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The digital transformation of international business: A conceptualization, multidisciplinary review, and research agenda

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1. Introduction

Rapid advances in digital technologies—together with their increasing accessibility and new organizational affordances—are reshaping international business (IB) activity. These shifts also challenge core assumptions that have long underpinned IB theory (e.g., Banalieva & Dhanaraj, 2019; Birkinshaw, 2022) and practice (e.g., Altman & Bastian, 2024; Lee et al., 2023). Digital technologies facilitate seamless, real-time information flows and digitally based collaboration across distances, effectively transcending traditional geographic boundaries (Bharadwaj et al., 2013; Luo, 2022b). They have enabled multinational enterprises (MNEs) to achieve even greater flexibility, efficiency, global learning, and innovation (Luo, 2021a). They have given rise to new types of global firms—so-called 'born-digitals'—that rely almost exclusively on digital technologies for executing international business models (Monaghan et al., 2020).

Yet the 'digital era' is not only defined by unprecedented new opportunities—it also brings a host of new risks fueling corporate (Luo, 2022a) and national security (Lai, 2021) concerns, complex regulatory challenges (Schotter & Andrews, 2024), and heightened geopolitical tensions (Luo & Van Assche, 2023). For IB scholars, these dynamics and their implications inject novel considerations into the IB field, offering exciting prospects for scholarly research aimed at advancing the field and pushing its boundaries. Realizing this potential, however, demands a unified, forward-looking research agenda—one that captures the full scope of digital transformation in IB and does so by purposefully integrating ideas, perspectives, and methods from adjacent disciplines.

Over the past decade, IB scholarship has devoted increasing attention to digital transformation, as evidenced by the surge in related publications, particularly since 2018 (Figure A, online appendix). With the advent of the Internet in the early 1990s, the thematic scope of this research has broadened considerably, as illustrated by the key themes mapped in Fig. 1. However, as we will demonstrate, a closer assessment indicates that extant IB scholarship remains significantly fragmented. As a result, we still lack a synthesized view of how digital technology-induced shifts jointly reconfigure the canonical IB questions of *why, where*, and *how* firms operate abroad, and how those shifts cascade through the economic, political, and institutional environments in which IB is embedded.

A series of conceptual contributions has begun to illuminate individual facets of this transformation—MNEs' global strategy (Meyer et al., 2023; Autio et al., 2021; Ghauri et al., 2021), digital platforms and ecosystems (Nambisan et al., 2019; Li et al., 2019; Stallkamp & Schotter, 2021), and the unique characteristics of digital-only ventures (Monaghan et al., 2020; Birkinshaw, 2022). Collectively, these works have already begun to challenge and reshape foundational assumptions of IB theory (e.g., Banalieva & Dhanaraj, 2019, [redacted], 2025). Yet, as Birkinshaw (2022: 620) cautions, a non-trivial share of recent studies still "shoehorn new phenomena into existing schemata," implicitly assuming that established IB theory is sufficient for explaining digital transformation (e.g., Hennart, 2019, 2022). This stance risks obscuring the transformative impact of digital technologies and, in particular, understates the extent to which they reshape IB. We posit that to make further progress, IB researchers need to engage more actively in new theorizing and in futureproofing established perspectives for the digital era. This effort can be accelerated by drawing on insights from adjacent disciplines, viewing digital transformation through complementary lenses.

To advance the field through new theory-building requires an integrative framework that links digital technology adoption, strategic

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decision-making, and geopolitical pressures across levels. Because digital transformation itself transcends fields beyond traditional IB paradigms, it invokes technology-adoption questions central to Information Systems (IS) and geopolitical tensions that are the subject matter of International Relations (IR). An adequate framework must span these domains. It should explain how digital technologies and their affordances reshape the why, where, and how of cross-border economic activity, and link shifts in the IB decision space to changing geopolitics and the broader institutional environment. In this respect, our approach differs markedly from prior literature syntheses.

Existing literature reviews have typically examined discrete and isolated aspects of digitalization's influence on IB—such as the emergence and significance of Fintech firms (Cumming et al., 2023) or the internationalization process of digital platform-based firms (Li et al., 2025)—and have relied almost exclusively on literature and well-established concepts from the IB field. Although these contributions provide valuable insights, they lack the conceptual multidisciplinary integration needed to build and support a comprehensive, forward-looking research agenda (see Table A, online appendix). By contrast, our review offers a more comprehensive, theoretically grounded, and cohesive account of digital transformation in IB and pertinent research from adjacent fields.

The paper proceeds in three steps. First, we derive an integrative, multilevel framework that maps how digital technologies reshape the *why, where*, and *how* of cross-border activity, and situates foundational IB constructs within the broader context of digital transformation. Second, we undertake a multidisciplinary review of scholarship from IB and adjacent fields. Rather than imposing our integrative framework on the literature corpus, our review of 201 peer-reviewed articles allows thematic patterns to emerge inductively from the evidence base. Third, we juxtapose these patterns with the deductively developed integrative framework, identifying points of convergence, tensions, and omissions to be addressed by future research. This approach (Mantere & Ketokivi, 2013) allows us to delineate a forward-looking, evidence-based agenda for future research that identifies the most promising directions for theory development and empirical inquiry.

