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Haitao Yu Dr
IESEG School of Management

Pratima (Tima) Bansal Dr.
Western University

Diane-Laure Arjaliès
Ivey Business School

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Haitao Yu

h.yu1@ieseg.fr

IESEG School of Management
Parvis de la Defense
92800 Puteaux, France

Pratima (Tima) Bansal

tbansal@ivey.ca

Ivey Business School
Western University
1255 Western Rd,
London, ON N6G 0N1, Canada

Diane-Laure Arjaliès

darjalies@ivey.ca

Ivey Business School
Western University
1255 Western Rd,
London, ON N6G 0N1, Canada

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ABSTRACT

All business contributes to environmental crises because of its focus on profit. We argue that international business (IB) contributes more than its fair share. IB's focus on cross-border arbitrage has led to the over-extraction of natural resources and the accumulation of waste. This is a problem, because natural resources are limited in quantity and embedded in their local environment. It is time for IB researchers to step up and substantially and meaningfully address IB’s contribution to environmental crises by embracing the principles of natural systems processes within its core assumptions and improving its theorizing of natural resources. In this paper, we take a step forward in this direction by revisiting and refining the theoretical dimensions of country-specific advantages (CSAs) and firm-specific advantages (FSAs) to recognize natural resources more explicitly. We propose three natural resource-based strategies for multinational enterprises (MNEs): reducing, replacing, and regenerating. This article offers a new theoretical perspective to understand how IB can create value and steward the natural environment, contributing to the sustainability of business, society, and the planet.

Keywords:

Multinational Corporations (MNCs) and Enterprises (MNEs), Business and the Environment, Firm-Specific Advantages, Natural Resources, Country-Specific Advantages, Sustainability

INTRODUCTION

Since World War II, international business (IB) has contributed to economic development and improved the lives of many (Buckley & Ghauri, 2004). Through cross-border arbitrage, IB has successfully created and distributed wealth worldwide. However, this wealth creation and distribution has come at an environmental cost.

We argue that IB has contributed to the environmental crises, even more so than domestic businesses, because of its international reach and scale. International firms can extract natural resources in one place, manufacture products in another, and sell these products in yet another. In doing so, IB creates and disposes waste throughout the supply chain. There is little economic incentive for international firms to manage their environmental impacts beyond what is required by local regulations.

IB researchers often argue that it is not the role of business but the role of national governments to manage local natural resources. Yet, there is robust evidence supporting the pollution haven hypothesis, which states that international firms off-shore their polluting activities to countries where regulations are lax (Bu & Wagner, 2016; Eskeland & Harrison, 2003). IB, then, seeks not to avert environmental crises, but to exploit its international scope by side-stepping environmental legislation.

Environmental crises are now becoming catastrophic – both locally and globally. These crises arise from changes in natural systems that are pushed beyond their regenerative thresholds and cannot be reversed (Steffen et al., 2015). Environmental crises create existential threats to society and numerous species. Between 1970 and 2016, over 68% of the planet's mammals, birds, amphibians, reptiles, and fish disappeared, and more than 85% of wetlands were lost (WWF, 2020). In 2020, the dry weight of global human-made mass exceeded all living biomass (Elhacham, Ben-Uri, Grozovski, Bar-On, & Milo, 2020).

Increasing environmental concerns from the second half of the 20th century motivated the World Commission on Environment Development (WCED) to coin the term 'sustainable development' as a counterpoint to 'economic development.' Sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987: 43). The concept requires businesses to create wealth within natural resources' regenerative capacity. If those limits are exceeded, basic human needs, including food, housing, and clean water, cannot be met.

Recently, IB scholars have called for more research related to sustainability (Buckley, Doh, & Benischke, 2017; Buckley & Ghauri, 2004). Researchers have argued that sustainable development can offer IB a competitive advantage, because it helps them preempt environmental regulations (Rugman & Verbeke, 1998), cope with stakeholder pressures (Maksimov, Wang, & Yan, 2022), and innovate new technologies (Nippa, Patnaik, & Taussig, 2021). However, much of this work has treated the natural environment as a variable in a model or a context for IB; the unique attributes of the natural environment have not yet been theorized.

In this article, we advocate for IB researchers to consider natural resources more explicitly in their theorizing. Specifically, we revisit and refine the conceptualization of country-specific advantages (CSAs) and their implications for firm-specific advantages (FSAs). This article offers avenues for apprehending the regenerative and tangible qualities of natural resource-based CSAs and their effects on business strategies and sustainable development. Our approach takes a long-term view of business and society, advocating for IB to create wealth for not just the current, but also for future generations (Bansal & DesJardine, 2014). We aim to align IB research with its ambition to contribute more directly to real-world challenges (Buckley et al., 2017; Doh, 2015).

Although we argue that IB has contributed disproportionately to environmental crises, our ambition is to offer ways in which IB researchers can meaningfully theorize solutions. In doing so, we make two significant contributions to the IB literature. First, we elaborate on the distinctiveness of natural resource-based CSAs, such as plants, animals, fossil fuels, and minerals, and the implications for FSAs. The IB literature has primarily elaborated on intangible forms of CSAs, such as political, economic, and institutional systems (Dunning, 1998, 2000; Meyer & Peng, 2005; Porter, 1994; Rugman & Verbeke, 1992, 2004). Our second contribution is identifying three MNE strategies that foster FSAs to redress environmental crises: reducing, replacing, and regenerating. These strategies can help IB secure financial success while contributing to sustainable development.

WHY NOW? CURRENT ENVIRONMENTAL REALITIES

In recent years, businesses have extracted natural resources, developed the built environment, and generated waste deposited to land, air, and water at unprecedented rates. These impacts have created environmental crises, putting all life on Earth at risk. To help readers understand environmental crises and their implications for IB, we first explain the natural systems processes.

The natural environment is a self-organizing, complex, dynamic system. Over time, natural systems reach a state of homeostasis – a dynamic equilibrium in which each element works symbiotically to support the other. Natural resource limits are the thresholds within which natural resources can be extracted to perpetuity, making them 'sustainable.' When confronting minor changes, such as the extraction of resources or the generation of waste, the natural environment can reorganize to retain the same function and structure – a property called resilience (Walker, Holling, Carpenter, & Kinzig, 2004). However, natural systems will move into a new regime when faced with significant shocks, such as rapid resource depletion and waste generation that push the systems beyond their thresholds, leading to environmental crises. Once over the threshold, natural systems cannot easily return to their prior state. The last five mass extinctions, including that which contributed to the demise of the dinosaurs, were crises resulting from major disruptions in natural systems, and led to new ecological epochs (Ceballos, Ehrlich, Barnosky, García, Pringle, & Palmer, 2015).

To predict and manage critical environmental crises, the scientific community has identified nine planetary boundaries[1] that define the safe operating space for Earth's systems in the current geological epoch, in which humanity has developed and thrived for about 10,000 years (Steffen et al., 2015). For a long period, industrial activities, such as forestry, agriculture, and fishing, were of such low intensity that they did not disrupt the inherent ability of living system to regenerate (Sachs, 2020). Industrial practices were often local, and the people involved in economic practices were attuned to the cycles of natural environmental systems (King, 1995). However, since the industrial revolution, resource extraction and waste generation rates have increased so substantially that the thresholds of natural systems are being breached.

