & Wang, 2015; Lambert, 2019). Some of these might be prescribed by government policies, codes of conduct for businesses, and directives. Accordingly, political and nonpolitical actors act via ownership and control of firms, advocating and bringing about pro-market reforms. There are also market actors such as producers, suppliers, distributors, and investors who participate in market transactions to exchange goods, services, or assets for money or other forms of value and operate inside the market system.

2.3 | Defining green industrial policy

Past studies have highlighted the challenges and opportunities faced by MNEs in the sustainability context, such as pollution prevention and waste reduction (Christmann, 2004; Kolk & Pinkse, 2008). Central to the origins of industrial policy is the question of how governments see fit to reform and restructure industries to deliver their social and economic objectives (Rodrik, 2007). Industrial policy involves some form of governmental intervention to incentivize good behavior and dissuade harmful activities of organizations and individuals (Lazzarini, 2015; Rodrik, 2007). GIP encompasses government measures designed to speed up the structural transformation toward a low-carbon and resource-efficient economy that delivers higher productivity (Altenburg & Assmann, 2017; Hallegatte et al., 2013).

Anchored in a typical GIP is an attempt by the government to prioritize and support certain activities and industrial sectors deemed essential for the nation's long-term competitiveness and defense. Past studies indicate that GIP tools may include tax cuts for business investment, green public procurement, green taxation, subsidies, tax relief for renewable energy (Palladino, 2022), reduction of barriers to competition, investment in green infrastructure, and green energy technologies. GIP represents an attempt to deal with the high degree of uncertainty related to the adoption of green technologies and processes and to provide certainty regarding government actions for green investment. Thus, it is a pathway toward ET and a low-carbon economy for the future.

Industrial structural changes often seek to shift incentives for trade, investment, and businesses from traditional and high-polluting industries to renewables, as well as incentivize the adoption of green business practices across sectors of the national economy (Harrison et al., 2017). Consequently, GIP may entail environmental regulation and market reforms that encourage traditional industries to update, upgrade, and improve their technologies, processes, and activities in an environmentally sustainable manner (Harrison et al., 2017). As observed by Schwarzer (2013, p. vi), "green industries are essentially infant industries, with all the characteristics of conventional infant industries." By accelerating the changes toward higher productivity, countries can also promote and produce green technologies such as biofuels, solar photovoltaic (PV), and wind turbines, which expedite green industrialization (Harrison et al., 2017).

Operating within the realms of GIP, it has been suggested that transitioning from traditional industries to the green economy requires public investments (Harrison et al., 2017) coupled with regulations that incentivize firms to adopt new and clean processes and techniques (Altenburg & Assmann, 2017). Accordingly, the financial and reputational benefits that can be accrued from green initiatives can incentivize the adoption of measures such as pollution reduction, reuse or recycling, waste reduction, and resource conservation that deliver efficient energy use and are less harmful to society (Altenburg & Assmann, 2017). This is important given that corporations tend to prioritize profit-maximizing ahead of the welfare of the nation-state and its citizens (Palladino, 2022). Taken together, GIP seeks to ease the regulatory and structural constraints to help usher in environmentally sustainable practices and the development of green capabilities.

2.3.1 | Intra-country and inter-country GIP

We contend that there are two broad dimensions of GIP: intra-country GIP and inter-country GIP. Intra-country GIP pertains to reforms within a country's market and institutions to motivate the adoption of green practices. Government agencies within a country may collaborate on activities, create conditions for knowledge sharing, and transfer best practices to bring about change (Kim et al., 2008). Official government approvals are often required in awarding contracts (Collins et al., 2009), making this a vehicle for embedding specific environmental sustainability requirements in business practices. Government-induced initiatives through subsidies and financial support can also create an enabling environment for investments and investors (Delios & Henisz, 2003). However, a possible outcome of this approach is that regional policy and labor cost discrepancies within a country may lead to industry relocation and businesses moving to areas with lax regulations (Xu et al., 2017; Zhu et al., 2014).