2. An integrative framework for digital transformation of IB

Since the commercial internet in the late 1990s—and now with generative AI—successive digital general-purpose technologies (GPTs) have produced applications that directly reshape international business. They alter how firms identify cross-border opportunities, choose locations, and organize activities across jurisdictions. These technologies reshape how firms *do* business by enabling previously unattainable ways of handling (collecting, transferring) and recombining (connecting, aggregating) digitized information into actionable insights (Adner et al., 2019). They have a particularly profound impact on firms' cross-border operations because they challenge core assumptions regarding the role of distance as a constraining factor for business activities, thereby redefining the opportunities and challenges firms encounter in navigating global markets (Andrews et al., 2024).

Yet, the nature and full scope of these technology-induced shifts and their implications for IB remain insufficiently understood—partly because they transcend the traditional boundaries of IB as a research discipline. What is needed is an integrative framework that comprehensively captures the defining features and underlying dynamics of digital transformation in international contexts—coherently linking firm-level technology adoption to the IB decision space and broader macro-level developments such as shifting globalization patterns and intensifying geopolitical tensions.

Our framework (Fig. 2) addresses this need. It comprises six interlocking elements, derived from a expansive range of conceptual studies concerned with the digital transformation of IB (see Table B, online

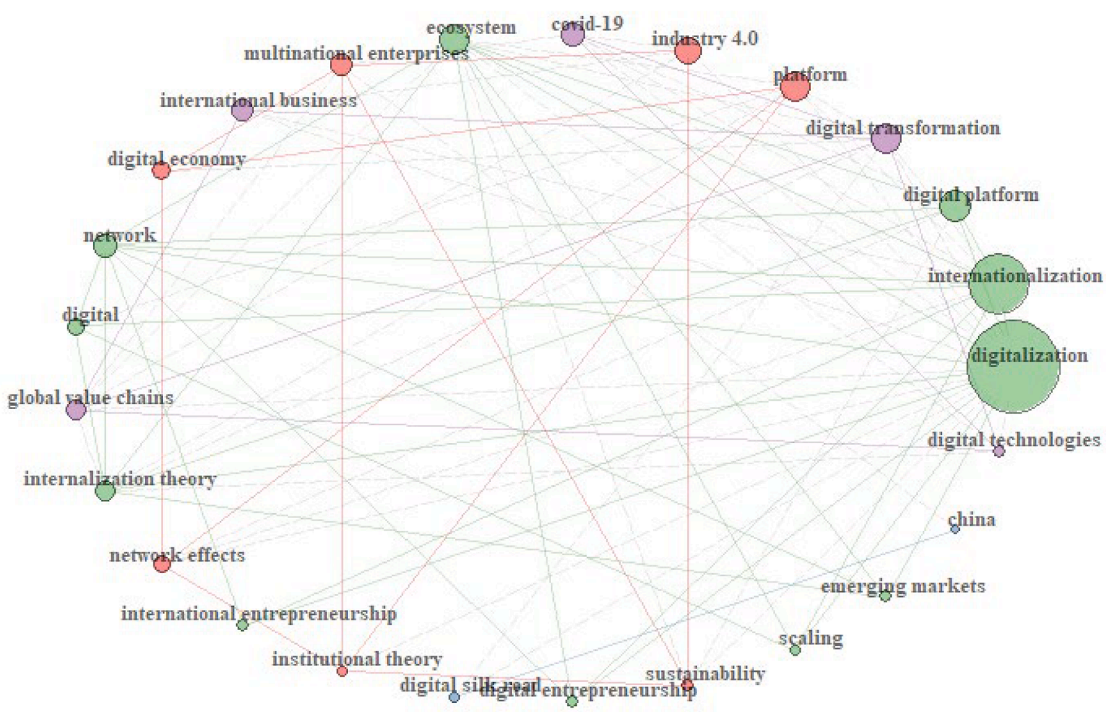

Fig. 1. Main Themes in Existing IB Literature, and Their Relations (152 articles; 1990–2024. based on author-suppled keywords).
Note: Fig. 1 shows a circular co-word network that maps the conceptual space covered by a corpus of 152 articles on digitalization and digital transformation (as indicated by the title or abstract) published in the leading journals (Journal of International Business Studies, Journal of World Business, International Business Review, Management International Review, and Global Strategy Journal) between 1990 and 2024. In R using the *Bibliometrix* package (Aria & Cuccurullo, 2017), we cleaned and recoded author keywords, constructed a keyword co-occurrence matrix, and selected the 25 terms with the highest co-occurrence degree (each appearing in at least five articles). The network was visualized in a circle layout: node size reflects the number of articles per keyword, and edge thickness represents the strength of co-occurrence. Equidistant placement of nodes emphasizes core thematic linkages without pre-defined clustering.

