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The scaling of game-changer business models to address societal grand challenges

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Abstract

Purpose – This viewpoint paper aims to identify and illustrate the underlying logics of game-changer business models and situate them within the broader academic discourse on sustainable business model innovation and international business. This paper also examines the factors that influence the potential and actual scaling of these models.

Design/methodology/approach – This paper examines 17 cases identified as game-changers from the existing literature, the World Investment Forum's Game Changers Summit and by scanning the outcomes of high-profile business competitions. These organizations aim to develop innovative solutions to address issues such as food security, climate change, plastic pollution, waste management, water security, sanitation, economic growth and the energy crisis.

Findings – The authors identify six recurring patterns or "logics" that characterize these game-changers: place-based solutions scalable through global relevance; leveraging the opportunities provided by advanced technologies; a "land-to-lab" approach for innovation; multi-stakeholder collaboration; the ability to tap into multiple funding sources; and a blend of vision, science and management capabilities.

Originality/value – The authors highlight how the meaning attached to particular terms, such as game-changers, can evolve over time. The findings and the subsequent theorizing outline how the concept of game-changers overlaps and differs from other concepts such as sustainable business models, blue ocean and disruptive innovators. By deriving observable logics from these cases, the authors provide a frame of reference

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to facilitate the comparison of findings across time and space regardless of how these business models are labeled.

Keywords Game-changer business models, Sustainable business model innovation, Grand societal challenges, Impact-driven scaling, Born-global firms, Inclusive innovation

Paper type Viewpoint

1. Introduction

This viewpoint paper identifies the underlying logics of game-changer business models and situates them within the academic discourse on sustainable business model innovation and international business. The term "game-changer" has gained visibility through international initiatives and platforms that emphasize business-led innovation for sustainable development. Since 2018, the Global Investment Game Changers Summit has provided a platform for participants to engage with "trailblazers, visionaries and leaders who are disrupting traditional paradigms, reshaping business practices and redefining industry norms in their respective fields, all while advancing sustainable development" (World Investment Forum, 2023). The term "game-changers" describes businesses addressing grand challenges through scalable, disruptive innovation by leveraging technological advances (Subramanian *et al.*, 2023).

A decade earlier, very similar ideas were captured by the concept of "breakthrough innovation and breakthrough business models" (Volans, 2013). Despite the difference in labels, there is a consistent focus on the role of science, technology, paradigm shifts and inclusiveness to find solutions that can benefit the exponentially growing number of affected people. While unconditionally relying on technology to solve humanity's problems can result in unintended negative consequences, technological innovation, when supported by appropriate policy interventions, is widely recognized as a critical lever for achieving sustainable solutions (Higgins, 2015). This is reflected in technology representing a cross-cutting theme in implementing the Sustainable Development Goals (SDGs). Whereas the idea of disruptive innovation driven by novel technologies is not new (cf. Jones *et al.*, 2025; van Tulder and van Mil, 2023; Zahra, 2024), their application to enable sustainable development is comparatively recent in business and management studies.

George *et al.* (2016: 1881) define grand challenges as "specific critical barrier(s) that, if removed, would help solve an important societal problem with a high likelihood of global impact through widespread implementation." They view the SDGs as the most widely adopted collection of grand challenges. Underlying issues include, for example, food insecurity, extreme poverty, unemployment, climate change, gender inequality, war and biodiversity loss on land and underwater. Van Tulder and van Mil (2023) propose a more elaborate way of thinking about the challenges captured by the SDGs. They use the lens of wicked problem theory and offer a structured approach to differentiate between complicated or complex problems and wicked problems.

Not all SDGs will have the same level of wickedness, and, given their interconnectedness, interventions need to consider nexus challenges and focus on reducing negative trade-offs and creating positive synergies (van Tulder and van Mil, 2023). A conceptual and analytical discussion of grand challenges and wicked problems is beyond the scope of this paper. Here, we focus on the basic tenet that the underlying issues transcend borders, are interdependent and complex and require a collaborative effort to be addressed. While we acknowledge that wicked problems resist permanent solutions as they do not have a stopping rule (van Tulder and van Mil, 2023), our aim is to highlight commonalities in bottom-up approaches to addressing these challenges (Sinkovics *et al.*, 2015). Although game-changers initially target

local constituents, their solutions are scalable and have the potential to have a global impact and effectuate wider systemic change (Ambos and Tatarinov, 2023; Iheanachor *et al.*, 2021; Ritala, 2024; Sinkovics *et al.*, 2014).

International business (IB) scholars increasingly recognize the importance of businesses in developing solutions to address grand challenges, yet the predominant focus is still on established multinational enterprises (cf. Buckley *et al.*, 2017; Dörrenbächer *et al.*, 2024; Sinkovics *et al.*, 2021a, 2021b, 2021c). There is less attention accorded to what facilitates or constrains the global scaling of emerging, potentially game-changing, business models (cf. Busch and Barkema, 2021; Reuber *et al.*, 2021; Shepherd and Patzelt, 2022; Tatarinov *et al.*, 2023), how advanced technologies are used in this process and what their sustainability implications are within the wider ecosystem (Audretsch *et al.*, 2024; Ciulli and Kolk, 2023; Nambisan *et al.*, 2019; Tippmann *et al.*, 2023). Further, the role of industry- and location-specific factors is not always sufficiently taken into consideration (Ciulli and Kolk, 2023; Ocelík *et al.*, 2023; Reuber *et al.*, 2021).

In what follows, we build on scholarship regarding business model mapping to examine how game-changer firms respond to grand challenges. While this paper is conceptual in nature, it draws on structured insights from 17 illustrative cases of game-changer business models. Using a flexible pattern-matching approach (Sinkovics, 2018), we identify six recurrent conceptual logics. These are not empirical findings in the conventional sense, but theory-informed reflections distilled through case-based reasoning to support conceptual development.

2. Business models, innovation and the shift toward sustainability considerations

The idea of business models as a framework to map the logic of how an organization creates value has been present in the literature for over six decades (Wirtz *et al.*, 2016). There have been debates about the number of components that should be used in business model analysis, whether business models are static or dynamic and whether the focus should be on economic value creation or be extended to social and environmental aspects as well (cf. Demil and Lecocq, 2010; Joyce and Paquin, 2016; Shafer *et al.*, 2005; Sinkovics *et al.*, 2015).