Within the realm of literature on government actions, pro-market reforms can seek to create opportunities for sustainable firm competitiveness (Cuervo-Cazurra & Dau, 2009a, 2009b; Doganis, 2005). Pro-market reforms, such as privatization, market liberalization, and deregulation, can fundamentally transform industries from being restricted with limited competition to a fully competitive setting (Cuervo-Cazurra et al., 2019; Dau, 2012). The policy environment includes rules, regulations, administrative procedures, and policies enacted by governments that govern firm behaviors (Delios & Henisz, 2003). Such measures can be harnessed to improve the functioning of markets by eliminating overlapping, unnecessary regulations and bureaucratic bottlenecks, enhancing businesses' ability to identify and exploit market opportunities (Dau, 2013; North, 1990). Neoliberal reforms, such as privatization, deregulation, and liberalization,

TABLE 1 Key dimensions, challenges, and opportunities of green industrial policy (GIP).

Key terms	Key explanations	Opportunities	Challenges
Intra-country GIP	Focuses on within-country drive to improve the infrastructure, and institutional and policy environment to create opportunities for business and society.	• Reducing dependence on foreign nations. • Providing opportunities for foreign direct investment, green job creation, and start-ups. • Taxing dirty energy while concurrently rewarding clean energy. • Benefits from green domestic production in terms of employment opportunities. • Diversifying and scaling up new energy sources. • Opportunity to decentralize energy generation to households and businesses.	• Potential mismatch between firms' adaptive resources and the pace of change. • Relocate out of stringent regulatory areas. • The potential decentralization or relocation of jobs from high-cost inner cities to low-cost areas. • Institutional impediments, such as strong legal enforcement, can impede the functioning of the market.
Inter-country GIP	Focuses on cross-country efforts to drive GIP implementation not just within a single country but across countries.	• Government investment in green energy technologies. • Investment and reinvestment in clean energy sources in urban and rural areas. • Reforms by home and host-country governments, along with financial and non-financial support, can foster a competitive environment for scaling up.	• Potential regional job relocation due to unequal commitment and application of the GIP. • Industrial relocations leading to the pollution haven hypothesis.

Note: Data sources: synthesized from sources: IRENA (2022a, 2022b), IRENA and AfDB (2022), Chiang and Young (2022), Doganis (2005), Durugbo, & Amankwah-Amoah (2019),_Cavusgil et al. (2020), Kumar et al. (2021), Lazzarini (2015), Lazzarini and Musacchio (2018).

have transformed the renewable energy landscape, creating a more competitive environment (Verbong & Geels, 2010). Pro-market reforms can enhance the competitiveness of domestic firms and encourage inward investment and foreign firms, leading to downward pressure on prices (Cuervo-Cazurra & Dau, 2009a, 2009b). Furthermore, these reforms have been linked to the adoption of innovative business models that align with the demands and requirements of citizens (Cuervo-Cazurra et al., 2019).

Inter-country GIP involves cross-country and supranational organizations pursuing GIP. Supranational organizations, such as the African Union, European Union (EU), United Nations, and World Trade Organization (WTO), represent the interests of contracting member countries that may have ceded some authority over policy (e.g., setting carbon pricing and regulating greenhouse emissions) to the group. This agreement between two or more independent countries entails the ability to regulate some industrial activities. It aims to harness the collective power of multiple countries to support and implement stringent reforms and common policies that govern firms' activities. Such collaboration among nations can help mitigate duplication of enforcement activities and extend the capacity of governments to better regulate cross-border activities (Kim et al., 2008).