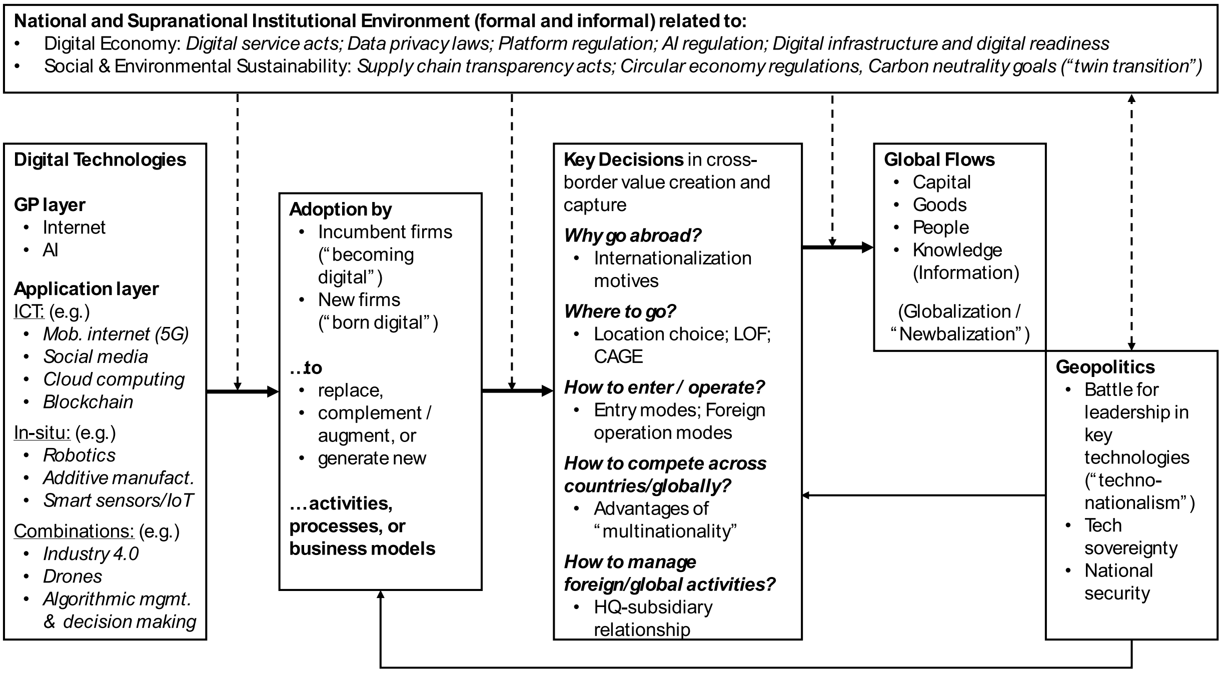

Fig. 2. The Digital Transformation of IB: An Integrative Framework.
Note: The framework draws from and integrates perspectives and concepts related to the digital transformation of IB activities suggested in a range of existing IB studies summarized in Table B (online appendix).
Source: Own depiction.

appendix). At its core, the framework considers (i) *digital technologies* as critical forces driving and enabling this transformation, and (ii) firms as *adopters* combining a variety of digital applications to augment or replace existing business activities and processes. Widespread adoption eventually reshapes core assumptions and rationales underpinning (iii) firms' decisions on *why, where*, and *how* to engage in cross-border business. At an aggregate level, these shifts reshape the global business environment, transforming (iv) *global flows* across key dimensions—trade, capital, people, and knowledge—and influencing (v) geopolitical dynamics. Finally, (vi) *national and supranational institutional environments* constitute critical boundary conditions for their unfolding. The next section unpacks these six elements, beginning from the center, moving left to right, and concluding with the institutional context.

3. Key decisions in cross-border value creation and capture

Our integrative framework centers on the classical IB decision space: *why* firms pursue cross-border value creation and capture, *where* they locate activities, and *how* they enter, compete, and coordinate abroad. These foundational questions have long structured the "going" versus "being" international perspectives in IB theory and practice. As indicated in several studies (Table B, online appendix), this decision space is now being reinterpreted through the lens of digital transformation. First, digital transformation broadens the *why* of internationalization—from exploiting tangible assets to capturing the relational value of data, platforms, and ecosystems (e.g., Luo, 2021; Banalieva & Dhanaraj 2019). Second, it compresses geographic and institutional dimensions of distance (Berry et al., 2010; Ghemawat, 2001), thereby expanding the *where* and *how* choices and enabling virtual presence, asset-light participation, and hybrid entry modes that combine ownership with digitally enabled market access (e.g., Brouthers et al., 2022). Third, it recasts global coordination, shifting governance away from rigid hierarchies toward digitally orchestrated, multi-partner ecosystems (e.g., Autio et al., 2021). In short, digital transformation is reshaping the IB decision space—and with it, the logic of cross-border value creation and capture that anchors our framework.

4. Digital adoption: incumbent "becoming-digital" versus new "born-digital" firms

Digital transformation affects established MNEs and born-digital firms in fundamentally different ways. Incumbent, born-analog MNEs embark on a "becoming-digital" journey, where each adoption decision must be grafted onto legacy architectures, routines, and management structures. Born-digital firms—such as online platforms and digital content providers—stand in sharp contrast. Their outlook is "global-by-default" (Birkinshaw, 2022) and their international expansion unfolds along compressed learning cycles and minimal resource commitments (Monaghan et al., 2019). For these firms, big data, user networks, and algorithmic capabilities constitute the primary firm-specific advantages. Their location choices hinge less on factor-cost arbitrage than on latency, regulatory permissiveness, and the depth of complementary digital ecosystems (Nambisan & Luo, 2021). Conceptual work on platform firms further argues that they confront a liability of user-network outsidership, rather than the classical liability of foreignness (Hymer, 1960; Zaheer, 2002), favoring asset-light entry and loosely coupled governance arrangements (Brouthers et al., 2016; Stallkamp & Schotter, 2021, Stallkamp, Hunt & Schotter, 2022). Their emergence and growing weight in the global economy (UNCTAD, 2025) challenges established IB theories and underscores the need to rethink how their distinct attributes reshape the *why, where*, and *how* of cross-border value creation and capture.

