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Reverse Innovation for Global Sustainable Development: a Conceptualization

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Reverse Innovation for Global Sustainable Development: a Conceptualization

Abstract

Purpose: we offer a first conceptualization of sustainable reverse innovation, by discussing the contribution of innovation from the Global South towards sustainable development. In so doing, we aim at recognizing an active role played by developing countries in creating viable and innovative solutions that can contribute to the achievement of sustainable development *for all*.

Design/methodology/approach: we present five innovation vignettes and discuss them through an antecedents-enablers-consequences scheme for exploring the concept of sustainable reverse innovation. While discussing the model components, we develop propositions to drive future research directions.

Findings: we contribute to both development studies and innovation studies by recognizing and highlighting the role played by businesses in addressing global challenges through sustainable innovation sourced from or inspired by developing countries.

Originality: this is the first study that offers a conceptualization of sustainable reverse innovation that goes beyond the low-cost and frugality connotation that has characterized the debate surrounding innovation from emerging economies.

Keywords: *Sustainable Development, Sustainable Development Goals (SDGs), Reverse Innovation, Global North, Global South, Innovation from Emerging Economies, Sustainable Innovation.*

1. Introduction

The aim of this paper is to discuss the contribution of innovation towards sustainable development by adopting a reverse innovation perspective and advancing a conceptualizsation of sustainable reverse innovation based on an antecedents-enablers-consequences scheme.

We start by positing that while both development and innovation management studies share a similar path in shifting from a western-centric and aid-focus approach to a more globally intertwined one that recognizes full agency to the Global South[1] (Horner and Hulme, 2019), the two fields have so far remained largely disconnected. This has led to two interconnected issues.

First, while recognising a possible role played by businesses as development agents, development studies remain sceptical of the validity of the contribution that corporate action can deliver. It is widely believed that businesses tend to cherry pick the goals they want to contribute to, on the basis of their own (economic) sustainability and business case (Heras-Saizarbitoria *et al.*, 2022), thus undermining the achievement of the full Agenda 2030

Second, despite a globalizsed approach to sustainable development, where both developing and developed countries are recognizsed as active agents in the achievement of a more sustainable future for all, the common narrative remains dominated by a largely unilateral flow of solutions from North to South. Lack of studies into how the developing world can support the developed one with sustainable and innovative solutions shows a tendency to still consider the Global South as a local agent, and the Global North as the global saviour (Hidayat and Virgianita, 2019; Sachs, 2005). This narrative persists as a consequence of an over-reliance on western epistemes of sustainable development (Nwankwo *et al.*, 2009).

Our conceptual model addresses both issues and offers a first conceptualization of how sustainable innovation ideated for and/or marketed first in developing countries can contribute to sustainable development in the Global North.

We present the elements of our conceptual model with the support of a set of five vignettes of firms that have addressed Sustainable Development Goals (SDGs) through their innovations in both developed and developing countries. The vignettes represent evidence of innovative solutions that were designed and implemented for countries in the Global South, but that could also represent viable and sustainable solutions to social, environmental and/or economic challenges faced by countries in the Global North.

While discussing the model and the vignettes, we develop research propositions associated to the different identified dimensions of sustainable reverse innovation.

2. Development and Innovation: a Parallel Journey?

2.1 From international development to global sustainable development

Despite a long and well-established tradition of development studies, the concept of international development has been widely contested (Scholte and Söderbaum, 2017a).

[1] For the purpose of our analysis, we use developing countries/emerging economies/Global South and developed countries/advanced economies/Global North interchangeably.

Scholars have tended to identify the start of international development studies around the 1960s as a discipline that analysed the causes of underdevelopment and poverty (Chan, 2016) - a discipline epistemologically embedded in Western views of the world (Nwankwo *et al.*, 2009). Developing countries have typically been theorizsed as the recipients of support from developed countries (i.e., the aiders), as well as recipients of innovations developed in the Global North for the Global South. International development has usually been associated with the idea of policies and actions promoted by developed countries for the benefits of developing countries (Mönks *et al.*, 2017), with a narrow geographical focus mainly centred on interventions in the Global South (Horner, 2020). Well-meaning but often ineffectual development interventions have tended to focus on "fixing" developing countries with a modernization model based on what worked in the Global North (Rostow, 1960). This mainstream view was very much reflected in both theory and policy development, and it constituted the underlying perspective of the *2000 United Nations Millennium Development Goals* (Hulme, 2009). In that case, targets were created *by* developed countries *for* developing countries, and approaches were mainly based around the ideas of aid, charity and colonialist-type of investments. In this scenario, developing countries tended to be passive recipients of funds and intervention programmes (Sachs, 2005), instead of change agents of their own development journeys.