Globally, emission standards are often set by regional bodies, such as the European Union Aviation Safety Agency in the EU, which is involved in certifying, regulating the industry, and setting standardization (European Commission, 2022a). The legally binding Paris Agreement (COP21) in December 2015 also outlined a global commitment by multiple countries to limit global warming to well below 2°C (European Commission, 2022b). Indeed, the EU and its member states are among the 190 signatories to the agreement (European Commission, 2022b). Other examples include market-based measures such as the EU's Emissions Trading System and ICAO's Carbon Offsetting and Reduction Scheme for International Aviation. GIP can incentivize businesses to adopt more effective environmental management practices (EMPs) geared toward curtailing the impact of activities on the natural environment (Hardcopf et al., 2021). In the competitive arena, the adoption of EMPs can signal to stakeholders that the focal firm is environmentally responsible and adheres to higher operational standards (Hardcopf et al., 2021). Such an approach has also been demonstrated to help organizations avoid or reduce penalties and fines (Yang et al., 2015). There has also been a shift in how organizations view EMPs, from contaminant control during the productive process and end-of-pipe treatment toward pollution prevention and the elimination of wastes across functional areas of organizations (Yang et al., 2015). It is also worth noting that uncertainty has often surrounded governments' policies and business decisions pertaining to sustainability (Gode, 2019). Table 1 summarizes the features, challenges, and opportunities related to intra-country GIP and inter-country GIP.

3 | TOWARD A TYPOLOGY FOR RENEWABLE TRANSITION

As noted previously, there are two broad dimensions of GIP: intra-country GIP and inter-country GIP. For analytical clarity and to build a bridge toward a better understanding of how firms can advance GIP, we contend that there are two main types of firm ownership structure: POEs and SOEs in both home and host countries. These can be

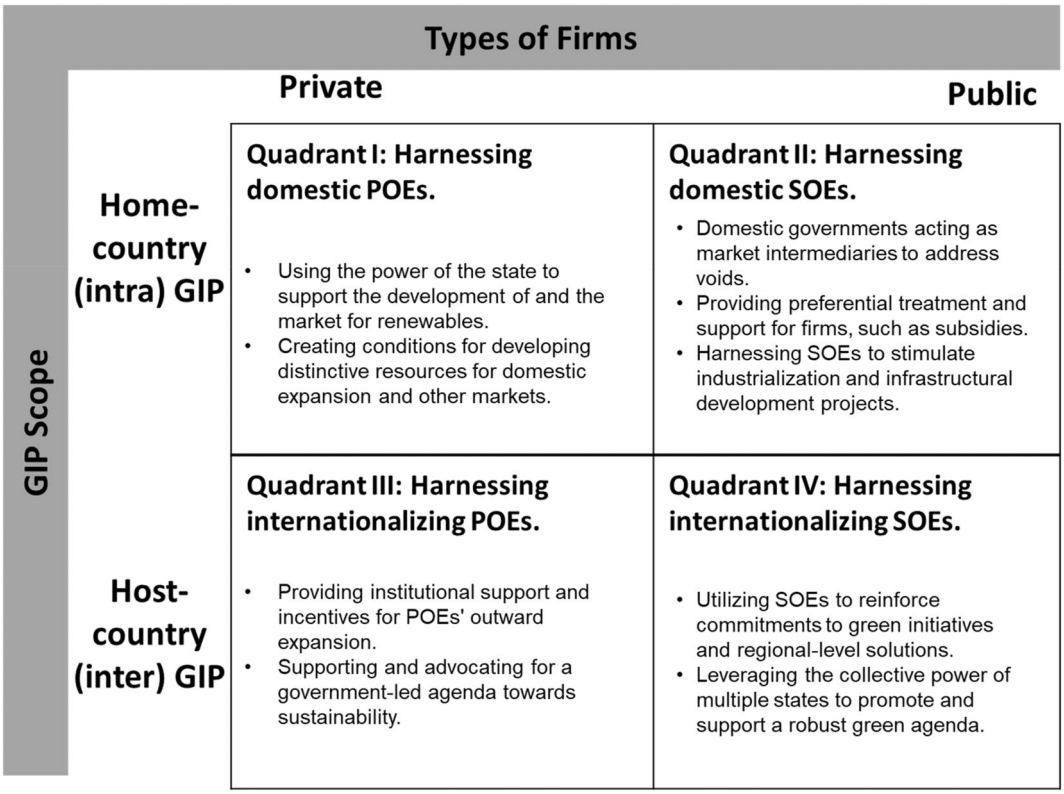

FIGURE 2 An integrated organizing framework of green industrial policy for renewable transition.