At current production rates of greenhouse gas emissions, the global temperature will likely rise by about two degrees Celsius between 2030 and 2052, putting much life on the planet in peril (IPCC, 2022). Human activities have had such an impact on the Earth's ecology and geology that some commentators are calling this epoch the Anthropocene (Crutzen & Stoermer, 2000) and anticipate a sixth mass extinction (Ceballos et al., 2015).

Although all businesses have contributed to these crises, the issues are particularly acute in IB, whose impacts are magnified by their large scale and international reach (Dauvergne, 2018). IB profits from the cross-border arbitrage of natural resources, where natural resources are extracted from one part of the world and moved to other parts for production and sale. Not only does resource extraction disrupt local environmental cycles, but the movement of natural resources and products also consumes energy and generates emissions. To offset the costs that may be associated with pollution, IB situates their extraction and production activities in places with lax regulation (Eskeland & Harrison, 2003).

These issues are particularly salient in multinational enterprises (MNEs), large firms that own and control activities in multiple countries (Buckley & Casson, 1976). The MNE is the most prominent organizational vehicle for IB (Buckley, 2002) and embodies IB's cross-border arbitrage and profit-making logic. MNEs extract natural resources on a large scale, move those resources, manufacture products out of them, and then sell these products for consumption. In this process, MNEs use and waste considerable natural resources and energy (Lenox & Chatterji, 2018). In 2020, just five MNEs possessed 82% of the world's palladium production (Nornickel, 2020). Five MNEs carried out about 90% of the global palm oil trade (CIFOR, 2017), and just 13 harvested about 15% of the global seafood (Österblom et al., 2015). The largest national and international energy companies owned 65% of petroleum and 60% of gas in 2018 (IEA, 2020). Twenty were responsible for more than a third of all carbon emissions from 1965 to 2017 (CDP, 2017).

Bartlett and Beamish (2018) have identified four types of MNEs on a spectrum from economic profit maximization to value creation for broader society: exploitative, transactional, responsive, and transformative. Exploitative MNEs take advantage of the local host environments, transactional MNEs aim to do no harm and meet local regulations, responsive MNEs proactively address social issues, and transformative MNEs create life-enhancing changes. Although our analysis focuses primarily on exploitative and transactional MNEs, it is still relevant to responsive and transformative MNEs, given that Bartlett and Beamish (2018) themselves did not mention natural resource cycles, even though they acknowledged social development actions. Further, the environmental crises catalyzed by MNEs occur not only through their local activities, but also through their compression of geographic distance.

MNE executives often make operational decisions at a distance. They tend not to be embedded in and attuned to local ecological processes, so they may not be fully aware of the disruptions their MNE is creating (Bansal, Kim, & Wood, 2018). Local environmental processes are nested within a dynamic equilibrium of global processes crucial for environmental integrity (Steffen et al., 2018). Decisions not made locally can be blind to local natural resource relationships and inadvertently disrupt local cycles, destabilizing the global biosphere (Folke et al., 2019) and devastating local communities and ecosystems (Banerjee, 2011). When these environmental incursions occur in many locations or on a massive scale, local environmental issues become global, menacing the global-local dynamic environmental equilibrium for sustainable development.

Not only do MNEs influence the natural environment, the erosion in the integrity and resilience of the natural environment also has implications for MNEs. Society and governments can become agitated about MNEs' negative environmental impact (Maksimov et al., 2022; Surroca, Tribó, & Zahra, 2013), and critical natural resources become harder to find and more expensive as the natural environment is compromised (Henderson, 2020).

IB researchers need to tackle these issues and more meaningfully include the natural environment in their theorizing. This article proposes ways in which IB can redress environmental crises and contribute to sustainable development. We believe the opportunity for this lies in the literature on CSAs and FSAs.

COUNTRY AND FIRM-SPECIFIC ADVANTAGES

Since IB research focuses on the role of MNEs in cross-border trade, the locational features of resources are central to the literature. CSAs are resources external to MNEs, situated in particular geographic locations where firms can extract value (Rugman & Verbeke, 2001, 2004). They include natural resources, inexpensive labor, infrastructure, formal institutions, and geographic clusters associated with innovation and entrepreneurship (Dunning, 1998; Markusen, 1996; Porter, 1994; Rugman & Verbeke, 1992, 2004). FSAs, on the other hand, are resources internal to MNEs on which firms have capitalized (Rugman & Verbeke, 2001, 2004). They include intellectual capital, organizational expertise, entrepreneurship, and learning capacity (London & Hart, 2004; Teece, 2014).

In keeping with its strategic management roots (Peng, 2001), IB research explains how MNEs foster competitive advantage by arbitraging across borders, developing organizational resources and capabilities, building economic efficiency, and securing market power. MNEs exploit CSAs to develop FSAs that ultimately create value and generate profit. The international reach of MNEs offers economies of scale and scope gained from arbitrage opportunities arising from national differences (Bartlett & Ghoshal, 2002; Rugman & Verbeke, 1992, 2001, 2002). MNEs can capitalize on geographic distance and country-level differences by moving resources and assets across different factor markets (Dunning, 1998). This process helps MNEs develop value-creating FSAs, such as technological knowledge, market intelligence, and financial capital, that further capitalize on CSAs (Narula, 2012).

Through this interaction between CSAs and FSAs, MNEs have created jobs and lifted people out of poverty, driving economic development worldwide (Narula, 2019). Technology and know-how diffuse across international boundaries. Through this process, domestic companies can acquire new capabilities and generate wealth locally. By the end of the 20^{th} century, global human indicators such as population, GDP, and foreign direct investment (FDI) had increased exponentially across nations (Sachs, 2020). However, an unintended consequence has been the heightened frequency and magnitude of environmental crises through the over-exploitation of natural resources and the accumulation of waste.

NATURAL RESOURCES OFFER DISTINCTIVE COUNTRY-SPECIFIC ADVANTAGES

In conceptualizing CSAs and FSAs, IB researchers have not discriminated natural resource assets from other assets. This section elaborates on the distinctiveness of tangible natural resource-based CSAs and other intangible CSAs. We are not claiming that all natural-resource CSAs are either tangible or intangible,[2] but this polarized categorization permits us to illuminate our argument.

Intangible CSAs

Intangible CSAs include intellectual capital (Dunning, 1998), social networks (Meyer & Peng, 2005), innovation clusters (Li & Bathelt, 2018), stakeholder relationships (London & Hart, 2004), social systems, and institutional systems (Brandl, Darendeli, & Mudambi, 2019). Intangible CSAs help organize society, provide structures for efficient organizing and markets, contribute to value creation, and provide social safety and wellbeing (Markusen, 1996). Even though these CSAs reside in a physical location, IB research often demarcates their location by their intangible features, such as the political and economic boundaries of the institutional systems in which they are embedded (e.g., Dunning, 1998; Rugman & Verbeke, 2004). Because they are intangible, they do not possess mass or weight and are socially constructed and negotiated.

Intangible CSAs have certain essential attributes. First, they are not limited in quantity. Country differences in technology, labor costs, and know-how provide MNEs with seemingly endless opportunities to scale size and profits. There is no physical constraint to new ideas, so MNEs can often find new ways to unlock value in intangible CSAs. Indeed, attention to intangible CSAs has been growing quickly with the increasing role of digital technologies, which have unlocked considerable opportunities for MNEs to create value from cross-border differences. Second, governments offer MNEs opportunities to leverage intangible CSAs through national policy initiatives, funding research institutes, and adopting laws to protect intellectual property (Markusen, 1996). For instance, the government actions taken by Singapore and Hong Kong to develop research universities have offered world-class human capital and innovation systems that have attracted businesses and helped accelerate local economic development. Finally, intangible CSAs tend to evolve with changes in laws, immigration, and institutions, which can be quite rapid and dramatic (Meyer & Peng, 2005).