In the past decade, a paradigm shift has started to occur in development studies (Gore, 2015; Horner and Hulme, 2019; Kaul, 2017; Scholte and Söderbaum, 2017b), with the creation of a *global* sustainable development agenda, for which the boundaries between sustainability challenges faced by developing *versus* developed countries have blurred. A 'global development' paradigm –as a replacement of the more traditional international development one- recognizes the reality of the universality of social and environmental challenges, as framed in the Sustainable Development Goals (SDGs). '[T]he most influential problem-oriented development strategy in the present' (Telleria, 2024, p. 24), the SDGs comprizse large scale global societal challenges that require a collaborative approach between both state and non-state actors for their solutions, from both the Global South and the Global North.

We call on all businesses to apply their creativity and innovation to solving sustainable development challenges. ((United Nations, 2015)~~United Nations, 2015, #~~6762~~)

The inclusion of businesses as active agents in pursuit of the new global development agenda (Scheyvens *et al.*, 2016) ~~have~~ set high expectations on their contributions (Witte and Dilyard, 2017), as well as the prospect of more proactive partnerships with civil society organisations (including non-governmental organisations and trade unions) and state actors for innovative solutions to societal challenges.

Innovation represents one clear way for business actors to directly contribute to the achievement of the sustainable development agenda. In particular, we look at reverse innovation in order to overcome the limiting view of innovation from emerging economies as a process confined in self-aid or self-development / South to South (Hidayat and Virgianita, 2019).

2.2. From the Product Lifecycle Theory to Reverse Innovation

Despite collective and shared global challenges being the premiseise of the SDGs, there is currently a limited understanding of the role of innovation developed in/for or inspired by emerging economies in contributing to the achievement of sustainable development for all. In the past, the innovation management literature has recognizsed the relevance of emerging economies for global innovation. This was in contrast to a mainstream North-to-South flow of

innovation typically described by the Product Life Cycle Theory (Vernon, 1966, 1979), where emerging economies were merely recipients of innovations developed by and for advanced economies. It was only at the end of last century that scholars started discussing the need for global organizations to consider emerging markets as prime destinations rather than secondary ones. This approach was put forward primarily by C.K. Prahalad with his "Innovation for the bottom of the pyramid" concept (Prahalad, 2002). According to this and related innovation concepts (including cost innovation, frugal innovation, and resource-constrained innovation), companies could profit by serving vast low-income markets in emerging economies. In order to do so, they would have to revolutionize their innovation strategy and business model, and develop entirely new products and services that target those markets. This research stream also had the merit to shift part of the discussion on innovation in the Global South in two aspects. First, it begaun to look at local actors (including local businesses) as important innovation agents. Second, it linked the idea of innovation for developing countries to the concept of sustainable development (Hart *et al.*, 2016). However, most of this literature remained confined to the idea of targeting the Global South with innovative products, services and business models exclusively developed for those markets. Part of this literature is mirrored in the studies that look at the internationalization of MNCs from the Global South, highlighting how this is mostly driven by asset-seeking rather market-seeking as in the case of MNCs from the Global North (Hong et al., 2024; Luo and Tung, 2007). Only more recently ~~scholars~~ have scholars started investigating the emerging phenomenon of reverse innovation (Immelt *et al.*, 2009). Reverse innovation is broadly defined as an innovation first adopted or developed in the Global South before being further developed and/or adopted in the Global North (Von Zedtwitz *et al.*, 2015). The Global South can therefore inspire or trigger the development of innovations that have global market potential, suggesting an at least partial shift of a traditionally ethnocentric view of global innovation~~,~~ that sees the Global North as the only locus of innovation. Furthermore, this shift has implications not only on the geographical source of innovation but also on the relevance of actors that generate innovation. While traditionally dominated by multinational corporations from advanced economies (AMNCs), multinationals from emerging economies are now playing an ever-increasing role in the global innovation scenario.