5. Digital technologies and their affordances as drivers of digital transformation

The transformative impact of digital transformation originates in the affordances embedded in distinct classes of digital technologies. Conceptual work over the past decade (see Table B, online appendix) shows that these technologies are far from homogeneous; they differ in the pressures they exert on each dimension of the IB decision space. The first key distinction separates GPTs from the applications built on top of them. The Internet is a GPT; the 5G mobile-internet standard is an application that capitalizes on that infrastructure. For IB, this distinction matters: GPTs reconfigure and expand the opportunity space for cross-border business activities, while application-layer technologies determine how firms translate that potential into concrete gains through increased global efficiency, operational flexibility, and local adaptation. Given their infrastructural nature, GPTs are becoming increasingly homogeneous and more open accessible across borders. In contrast, the availability and maturity of application-layer technologies—and the affordances they enable—vary considerably across countries, shaping the extent to which firms can realize the potential benefits of digital transformation in specific country contexts.

A second IB-relevant distinction concerns information and communication technologies (ICTs) that move information across space and in-situ digital technologies that act on physical artefacts. Autio et al. (2021) show that ICTs (e.g., cloud computing, mobile internet) ease cross-border coordination and governance, whereas in-situ tools such as additive manufacturing collapse production and consumption into the same location, reshaping location choices and global flow patterns. Combinations of both are especially powerful in driving digital transformation (Vial, 2019): Industry 4.0 systems fuse sensor-rich machinery (in-situ) with mobile connectivity and AI-based analytics (ICT), simultaneously reconfiguring value creation, coordination, and applicable data-governance regimes (Strange & Zucchella, 2017).

6. Global flows and geopolitical dynamics: digital transformation's system-level reverberations

Once adopted at scale by incumbent and born-digital firms, digital technologies –through the pathways depicted in Fig. 2—reshape key dimensions of the IB decision space. In aggregate, they trigger visible shifts in the cross-border flows of goods, investments, people, and knowledge—as well as data and information—that underpin globalization. At the same time, they draw international politics ever closer to the core of digital transformation in IB. Conceptual work (Table B, online appendix) converges on three system-level tendencies.

First, digital transformation alters the composition and direction of global flows. Digital services and data now move faster and more easily than goods (e.g., Nambisan & Luo, 2021), while additive manufacturing and Industry 4.0 shorten or re-localize value chains, recasting trade patterns (e.g., Dachs et al., 2024; Laplume et al., 2016). Firms increasingly decouple knowledge generation from production, reshaping the geography of innovation investment and foreign R&D (Dachs et al., 2024). Meanwhile, platform dominance and data asymmetries can disadvantage emerging economies in their global value chain upgrading efforts (Sturgeon, 2021). Second, the critical-infrastructure character of many digital technologies heightens their geopolitical salience (Luo, 2021b). Given their role as access points into critical national infrastructure such as healthcare, energy supply, or defense, semiconductors and 5G equipment are now treated as strategic assets. This perception fuels export controls, localization mandates, and national subsidy programs. Luo (2021b) describes this environment as one of techno-nationalism—a fusion of security logics and industrial policy that exposed MNEs to regulatory fragmentation and retaliatory measures. Third, these geopolitical tensions feed back into firm-level internationalization choices. Data-residency rules reshape entry modes for digital platforms, while increased supply-chain scrutiny spurs diversification and "friend-shoring" of critical inputs (Strange & Zucchella, 2017). Firms must recalibrate where and how they operate internationally in light of both market opportunities and shifting geopolitical fault lines (Nambisan & Luo, 2021).

In sum, digital transformation does more than update the technology base of IB—it reconfigures the very flows through which value, knowledge, and power move across borders and, embedding them in an increasingly contested geopolitical arena. Our integrative framework captures these feedback loops explicitly, positioning global flows and geopolitical dynamics as co-evolving outcomes that both shape and are shaped by firms' strategic choices.

7. The moderating role of national and supranational institutions

Digital transformation unfolds within the formal and informal institutions that govern cross-border economic activity (Meyer et al., 2023). Formal regulatory frameworks are proliferating—including the European Union's Digital Services Act, a patchwork of national data-residency laws, and the first wave of AI-specific regulations—determining which technologies firms may adopt, where data can be stored or processed, and how critical infrastructure is protected. Yet, informal institutions matter no less. Societal digital readiness and trust in data sharing shape consumer acceptance and influence the political appetite for regulation. Conceptual works show these institutional forces rarely act in isolation. Meyer et al. (2023) argue that national institutions and resource endowments jointly steer firms toward owning, participating in, or transforming global platforms. Increasingly, digital transformation is coupled with sustainability goals under the policy banner of the "twin transition." New regulations and voluntary standards aim to align digital and environmental objectives for mutual benefit. George and Schillebeeckx (2022) show how sustainability mandates interact with digital adoption to recalibrate global–local trade-offs, while Ciulli and Kolk (2023) demonstrate that the environmental affordances of blockchain, the Internet of Things (IoT), and AI depend on location-specific social and ecological conditions, making institutional support critical to realizing sustainability gains. National and supra-national institutional forces cascade through all of the elements in our framework—shaping technology adoption, reframing location decisions, and magnifying geopolitical effects. Thus, understanding digital transformation in IB demands constant attention to this evolving institutional canvas on which firms craft their international strategies.

8. Summary: nature and value-added of our integrative framework

Our framework reflects key features of context-sensitive meta-frameworks (Mühlburger & Krumay 2023): it synthesizes fragmented concepts, operates at a high level of abstraction, and helps map the theoretical space in which digital transformation reshapes IB. Yet, it moves beyond descriptive mapping. It offers a dynamic, directional structure with sequential logic and recursive feedback loops. Specifically, it links different types of digital technologies to firm-level adoption processes—across both 'born-digital' and 'becoming-digital' firms—which shape five core internationalization decisions: *why* and *where* to expand, *how* to enter, compete, and manage across borders. In aggregate, these decisions give rise to shifting global flows of capital, goods, people, and data, which trigger geopolitical and institutional responses. Feedback effects and moderating conditions reflect the recursive, context-dependent nature of these processes. The following section outlines the method used to conduct this review, detailing the procedures and criteria applied to ensure rigor and breadth in identifying and evaluating relevant prior research.