Tangible Natural Resource-Based CSAs

Based on the Oxford English Dictionary's definition of natural resources, we define natural resource-based CSAs as resources that rely on materials or substances of a place and are used to sustain life or for economic gain. Such CSAs are tangible because they have mass and occupy space at a specific time. Natural resource-based CSAs support humans' basic needs, such as nutrition, clothing, housing, energy, and product materials. They sustain life and are, therefore, essential to sustainable development. They hold economic value when extracted, such as timber, palm oil, or coffee. They can also be processed for additional uses, such as oil, coal, and natural gas, which are transformed into energy. A recent report by the World Economic Forum indicated that $44 trillion of economic value generation – over half the world's total GDP – directly or indirectly depends on natural resources (WEF, 2020).

Unlike seemingly unconstrained intangible CSAs, natural resource-based CSAs are limited in supply. There is a finite amount of minerals, forestry products, and agriculture. Once the resources are extracted, the country will lose income-earning potential. For example, the fisheries off the coast of Eastern Canada harvested cod beyond their ability to regenerate, which led to the collapse of fisheries and related businesses in the 1990s (Bavington, 2011). For this reason, governments are increasingly protecting natural resources. Further, governments are increasingly recognizing the environmental costs of extracting natural resources. Indeed, natural resources provide many indirect but essential services for organizations, industries, and societies, such as pollinators for agriculture and regulation of climate and water cycles (Millennium Ecosystem Assessment, 2005). MNEs that remove natural resources can undermine the resilience and integrity of the natural environment.

We further discriminate between renewable and non-renewable natural resources. Renewable natural resources can regenerate over time. They include almost all life forms, including agriculture, forestry, livestock, and fish. Non-renewable resources do not regenerate within human time scales. They include fossil fuels, metals, and minerals. We synthesize and compare their differences in Table 1.

---- Insert TABLE 1 Here ----

The Opportunity in IB Research: Natural Resource-Based CSAs

Prior IB research explains that MNEs, especially exploitive and transactional MNEs (Bartlett & Beamish, 2018), profit from the efficient extraction and movement of resources and the production of goods through cross-border arbitrage. These MNEs move natural resources through a linear 'take-make-use-waste' economy. Resources are extracted from one place, processed or produced in another, and sold to consumers in yet another, before the products are ultimately disposed of into waste streams. Along the way, the processes generate emissions in the extraction, movement, and production processes. We illustrate this linear economy in Figure 1.

---- Insert FIGURE 1 Here ----

The four aspects of the linear economy map nicely onto Dunning's (1998) categorization of the competitive advantage garnered through CSAs (Buckley, Forsans, & Munjal, 2012). Natural resource seeking is the most direct driver for MNEs to extract CSAs for FSAs. In this case, MNEs seek to take the cheapest and easiest to acquire natural resources from the host country (Krugman, 1993). MNEs are efficiency seeking in making products in order to expand their scale and scope. They are also market seeking, looking to serve new users with more products with similar factors in the production (Buckley & Ghauri, 2004). Finally, firms can escape disposal or waste management restrictions in their home country by finding 'pollution havens' in countries with weak regulations in order to lower costs (Bu & Wagner, 2016).

This linear approach to the economy and supply chains extracts virgin materials in host countries, manufactures them into products, moves the resources or products across countries, and produces tremendous waste in the extraction, movement, production, and consumption processes. MNEs often negatively impact residents and disrupt local communities throughout the chain. For example, Brandl, Moore, Meyer, & Doh (2022) illustrated how MNEs exacerbated poverty in Africa through natural resource extraction.

MNEs magnify these negative impacts by moving products over vast geographic distances. They leverage advances in infrastructure, transportation, communications, and manufacturing technologies, and, in doing so, they compress geographic distance, making the world appear ever smaller (Cuervo-Cazurra &

Genc, 2008). Inevitably, these processes scale up the amounts of natural resources extracted, goods produced and sold, and waste generated.

The linear economy appears efficient, at least in the short term, because virgin resources are often cheap, and the corporations that produce the product often bear little cost in or responsibility for the waste created through the product. This logic has been embedded in MNE business models. MNEs are celebrated for generating profits by leveraging country-level cost differences. It is no wonder that MNEs have contributed substantially to environmental crises.

Take the example of Zara, which has created a fast fashion business model that has set the standard for the industry. Zara slashed its production cycle from the typical six months to a mere two weeks by treating clothes as perishables. They heavily discount unsold goods to make room for new incoming goods (WWF, 2007). To execute this take-make-use-waste approach to their operation, Zara multiplied its tiers of suppliers by coordinating them through a central node that owned the brand. Zara built its manufacturing facilities close to the source of textiles and cheap labor in countries with lower environmental and labor regulations, such as Bangladesh and Cambodia. Zara also leveraged market-seeking behavior by responding to and even shaping fashion trends. Its low prices ensured that fashionable clothes were accessible by a broad market in developed and emerging countries, who could replace their outfits within weeks, contributing to a vast mountain of waste (McKinsey & Company, 2016).

By extracting natural resource-based CSAs in a way that does not accommodate their biophysical limits, MNEs undermine the resilience and integrity of the natural environment. The threat will persist until MNEs align the extraction of natural resources with local and global ecological cycles (Bansal et al., 2018). Fortunately, some MNEs are redressing environmental crises and these MNEs offer beacons in a field wrought with challenges (Lenox & Chatterji, 2018; Polman & Winston, 2021).

A SUSTAINABLE APPROACH TO INTERNATIONAL BUSINESS

By recognizing the distinctiveness of natural resources in their theorizing, IB researchers have the opportunity to enable MNEs to develop strategies that uphold the principles of natural systems processes. This section describes three MNE strategies that can redress environmental crises and contribute to sustainable development (see Table 2). We discuss the tensions between the three strategies and their implications for future research in the 'Discussion' section.

---- Insert TABLE 2 Here ----

Reducing

Mechanism. MNEs use natural resources efficiently by extracting fewer natural resources or decreasing waste for the volume of products produced or sold.

Key FSAs. Efficiencies can be gained throughout the products' lifecycle, including design, production, transportation, and consumption. *Management and technological innovations* are needed to build such efficiencies. Good examples include capturing carbon at the source; installing smart grids; using fewer materials, such as thinner plastics and less packaging; and reusing products at their end of life. For example, Schneider Electric developed a bi-directional grid, which helps to manage the temporal mismatch between energy demand and supply. By combining renewable energy generation and digital software-led electric products, Schneider decreased carbon emissions (Schneider Electric, 2020).

MNEs can also *work with their partners across the value chain*, either upstream (e.g., suppliers) or downstream (e.g., customers). MNEs can use their market power and technological know-how to encourage suppliers to reduce harmful emissions and natural resource utilization by adopting cleaner practices (Delmas & Montiel, 2009). For example, Unilever worked with smallholder farmers and small-scale distributors to implement sustainable agriculture principles. By 2020, 67% of Unilever's raw materials were from more sustainable sources (Unilever, 2021a). MNEs can also scale up the impact of technological innovations, such as Schneider's smart grid and digital solutions, by offering customers energy efficiency or recycling options. By working with both the upstream and downstream, MNEs can maintain the competitiveness of the value chains on which they depend.