Generally, business model components can be categorized into value proposition, value creation, value delivery, value capture (Osterwalder and Pigneur, 2010; Teece, 2010) and, more recently, value intention (Barth *et al.*, 2017). To capture the dynamism of business models over time, Sinkovics *et al.* (2014) introduced two additional components: change in offering and change in strategy. They argue that this is necessary to map responses to opportunities or constraints in the firm's environment. Changes in the offering and strategy frequently necessitate an adaptation or redesign in one or several business model components (Afuah, 2004; Linder and Cantrell, 2000).

However, to qualify as business model innovation, a change is required to fulfill several criteria. It needs to occur in one or more components of the business model, and it must be substantial and novel to the firm or to the industry or both (Foss and Saebi, 2018). Sustainable business model innovation extends the concept of general business model innovation to capture how sustainability aspects are meaningfully integrated into business model design and implementation (Shakeel *et al.*, 2020).

Sinkovics *et al.* (2021a, 2021b, 2021c) bring together different manifestations of sustainable business models and sustainable business model innovation into an integrative framework. Base of the pyramid business models target the alleviation of poverty in vulnerable communities (Prahalad, 2012). Although the idea originates in developing economies and some of these business models are mainly scalable in similar institutional

contexts, others can also be implemented in developed economies. Circular business models focus on waste and emissions reduction through slow, closed and narrow resource loops. Their value creation rests on the use of reusable, renewable and/or recyclable production inputs and the extension of the life span of outputs (Geissdoerfer *et al.*, 2018). Lean and green business models have both a waste reduction element and a continuous quality and efficiency improvement element (cf. Caldera *et al.*, 2019).

Sustainable business model innovation can also manifest through a product–service system. A product–service system can take the form of product-oriented (additional service components), use-oriented (ownership of product remains with provider) or results-oriented business models (emphasis on results rather than product) (Tukker, 2004). Sharing economy business models build on the idea of collaborative consumption and production. Users are granted temporary access to an underused product through a sharing platform (Curtis and Mont, 2020). Social business models generally prioritize social value creation over economic value creation (Wilson and Post, 2011). Finally, integrative business models balance all three dimensions of sustainability (Lüdeke-Freund *et al.*, 2018).

In the world of consulting, the term game-changer, in conjunction with the term business model, has been used in the sense of disrupting competition (Lindgardt *et al.*, 2009). Similarly, the idea behind a blue ocean strategy is to create an "uncontested market space that ma[kes] competition irrelevant" (Kim and Mauborgne, 2014: 4). Historically, the value intention behind these business model innovations was the creation of economic value for the company (Kim and Mauborgne, 2005). Social and environmental value creation, if achieved, was a byproduct.

Although the world is not on target to achieve the SDGs by 2030, their introduction in 2015 created a paradigm shift in business and management research, making the focus on sustainability issues more desirable than in the decades before (Jones *et al.*, 2025). While this process of mainstreaming sustainability in business and management is not yet complete, the increasing pressure from stakeholders, including policymakers and legislators (e.g. European Union, 2024), created the need to rethink existing theories, frameworks and approaches (e.g. Buckley, Doh, and Benischke, 2017; Hofstetter *et al.*, 2021; Sinkovics *et al.*, 2022).

As a consequence of this shift toward sustainability considerations, the term game-changer business model takes on a different meaning by directing its innovation component at addressing social and/or environmental aspects of sustainability without compromising economic sustainability. In other words, their value creation, delivery and capture mechanisms aim to integrate the three pillars of sustainability.

In the remainder of this paper, we compare and contrast theoretical patterns from the integrative framework developed by Sinkovics *et al.* (2021a, 2021b, 2021c), as shown in Figure 1, with observations from illustrative cases to identify the conceptual logics that characterize game-changer business models.

3. Illustrative case selection

To inform our conceptual analysis, we selected illustrative cases from academic publications, participants in the World Investment Forum's Game-Changers Summit (2023), and high-profile business competitions. Our focus was on organizations addressing grand societal challenges, such as food security, climate resilience in agriculture, plastic pollution, water and sanitation, decent work and energy transition. In line with prior conceptualizations for game-changers (e.g. Sinkovics *et al.*, 2023; Subramanian *et al.*, 2023; Volans, 2016; Volans, 2013; World Investment Forum, 2018; World Investment Forum, 2023), we applied three key criteria in case selection: first, the extent to which the firm's core innovation addresses a grand societal challenge rather than delivering incremental improvements; second, the use of