9. Review methodology

9.1. Scope and selection of literature

We followed prior systematic review articles in top management journals (e.g., Bruijn et al., 2024; Chen et al., 2022; Chi et al., 2019) and used a stepwise approach to conduct our review. To identify relevant literature, we searched the SCOPUS database for peer-reviewed journal articles containing the terms "digital*" AND ("international*" OR "multinational" OR "MNE*" OR "MNC*" OR "born global" OR "born digital") in the title, abstract, or keywords. We conducted a broad search for journal publications in English across multiple subject areas in SCOPUS labeled 'Social Sciences,' 'Business, Management and Accounting,' and 'Economics, Econometrics, and Finance.' This search resulted in 9871 hits. To ensure the quality and relevance of the reviewed literature, we then limited the scope to top journals ranked three or higher according to the Academic Journal Guide (AJG) by the Chartered Association of Business Schools, resulting in 622 articles. Next, we screened for relevance to the theme of digital transformation in IB. That is, we eliminated articles that mentioned the search terms only in passing, failing to connect them meaningfully to the research question or the phenomenon studied. The final sample includes 201 articles that explicitly and substantially engage with the phenomenon of digital transformation in an IB context and hence represent the corpus of literature for our review. As shown in Table C in the online appendix, which maps all 201 articles in our multidisciplinary literature corpus across journals and academic fields, the final sample is dominated by contributions from the IB (incl. *Area Studies*) and Innovation fields, while *Information Management* and other social sciences are moderately represented.

9.2. Coding and sensemaking process

Rather than imposing our integrative framework (Fig. 2) from the outset on the literature corpus, we adopted an exploratory and iterative coding approach, which is especially appropriate for dynamic and emerging fields (e.g., Elsbach & Stigliani, 2018) and fields that cut across disciplines (e.g., Laplume et al., 2008). Accordingly, we allowed the coding to evolve iteratively based on the themes emerging from the 201 articles in our corpus. This iterative approach enabled us to uncover unexpected patterns and refine coding dimensions over time to align with the data (Simsek et al., 2023). In a final step, we compared these inductively derived patterns against the deductively developed integrative framework (Fig. 2).

9.3. Taking stock: assessment of extant literature

Building on the coding scheme outlined above, we identified four main literature streams that explicitly focus on firm-level phenomena. These streams can be differentiated and organized along two key dimensions: The first dimension, "*going* vs. *being international*", differentiates firms and their challenges in navigating digital transformation according to the stage of internationalization: whether they are in the process of expanding across borders or already operate as multinationals. The second dimension, "*born-analog*" vs. *born-digital*", distinguishes firms by their level of digital assimilation: whether they have been established in the pre-digital era and are now adopting digital technologies on top of their legacy systems, or whether they are digital-natives that embedded such technologies at the core of their business models from inception. We observed that the majority of reviewed studies can be mapped onto one of four research streams defined by the intersection of these two dimensions. In addition, we identified another stream comprising studies that examine broader technological or geopolitical developments. In the following, we briefly present the main themes that emerge across these streams of literature.

9.4. Born-Analog firms at different stages of internationalization

Along this first main dimension of the literature, one stream examines how born-analog firms pursue their initial internationalization steps in parallel with or amidst digital transformation—a body of work we refer to as the "*Going International, Going Digital*" stream ($n = 25$; Table D in the online appendix). A second stream investigates how born-analog firms with already established international footprints (typically MNEs) integrate digital technologies to enhance global competitiveness and cross-border operations, which we refer to as the "*Being International, Going Digital*" stream ($n = 61$; Table E in the online appendix). Table 1 contrasts both streams, highlighting enabling factors and challenges.

Digitally Enabled Internationalization. Across both streams, prior studies highlight the enabling role of digital technologies in supporting international activity, though the mechanisms and points of emphasis vary. Within the literature focusing on the "*Going International*" stage of internationalization, digital tools are seen as lowering entry barriers by reducing transaction costs, enabling real-time market access, and allowing firms to reach foreign customers without physical presence (Liu et al., 2024). AI and analytics enhance firms' ability to identify opportunities and make informed decisions during foreign expansion (Denicolai et al., 2021; Liu et al., 2024), while social media and e-commerce platforms facilitate early-stage internationalization

Table 1
Born-analog firms at different stages of internationalization.