effectively harnessed in scaling up renewable energy sources. Crossing these dimensions (i.e., POEs/SOEs × intra-country/inter-country GIP) yields a four-cell typology of GIP-firm ownership dimensions, as demonstrated in Figure 2. This illustrates the mechanisms through which different actors can advance, influence, and shape policy formulation for sustainability orientation and a green future. Thus, GIP, buttressed by SOEs and the private sector, is pivotal in stimulating economic development, delivering government policy, and promoting greater adoption of environmental sustainability. By internationalizing firms, we are referring to organizations that undertake steps to expand the scope of their activities and operations beyond their domestic market. This encompasses entering and operating in foreign markets (see Bianchi & Stoian, 2024; Cavusgil et al., 2020; Hill & Hult, 2016). The decision to establish a presence in foreign markets can be made through entry modes such as exporting, joint ventures, and strategic alliances (Hill & Hult, 2016).

3.1 | Quadrant I: Harnessing domestic POEs

Quadrant I refers to harnessing domestic POEs as a mechanism for capitalizing on and delivering GIP. GIP incentives, such as tax relief and subsidies, have the potential to motivate firms to invest resources in R&D activities. Domestic GIP can tilt firms' home-country conditions by providing incentives for investment in green initiatives such as recycling, energy conservation, and waste mitigation. Home-country GIP can incentivize domestic firms to reform their business models and embrace approaches geared toward mitigating energy use and conserving resources. The accompanying structural changes of GIP and pro-market reforms, such as deregulation and liberalization, can also provide opportunities for domestic firms to develop green capabilities, which can then equip them for international markets and expansion. A distinguishing characteristic is that advanced economies are typified by features such as very limited government intervention in business and markets, highly competitive and deregulated industries, and well-developed physical and commercial infrastructure that underpins the effective functioning of the market (Cavusgil et al., 2020).

Nevertheless, institutional dysfunction in developing countries, such as absent financial market institutions, undeveloped transportation and communication infrastructures (Khanna & Palepu, 1999; North, 1990; Webb et al., 2020), high levels of corruption, excessive regulatory burden, bureaucracy, and unreliable government authorities (Cavusgil et al., 2020; Peng, 2017), can serve as an obstacle in curtailing large enterprises' and SMEs' access to green finance and business credit. As observed by Meadowcroft (2011), legal structures and regulatory initiatives can accelerate or impede the adoption of new technology and innovation. For developing countries, factors such as corruption and weak enforcement of environmental regulations can impede attempts toward a green national economy (Harrison et al., 2017). Thus, ET pathways are likely to be punctuated by a number of institutional and market-oriented challenges and

opportunities for development. Accordingly, to amplify the potential of POEs, it also requires governments to help firms overcome institutional dysfunction as well as advance pro-market reforms such as privatization and deregulation as a means of helping to open up opportunities for private businesses as well as drive market competition and new investments. This may entail the government phasing out subsidies for firms in dirty industries to help ignite new sources of competition.