3. Vignettes

Business organisations can contribute to society and have a positive impact on sustainable development in several ways.

In this section, we present five vignettes that represent examples of business contributions to SDGs in the form of innovation (new products or services), inspired by or adopted first in an emerging economy before being further developed and/or adopted in advanced economies. We will then apply an antecedents-enablers-consequences scheme to the cases and discuss their implications in terms of reverse innovation for global sustainable development.

Loowatt

Established in 2009 in London, the company has developed and commercializ~~s~~ed a waterless toilet. The founder was inspired by the lack of access to clean and safe sanitation experienced by almost half of the world population and causing almost 1 million deaths each year (United Nations Development Programme, 2006), in addition to the environmental costs of the unsafe

disposal of untreated waste. The technology developed by Loowatt uses a waterless toilet system to collect, store and dispose of waste in a safe and energy efficient way. The system is differentiated into an off-grid urban/home environment solution that serves the Global South and an echo-tourism and event toilet solution that is offered in the Global North. Both include the possibility of converting waste into biogas, and therefore energy, or fertilizer. Initially developed for and deployed in for regions of the Global South with low or no access to safe sanitation, the system is also marketed in the Global North (UK).

GE Healthcare

As one of the most important subsidiaries of General Electric (GE), GE Healthcare is also the most known case of reverse innovation. It has been used as a first example of the phenomenon (Immelt *et al.*, 2009), resulting in the coining of the term reverse innovation, and in further studies on its micro-determinants (Malodia *et al.*, 2020). GE Healthcare reverse innovations stem from India and China. In both cases the company developed healthcare solutions that significantly distanced themselves from the way in which GE had been approaching the local markets. Until the early 2000s' they had in fact simply been adapting machines that were ideated for hospitals typical of the advanced world. Deeming that approach unsatisfactory and risky, the company decided to focus on ideating and developing solutions for the local markets. In China, GE Healthcare focused on the development of a portable, PC-based ultrasound machine while in India the company developed a handheld electrocardiogram machine. Both innovations, although in different contexts, responded to similar local market requirements that were characterized by the presence of a basic rural clinic or no clinic at all: portability, easiness of use, and low cost. After several rounds of development and adaptations to the local markets, both innovations found their commercial way to the Global North, where they tapped into unserved or underserved market segments such as small clinics (especially in rural areas) and ambulances.

Vestergaard

Founded in 1957 in Denmark as a uniform manufacturer, the business was later redirected towards designing and commercializing solutions for health challenges in the Global South such as insecticidal nets to protect from malaria (PermaNet), an innovative storage bag (ZeroFly) and associated trading platform (GroR) to protect and trade dry agricultural commodities, and a water filtration and purification device (LifeStraw). The latter was first developed as a simple straw that incorporated technology to filter water in areas of the Global South severely affected by Guinea worm. The company later developed an entire portfolio of water purification devices (from portable bottles for hikers to pitchers for domestic use) that is now commercialized in North America and Europe.

Mobike

Launched in Beijing in January 2016, Mobike was the first dock-less smart bike sharing system in the world. Enabled by an app connected to a bank account, bikes can be used against via automatic payment of a small fee, locked and unlocked through a smartphone and parked freely around a city-confined perimeter. The idea was triggered by severe traffic and environmental conditions in Beijing, and Mobike quickly spread throughout China. In 2017 Mobike internationalized first in the UK and later on in other European countries such as Italy, The

Netherlands, Germany, France and Spain. While its business outside China largely declined after the Chinese online shopping platform Meituan bought its China business in 2018, Mobike's model of a dock-less smart platform inspired further bike and scooter-based urban mobility initiatives.

Global Research Innovation and Technology (GRIT)

GRIT Freedom Chair is an evolution of the Leveraged Freedom chair originally developed for the Global South, especially Africa and Asia. Noticing how regular wheelchairs were not fit for purpose in the uneven and hard terrains of the extensive areas of the Global South (with hilly, muddy and unpaved terrains), between 2006 and 2010~~,~~ a team of MIT-based engineers ideated and developed a lever-powered wheelchair that could help tackle those challenges. The users for which the MIT-based team of engineers developed this chair also required ~~for~~ it to be cheap, locally made and easily fixable in case it broke. The chair went through several rounds of design and during one of these, in partnership with Boston-based design consultancy Continuum Innovation, the team developed a version of the chair that targeted the USA and other countries in the Global North. Several different versions of the GRIT Freedom Chair are now commercialized all over the world as an all-terrain wheelchair that provides access to adventure to people with mobility issues.