Main themes	Born-analog firms "Going International"	Born-Analog Firms "Being International"
Digitalization as Enabler	- *Digital tools* ***lower transaction costs*** (*Denicolai et al., 2021; Liu et al., 2024*) - *Social media and e-commerce platforms enable* ***borderless sales*** (*da Fonseca et al., 2023*) - *Digital tools* ***reduce local investment*** *needs* (*Elia et al., 2021; Mithani, 2023*) *and* ***enhance scalability*** (*Liu et al., 2024; Zhang & Deborah, 2024*) - *SaaS and IoT enable the emergence of* ***micro-multinationals*** (*Felzensztein & Tretiakov, 2023*) - *Predictive market intelligence* ***enhances decision-making*** *in foreign expansion* (*Denicolai et al., 2021*) - *Digital globalization accelerates expansion* (*Lo et al., 2023*)	- *AI and automation* ***enhance global knowledge-sharing*** *and coordination* (*Badakhshan et al., 2022; Bucher et al., 2024; Dachs et al., 2024*) - *Digital HRM* ***optimizes global talent*** (*Åkesson, 2025*) - *Remote work solutions* ***expand workforce flexibility*** (*Mello et al., 2023*) - *Digitalization boosts* ***supply chain efficiency*** (*Bhandari et al., 2023; Salvi et al., 2021*) - *AI enhances* ***operational productivity*** (Denicolai et al., 2021)
Digitalization-Related Challenges	- ***Liabilities of integration*** (*Rong et al., 2022*) - ***Limits firm autonomy*** (Kim & Cavusgil, 2020; Zhang & Deborah, 2024) - ***Regulatory tensions*** *limiting scalability* (Bhatti et al., 2022; Schotter & Andrews, 2024) - ***Data compliance,*** *cybersecurity risks, and AI governance policies have become increasingly complex* (Madan et al., 2023; Kemmerling & Trampusch, 2023) - ***Digital protectionism*** *due to stricter regulations on foreign digital service providers* (*Mithani, 2023*) - ***Fragmented digital infrastructures*** *across regions create operational bottlenecks* (Wareham et al., 2005)	- *Failure to adopt digital transformation limits* ***competitiveness*** (*Gooderham et al., 2022*) - Global digital models require **localization** (Verbeke & Hutzschenreuter, 2021; Luo, 2022). - *Digitalization alters industry* ***labor dynamics*** (Fromhold-Eisebith et al., 2021; Krzywdzinski, 2021).

Note: The studies presented in this table represent a selected subset, while the full list of studies is available in the online appendix (Tables D and E).

through borderless customer engagement (da Fonseca et al., 2023). Cloud-based Software-as-a-Service (SaaS) solutions and IoT technologies are frequently cited as providing scalable infrastructure with low sunk costs, facilitating global coordination (Elia et al., 2021; Mithani, 2023). This body of work often emphasizes the rise of "micro-multinationals" that leverage digital ecosystems to compete internationally (Zhang & Deborah, 2024; Felzensztein & Tretiakov, 2023).

For born-analog MNEs, studies primarily examine how digital tools can enhance internal coordination, knowledge sharing, and decision-making. Studies highlight how AI-powered systems facilitate intra-firm collaboration and knowledge transfer across subsidiaries, reducing inefficiencies and improving integration across global operations (Badakhshan et al., 2022; Bucher et al., 2024; Dachs et al., 2024). Similarly, digital communication tools are shown to transform global mobility and Human Resource Management (HRM) policies, making remote work and employee autonomy more feasible, effective, and prevalent (Mello et al., 2023; Åkesson, 2025). Several studies point to productivity gains from digitalization in global supply chains and operations, particularly through automation and AI-driven analytics (Bhandari et al., 2023; Salvi et al., 2021).

Digitalization-Related Challenges. While digitalization offers clear benefits for firms going abroad, studies also highlight a range of new risks, dependencies, and regulatory constraints that can complicate internationalization. Many firms internationalize through platform-based business models, gaining reach without ownership in foreign assets but becoming reliant on digital gatekeepers (Elia et al., 2021; Adner et al., 2019). This dependency creates 'liabilities of ecosystem integration', as firms must adapt to diverse institutional and regulatory environments while maintaining platform compatibility (Rong et al., 2022). Regulatory challenges are particularly pronounced in digital sectors, where firms must navigate restrictions on data flows, AI applications, and automated decision-making (Kim & Cavusgil, 2020; Zhang & Deborah, 2024). Compliance with cross-border data protection, cybersecurity, and taxation regimes adds further complexity, potentially limiting the scalability of digital-first firms (Bhatti et al., 2022; Madan et al., 2023; Schotter & Andrews, 2024). Growing digital protectionism and fragmented infrastructures further constrain scaling, challenging the often-assumed frictionlessness of digital internationalization (Mithani, 2023; Wareham et al., 2005). For born-analog MNEs, studies highlight significant risks and limitations when digital transformation is poorly managed or approached in overly generic ways. As Gooderham et al. (2022) show in the case of mobile network operators losing ground to digital platforms in the 4G era, extant firms that lag in adopting digital transformation may find themselves at a disadvantage compared to digital-native competitors, facing both reduced market relevance and growing operational inefficiencies. Additionally, scholars point to the "dark side" of digital globalization, warning that firms often overestimate the universal scalability of digital business models while underestimating the need for local adaptation (Verbeke & Hutzschenreuter, 2021; Luo, 2022b).

9.5. Born-digital firms at different stages of internationalization

Scholars examining born-digital firms distinguish between firms and their challenges as they expand to new geographies versus managing across foreign markets. Accordingly, one stream examines how local, born-digital firms start to expand their business models globally—a body of work we refer to as the "*Going International, Being Digital*" stream ($n = 36$, Table F in online appendix). Another stream investigates how born-digital firms with established international footprints operate as multinationals across countries—what we refer to as the "*Being International, Being Digital*" stream ($n = 34$, Table G in online appendix). Scholars in both streams distinguish born-digital firms according to their business models and core value propositions: those with digital platform-based business models tied to orchestrating multi-sided interactions through digital infrastructures, and those with digitally enabled business models that leverage digital tools without relying on a digital platform-based architecture at their core. Table 2 contrasts these themes explored across the two types of firms and the two stages of internationalization.