Transferring FSAs. Since technological innovations in the manufacturing process can reduce MNEs' overall costs, MNEs are incentivized to standardize manufacturing processes across their subsidiaries (Bartlett & Ghoshal, 2002; Pinkse, Kuss, & Hoffmann, 2010) to increase efficiency. MNEs' transnational activities (e.g., operations in contexts with similar environmental regulations) enable them to accumulate resources and capabilities for technological innovations, often channeled to the headquarters and transferred from there to subsidiaries in other countries in a top-down approach with centralized guidelines (Mees-Buss, Welch, & Westney, 2019; Rugman & Verbeke, 2001). Once developed in a specific location, MNEs can transfer these technological innovations across MNE subsidiaries at a relatively low marginal cost (Mees-Buss et al., 2019). For example, with its energy technological innovations, Schneider Electric aimed to reduce 800 million tons of CO2 emissions for its customers worldwide and maintain carbon neutrality in its global operations from 2018 to 2025 (Schneider Electric, 2021).

Sources of competitiveness. Reducing natural resource-based CSA extraction and waste can boost MNEs' profitability by lowering financial costs related to raw materials and waste management. During the 1990s, Dow Chemical pursued its first 10-year sustainability strategy, the Footprint Initiative, designed to reduce the company's overall environmental footprint. From 1995 to 2005, Dow reduced costs by $5 billion by saving material and energy after an investment of $1 billion in innovative processes and technologies (Eccles & Serafeim, 2013).

Since FSAs developed through a reducing strategy are not bound by location, they can be standardized across operations and exploited globally to provide MNEs with a critical competitive advantage through increased scale and scope (Rugman & Verbeke, 2001). Nippa et al. (2021) found that MNEs possess the strategic and operational means to reduce carbon emissions in their home countries and could leverage this competitive advantage across contexts. MNEs were more effective in reducing carbon emissions than purely domestic peer firms. However, those advantages are hard to maintain in the long term, because competitors can adopt these technological innovations across subsidiaries at a relatively low marginal cost (Mees-Buss et al., 2019). Bowen, Bansal, and Slawinski (2018) showed that oil sands companies that developed new technologies to reduce greenhouse gas emissions could not sustain their pre-competitive collaborations, because greenhouse gas technologies were too easily transferred to competitors.

***Impact on environmental crises*.** There needs to be a threshold amount of natural resources for the natural environment to regenerate or to absorb waste. If natural resources become too sparse, the natural environment is incapable of reproducing to regenerate supply. A reducing strategy ensures that the natural resource extraction rate does not exceed the rate needed for natural resource regeneration and that waste does not accumulate too rapidly to be absorbed.

Replacing

Mechanism. MNEs replace natural resource-based CSAs with more abundant, regenerative, less toxic, or persistent alternatives.

Key FSAs. A replacement strategy enables MNEs to create more customer value by offering a long-term solution that anticipates the supply issues and costs associated with natural resource-based CSAs. MNEs can *replace* environmentally taxing materials in products with materials drawn from quickly regenerated renewable resources. Doing so often requires MNEs to innovate. For example, energy companies can replace fossil fuels with renewable or low-carbon resources to generate energy. Meals based on plants rather than meat can also reduce greenhouse gas emissions. MNEs can use plant-based fibers to replace nylons or plastics, which take hundreds of years to be absorbed back into the environment.

In Malawi and the Ivory Coast, LafargeHolcim developed an affordable, low-carbon, soil-based construction material called DURABRIC. This is a compressed earth, stabilized block made of local soil, sand, and cement (LafargeHolcim, 2022). Locally made, DURABRIC brick is about 20% cheaper per square meter than a burnt wall. Furthermore, DURABRIC does not require firing, which reduces deforestation pressure from burnt bricks in many developing countries. Such innovative initiatives can be valuable for companies entering emerging countries because of the lower costs and environmental impacts associated with these initiatives (Mees-Buss et al., 2019). In 2016, LafargeHolcim formed a joint venture company with the CDC Group, the UK Government's impact investor, to scale up the DURABRIC solution to provide affordable housing in Africa. Combining the DURABRIC solution with 3D printing technology, the joint venture has addressed housing needs and climate challenges in lower-income countries like Kenya, Rwanda, Tanzania, Cameroon, and Zambia. From 2016 to 2019, three million bricks were produced and used, contributing to an estimated 4,000 trees and 15,000 tons of carbon emissions saved (World Cement, 2019).

An alternative approach to MNEs replacing materials with less impactful materials is to *offer services* (often called *servicizing*) that keep the materials in circulation longer. The business model offers the product's functionality to the customers rather than the product itself. The company maintains ownership of the products and earns revenue through a pay-for-use arrangement by providing the work that needs to be done (e.g., driving and lighting). This business model often extracts the maximum value from the good before it is retired. Examples include Michelin Fleet Solutions, a business model that moved from selling tires to selling kilometers; Philips Lighting, which shifted from selling lightbulbs to offering a pay-per-lux service; and Interface Carpets, which sells carpeting services (Lenox & Chatterji, 2018).

Transferring FSAs. Through a replacing strategy, MNEs focus on developing product innovation capabilities. Developing new production processes and products to meet market needs while using more renewable natural resources often requires understanding the local natural environment. These kinds of product or material innovation FSAs are more likely to be developed by host country subsidiaries, which are attuned to the host country's natural resources. Headquarters can leverage and share these FSAs across the MNE but can be constrained by a geographically bounded vision (Bartlett & Ghoshal, 2002).

Creating innovative solutions requires MNEs to be open to new ideas and grant subsidiaries autonomy to find unexpected value sources. These innovations can then be transferred back to headquarters and scaled up globally, even if the initiatives are geographically dispersed (Mees-Buss et al., 2019). Researchers have found that MNEs can often generate ‘small wins’ that can scale up from host countries (Ferraro, Etzion, & Gehman, 2015), as the DURABRIC example shows.

Sources of competitiveness. Whereas reducing natural resource use reduces costs, this replacing strategy contributes to MNEs’ long-term growth across markets. MNEs that can innovate products with more abundant or less polluting natural resources have the potential to boost sales and grow markets over time. During the 2000s, Dow Chemicals pursued its second 10-year sustainability strategy, called the Handprint Initiative. This strategy focused not on pollution prevention but on product innovation. From 2009 to 2013, Dow Chemical's EBITDA from new product innovation exceeded $400 million yearly, which stemmed from improved sustainability performance (Eccles & Serafeim, 2013).

Impact on environmental crises. By replacing natural resources with less toxic or persistent alternatives, the natural environment gains higher capacity to regenerate necessary resources to supply needs. As well, the waste generated can be absorbed back into the natural environment with greater speed.

Regenerating

Mechanism. MNEs work with the natural environment's biophysical rhythm to maintain natural resource cycles within their existing thresholds (Ehrenfeld, 2007). Resources are extracted and products disposed of at rates that do not disrupt these cycles.