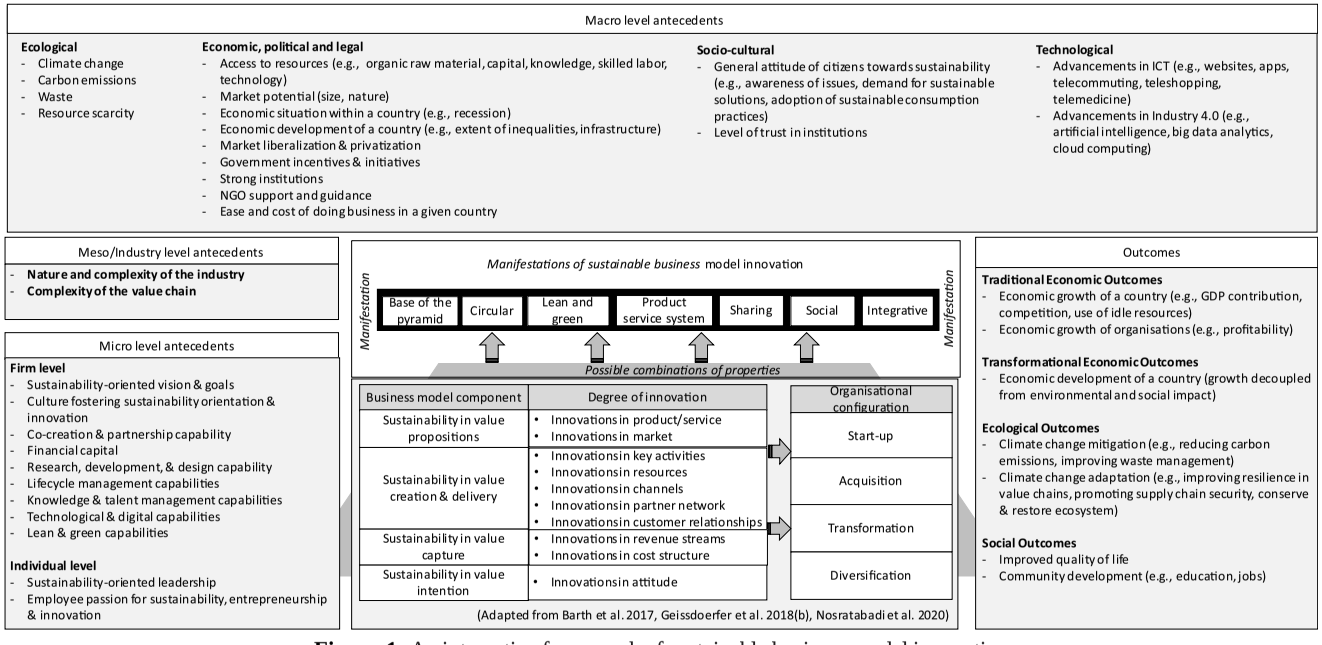

Figure 1. An integrative framework of sustainable business model innovation
Source: Sinkovics *et al.* (2021: 4)

advanced technologies to enable systemic impact; and third, demonstrated evidence or potential of scalability across markets and contexts. To capture heterogeneity and explore the role of location-specific factors, we purposively chose organizations from developed, emerging and developing countries (cf. Eisenhardt and Graebner, 2007). To inform both case selection and our subsequent analysis, we consulted a wide range of secondary sources – including company websites, media reports, industry analyses, social media and podcasts.

Sustainable business model innovation can be implemented through different organizational configurations. These include the creation of a start-up, the transformation of an existing business model, diversification through a parallel model, or acquisition and integration of a new model (Geissdoerfer *et al.*, 2018; Sinkovics *et al.*, 2021a, 2021b, 2021c). While mature firms can transform or diversify their business models, we propose that game-changers are more likely to be launched as start-ups because they are not bound by legacy structures and resistance to change.

Table 1 provides an overview of our illustrative cases. While most are early-stage or transitioning ventures (e.g. NatureDots, Summit Nano, Piclo, PlasticBank), we also include established firms that were once disruptors and have maintained long-term viability (e.g. Grameen Bank, Grameen Foundation, Jacobs Farm del Cabo). The sample spans a range of organizational trajectories; some are diversifying (e.g. SOLshare, Log9), some have been acquired or merged (e.g. iHub), while others have restructured to focus more narrowly on innovation (e.g. RedSea Farms, now iyris). This diversity allowed us to examine how value intentions, founder expertise and organizational agility contribute to ideation, experimentation and scaling, particularly through advanced technologies (Zahra, 2024).

Our approach draws on a flexible pattern-matching logic (Bouncken *et al.*, 2021; Sinkovics, 2018), in which we compared illustrative case insights with conceptual patterns derived from prior sustainable business model scholarship (for a detailed summary of the cases, see Gunaratne, Sinkovics, and Sinkovics, 2025). This process enabled us to identify six conceptual logics (see Table 2 for a summary) that distinguish game-changer business models from other forms of sustainable or disruptive business models (cf. Zahra, 2024). In doing so, we also reflected on how home- and host-market contexts shape the emergence, replication and scaling strategies of these organizations.

4. Conceptual logics underpinning game-changer business models

4.1 Place-based solutions scalable through global relevance

Game-changer business models are designed to address the localized impacts of grand challenges. They have a deep understanding of how these challenges affect local communities, leading to the identification of unmet needs and the development of solutions tailored to underserved markets. This focus on contextual needs leads to solutions that are inherently scalable because they are built on shared human and environmental concerns that transcend borders.

Across our cases, this place-based focus shapes value intentions in different ways, forming a spectrum of intentionality. At one end, some firms appear to prioritize social and environmental impact from the outset, trusting that economic value will follow because of the relevance of the value proposition to a sizable market. At the other end, some firms adopt an integrated approach, where social, environmental and economic considerations are tightly interwoven from inception. For instance, NatureDots targets the climate resilience of Indian fish farmers by integrating DeepTech with nature-based systems. One founder reflects:

> I love whales, dolphins, and everything water! I have spent the majority of my life on the banks of either a lake, river, coastline, or even a small stream in a forest […] While working across different freshwater ecosystems in seven landscapes over the last three years […] I observed that the fish

Table 1. Profile of the selected cases

Name	Country	International markets or operating regions	Grand challenge addressed	Description
NatureDots	India	Primarily operates in India, with pilot projects in the Washington State, USA	Food security and climate resilience	It focuses on enhancing climate change resilience among fish farmers, promoting food security by tackling nutrient deficiencies and supporting the livelihoods of direct and indirect stakeholders involved in fish farming (NatureDots, 2024)
PlantVillage	USA	Primarily operates in Africa and focuses on countries such as Kenya and Tanzania. The organization has also conducted projects in Southeast Asia and Latin America	Food security and climate resilience	Operates as a research and development unit of Penn State University, dedicated to enhancing food security and addressing the risks posed by climate change. In addition, they focus on improving smallholder farmers' understanding of crop health, plant diseases, pests and climate-related challenges. PlantVillage+ is a spinoff that aims to measure and verify carbon sequestration to tackle climate change (PlantVillage, 2024)
RedSea Farms	Kingdom of Saudi Arabia	Globally scaled across seven countries spanning the Middle East, Southern Europe and Mexico	Food security and climate resilience	RedSea Farms was founded in 2018 to "help feed the world sustainably" by addressing food insecurity and combating impacts of climate change, especially desertification, through the development of AgriTech solutions tailored for hot and harsh climates. In December 2023, it was rebranded under iyris and SecondSky after being acquired by Pure Harvest Smart Farms (iyris, 2024; Pure Harvest, 2023)
Jacobs Farm del Cabo	USA	Exports its products to the USA and Canada. The production occurs mainly in Northern California and Mexico	Food security and climate resilience	Operates as a farming collective focused on addressing food security challenges and mitigating the impacts of climate change on agriculture. By promoting soil health and enhancing farmers' resilience to climate-related