3.2 | Quadrant II: Harnessing domestic SOEs

Quadrant II refers to leveraging domestic SOEs as the mechanism for capitalizing on and championing GIP. State ownership can provide stability and assurance in the face of a crisis, as well as serve as "champions of nations" (The Economist, 2012). SOEs' link to governments can pave the way for firms to access scarce political resources, as well as deal with inefficient institutional environments (Shen et al., 2022). More importantly, state ownership and governmental involvement can be seen as an effective mechanism for shepherding through long-term green investments and difficult reforms without undercutting or diminishing national security (Doganis, 2005). In this quadrant, the presence of SOEs may drive governments to become more involved in regulating industries. Governments, as political actors and powerful forces, especially in developing countries, can influence the development and scaling-up of industries (Spencer et al., 2005).

To illustrate Quadrant I and II, we turn to the case of the renewable energy sector in China. As a pillar of China's wider green industrialization efforts and transition toward a more circular economy, the country has mobilized and invested in both renewable SOEs and POEs (Mathews, 2020). In 2022, China devoted $63 billion in the form of subsidies aimed at supporting domestic renewable energy companies (Bloomberg News, 2022). These subsidies were largely intended to ensure the development and stability by mitigating potential business bankruptcies in the renewable energy sector, including solar PV and wind power producers (Baiyu, 2020). Crucially, this was part of the country's efforts toward reducing carbon emissions, dependence on fossil fuels, and supporting the development of capabilities in the renewable energy sector.

As observed by Mathews (2020, p. nd), China has now emerged as a "renewables superpower, dwarfing other countries in its building of renewable capacity and the speed of its transition to innovations such as electric cars, trucks, and buses." This wider offering has underpinned its green industrialization strategy, harnessing both POEs and SOEs in the pursuit alongside the "fossil-fueled industrialization strategy." In line with the industrialization path of developed economies and previous industrial powers, China also initially relied on fossil fuels to power its development, but this was accompanied by massive investments in green technologies and green industries (Mathews, 2020). By obtaining access to resources from governments via political ties, such firms are also under increasing pressure to seek to return the favor by investing in or undertaking projects in tune with the demands of the political actors (Okhmatovskiy, 2010). It is worth noting that many political leaders also tend to make short-sighted decisions that impede attention to long-term policies pertaining to sustainability and the environment (Meadowcroft, 2011).

3.3 | Quadrant III: Harnessing internationalizing POEs

A distinguishing feature of Quadrant III from the others is its focus on harnessing internationalizing POEs as the mechanism for capitalizing on and championing GIP. Inter-country GIPs are likely to create a level playing field for all firms in the signatory countries. When an industry is governed and constrained by complex regulations, internationalizing POEs are often motivated to advocate for change. In industries such as aviation, partly due to lobbying by privately-owned airlines for reforms, liberalization, and "open skies" have played a pivotal role in removing restrictions on airlines' designations, thereby facilitating increased internationalization, green investments, and outward expansion. Indeed, internationalizing POEs are likely to embrace and advocate for pro-market reforms, such as the elimination of outdated economic regulations that can foster the adoption and development of renewables. Based on the feature of the quadrant, it can be argued that foreign POEs are better able to accrue benefits from market-based interventions such as tax incentives and subsidies geared toward promoting the adoption of green business practices and clean technologies. For foreign firms and/or subsidiaries of multinational corporations, Quadrant III indicates an opportunity for collaborating with other firms to undertake sustainable business practices and investments.

The IATA (International Air Transport Association), which represents around 300 global airlines and about 80% of global air traffic, has adopted an industry-wide target to achieve net-zero carbon emissions by 2050 (IATA, 2021). Inherent in this commitment is a major industry-wide and individual airlines' attempt to progressively strive to reduce emissions while capitalizing on the increasing global demand for domestic and international air travel (IATA, 2021). In tandem with this, there is a sector-wide investment in green initiatives such as new aircraft technology, sustainable aviation fuels, and harnessing renewable energy sources such as electric, solar, and hydrogen power (Amankwah-Amoah et al., 2023; IATA, 2021). This commitment also supports the Paris Agreement adopted by national governments to reduce global emissions (IATA, 2021).