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4. A conceptual model of sustainable reverse innovation

4.1 Antecedents

Previous research has already identified several micro factors that determine the ability of a firm to develop reverse innovations (Malodia *et al.*, 2020). These are usually associated with~~to~~ its ability to detect a specific and peculiar market need in an emerging economy and, further, have the capability to convert that market knowledge into an actual marketable product. This is clearly the case for GE Healthcare in the Indian and Chinese markets (Immelt *et al.*, 2009; Malodia *et al.*, 2020). While MNCs from the Global South have an advantage in the identification of emerging markets needs, they struggle to transfer internationally their domestically developed innovations (Govindarajan and Ramamurti, 2011). ~~On the opposite~~In contrast, MNCs from the Global North have an advantage given by their international organisational structure but face other challenges. For example, research has shown how the ability for these organisations to pursue these opportunities is affected by their governance models and, specifically, the presence of senior management *champions* that challenge their organisations' traditionally ethnocentric view of innovation and promote innovations originating from emerging economies through their global presence (Corsi *et al.*, 2014). However, what drives these organizations to develop SDGs-oriented innovation is primarily their market opportunities~~y~~ more than their social purpose, thus limiting the social impact of an innovation to the viability of its business case (Scheyvens *et al.*, 2016). ~~On the opposite~~The approach by~~,~~ start-ups such as Loowatt or GRIT, though, is different: they incorporate their social purpose as a founding principle of the organization. They are founded on the basis of addressing a sustainability issue and this determines their nature and mission.

Proposition: start-ups are more likely than MNCs to develop sustainable reverse innovations.

Founders of these start-ups often coincide with individuals who have experienced first-hand the gap or issue that they want to address. The identification and development of a solution thus requires a high level of embeddedness (Lin *et al.*, 2019). Entrepreneurs can be local individuals who respond to a need with which they are very familiar ~~with~~, such as the case of Mobike's founder Weiwei Hu, who decided to develop a smart bike sharing system in response to her struggles with urban mobility in Beijing. Or the founders can be international entrepreneurs who are exposed to emerging markets' needs through different experiences such as, for example, collaborating with a local NGO. This is the case of GRIT, where MIT researchers that developed the freedom chair did so by spending extensive periods of time in emerging economies, working in close contact with wheelchair users and therefore being exposed to the specific needs ~~that these~~they had in those environments (Winter and Govindarajan, 2015). Similarly, even though Vestergaard was founded in 1957 as a textile company, it was transformed into a social for-profit enterprise focused on the Global South by third generation family owner Mikkel Vestergaard Frandsen. The foundations of this renewed mission are found in Mikkel's multi-year experience as an entrepreneur and traveller in Africa (Agrawal and Gugnani, 2014).

Proposition: sustainable reverse innovations are more likely to originate from entrepreneurs whose backgrounds are~~is~~ highly embedded into emerging markets.

It has been widely discussed how solutions developed by business organisations, either MNCs or smaller firms, for emerging markets are a response to resource constraints that characterize~~s~~ those markets either in terms of technological or financial maturity. Previous studies have shown~~ed~~ how innovations for emerging markets are cost-driven and easy to use (Hart *et al.*, 2016). These are generally indicated as frugal innovations (Weyrauch and Herstatt, 2017) or resource-constrained innovations (Pansera and Owen, 2015). While these remain very important elements of sustainable reverse innovations, they are not the only drivers. We believe that maintaining a frugal or cheap characterization of innovations from emerging economies limits our ability to explore ways and approaches through which emerging economies can contribute to global sustainable development. In fact, as most innovations address a market need, it is relatively easy to pinpoint an SDG that they help achieve. For example, GE Healthcare's work in advanced economies on technologies that help improve~~ing~~ people's lives addresses SDG 3 – Good Health and Well-Being. Their machines for rural hospitals and doctors in China and India, being predominantly based on affordability rather than on a substantially different approach to the problem, have the great merit of making a technology and associated service accessible to a larger share of the population, but maintains an exclusive focus on SDG 3. If instead an innovation is developed to address a need in a sustainable way, rather than solely pursuing a market opportunity through a sustainable innovation, the nature of the entrepreneurial effort behind the innovation is such that it incorporates solutions that address multiple SDGs. By identifying the need for access to safe sanitation, Loowatt takes into account~~s~~ environmental constraints which are not exclusive to the Global South. While access to water and the presence of a sewage system is not an issue in most countries of the Global North, their sustainability from an environmental and capacity perspective certainly is. As a result, the technology developed by Loowatt is not only providing certain areas of the Global South with access to safe sanitation, but it is doing it in a sustainable way that lessen~~sed~~ the burden on the environment (i.e. no water, no relying on a sewage system, clean energy) in response to a lack of infrastructure and a forced technological choice.