(*continued*)

Table 1. Continued

Name	Country	International markets or operating regions	Grand challenge addressed	Description
				stresses, they aim to create a sustainable agricultural framework. In 2020, they launched ClimateLab™ as part of this mission (Jacobs Farm del Carbo, 2024)
Plastic Bank	Canada	Operates in several countries, including the Philippines, Indonesia, Thailand, Brazil and Egypt	Plastic pollution and waste management	Functions as a social fintech with a global bottle deposit program designed to combat poverty and reduce plastic pollution. The initiative encourages plastic collection by using it as currency, referred to as Social Plastic® (Plastic Bank, 2024)
Waste2Wear	The Netherlands	Operates in The Netherlands, UAE, China, India, Vietnam and the USA	Plastic pollution and waste management	Aims to address the plastic waste crisis by converting discarded plastics into textile products that consumers can verify for authenticity and sustainability (Waste2Wear, 2024)
Let's Recycle	India	Operates across various regions in India	Plastic pollution and waste management	They aim to address the critical waste management issues arising from increasing landfill usage linked to urban waste growth (Let's Recycle, 2024)
GARV Toilets	India	Internationalized to Bhutan, Ghana and Nigeria	Water security and sanitization	Focuses to address sanitary issues related to open defecation and the lack of access to basic toilet facilities by tackling water, sanitation and hygiene needs of underserved communities (GARV Toilets, 2024)
Sarvajal Foundation	India	Operates across various regions in India	Water security and sanitization	To address water security challenges by providing innovative and affordable solutions for safe drinking water (Piramal Sarvajal, 2024)
Grameen Bank	Bangladesh	This model has been globally scaled and replicated across over 100 countries	Decent work and economic growth	Aim to alleviate poverty through self-sustaining economic growth. The founder received the

(*continued*)

Table 1. Continued

Name	Country	International markets or operating regions	Grand challenge addressed	Description
				Noble Prize recognizing the business model (Grameen Bank, 2024)
Grameen Foundation	USA	Globally scaled their operations in Africa, the Americas, Asia and the Middle East	Decent work and economic growth	Grameen Foundation, inspired by the business model of Grameen Bank, focuses on leveraging innovation and technology to empower marginalized populations, especially women. They aim to enhance resilience and financial security, increase incomes and overall well-being and create pathways for successful entrepreneurial ventures (Grameen Foundation, 2024)
Wennovation Hub	Nigeria	Operates in Nigeria and has created an impact across Africa	Decent work and economic growth	It is among the pioneering private sector initiatives aimed at addressing youth unemployment and enhancing entrepreneurial opportunities in the African region (Wennovation Hub, 2022)
iHUB	Kenya	Operates in Kenya and inspired the establishment of technological hubs across Africa	Decent work and economic growth	This incubator focuses on empowering East African digital entrepreneurs and startups, particularly mobile technology and ICT innovations (iHUB, 2024)
SOLshare	Bangladesh	Pilot projects in India and plans to expand in South Asia and the Sub-Saharan region	Energy crisis	The organization aims to end energy poverty by empowering vulnerable communities to access energy using peer-to-peer energy-sharing grids. They have installed the world's first solar peer-to-peer energy-sharing grid (SOLshare, 2024)
Log9	India	Manufacturing operations in India and exports worldwide	Energy crisis	Aims to address the energy crisis by transforming energy production, distribution and storage through technological innovations. Their objectives include enhancing India's carbon

(*continued*)

Table 1. Continued

Name	Country	International markets or operating regions	Grand challenge addressed	Description
				neutrality and energy independence while leading the clean energy revolution. Further, they plan to rapidly scale operations in tropical countries by developing batteries designed to endure harsh environmental conditions (Log9, 2024)
Summit Nano	Canada	Operations in Chillie, and plan to expand in South America	Energy crisis	To minimize the environmental impact on water, air and land caused by traditional lithium production methods, and oil and gas industries. They extract high-purity lithium from natural resources faster and sustainably to support the growing global demand for electric vehicles (Summit Nanotech, 2018)
Piclo	United Kingdom	Italy, Ireland, Lithuania, Portugal, the USA and Australia	Energy crisis	Aims to tackle the energy crisis by decarbonizing the energy grid through developing software solutions that make the energy sector more decentralized and sustainable. Furthermore, they aim to provide peer-to-peer trading services and connect the ecosystem partners, including energy suppliers, grid operators and energy consumers through digital platforms (Piclo, 2023)

Source(s): Authors' own compilation based on data from company websites (see References)

Table 2. Summary table of conceptual logics underpinning game-changer business models

Logic	Logic summary	Selected examples
Place-based solutions scalable through global relevance	Solutions grounded in local realities but designed with adaptability for global relevance	RedSea Farms (hot-climate agriculture); PlantVillage (AI-driven pest control); NatureDots (aquaculture platform tailored to river systems); GARV Toilets (open defecation and sanitization issues); Grameen Bank (microfinance needs); Piclo (energy transitions)
Leveraging advanced manufacturing and digital technologies to support scaling	Use of digital and manufacturing technologies to enable scalability, transparency and affordability	Sarvajal Foundation (IoT water ATMs); PlantVillage (AI diagnostics); Plastic Bank (blockchain for traceability)
Embedding user co-creation through "land-to-lab" design	Iterative, user-centered innovation shaped by deep community engagement and field testing	ClimateLab by Jacobs Farm del Cabo (co-created climate resilience); Nuru App by PlantVillage (farmer-driven content); RedSea Farms (field-based piloting)
Building cross-sectoral solution networks through multi-stakeholder partnerships	Collaboration across sectors to Pool complementary resources, knowledge and legitimacy	iHUB (government, tech companies, NGOs); Waste2Wear (apparel and blockchain partners); Plastic Bank (NGO and corporate alliances)
Securing multiple funding sources across different stages of growth	Funding transitions from seed capital to diversified, impact-driven sources aligned with growth stages	GARV Toilets (PPP and donor contracts); Piclo (Series A funding); Summit Nano (impact investment); Let's Recycle (infrastructure and operations sharing)
Fusing vision, science and management capabilities	Leadership combines scientific knowledge, values-driven vision and agile management structures	Founders of NatureDots, PlantVillage, Summit Nano led by researchers; Waste2Wear recruits global experts; Plastic Bank built on values of equity and regeneration

Source(s): Authors' own work

> farmers suffer huge losses at the tune of USD 16000/ha/year due to the fluctuating water quality, resorting to unsustainable practices to control pollution and to achieve high growth […] This challenged us to rethink the way existing fisheries and freshwater resources are being managed; how might we mitigate the risks of fish farmers and establish sustainable freshwater fisheries? (Snehal Verma, 2022).