The example of BA exemplifies this quadrant as it highlights the role of an internationalizing POE in promoting green industrial policies. British Airways (BA) traces its roots to 1919 when it launched the world's first daily international scheduled air service between London and Paris (BA, 2023a; Singh, 2021). It is largely seen as the UK's national airline with its headquarters in London. Although the privatization of the airline was finalized in 1987 under the leadership of Chairman Lord King (BA, 2023a), the airline has maintained its position as the choice airline for travelers originating from the United Kingdom. After merging with Gatwick-based British Caledonian Airways in 1988, BA's positioning as the quintessential UK

national airline was further cemented (BA, 2023a). Indeed, BA is often seen as the "national champion, a potent symbol of the country's commercial prowess" (Leggett, 2020, p. nd).

British Airways has prioritized environmental sustainability and committed to reducing carbon emissions to achieve net-zero carbon emissions by 2050 in line with the IATA efforts toward decarbonizing the aviation industry. Besides its policy of investing in modern aircraft that are around 40% more efficient than the fleet they replace the adoption of eco-efficient fleet, BA has also made substantial investments in state-of-the-art and fuel-efficient technologies to improve fuel efficiency and reduce greenhouse gas emissions. Besides investments and collaborative partnerships with governments and other stakeholders toward supporting the development of sustainable aviation fuel, hydrogen-powered aircraft, and carbon capture technology, the airline has also been offsetting carbon emissions on all domestic flights in the United Kingdom since 2020 (BA, 2023b). Indeed, BA's parent company has committed $400 million over two decades toward the development of sustainable aviation fuel to help reduce its carbon footprint (BA, 2023b).

Nonetheless, inter-country GIPs can also lead to large multinationals taking advantage of weak environmental regulation in neighboring countries to sidestep their responsibilities to society. A burgeoning strand of research suggests that regional differences in environmental regulations and policies often create space leading to the relocation of polluting industries (Xu et al., 2017; Zheng & Shi, 2017; Zhu et al., 2014). Researchers have suggested that carbon emissions can be relocated with investment and trade (Wang et al., 2019). In contrast to advanced economies, emerging markets are generally typified by factors such as weak enforcement of environmental regulation and rampant pollution by large MNEs (Harrison et al., 2017). Developing countries may exhibit a limited uptake of environmental practices, a deficit of environmental regulatory enforcement, high levels of regional disparities in enforcing "rules of the game," and insufficient institutional capacity that impedes the functioning of markets (Zhu et al., 2014). This is further exemplified by the fact that even in liberalized developing economies, the institutional development might not be robust enough to offset the effects of market dysfunction.

The pollution haven hypothesis asserts that strict environmental regulations are likely to lead to industrial relocation to adjacent countries or regions with a more relaxed regulatory regime (Wang et al., 2019). Indeed, dirty industries tend to relocate to countries/regions/areas with looser environmental regulations, thereby transforming those territories into "pollution havens" (Wang et al., 2019). It has been demonstrated that stringent environmental regulation and tightening up pollution regulation often impose additional costs on businesses and lead to the relocation of dirty goods production to lax regulatory territories (Wang et al., 2019; Zhu et al., 2014). Intra-and inter-country GIPs have the potential to force opportunistic firms to relocate their activities in high-polluting regions with lax environmental regulations (Wang et al., 2019). Accordingly, intra-country and inter-country GIPs are very likely to lead to "pollution havens" (Wang et al., 2019).

3.4 | Quadrant IV: Harnessing internationalizing SOEs

Quadrant IV is where internationalizing state firms, such as state-owned multinational companies, as mechanisms for capitalizing on and championing GIP, are seen as vital for firm growth. Quadrant IV indicates the potential for internationalizing SOEs and subsidiaries of SOEs to forge collaborations not only with other SOEs but also POEs to promote sustainability and take steps toward global ETs. As demonstrated by some past studies, home-institutional conditions have an effect on subsidiary-level environmental innovation (Konara et al., 2021). This can manifest in terms of motivating firms to adopt new technologies, green business practices, as well as undertake green investments. A hindrance in implementing GIP is the cost of transitioning to the latest technologies for firms and the compliance of businesses and financial resources needed for upgrading technology for end-users (Harrison et al., 2017).