Proposition: the partial lack of traditional infrastructure in the Global South offers opportunities for the development and testing of innovations that address unsustainable infrastructure in the Global North.

Proposition: innovations developed in response to local needs/challenges in the Global South have the potential to address SDGs in the Global North.

4.2 Enablers

As shown by previous studies (Bisaga *et al.*, 2017; Onsongo, 2019), the development and marketing of social innovations targeting the bottom of the pyramid have relied on micro-finance or innovative business models to be financially viable and sustainable. Companies that commercialize the same innovations in both the Global North and the Global South face the question of whether to adapt ~~or not~~ their business models for the two different markets or not. Previous literature has discussed the challenges of managing dual business models (Markides and Charitou, 2004). This challenge is particularly relevant for companies that operate in

emerging markets, as these are often characterized by both high and low-end market segments (Winterhalter *et al.*, 2016) and a risk of self-cannibalization. This risk is still strongly present for MNCs from the Global North that implement reverse innovation by also marketing a product developed for emerging markets ~~also~~ in their home countries as described by ~~in the case of Speres by~~ Corsi, DiMinin, and Piccaluga (2014) in the case of Speres. A way to overcome this risk is to identify market segments in the Global North that are untapped and do not overlap with segments that are already being served by the same company. The case of GE Healthcare entering American and European markets with a technology that was first developed and commercialized in India and China is such an example (Immelt *et al.*, 2009). This was affected by an organisational structure that on one side allowed GE to take advantage of a global presence and an in-depth knowledge of different country-markets while at the same time, constraining~~it constrained~~ the MNC not to explore potential disruptive market strategies.

~~On the opposite,~~In contrast, start-up companies such as Mobike, Loowatt or GRIT stem from pioneering ideas and research that are market-creators, as existing technologies do not address the problem they target. As such, when they are reversed, they do not face the risk of self-cannibalization. However, their start-up nature may make it more difficult for them to transfer their innovation across countries as 1) they do not operate in those countries, and 2) they do not know those markets. Besides, their lack of organizational routines and culture make them more prone to adapting their business models according to the different markets in which they operate. As a result, their business models may vary depending on whether they operate in the Global South or the Global North. For example, GRIT, Vestergaard and Loowatt's most common clients in emerging markets are NGOs (and government institutions), while in advanced markets these are industrial clients and end-users of similar products. Furthermore, the commercial sustainability of certain solutions in the Global South may still escape the business case (Scheyvens *et al.*, 2016). As a result, GRIT and Vestergaard operate a business model whereby products distributed in the Global South are subsidized by revenues generated in the Global North.

Proposition: the organisational structure of a company will affect their business model across developing and advanced countries.

While start-ups may have an advantage in identifying new ways to address a sustainability challenge, they struggle with internationalization even though they may have a natural tendency to it (Tanev, 2012). Loowatt's market strategy, although initially strongly focused on emerging markets, has always had an international scope given 1) the location of its headquarters in London, 2) a first grant received from the Bill and Melinda Gates Foundation to work in Madagascar, and 3) a grant from the UK Innovation Agency (Innovate UK) to develop a portable toilet for the UK market. Its~~Their~~ internationalisation was therefore driven by a set of innovation policies promoted by both public and private actors. However, even though both grant providers aimed at sponsoring a solution for the same problem, they acted independently and provided support for the same technological development but in different geographic areas. This has potentially 1) reduced the impact of the funding provided through unrealiz~~s~~ed efficiencies, and 2) missed the opportunity to further support a transnational knowledge and technology transfer process.