Addressing these local needs, NatureDots designed a comprehensive value proposition that spans fish health, water quality, weather tracking, financial assistance and market access. They generate revenue by offering services that improve the livelihood of those involved in fish farming, but the technology also has some alternative uses that extend the client base to, for example, utilities and restoration managers (NatureDots, 2024). Similarly, GARV Toilets, established to address the lack of sanitary facilities in India, has successfully conducted pilot projects in Bhutan, Nigeria and Ghana (Goyal *et al.*, 2020). Since 2015, they have rapidly scaled in 4 countries, managing over 318 locations and addressing the needs of over 200,000 users (GARV Toilets, 2024). Although the business model was triggered by a local infrastructure challenge, it is related to a global SDG concern, access to safe sanitation,

illustrating the scalability of contextually rooted innovations. Another prominent example is Grameen Bank. Even though initially it was a national microfinance initiative, the business model has been successfully replicated in more than 100 countries worldwide (Kayongo and Mathiassen, 2023).

By contrast, other organizations exhibit a deeply integrated logic, where social, environmental and economic goals are tightly intertwined from the beginning, a pattern especially visible among firms addressing energy transitions. For example, Piclo's founders anticipated the transition from centralized fossil-based systems to decentralized and decarbonized energy networks in the UK, prompting them to develop a marketplace for energy flexibility (Piclo, 2023). Together, these cases indicate that value intentionality exists along a spectrum: from impact-first firms to those blending social, environmental and economic motives. Nevertheless, what unites these game-changers is that their innovations are deliberately designed to address social and/or environmental challenges, rather than treating such issues as incidental outcomes, as is often the case with conventional disruptive innovators (Zahra, 2024).

These variations in value intentions are shaped by home-market conditions, which influence the resources and opportunities that firms can draw on, as well as by the constraints they encounter in scaling. In the Global North, game-changers benefit from favorable institutions, such as supportive regulation, digital infrastructure, funding ecosystems and value-driven, socially and environmentally conscious consumer segments (Anwar, 2022). For instance, Piclo and Summit Nanotech leverage public investment in grid decarbonization and clean tech, enabling rapid business model scaling (Piclo, 2023; Summit Nanotech, 2018). These outcomes are further enabled by the presence of entrepreneurial incubators, research and training institutions, multiple sources of funding, intellectual property rights and patent systems that positively influence replication and scaling (Thomas and Samuel, 2023).

In contrast, game-changers in emerging or developing contexts rise in response to institutional voids and resource scarcity. SOLshare in Bangladesh built an off-grid energy-sharing platform to address the lack of conventional infrastructure (SOLshare, 2024). In such settings, firms must work around literacy constraints, governance gaps and resource scarcity, factors that both motivate and hinder innovation (Lashitew *et al.*, 2022; Sinkovics *et al.*, 2016; Sinkovics *et al.*, 2014).

Scaling across borders, however, also depends on the institutional distance between home and host markets. Piclo, for example, expanded into Italy and the USA, representing contexts with similar energy transition goals. In contrast, Grameen America had to significantly adapt to the regulatory and financial context of the USA, despite retaining its core principle of women's empowerment. However, Grameen Bank's expansion into China failed because of legal restrictions and local mistrust. This example demonstrates the friction that can emerge when host-market institutions clash with the assumptions embedded in the originating business model. Game-changers often scale nationally before exploring international replication, as seen with Grameen Bank, which remained a pilot project in Bangladesh until it became an independent bank in 1983. Its global replication began to unfold in the late 1980s and early 1990s as the model matured (Hulme, 1991).

Logic summary: By anchoring in the localized needs created by grand challenges, game-changer business models build solutions that are scalable and adaptable. However, the conditions under which they scale, whether into similar or institutionally distant contexts, depend on how well their models can accommodate or adapt to varying institutional logics.

4.2 Leveraging advanced manufacturing and digital technologies to support scaling

To create breakthrough innovations, game-changers build on advanced manufacturing and digital technologies, including artificial intelligence, machine learning, data analytics, cloud computing, nanotechnology, blockchain, the Internet of Things and enterprise resource planning systems (cf. Ahi *et al.*, 2022). The rapid proliferation of mobile technologies, particularly in developing countries, has facilitated the replication and global scaling of these models (Kayongo and Mathiassen, 2023). By 2024, over 5.61 billion people had mobile phone subscriptions, and 5.4 billion were internet users (DataReportal, 2024; UN, 2024).

In our illustrative cases, the opportunities provided by technological innovations include their ability to improve awareness, availability, accessibility and affordability among beneficiaries, as well as increase revenue streams and reduce operational costs. For example, the Sarvajal Foundation uses solar technology, cleaner production methods, cloud computing, enterprise resource planning technologies, mobile technologies and the Internet of Things to offer affordable and accessible water solutions while also monitoring the use of their water ATMs to minimize operational costs.

The modularity and generative features of these technologies have been instrumental in creating and delivering their value propositions and capturing value (Nambisan *et al.*, 2019; Tatarinov *et al.*, 2023). Modularity in digital technologies allows for replication of various functionalities with minimal reprogramming of the core product (Tatarinov *et al.*, 2023). NatureDots' digital platform provides customized alerts and advice to fish farmers in thirteen languages. The generative features of these technologies allow for spontaneous changes, data transformation and reuse, supporting co-creation with stakeholders and end-users. PlantVillage's Nuru app is powered by artificial intelligence. It empowers farmers to devise innovative ways to use the tool for crop diagnostics and yield improvement. By encouraging farmers to take photos and share crop information, the app helps develop tailored solutions to agricultural challenges.