To illustrate the case of internationalizing SOEs and how they can contribute to green industrial practices, we turn to the case of Emirates Airline. Emirates is a Gulf-based airline in Dubai, owned by the Government of Dubai's Investment Corporation of Dubai and operates across six continents (Emirates, 2023). The airline has championed a diverse range of green/sustainability initiatives to curtail its environmental footprint around the globe. The United Arab Emirates' government has advantageously utilized the airlines to showcase its green credentials via the adoption of sustainable aviation initiatives. Among them has been the company's attempt to achieve 100% sustainable aviation fuel operations alongside the IATA's aviation industry's goal of achieving net zero by 2050 (Ahlgren, 2023; Singh, 2023).

In addition, the airline also undertakes fleet modernization and operates some of the youngest wide-body aircraft with an average age of 8.2 years, thereby reducing fuel consumption and pollution relative to other airlines with older-generation fleets (Singh, 2023). The airline is also an active participant in the Carbon Offsetting and Reduction Scheme for International Aviation, a scheme for airlines to compensate for their emissions by supporting and financing emission reduction elsewhere (IATA, 2023). The investments in fuel-efficient aircraft and commitment to green aviation demonstrate how such companies can contribute to global sustainability efforts. As an SOE with a global presence spanning five continents, the airline has undertaken numerous initiatives to fuel efficiency and reduce emissions. Given that policy uncertainty can have an adverse influence on transitioning to a greener economy across countries, government support in terms of creating friendly policy environments and capacity-building activities is pivotal in developing state-owned multinational companies as engines for green and long-term sustainable development. Nonetheless, given the ownership stake of governments in subsidiaries of SOEs, there is a risk that they become intertwined with political sanctions in foreign countries, in addition to their weakness of political influence by the home government.

4 | DISCUSSION AND IMPLICATIONS

The present research sought to illuminate researchers' understanding of how different types of ownership structures can be harnessed as mechanisms for capitalizing on and championing GIP. This study advanced a 2 × 2 matrix (privately-owned/SOEs × intra-country/inter-country GIP matrix accounting for the role of different types of firms (i.e., SOEs and POEs) in both home and host countries) in harnessing market reforms toward neutralizing uncertainties inherent in scaling-up renewables. The 2 × 2 organizing framework provides an effective mechanism toward a better understanding of the pathway changes to ET by providing concrete insights into different types of enterprises (i.e., privately-owned or state-owned) and geographical scope toward promoting green industrial development. As demonstrated, Quadrants I and II focus on harnessing the domestic private sector and SOEs as the engine for ET. This suggests a large role for home country governments in creating a friendly policy environment that can serve as a springboard for future firm internationalization and the transfer of best practices to foreign markets. Thus, SOEs, in particular, provide an anchoring point for governments to drive investments and growth of green businesses and industries. On the other hand, Quadrants III and IV place emphasis on leveraging internationalizing private sector and SOEs, which have the potential to attract foreign investments and technology transfer into green industries. The shift toward green ETs entails a pivotal role for foreign firms and/or subsidiaries of multinational corporations, especially in Quadrants III and IV. Taken together, the four quadrants advanced in this study are interrelated and interdependent in the sense that they shed much-needed light on the mechanism for promoting the adoption and scaling-up of green business practices.