Proposition: coordination mechanisms between public and private actors have a positive impact on the identification and implementation of sustainable reverse innovation.

Similarly, the footprint provided by private investors can determine the international and reverse scope of an innovation first developed and adopted in emerging markets ~~first~~. Mobike's international expansion was funded by Chinese companies such as Tencent, Ctrip International and Foxconn that clearly had a supportive view of Mobike's reverse innovation plans. This was interrupted when Mobike was acquired by the Chinese company Meituan-Dianping. The new owner proceeded to divest from almost all of Mobike's international operations as they were not aligned with the group's focus on the Chinese market.

Proposition: private funders have an impact on the likelihood of sustainable reverse innovations.

4.3 Consequences

Previous research has shown how a reverse innovation approach can provide companies with a global competitive advantage (Govindarajan and Ramamurti, 2011; Malodia *et al.*, 2020). This is particularly true for MNCs from the Global North that already benefit from a global presence, and they can leverage that in order to profit from innovations first developed and adopted in the Global South. Their knowledge of their markets of origin in the Global North give them an advantage over~~on~~ the MNCs from the Global South that may enter those markets with potentially disruptive technologies developed domestically; ~~and~~ this has been shown in the case of GE Healthcare (Immelt *et al.*, 2009; Malodia *et al.*, 2020). MNCs from the Global South would in fact be in a better position than MNCs from the Global North to identify business opportunities driven by sustainability challenges in their home markets. They would also be in a better position to interpret how to best respond to such challenges given their local embeddedness (Govindarajan and Ramamurti, 2011). China was an ideal location for the development of a dock-less smart bike-sharing system, as it integrated technologies (e.g. smartphone-based fintech-supported app) that were widely diffused and used by the Chinese population. This was not the case for similar firms that operated dock-based bike sharing systems in Europe and other foreign markets, and this gave Mobike a global competitive advantage. We believe that the global competitive advantage that companies can achieve through reverse innovation is even stronger if these are sustainable. There is no doubt that unsustainable technologies will be phased out in the future and replaced by more sustainable ones. As presented in the *Antecedents* section, sustainability challenges are overall present with a much higher gradient of severity in the Global South, which therefore present an "ideal" environment for the ideation and development of innovative sustainable technologies. Being able to manage sustainable reverse innovation will influence positively a firm's global competitive advantage and ultimately their performance.

Proposition: sustainable reverse innovations can provide a global competitive advantage to companies from both the Global North and the Global South.

At a macro level, sustainable reverse innovations are likely to address SDGs in ways that would not be possible if firms were to operate in and target only markets in the Global North. In fact, previous studies have shown how established firms (e.g. MNCs) that target SDGs are often cherry-picking goals to achieve in order to make their case and build a favourable narrative of doing good (Olwig, 2021). Shifting the focus on the Global South from a market-based perspective to one based on sustainability provides space for a renewed innovation approach

for both existing and newly formed firms. The development gap that has traditionally separated the Global North and Global South remains large, but it is now recognized that a within-country gap in Global North economies is apparent and needs to be addressed. Emerging markets provide an excellent workshop for the development of sustainable solutions that can be adopted in advanced markets.

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5. Conclusion

~~In this contribution, we~~This paper advances a conceptualizsation of sustainable reverse innovation based on an antecedents-enablers-consequences scheme. We offer a first conceptualization of how sustainable innovation ideated for and/or marketed in developing countries can contribute to the achievement of global sustainable development for all. We derive research propositions that we hope can drive future research at the intersection of development studies and innovation.

Starting from the recognition of a parallel journey and gap in development and innovation studies, this paper represents a first attempt to develop a conceptualizsation of sustainable reverse innovation. We argue that there is a gap in recognizing full agency of emerging countries in contributing to global challenges through innovation. More specifically, we posit that acknowledging more agency to business actors operating in the Global South has the potential to unlock opportunities for the development of innovations that address global sustainability challenges as presented by the SDGs. More importantly, we maintain that the Global South's environmental characteristics represent unique sources of sustainable innovations that, going beyond the frugality connotation, have the potential to address sustainability challenges in advanced economies.

In the paper we identify some of the challenges that firms face in this scenario. Moving past the well-known risk of self-cannibalization for AMNCs, we propose a conceptualization of sustainable reverse innovation that escapes from its frugal and low-cost characterization (Harris, 2024). We believe that only by doing so~~,~~ can we ~~can~~ make progress on the decolonization of innovation for sustainable development and benefit from a truly global effort to achieve SDGs targets.