Tracking technologies, such as blockchain, the Internet of Things and satellite-based global positioning systems, have strengthened operational transparency and accountability, improved the fair distribution of benefits and promoted social justice. For example, Plastic Bank uses digital wallets built on blockchain technology to guarantee fair payments and secure transactions for plastic collectors. This system not only protects the funds of vulnerable waste collectors from theft, but it also facilitates the financial inclusion of individuals with limited access to banking facilities (Gong *et al.*, 2022). The data collected through these technologies enables organizations to assess the magnitude of the issues they address and to evaluate their impact on mitigating them. This information can be shared with various stakeholders, including government and regulatory bodies, universities, research organizations, NGOs and customers, facilitating the development of targeted solutions through collaborative efforts. For instance, Grameen Foundation shares mobile app data with the Ghanaian government to inform agricultural policy (Kayongo and Mathiassen, 2023).

Logic summary: Game-changers use advanced technologies to enhance accessibility, transparency and co-creation. Their modular and generative features support rapid replication, impact tracking and scalable solutions.

4.3 Embedding user co-creation through "land-to-lab" design

As game-changers address location-specific challenges, they often adopt a "land-to-lab approach" (James, 2018). This participatory method integrates the indigenous knowledge of end users throughout ideation, pilot project creation, experimentation, prototype development and scaling of their business models (Ferraro *et al.*, 2015). For example, in developing their ClimateLab™ initiative, designed to enhance farmers' climate resilience,

Jacobs Farm del Cabo collaborates closely with indigenous farmers to draw on their topographical knowledge and incorporate a bottom-up approach to innovation (Jacobs Farm del Carbo, 2024). They also recruited local student trainees, either agriculture students or second-generation farming community members, who brought a grounded understanding of local realities. These inputs became vital components in developing their mobile-based alert system. Therefore, the land-to-lab approach enables the integration of humans with technological intelligence in designing the value proposition.

Field agents (or extension officers) are important in bridging information gaps and creating learning loops between end users and internal research and development teams (DiBella, 2019). They provide on-the-ground support for technological adaptation, disseminate best practices and build capacity among end users. In addition, they contribute to value capture by extending revenue streams to the grassroots. For example, in scaling their peer-to-peer energy-sharing business model in Bangladesh, SOLshare enlisted local community members as field engineers to expand their model and promote energy independence and autonomy in rural communities (SOLshare, 2024).

Logic summary: Game-changers embed user co-creation through a land-to-lab approach that leverages local knowledge and participatory design. By integrating end-user insights from the outset and sustaining engagement through field agents, they develop context-responsive solutions that enhance scalability, legitimacy and impact across different geographies. Specifically, this approach helps mitigate liabilities of newness and foreignness in new locations.

4.4 Building cross-sectoral solution networks through multi-stakeholder partnerships

The grand challenges that game-changers address are complex and multifaceted, requiring multiple solutions co-created through multi-stakeholder partnerships. Within these partnerships, stakeholders operate independently but collaborate to achieve shared goals, co-evolving as they develop integrated responses (Roulet and Bothello, 2022). Stakeholders typically include governments, local governance bodies, academics, researchers and experts, impact funders, international donor agencies, NGOs, incubators and technology partners. For example, in establishing iHUB, Kenya's tech community collaborated with the government, leading tech companies, impact funders and NGOs.

These stakeholders play different roles, such as orchestrators who drive scaling; complementors who contribute resources and services for solution implementation; and integrators who bring access to local expertise (Tatarinov *et al.*, 2023). In the case of Waste2Wear, textile manufacturers and leading apparel retailers have acted as orchestrators, advancing the recycling of PET materials and promoting the use of recycled plastic to ensure environmental sustainability in the apparel industry. Technology vendors and impact funders, who supported the creation of the WE-Co. blockchain platform, serve as vital complementors, providing the technological backbone, stakeholder access to trace product journeys and the necessary funding to scale operations. Governments, local regulatory officials, research and training institutions, NGOs, fishermen and plastic collectors act as integrators, linking local actors within Waste2Wear's network (Waste2Wear, 2024). Through these multifaceted stakeholder partnerships, a transparent and efficient global recycling network emerges, contributing to efforts against plastic pollution (Gong *et al.*, 2022).

*Logic summary: These partnerships enhance game-changers' entrainment capabilities and their ability to internalize and respond to some of the impact of grand challenges by mobilizing resources and building adaptive capacity (*DiBella, 2019*). Being embedded in these collaborations fosters trust and mutual reciprocity, which are essential for sustaining*

momentum and legitimacy. Such partnerships also help mitigate the liabilities of outsidership and foreignness during the scaling-up process.

4.5 Securing multiple funding sources across different stages of growth

Game-changers can attract funding from different sources as they scale their operations. In the initial stages of ideation and pilot implementation, founders often rely on their investments and contributions from their immediate networks. If the founders are associated with research and training institutions, they may also receive grants and institutional funding as seed capital. This has been the case for spin-offs such as PlantVillage, RedSea Farms, SOLshare and Log9, which originated from university research projects.

Prize competitions have also become key sources of early-stage funding. Specifically, competitions such as XPRIZE (won by PlantVillage) and UpLink (won by NatureDots) are designed to recognize game-changers that demonstrate the ability to develop breakthrough solutions capable of addressing grand challenges. For instance, XPRIZE highlights, "Our mission is to inspire and empower humanity to achieve breakthroughs that accelerate an abundant and equitable future for all […]. Our prize model reflects a commitment to evidence-based practices, scientific rigor, and validation, leveraging a global network of experts to support it" (XPRIZE Foundation, 2025). Beyond funding, these competitions have facilitated connections with impact funders, venture philanthropists and other potential partners. They have offered access to incubators, technical and laboratory support, knowledge sharing and expansive networks.