Key FSAs. MNEs have applied *regenerative production processes* to protect the ecosystems where they extract renewable resources to ensure that resources are not extracted beyond the carrying capacity of the natural environment. They can learn from local communities, particularly Indigenous people, who have sustained their ecosystems for millennia (King, 1995). Norlha Textiles is a luxury enterprise designing and producing yak wool textiles from a nomadic community on the Tibetan Plateau and selling them to the global luxury market. Norlha adjusts its production to accommodate the land's carrying capacity of yaks. The enterprise applies a price premium to ensure sufficient profits, given its limited production. It also employs local nomads, who understand yak behavior and can ensure that the ecological grasslands and animals are sustained (Yu, Bansal, & Arjalies, 2020). In 2021, B Lab gave Norlha the highest score (87.5) in the 'community' dimension, recognizing its positive impact on the nomadic communities (B Corporation, 2021).

In a similar vein, MNEs can *manage ecological processes at multiple scales* by adapting to the speed at which different natural resources based on living systems are regenerated and harvested. Organizations can farm various species of plants and animals with complementary timings. For example, Kim, Bansal, and Haugh (2019) found that Fairtrade-supported tea producers in East Africa harvested honey in the dry season and tea in the wet season to supplement income.

A regenerative strategy can also apply *circular economy* principles by deliberately bringing non-renewable products back into the production system at the end of their lives. MNEs can keep materials and products at their highest utility and value through an extended lifecycle and better waste and pollution management. End-of-life products are transformed into resources for other processes, which could be valuable for non-renewable resources such as metals and minerals. Facing the difficulty of recycling toxic medium-life bulk products, such as mattresses and carpets, DSM-Niaga developed a non-toxic, easily recyclable, mono-material component with a modular design. This design meant that, when a part of the product is damaged, only that piece needs to be replaced and the damaged materials can be easily recycled into the product stream (Ellen MacArthur Foundation, 2021a).

It is difficult for corporations to develop a regenerative strategy in isolation; they need to build new industrial ecosystems with suppliers that can offer recycled content and buyers willing to return their consumed items into the industrial product stream (Ellen MacArthur Foundation, 2012). MNEs must *build collaborations* based on material flows up *and* down the supply chain and with multiple unlikely partners, such as competitors (Prashantham & Birkinshaw, 2020). For example, Dow partnered with Fuenix Ecogy Group to achieve circular plastic production. Fuenix developed a new feedstock made from recycled plastic waste, which Dow will scale up to produce polymers identical to products from traditional feedstocks (Dow, 2019).

Transferring FSAs. The geographic distance between subsidiaries and headquarters shapes the extraction, movement, production, consumption, and recycling of natural resources. The entire supply chain can be locally embedded to regenerate renewable organic resources, such as food, while regenerating non-renewable technical resources, such as electronic equipment, requires global processes. Organic materials can be regenerated through the soil, whereas technical material relies on industrial processes that require sufficient throughput. We illustrate the two processes in Figure 2.

---- Insert FIGURE 2 Here ----

Regenerating renewable resources requires MNEs to embed subsidiaries in place-specific locations. To be embedded, an MNE subsidiary needs deep local networks to learn about the ecosystems experientially (Whiteman & Cooper, 2000). MNE subsidiaries need to see themselves as part of a multinational conglomerate and as part of a local physical natural environment that links both material flows and economic flows (Beugelsdijk, McCann, & Mudambi, 2010; Buckley & Ghauri, 2004). MNE subsidiaries can then engage in dialogue with diverse local stakeholders, enabling them to see aspects of their local environment that are often invisible at a physical remove.

Ecosystems operate in a dynamic equilibrium in which each element works symbiotically to support the other. The waste released from the death of a plant or animal provides feedstock for the birth and development of another. Regenerative agriculture combines mutually beneficial plants, purposefully creating supportive relationships on farmland and reducing the need for fertilizers and pesticides (Berkes, Colding, & Folke, 2000). In the US, Unilever introduced cover crops to soy farmers, which were planted after the soy was harvested. The cover crops capture carbon and nitrogen from the air and feed it back into the soil, where the microbes improve soil conditions (Unilever, 2020). Even though local collaborative relationships and ecological knowledge cannot be easily transferred, MNEs can transfer the capabilities of building such partnerships and engaging with local communities.

Regenerating non-renewable resources requires national or global processes for several reasons. First, non-renewable resources (e.g., minerals and fossil fuels) tend to share standardized attributes globally, so there are efficiencies to be gained by aggregating these materials. Second, the extraction, movement, production, consumption, and recycling of non-renewable resources are geographically dispersed and require specialized processes. For example, Canada's circularity rate for renewable and non-renewable materials is only 6.1%. It is so low that their nascent recycling industry lacks sufficient waste feedstock to flourish (Council of Canadian Academies, 2022).

In the case of high value-to-weight resources, such as valuable metals, companies need to work with partners worldwide to reach a larger pool of materials and economies of scale. To create a circular economy around batteries for electric vehicles (EVs), Groupe Renault, Veolia, and Solvay have formed a cross-border consortium to recover metals, such as lithium and cobalt (Ellen MacArthur Foundation, 2021b). EV batteries have a complex material composition, making recycling metals from end-of-life products particularly difficult. France-based Veolia collects end-of-life EV batteries and provides them to Belgium-based Solvay, which leverages its capacity in chemical extraction to purify the metals. Finally, France-based Renault contributes to extending the lifecycle of EV batteries through repair and recycling schemes to give the metals a second life in new batteries.

In the case of low value-to-weight resources such as cement, transporting waste over a global geographic distance may require an amount of energy that would exceed the environmental benefits appropriated from the circular economy (Boldoczki, Thorenz, & Tuma, 2021). Companies need to assess the environmental footprint of a product's entire lifecycle to identify the optimal geographic distance. In a public-private partnership aiming to circulate construction materials in the Mediterranean, operations take place on the national level because of the high footprint of moving construction materials (Cerema, 2020).

Sources of competitiveness. The regenerating strategy enables MNEs to eliminate waste and even help regenerate degraded ecosystems by giving back more than they take from the natural environment. Unilever's former CEO, Paul Polman, described the firm as 'net positive' (Polman & Winston, 2021). By shifting to regeneration, MNEs can achieve sustainable production that prospers long term. Since 2010, Unilever has pursued the regenerating strategy under its *Sustainable Living Plan* with the long-term goal of growing while decreasing its environmental footprints. To that end, Unilever worked with smallholder farmers and NGOs in various countries to create value for business and society (Unilever, 2021a). Working with WWF Malaysia, Unilever sourced palm oil from certified producers who took stewardship of local biodiversity. Over a decade, Unilever reduced the total CO2 per ton of production by 70% and achieved zero waste in landfills across all factories. Meanwhile, the company's share price outperformed the S&P 500 by more than 60% and the FTSE by about 400% (Unilever, 2021b).

Impact on environmental crises. A regenerating strategy ensures that the natural resource extraction rate is within the dynamic range of the natural environment and waste is absorbed through circularity. Consequently, the environmental changes induced by natural resource extraction are reduced and waste does not accumulate.

The Environmental Impact of MNEs' Natural Resource-Based Strategies

The three MNE strategies work within the dynamics of the natural environment, not against it. Figure 3 maps the effects of those three strategies on the extracting process. The reducing strategy enables MNEs to use fewer natural resources in production and generate less waste for disposal. The replacing strategy enables MNEs to shift market needs, implying lower environmental footprints in developing new markets. The pressure for natural resource extraction is thus decreased in MNEs' efficiency-seeking, market-seeking, and restriction-escaping activities. The regenerating strategy enables MNEs to eliminate waste. By changing the 'take-make-use-waste' linear model to a circular one, MNEs decrease the pressure to extract natural resources.