Furthermore, we believe the most pressing challenge is to be able to identify and support firms and entrepreneurs that develop sustainable innovations but struggle to transfer them internationally. Given this challenge, we argue for the need of an actual collaborative approach between different state and non-state actors that can foster the flow of sustainable innovation from the Global South to the Global North.

We believe that only by doing so, can the full potential of a global approach to sustainable development ~~can~~ be achieved.

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Company	Origin	Product/Technology	Main Developing Markets and addressed SDGs	Main Advanced Markets and addressed SDGs	Business Model
Loowatt	UK	Waterless Toilet system that converts waste into energy	Antananarivo and Philippines – SDG 6 and 7	UK – SDG 6, 7 and 15	For profit in both environments
GE Healthcare	USA	PC-based ultrasound machine & handheld electrocardiogram machine	India (Ultrasound machine) and China (electrocardiogram machine) – SDG 3	USA and Europe – SDG 3	For profit in both environments
Vestergaard - LifeStraw	Switzerland	Water filtration straw technology	Several African countries - SDG 6	USA and Europe – SDG 6 and 12	Profits in advanced countries are used to subsidize distribution in developing ones
Mobike	China	Dockless smart bike-sharing system	China – SDG 11	Europe – SDG 11	For profit in both environments
GRIT	USA	Leveraged Freedom Chair (wheelchair for rough terrain)	Kenya, Vietnam, India – SDG 3	USA and Europe – SDG 3	For profit in both environments (with a significant price and tech difference)

Table 1 Firm and Innovation Cases[1].

[1] Sdg1: no poverty. Sdg2: zero hunger. Sdg3: good health and well-being. Sdg4: quality education. Sdg5: gender equality. Sdg6: clean water and sanitation. Sdg7: affordable and clean energy. Sdg8: decent work and economic growth. Sdg9: industry, innovation, and infrastructure. Sdg10: reduced inequalities. Sdg11: sustainable cities and communities. Sdg12: responsible consumption and production. Sdg13: climate action. Sdg14: life below water. Sdg15: life on land. Sdg16: peace, justice, and strong institutions. Sdg17: partnerships for the goals.

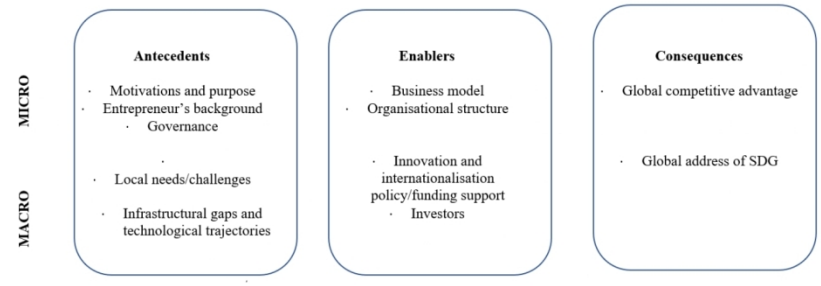

Figure 1 A conceptual model of sustainable reverse innovation.

Figure 1 A conceptual model of sustainable reverse innovation

297x210mm (150 x 150 DPI)

Scheme stages	Propositions
Antecedents	• *Start-ups are more likely than MNCs to develop sustainable reverse innovations* • *Sustainable reverse innovations are more likely to originate from entrepreneurs whose background is highly embedded into emerging markets* • *The partial lack of traditional infrastructure in the Global South offers opportunities for the development and testing of innovations that address unsustainable infrastructure in the Global North* • *Innovations developed in response to local needs/challenges in the Global South have the potential to address SDGs in the Global North.*
Enablers	• *The organisational structure of a company will affect their business model across developing and advanced countries* • *Coordination mechanisms between public and private actors have a positive impact on the identification and implementation of sustainable reverse innovation* • *Private funders have an impact on the likelihood of sustainable sustainable innovations.*
Consequences	• *Sustainable reverse innovations can provide a global competitive advantage to companies from both the Global North and the Global South*

Table 1 Summary of reverse innovation & sustainable development propositions based on the antecedents-enablers-consequences scheme.