As game-changers grow, they engage a broader set of stakeholders, including impact investors, donors, governments, customers, NGOs, banks and financial institutions. In this phase, they may access non-dilutive capital or rounds of impact funding, such as Series A, B, or C investments, as well as donations in various forms, including cash, matching gifts, endowments and infrastructure contributions. For example, GARV Toilets secured long-term service contracts with local governments for Integrated Smart Sanitation Centers, obtained seed investments, grants and mentorship from impact investors and received international grants, such as those from the VIA Water accelerator program funded by the Dutch government for a pilot project in Ghana (GARV Toilets, 2024). Similarly, Piclo raised angel investment, Series A venture capital and other sources of funds to support their rapid scaling efforts (Piclo, 2023). Some organizations can attract substantial impact funding as they grow, reaching unicorn status with valuations exceeding $1bn while remaining privately held. Summit Nano is an early-stage company that has achieved unicorn status, demonstrating the potential for significant growth and impact (Summit Nanotech, 2018). In developing countries, public-private partnerships play a crucial role in funding mechanisms. One example is Let's Recycle, whose founders collaborated with local governments in India to expand their programs. The government provides essential infrastructure to reduce urban pollution and landfill use, while Let's Recycle manages the operations, benefiting both parties (Goyal *et al.*, 2020).

As they generate revenue, they reinvest profits into their ventures. Their revenue models include pay-per-use, advertising-based income, subscriptions, licensing, freemium offerings, markups and commissions. For instance, GARV Toilets diversifies its revenue through water ATMs, sales of sanitary products, subscriptions and advertising fees, in addition to its pay-per-use sanitary center services. Similarly, organizations such as PlasticBank, Waste2Wear, Wennovation Hub, iHUB and Sarvajal Foundation sustain and grow their revenue streams through membership subscriptions from individual investors, corporations and customized plans. These robust internal financial sources improve autonomy, enabling strategic investment in organic growth and speeding up the scaling of business models.

As they expand or reach the end stage of their start-up phase, game-changers follow different trajectories. They may remain privately held while focusing on differentiating and diversifying their operations to address other grand challenges. Grameen Bank is a notable example. Initially, it aimed to ease poverty through microfinance but later diversified into Grameenphone, Grameen Fisheries Foundation and Grameen Shakthi (Hackett, 2016; Ringvold *et al.*, 2022). They can also inspire the establishment of other game-changers. For instance, Grameen Bank inspired and provided seed funding for the Grameen Foundation (Grameen Foundation, 2024). Alternatively, they may be acquired by or merged with another company. For example, RedSea Farms' controlled-environment agriculture production facility was acquired by Pure Harvest Smart Farms, enabling them to focus exclusively on agricultural technology solutions (Pure Harvest, 2023). In 2019, iHUB became part of a wider collective of Co-Creation Hub Africa, a group of companies that contribute to stimulating innovation and the application of technology across Africa for social impact across diverse sectors (iHUB, 2024).

Logic summary: Game-changers draw on a mix of competitive grants, institutional funding, partnerships and diversified revenue models to finance their growth. These funding pathways not only support scaling but also shape how game-changers evolve, diversify and embed impact across geographies.

4.6 Fusing vision, science and management capabilities

Game-changers demonstrate dynamic capabilities driven by a blend of scientific and management capabilities paired with intrinsic motivation to make a difference. Across all cases, founders and co-founders possessed specialized knowledge, whether as academic researchers, industry experts or through a deep understanding of ground-level realities. Their passion to address grand challenges was driven by their research interests.

For example, the leaders of NatureDots, GARV Toilets, PlantVillage, RedSea Farms and Summit Nano leveraged their research and field expertise to create their value proposition. Simultaneously, their goals were also influenced by qualities such as empathy, moral discernment, compassion and a sense of responsibility for addressing the local impact of grand challenges. The founder of Plastic Bank envisions a future in which recycled plastic serves as a driver for positive change in combating pollution and poverty (Plastic Bank, 2024).

Therefore, an organizational culture built on continuous innovation, risk-taking, fairness, co-creation, long-term orientation and stakeholder engagement is a core characteristic of game-changer business models. These values encourage deep reflection among team members to minimize negative societal and environmental impacts (Lashitew *et al.*, 2022). A lean organizational structure enables the rapid integration of learning through continuous experimentation, enhances agility and adaptability, decentralizes decision-making and accelerates time-to-impact.

To generate new ideas, obtain patents and successfully commercialize innovations, game-changers depend on internal research and development teams consisting of scientists, researchers, engineers, data analysts, project management experts and impact funding specialists. They recruit talent from around the globe, fostering diversity and multivocality in their search for solutions (Ferraro *et al.*, 2015). This fusion of vision, science and management capabilities represents one of the most distinctive logics of game-changer business models, setting them apart from conventional disruptors.

Logic summary: Game-changer firms rely on the unique vision, scientific grounding and management capabilities of their leaders and teams. Values-led leadership shapes a culture

of innovation and experimentation, while boundary-spanning and R&D capabilities enable global reach and responsiveness.

5. Concluding reflections and future directions

The purpose of this viewpoint paper was to identify the underlying logics of game-changer business models and situate them within the broader academic discourse. Drawing on the integrative framework of sustainable business model innovation (Sinkovics *et al.*, 2021a, 2021b, 2021c), we examined how game-changers overlap with or differ from other manifestations of sustainable business models. Game-changers can take on characteristics of previously documented categories of sustainable business models, including base-of-the-pyramid, circular and integrative models (Sinkovics *et al.*, 2021a, 2021b, 2021c; Sinkovics *et al.*, 2023).

However, they distinguish themselves through displaying the six logics, albeit to various degrees, together with an intentionality to tackle the localized impacts of grand societal challenges. They are purpose-driven and deeply responsible (Jones, 2023). Most importantly, their value intention goes beyond simply reducing negative impact; it is rooted in creating positive and regenerative outcomes that enhance welfare and resilience. This intentionality sets them apart from disruptive innovators whose primary goal is to create economic value through market disruption, also termed economic blue oceans (Kim and Mauborgne, 2014; Kim and Mauborgne, 2005).