4.1 | Theoretical implications

This article offers vital theoretical contributions. First, researchers in management have been successful in elucidating the dynamics of sustainability and long-term ETs (e.g., Adebayo, 2024; Adebayo & Alola, 2023; Doh et al., 2021; Erin Bass & Grøgaard, 2021), yet lacking in the current discourse is robust conceptualization and analysis toward harnessing SOEs and POEs as channels for championing GIP. In further addressing the disconnect between firm ownership structures and GIP in the current literature, this study advanced a 2 × 2 matrix (see Figure 2) to clarify the boundaries of the subject. The integrated conceptual 2 × 2 framework also provides much-needed insight into the pathways and challenges toward a sustainable future. In view of the limited stream of research on harnessing firm ownership structures for delivering GIP, the current study elucidates the process inherent in harnessing different firm ownership structures toward achieving environmental sustainability policies. The analysis underscores the role of public-sector and private-sector firms as engines in advancing reforms and achieving effective industrial development.

Inherent in the conceptualization of GIP is the view that government actions via policies can ignite positive and green orientation among businesses toward a green economy. Accordingly, intra-country GIP and inter-country GIP are very likely to lead to divergent types of the "pollution haven hypothesis" in terms of industrial relocation. By accounting for the effects of firm ownership structures in promoting GIP, this study further illuminates the ongoing scholarly discourse on the effective mechanisms for ushering in green transitions, as well as offering a deeper understanding of challenges toward a sustainable future. This paper also deviates from prior research that has focused on the debate about environmental sustainability challenges (see also Christmann, 2004; Kolk & Pinkse, 2008) to focus on mechanisms for scaling up renewables.

4.2 | Practical implications

From a practical standpoint, considering the demonstrated positive societal impact of GIP, governments would also be well-served to move toward "depoliticizing" renewable and ET policy. This involves creating conditions and independent bodies that focus purely on policy formation that benefits citizens and different types of firms, thereby aiding economic development. Additionally, government investments in technologies such as renewable generators and battery storage technologies/systems for renewables are needed to create conditions for such industries to flourish, especially in developing economies. Based on the quadrants, there are specific policy directions that can be pursued to achieve a sustainable transition. Besides incentivizing domestic private sector investments, such as subsidies and tax relief in green energy (Quadrant I), governments can also introduce public–private partnership initiatives and feed-in tariffs schemes to motivate households and businesses to adopt renewable and low-carbon energy sources, such as solar photovoltaic. Indeed, scaling up is likely to unleash ample opportunities for businesses to forge local and cross-border collaborations to develop new knowledge and share best practices.

In addition, there is also potential value that can be achieved via government investment in green energy technologies and R&D through SOEs (Quadrant II). Harnessing internationalizing POEs and SOEs (Quadrants III and IV) also provides opportunities for these firms to forge international alliances and partnerships with multiple stakeholders for green energy adoption and scaling up. Such an approach could go a long way in improving the competitiveness of firms. Governments would be well-served to direct resources toward inter-country GIP in tandem with capacity building of SOEs and POEs for regional and global competition. Indeed, resource- and pollution-intensive industries are more susceptible to industrial relocation. Broadly speaking, POEs are more flexible and responsive to changing consumers' demands for green products and services. This strength can be further developed with government investments geared toward incentivizing business adoption of green practices as well as providing affordable support for consumers to transition to green sources of energy.

4.3 | Limitations and future directions

There are some noteworthy limitations that must be borne in mind. Given that firms' ownership structure can change over time, as some companies transition from privately owned to state-owned, this potential change is not fully captured by the framework. There are also firms with more complicated structures where one aspect is wholly state-owned and others privately owned, which also offers an opportunity for future research on different types of enterprises. Another limitation is that the typology fails to capture all possible ownership types, such as hybrid organizations. A possible direction for future research would be to examine changes in firm ownership and hybrid organizations in the adoption and abandonment of green business practices. The conceptual nature of the paper demands additional empirical analysis to further illustrate the observations made here. Notwithstanding the noted shortcomings, the conceptual framework advanced provides a better understanding of the complex relationships between firm ownership structure and geographical scope toward green transitions. It is hoped that this study stimulates further policy-specific research.

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