Digital Platform-Based Business Models. Studies on early internationalization of digital platform-based firms examine how such platforms scale rapidly across borders by leveraging global (cross-country) and local (within-country) network effects (García-Canal et al., 2024; Shaheer et al., 2024; Stallkamp & Schotter, 2021), adapting business models to diverse institutional environments (Deng et al., 2018; He, 2024), and making strategic expansion choices (Ojala et al., 2018, 2023; Wu et al., 2023). Collectively, this body of work highlights the tension

Table 2
Born-digital firms at different stages of internationalization.

Main Themes	Born-Digital Firms "Going International"	Born-Digital Firms "Being International"
Digital Platform-based Business Models *(Firms that rely on digital platforms facilitating transactions and interactions across user groups)*	- *Platform firms expand internationally by leveraging global and local* ***network effects*** (García-Canal et al., 2024; *Shaheer* et al., *2024*). - *Internationalizing platforms face challenges related to* ***ecosystem integration*** *and institutional mismatches* (Deng et al., 2018; *He, 2024;* Rong et al., 2022). - *Platform firms must balance* ***frictionless scalability*** *with local adaptations* (Tippmann et al., 2023; Stallkamp et al., 2023). - *Digital platforms evolve in response to* ***international institutional conditions*** (Ojala et al., 2018, 2023; Wu et al., 2023).	- ***Physical networks*** *mitigate foreignness* (Galkina et al., 2023; Chen et al., 2022) - *Algorithmic recommendations build* ***credibility*** (*Deng* et al., *2021*) - *Blockchain enables* ***decentralized value creation*** (Silenskytė et al., 2024) - ***Outsidership risks*** *due to lack of local integration* (Jafari-Sadeghi et al., 2022) - ***Regulatory constraints*** *on platform-based expansion* (Coiquaud & Morissette, 2022) - ***Platform rivalry*** *favors local incumbents (Li, 2019; Li, 2022)*
Digitally Enabled Business Models *(Firms that leverage digital technologies but do not operate as platforms)*	- *Firms must reconfigure their* ***digital capabilities*** *to scale internationally* (Mihailova, 2023; Ojala et al., 2023). - ***Digital logistics****, automation, and e-commerce facilitate cross-border expansion* (Tolstoy et al., 2021; Qi et al., 2023). - *Research explores internationalization in Industry 4.0, healthcare, and high-tech sectors (Aerts* et al.*, 2023; Oliva* et al.*, 2022*) - ***Digital competencies*** *help firms manage market uncertainties and enhance global competitiveness* (Cahen & Borini, 2020; Crespo et al., 2024; Freeman et al., 2023).	- *AI-enabled social exchange applications improve knowledge-sharing and* ***talent management*** *within MNEs* (Malik et al., 2021) - *AI & data control* ***strengthen competitive advantage*** (Kemmerling & Trampusch, 2023; Lo et al., 2023) - *Digital media builds global* ***brand reputation*** (Yao et al., 2024). - *Fragmented digital ecosystems create* ***inefficiencies*** (Wareham et al., 2005) - ***Data security & cyber risks*** *vary across countries, shaping reputational and financial consequences* Madan et al., 2023) - *Cybersecurity and* ***data protection*** *pose global risks* (Madan et al., 2023). - ***Ethical tensions*** *in navigating political and regulatory constraints* (Tan & Tan, 2012).

Note: The studies presented in this table represent a selected subset, while the full list of studies is available in the online appendix (Tables F and G).

between scalability and firm-level capabilities, especially the challenge of balancing global standardization with local adaptation (Stallkamp et al., 2023). Tippmann et al. (2023) frame this as the global scaling paradox: platform firms must simultaneously pursue frictionless growth through replication while maintaining entrepreneurial flexibility to innovate and adapt across markets. In contrast, studies on digital platform-based firms with established international footprints focus on how these firms manage platform-specific scaling opportunities across foreign markets while addressing legitimacy and regulatory challenges. To mitigate the liabilities of foreignness, firms often complement their digital reach with a physical presence (Galkina et al., 2023; Chen et al., 2022) and employ signaling mechanisms—ranging from algorithmic cues to curated testimonials—to build credibility (Deng et al., 2021). Failure to embed in local ecosystems can lead to risks rooted in 'outsidership' (Jafari-Sadeghi et al., 2022). Persistent challenges in markets like China illustrate structural barriers that derive from outsidership: Google, Facebook, and eBay's failures stemmed from censorship, cultural misalignment, and competitive asymmetries (Li et al., 2019). Building on this, Li (2022) proposes a spiral model of platform rivalry, showing how local firms accumulate institutional advantages to outcompete global entrants over time.

Digitally Enabled Business Models. Unlike digital platform-based firms, firms with digitally enabled business models leverage digital technologies to enhance their internationalization rather than orchestrate interactions between different user groups via a platform-based architecture. Studies on early internationalization examine how digital tools and capabilities enable these firms to expand their business models abroad and compete across borders. Key themes include the development of dynamic capabilities for global scaling (Mihailova, 2023; Ojala et al., 2023) and the role of digital tools in supporting small firm internationalization (Tolstoy et al., 2021; Qi et al., 2023). Studies also highlight how firms integrate digital competencies to mitigate risks and accelerate growth in foreign markets (Cahen & Borini, 2020; Crespo et al., 2024; Freeman et al., 2023). In contrast, studies on firms with digitally enabled business models and an already established international footprint highlight how digital infrastructures can be leveraged to build and sustain international competitiveness. 'Digital power resources'—such as data sovereignty and AI-driven capabilities— can expose MNEs to data breaches that affect reputational strategies across regulatory contexts (Madan et al., 2023), while digital media can influence global reputation, particularly in cultural industries (Yao et al., 2024).