---- Insert FIGURE 3 Here ----

While the current MNE exploitation model mapped in Figure 1 increases natural resource extraction, the three natural resource-based strategies lead to a decrease. The FSAs being developed in these strategies can serve as strategic assets (Dunning, 1998), sustaining the long-term growth of MNEs without sacrificing the prosperity of society and the natural environment.

DISCUSSION

IB researchers have increasingly been calling for a greater focus on sustainable development (Buckley et al., 2017; Buckley & Ghauri, 2004). Although the integrity of the natural environment is essential for IB, IB literature often considers the natural environment as a context, a variable, or a constraint, rather than a desirable outcome. For instance**,** green FSAs (Rugman & Verbeke, 1998, 2009) and dynamic green capabilities (Maksimov et al., 2019) allow MNEs to outperform their rivals on environmental regulation issues and ultimately offer them a competitive advantage. Still, MNEs embody IB's cross-border arbitrage and profit-making logic to extract natural resources. Firms are separated from their natural environment rather than embedded in it. This article seeks to uphold the principles of natural systems processes and redress environmental crises.

Contributions to the IB Literature

In this paper, we revisit and refine the theoretical dimensions of CSAs and FSAs to explicitly recognize natural resources. We focus our analysis on MNEs and describe three MNE strategies that contribute to sustainable development through responsible natural resource management: reducing, replacing, and regenerating. In this section, we describe three contributions to the IB literature.

Distinguishing tangible natural resource-based CSAs from intangible CSAs. Our article encourages IB researchers to re-envision the crucial role CSAs play in redressing environmental crises and consequently contributing to sustainable development, which requires all actors, including governments, organizations, and people, to manage finite natural resources (WCED, 1987). Recently, IB researchers have studied sustainable development through various lenses, such as externalities (Montiel, Cuervo-Cazurra, Park, Antolín-López, & Husted, 2021), renewable energy (Georgallis, Albino-Pimentel, & Kondratenko, 2021; Hartmann, Inkpen, & Ramaswamy, 2021), carbon pricing (Nippa et al., 2021), MNEs and collaboration among small and medium-sized enterprises (SMEs) (Prashantham & Birkinshaw, 2020) and emerging markets (Brandl et al., 2019; Brandl et al., 2022). This article is a first step toward addressing sustainable development issues through the lens of CSAs and FSAs – a key pillar in the IB literature (Dunning, 1998; Rugman & Verbeke, 2002).

The IB literature has long recognized the role of MNEs in leveraging CSAs for economic development (Ghoshal & Bartlett, 1990; Rugman & Verbeke, 2002) and the importance of geographic location in CSAs (e.g., Dunning, 1998; Rugman & Verbeke, 2004). However, natural resources have received little attention in the discussions of CSAs (Shapiro, Hobdari, & Oh, 2018), other than the opportunity to source relatively cheap or rare resources (Beugelsdijk et al., 2010).

By treating natural resource-based CSAs as any other CSA, IB research has failed to recognize the intrinsic value of the natural environment and has little to say about the extraction, movement, production, consumption, or waste of natural resources. Through their FDI activities of resource seeking, market seeking, and efficiency seeking, and through their restriction-escaping motives, MNEs have disrupted local natural environments, including through desertification, deforestation, and toxification. As these local disruptions multiply, they ultimately contribute to major global environmental crises, such as climate change and biodiversity loss (Steffen et al., 2015).

IB researchers must treat natural resource-based CSAs as theoretically different from intangible CSAs. In doing so, IB researchers would offer MNEs greater insight into their impact on the natural environment and opportunities to build FSAs that are consistent with sustainable development. Some of the FSAs we describe in this article are technological innovations, new products or materials, servicizing business models, regenerative production processes, and cross-sectoral, cross-industry collaborations.

The cost of and value in waste. Following its strategic management roots (Peng, 2001), prior IB research has prioritized efficiency and financial performance as dependent variables. To increase financial performance, MNEs are incentivized to extract, produce, and distribute natural resources at the lowest cost, even at the expense of the natural environment (Bu & Wagner, 2016; Eskeland & Harrison, 2003). By focusing on cost, MNEs inevitably extract natural resources and generate waste excessively, because it is often cheaper to source virgin material than it is to reuse discarded material. This approach has fostered a linear economy with complex, global supply chains.

Yet, the price paid for natural resource-based CSAs often does not reflect the total cost of their extraction from the natural environment (Quattrone, 2022). If natural resource-based CSAs are extracted too quickly, businesses risk disrupting nature's balance and undermining the resiliency of ecosystems. This article advocates for the total value of natural resources to be considered, including both the value they bring through their extraction and their importance in the natural environment, such as for carbon sequestration, water filtration, or pollination. Treating the negative impact of business activities on the natural environment as an externality fails to account for the benefits of the natural environment for the community.

Further, government jurisdictions or even MNE headquarters could impose a cost on waste. The more waste is produced, the lower the MNEs’ profits should be, which will further reduce resource extraction and waste generation. Waste, then, can join profits as a key outcome variable for MNEs to manage. Companies that find ways to foster a circular economy through reusing waste can enjoy long-term competitiveness within planetary boundaries (Whiteman, Walker, & Perego, 2013).

Recognizing geographic distance. MNEs' efforts to compress cultural (Kogut & Singh, 1988) and institutional (Berry, Guillén, & Zhou, 2010) distance have received considerable attention among IB researchers. IB research treats distance as a multidimensional construct involving cultural, administrative, geographic, and economic differences among countries (Ghemawat, 2001). These differences create risks, liabilities, and costs in foreign operations (Lee, Chung, & Beamish, 2019). Thus, MNEs seek to compress distance across these dimensions to make host countries' environments more familiar for doing business, which has contributed to a world that is increasingly placeless (Relph, 1976) and 'McDonaldized' (Ritzer, 2003).

Even though it is less commonly discussed, geographic distance has received some treatment in IB research, especially the physical distance between home and host countries that facilitates cross-border operations (Beugelsdijk, Ambos, & Nell, 2018). This research conceptualizes geographic distance (e.g., climate, topography, and ecosystems) as a cost, such as the cost of moving goods and the hassle of executive travel (e.g., Schotter & Beamish, 2014). By leveraging infrastructure, transportation, communications, and manufacturing technologies, MNEs can compress geographic distance and lower cross-border operations costs. Yet, geographic distance is particularly salient in discussions of natural resources. The larger the distance, the more likely local environments will be disrupted, because executives may not be aware of the disruption to local natural cycles (Bansal et al., 2018). MNEs need to be seen as part of the natural environment, where geographic distance is not merely a risk or cost to be mitigated but a critical variable in sustainable development. MNEs need to manage geographic distance when attempting to transfer FSAs for more sustainable extraction of natural resources. We argue that MNEs need to acknowledge and accommodate geographic distance, not simply seek to compress it.