Game-changers are less likely to emerge through the business model transformation of existing firms. Given the initial novelty of their approach, they tend to come in the form of start-ups. Their potential for rapid international or global scaling places them in a subset of born-global firms (Knight and Cavusgil, 2004), although some of them may take longer to internationalize. However, the potential of a solution to be scalable does not guarantee its successful scaling. Game-changers are able to scale because they have the ambidexterity to simultaneously address the trigger constraint that inspired their emergence and a set of internal and external organizational constraints that, if they remain in place, will thwart growth (Sinkovics *et al.*, 2015; Sinkovics *et al.*, 2014).

As the trigger constraint is the ground-level manifestation of one or several interconnected grand challenges, the product or service offered is not a niche; there is exponential demand for the offering (Subramanian *et al.*, 2023; Volans, 2013). Unlike more conventional business models that use advanced technologies primarily to improve operational efficiency, game-changers harness technologies as enablers for delivering inclusive, affordable and scalable innovations. As a result, these models have the potential to scale exponentially, in some cases achieving up to tenfold growth in relatively short timeframes (Volans, 2016).

Further, by drawing a parallel to economic blue oceans, we propose that the concept of competition may need to be re-evaluated in the case of game-changers. For traditional disruptive innovators, getting from an initial blue ocean where competition is eliminated to a red ocean where competition has caught up again is not desirable, because it means that their competitive advantage is eroded. From a game-changer's point of view, finding themselves in a red ocean may mean that they succeeded in fulfilling their purpose. The more companies follow suit, the larger the scale on which the impact of grand challenges is mitigated. This brings our reflection back to how George *et al.* (2016: 1881) define grand challenges as "specific critical barrier(s) that, if removed, would help solve an important societal problem with a high likelihood of global impact through widespread implementation." For game-changers, this means that either the problem that brought them into existence no longer exists in its original form, or they need to leverage their knowledge and technology toward a different challenge.

It is also important to note that some grand challenges can take lifetimes to resolve, or if they constitute wicked problems, they resist ultimate solutions as they do not have a stopping rule (van Tulder and van Mil, 2023). The constraint alleviated through the current business model will simply move or transform and will need to be addressed anew in a different form because it is now connected to a different set of associated challenges (Sinkovics *et al.*, 2015). Game-changers are likely to possess the dynamic capabilities to leverage their knowledge and technology to align themselves with the shifting boundaries of localized problems.

However, there are some important limitations and tensions. Game-changers operating in emerging and developing markets will need the ability to navigate institutional voids, limited funding and infrastructure gaps. These conditions, although often the trigger for innovation, also constrain resource mobilization, increase uncertainty and hinder replication. Misunderstandings arising from low digital literacy, limited user capacity and short project cycles can lead to unintended negative consequences, such as privacy risks, misdiagnoses and precarious employment (cf. Goralski and Tan, 2020; Kolade *et al.*, 2021; Lashitew *et al.*, 2022). While advanced technologies such as artificial intelligence, the Internet of Things and blockchain can accelerate scaling, global expansion is constrained by regulatory inconsistencies, competition laws, digital infrastructure gaps, ethical and governance challenges and geopolitical or security tensions (Ciulli and Kolk, 2023; Ocelík *et al.*, 2023). Multi-stakeholder partnerships, while important for scaling, may introduce power asymmetries and goal misalignment (Gray *et al.*, 2022). As competition intensifies, access to funding becomes more contested, especially for firms in under-resourced settings. Environmental concerns, such as microplastic pollution from recycling processes, introduce further complexities into the long-term sustainability narrative (Saskia *et al.*, 2022). Consequently, game-changers may produce unintended adverse consequences that require resolution, highlighting the wicked nature of addressing grand challenges.

Therefore, future research is needed to further consolidate existing theoretical and operational approaches to support the proliferation of such business models. Given the wide range of grand challenges and the variation of their wickedness, it can be expected that within the category of game-changers a more fine-grained typology can be defined. To identify these patterns and translate them into a typology, future research may wish to draw on frameworks such as the business-responsibility matrix (Sinkovics *et al.*, 2021a, 2021b, 2021c), the wickedness assessment framework (van Tulder and van Mil, 2023) and systems approaches such as complexity theory (Jalonen, 2022). Understanding how value intentionality emerges from founders' mindsets and evolves during scaling is important for designing interventions that promote long-term scalability and limit mission drift. In this viewpoint paper, we inferred value intentionality by triangulating secondary data sources. Future research will need to build on this through primary studies that adopt a micro-foundational approach to capture founders' original motivations and their evolution as firms scale globally (Ambos *et al.*, 2025). Another promising avenue for future research is to evaluate how advanced technologies are locally adapted to accommodate institutional, cultural and infrastructural differences during cross-border scaling of these business models (Ocelík *et al.*, 2023). Future research is also encouraged to draw on fields other than IB to identify relevant theories that have not yet made their way into IB thinking. However, we would also like to highlight that the term game-changer is simply a label. We encourage researchers to see beyond the label and use the identified conceptual logics for synthesis and pattern identification.

Data availability

This study draws on secondary data from publicly available sources, including company reports, organizational websites and news articles. All data used in the analysis are accessible through open online sources. To enhance transparency and reproducibility, we provide supplementary materials, which include detailed profiles of the 17 illustrative cases, the coding of conceptual logics and full reference information. These materials allow readers to retrace the researchers' pattern-matching approach to qualitative analysis (cf. Sinkovics, 2018) and understand how the cases informed the conceptual framework. The supplementary materials are available via the Center for Open Science (OSF): Denanjalee Gunaratne, Noemi Sinkovics and Rudolf R. Sinkovics (2025), "Game-changer business models and grand challenges: Supplementary materials," Center for Open Science (OSF). 10.17605/OSF.IOJQ6VS.

Credit (Contributor Roles Taxonomy) statement

Denanjalee Gunaratne, Conceptualization, Formal Analysis, Investigation, Writing – Original Draft, Writing – Review and Editing, Visualization. Noemi Sinkovics: Conceptualization, Methodology, Writing – Review and Editing, Visualization, Supervision. Rudolf R. Sinkovics: Writing – Review and Editing, Supervision, Funding acquisition. Francisco-Jose Molina-Castillo: Resources.

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