Implications for Further Research

CSAs and sustainable development. This article opens a crucial direction for future IB research. First, future research could further investigate the relationship between CSAs and MNEs' impact on the natural environment. Studies could examine links between the natural resource-based CSAs and the nine planetary boundaries (e.g., the relationship between fossil fuels and climate change). Since these natural resource-based CSAs relate directly to major MNE industries (e.g., fossil fuels are critical in the energy industry), understanding these relationships further could help provide practical strategies and mechanisms for MNEs in specific industries to address the current environmental crises. Cultural diversity can encourage MNEs to share knowledge, innovate, and collaborate (Barner-Rasmussen, Ehrnrooth, Koveshnikov, & Mäkelä, 2014). Likewise, MNEs can learn from different forms of biodiversity by operating in diverse ecosystems worldwide, with an aim to protect species' genetic diversity. Such biodiversity could contribute to a more resilient global economy that resists major environmental disruptions. MNEs can aim for long-term success by diversifying the sources of natural resource-based CSAs, hoping that some would adapt to climate change.

Second, future research could broaden the scope of CSAs and explore their links with MNEs' activities and sustainable development. Although the natural environment is essential for sustainable development, we recognize that sustainable development is a multidimensional concept that comprises environmental and social concerns, as reflected in the 17 UN sustainable development goals (SDGs) or the 10 principles of the UN Global Compact. Location is not just a sociological system, but a system that links human society with the biophysical world (Berkes, Folke, & Colding, 2000). Socio-ecological interactions increasingly affect MNEs, including the military, human rights violations, and corruption, which are either catalyzed or accelerated by the extraction of natural resources (e.g., the current cobalt scandal in Congo and Lithium disputes in Chile). Future research should more fully consider sustainable development in the theorizing of CSAs.

Configurations of sustainable extraction strategies. The three strategies we describe – reducing, replacing, and regenerating – can help to uphold the principles of natural systems processes and solve environmental crises. However, adopting three strategies simultaneously might not necessarily be desirable because of inherent tensions between the three strategies. For example, reducing natural resource extraction lowers environmental impacts in the short term, but as resources become more available, prices may also drop, which can ultimately contribute to greater resource use, a situation often called the Jevons Paradox (Alcott, 2005). Moreover, an efficiency strategy is based on a scarcity mindset, where MNEs seek to reduce harm rather than create good. Such a mindset might preclude MNEs from seeing or pursuing the creative or collaborative activities needed for a replacing or regenerating strategy. Also, a reducing strategy reduces waste, whereas a regenerating strategy may require MNEs to produce specific waste that can be used in their own production or other firms' processes.

To help better understand the complementarity or tension among these strategies, future research could explore the organizational configurations needed to execute these strategies. Such analysis can offer insights into the coherence of these strategies. A configurational or set-theoretic approach, such as fuzzy-set qualitative comparative analysis (fsQCA) (Jacqueminet & Durand, 2020), could help identify the necessary and sufficient organizational conditions to produce desirable environmental outcomes.

Extraction strategies of responsive and transformative MNEs. In this article, we use MNE examples to illuminate the mechanisms in the three strategies for natural resource-based CSAs. While these cases are illustrative, they are limited in their capacity to uncover underlying mechanisms and build theory (Welch, Piekkari, Plakoyiannaki, & Paavilainen-Mäntymäki, 2011). Our work thus opens an avenue for IB researchers to delineate MNE extraction strategies aligned with the principles of natural resources systems.

Future research could investigate the issues through qualitative methods grounded in rich data, particularly in resource-constrained contexts. Emerging countries could provide an ideal setting to study mechanisms that may be too weak to notice or capture in more conventional contexts (Bello & Kostova, 2012). MNEs in resource-constrained contexts have been credited with frugal innovation, so they accomplish the same ends with fewer resources or means (London & Hart, 2004).

One stream of IB research that particularly explores MNEs' positive contributions to emerging countries is the framework of responsive and transformative MNEs (Bartlett & Beamish, 2018). Although Bartlett and Beamish (2018) identified and consolidated MNE behaviors and practices to cope with stakeholder pressures, they did not explain how responsive and transformative MNEs could address the limited supply of natural resources. Our research, based on the principles of the natural environment, adds an essential piece to the framework for IB scholars to uncover MNEs' sustainable behaviors and practices to address environmental crises.

Developing new measures. Future research should also consider new constructs that incorporate the natural environment directly into their models, such as constructs that account for waste and geographic distance. One challenge to overcome is to develop appropriate measures. Unlike financial returns or sales, there is no standardization for the conceptualization and measurement of waste that could enable a systematic comparison across MNEs and countries. In addition, MNEs can outsource the disposal of their waste to subsidiaries, suppliers, or vendors, which masks the amount of waste created and increases the difficulty in measuring it. Whereas there are many agencies that rate social and environmental criteria, their ratings are often inconsistent and opaque (Chatterji, Durand, Levine, & Touboul, 2016). Some governments provide specific emissions data by chemical, such as the US Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) Program. Still, the issue of commensurating different chemicals, especially across national borders, is challenging. More research needs to be conducted to develop reliable and standardized measures, which probably requires collaboration with other stakeholders.

Beugelsdijk et al. (2018) offer a systematic guideline for conceptualizing and measuring geographic distance. Building on their guideline, we suggest two options to measure geographic distance. One option is physical distance, the distance between two natural environments on Earth's surface by latitudinal and longitudinal coordinates. The other is contextual distance, referring to the dissimilarities in ecological attributes between two natural environments, much like IB researchers calculate differences in cultural attributes (Hofstede, 1984) for cultural distance (Kogut & Singh, 1988). Future research could consider the differences in geographic elements, such as climate, biodiversity, and topography, to calculate the geographic distance.

CONCLUSION

The world's population is expected to reach almost 10 billion by 2050.[3] Simultaneously, per capita natural resource consumption and waste production are higher than ever before. These conditions are putting human life in peril. Addressing environmental crises is one of the most critical challenges for IB. With over 50 years of scholarship, IB researchers are well placed to tackle the challenges. We hope that by drawing attention to this critical issue, we can catalyze thoughtful research that aligns IB with the ambition of sustainable development (Buckley et al., 2017).

ENDNOTES

1. The nine planetary boundaries include climate change, biosphere integrity, biochemical flows, global freshwater use, land system change, ocean acidification, stratospheric ozone, atmospheric aerosol loading, and novel entities.
2. We acknowledge that some CSAs, such as labor, factories, infrastructure, and country-specific material products, are tangible but not natural.
3. For more information on Our World in Data: Future Population Growth, see https://ourworldindata.org/future-population-growth.

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Table 1: Renewable Resources vs. Non-renewable Resources

	Renewable resources	Non-renewable resources
Definition	Natural resources based on living systems	Natural resources based on non-living systems
Examples	Agricultural products (palm oil, coffee, cotton, timber, fish), biomass energy, water	Fossil fuels (coal, petroleum, gas), metals and minerals (aluminium, copper, gold, lithium, cobalt, phosphorus)
How the resources are created and maintained	Produced through natural ecological cycles involving both organic and inorganic compounds within ecosystems	Produced geologically
Temporal attributes	Produced over seasons, years, decades	Produced over thousands to millions of years
Place-based attributes	Geographically bounded by local ecosystems	Relatively standardized across the globe
Regenerative capacity	Regenerate at specific rates within a bounded geography	Cannot regenerate at human time scales

Table 2: Three MNE Natural Resource-Based Strategies

		MNE Natural Resource-based Strategies		
	The Linear Model	**Reducing**	**Replacing**	**Regenerating**
Mechanism	Take-make-use-waste, cross-border arbitrage, compress geographic distance	Reduce natural resource-based CSAs' use and waste	Replace natural resource-based CSAs with more abundant, regenerative, and less-polluting alternatives	Extract and replace natural resource-based CSAs to match ecological cycles
Key FSAs	• Technological knowledge • Marketing expertise • Financial capital	**Building efficiencies** • Management and technological innovations • Work with partners across the value chain	**Creating more value** • New products and materials • Replacing product sales with service offerings	**Understanding and working within the broader systems** • Regenerative production • Industrial processes regenerating at multiple geographic scales • Circular economy • Cross-sectoral, cross-industry collaborations
Transferring FSAs	FSAs can be globally transferred through headquarters	Efficiency can be globally transferred through headquarters	Innovative products and business models can be transferred to new markets through a bottom-up approach	Non-renewable resources circulate on a national or global level; renewable resources circulate locally
Sources of MNE competitiveness	• Access to natural resources • Lower costs • New markets • Less restrictive regulation	• Lower costs • Short-term profitability	• Revenue generation • Long-term growth	• Regenerative systems • Business prosperity in a sustainable world
Impact on environmental crises	• Natural resource extraction rate is higher than regeneration rate • Waste accumulates more and faster than the natural environment can absorb	• Natural resource extraction rate does not exceed regeneration rate • Waste does not accumulate too rapidly	• Natural environment with a higher capacity to regenerate natural resources • Waste absorbed with greater speed	• Natural resource extraction rate is within the dynamic range of the natural environment • Waste absorbed through circularity

Figure 1: The Linear Economy

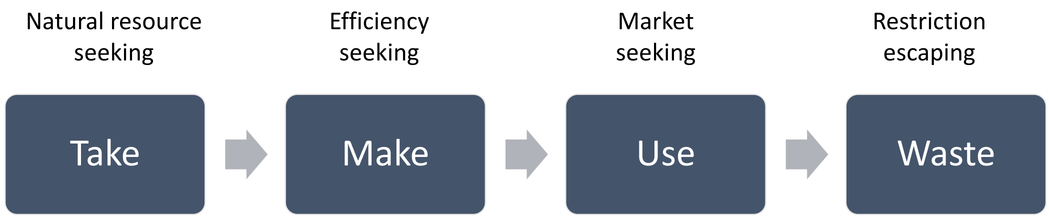


Figure 2: A Regenerating Strategy: Transferring FSAs between Headquarters and Subsidiaries

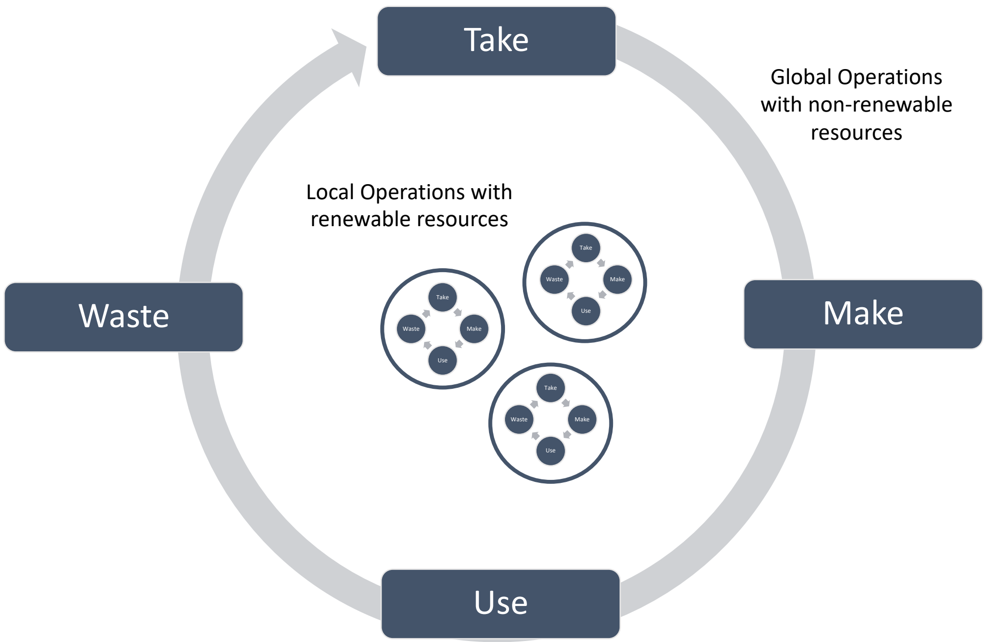
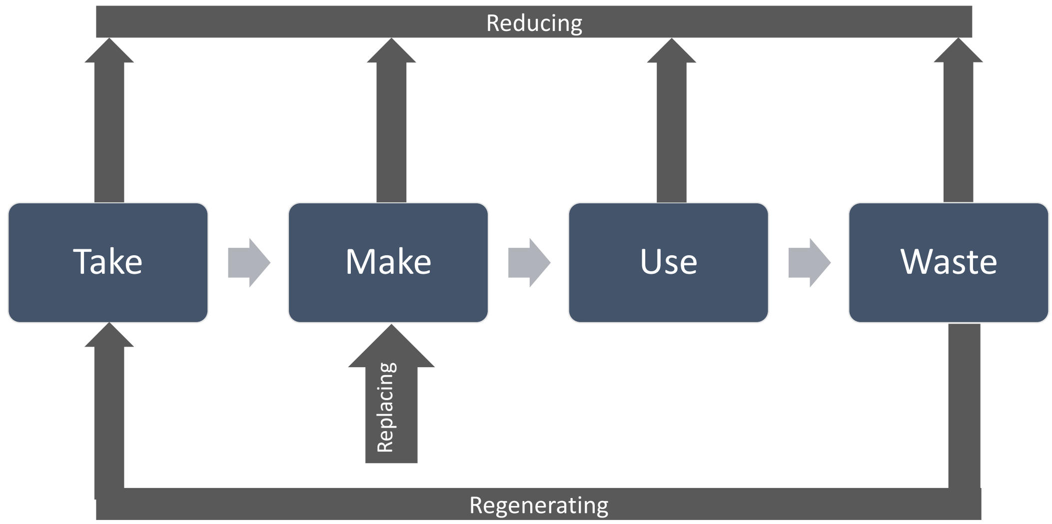


Figure 3: The Environmental Impact of MNEs' Natural Resource-Based Strategies



BIOGRAPHICAL SKETCH

Haitao Yu is an Assistant Professor in Strategy and Sustainability at IESEG School of Management, France. Haitao conducts research on organizations and sustainable development between the local and global, through the lens of place and space. He has done ethnographic work with organizations on the Tibetan Plateau and Indigenous Canada. He completed his PhD from the Ivey Business School.

Pratima (Tima) Bansal is a Professor at the Ivey Business School. Tima investigates the interplay between business strategy and sustainability and has published in several top management journals, including JIBS. Tima leads Innovation North, which is reimagining business innovation to create better business and society. Tima founded the Network for Business Sustainability and Ivey's Centre for Building Sustainable Value.

Diane-Laure Arjaliès is an Associate Professor at the Ivey Business School. She ambitions to push the boundaries of knowledge and practice by investigating how fashioning new devices, and collective actions can transform financial markets towards sustainability. She has studied responsible investing, impact assessment, integrated reporting, and alternative currencies. She is currently working on an extensive program on conservation finance.