9.6. Broader perspectives on digital transformation in an IB context

A small but nevertheless important group of studies in our review ($n = 28$) engages with broader questions that do not explicitly address firm-level behavior or outcomes, including topics from international political economy, global governance, and information systems. A full list of studies in this category is available in Table H in the online appendix. Studies in this stream explore the evolution of digital regulations and infrastructures (Jansen et al., 2023; Gritsenko, 2024), the role of digital technologies in reconfiguring cross-border flows and industry networks (Hahn & Massini, 2024; Du et al., 2023), and societal consequences such as labor precarity, corruption, or digital censorship (Malik & Froese, 2022; Luqiu & Yang, 2020). Collectively, these studies examine macro-institutional forces that enable or constrain firm-level digital transformation in IB, clarifying boundary conditions and policy levers that the previously reviewed streams largely take for granted.

9.7. Juxtaposing extant research with OUR integrative framework: what remains missing?

Having reviewed and synthesized 201 articles across five emergent research streams, we now turn to the final step: juxtaposing these streams with the integrative framework developed earlier in this paper (Fig. 2). This juxtaposition serves a dual purpose: to evaluate how well current scholarship aligns with the framework and to identify gaps and tensions that inform our subsequent research agenda. First, our review reveals critical gaps in understanding how the adoption of digital technologies gives rise to heterogeneous digital transformation trajectories in organizations—including incumbent, born-analog and new, born-digital firms. While extant literature documents individual cases, it rarely examines how legacy constraints, strategic tensions, and geographic dispersion shape born-analog firms' digital transformation paths. Similarly, existing scholarship provides limited insights into how different types of born-digital firms develop and evolve over time, despite their increasing economic relevance and distinct internationalization logics (UNCTAD, 2017). Notably, IS-informed perspectives remain largely absent from this area. These gaps underscore the need to study digital transformation as an unfolding trajectory—one shaped by firm type and organizational path dependencies.

Second, our assessment reveals a critical theoretical gap at the heart of our integrative framework (Fig. 2): how digital technology adoption reshapes cross-border value creation and capture in an increasingly digital economy. Born-analog firms face dual pressures from demand-pull and technology-push forces, requiring profound business model reinvention, while born-digital firms scale globally through entry and coordination modes that diverge from traditional, ownership-based models. Instead, most studies still draw on classical IB theories—resource- and capability-based views, transaction cost economics, and internalization theory—despite mounting evidence that they are ill-equipped to explain digital driven phenomena. As digital assets become increasingly strategically relevant resources (Meyer et al., 2023), transaction cost considerations shift (Menz et al., 2021), and new types of firm-specific advantage arise (Banalieva & Dhanaraj, 2021). While adjacent disciplines offer promising tools—such as digital affordances, legacy removal, digital ecosystems from IS, or techno-nationalism, regulatory sovereignty from IR—these perspectives have been adopted only sporadically so far.

Third, our review reveals that the interplay between geopolitics and firms' digital technology adoption remains underexplored across all four firm-specific research streams. While our framework identifies systemic feedback loops—especially geopolitical and institutional consequences of firm-level decisions—these dynamics receive limited attention. Only a small subset of the fifth research stream, focused on 'non-firm-specific' studies, addresses how digital transformation reshapes global flows of data, capital, and talent or contributes to regulatory fragmentation and techno-nationalist pressures. Consequently, phenomena such as digital sovereignty and state-sponsored cyber activities—despite their profound implications for firms' strategic context—are often treated as peripheral.

Fourth, our review highlights a significant yet underexplored link between digital transformation and rising sustainability demands in IB contexts. While firms increasingly recognize sustainability as a strategic imperative (George & Schillebeeckx, 2022), research in this area is still struggling to 'connect the dots' (Ciulli & Kolk, 2023). Aside from a few notable exceptions (e.g., Denicolai et al., 2021), extant literature—particularly empirical work—remains fragmented and offers only limited treatment of how digital technologies influence these dynamics. Studies have just begun to examine how digital tools can both mitigate negative externalities and amplify ethical and regulatory dilemmas across global operations. Few have systematically explored how digital transformation can simultaneously advance sustainability goals and create new challenges, such as labor displacement, increased energy consumption, or opportunities for greenwashing (Forcadell et al., 2020). Moreover, the potential of digital technologies to resolve tensions between economic viability and sustainability demands—through sustainable business model innovation —remains largely untapped. These gaps directly inform our proposed research agenda in the next section.

9.8. A forward-looking research agenda

Following these observations, we propose four main avenues for future inquiry: (1) Tracing digital transformation trajectories of geographically dispersed organizations, (2) futureproofing theories of cross-border value creation and capture for the digital era, (3) contextualizing digital transformation amid rising geopolitical tensions, and (4) squaring digital transformation and sustainability challenges in an IB context. In the following sections, we elaborate on each of these avenues, illustrating their significance and identifying key questions future research should address.

Across all four avenues, future IB research would benefit from deeper integration with IS and IR scholarship. IS research—with its focus on technology adoption in organizational contexts, digital platform ecosystems, technological affordances, and digital business models—can enhance our understanding of how existing conceptions of value creation and capture in a cross-border context must be modified or extended to reflect the realities of an increasingly digital world. It can also shed light on why and how digital-native firms internationalize in ways that diverge significantly from traditional models. Moreover, IS perspectives can illuminate digitalization trajectories of geographically dispersed organizations, particularly the critical process of legacy removal in born-analog MNEs, showing how they overcome path dependencies and navigate organizational change. Given rising geopolitical complexities (Luo, 2024), IR scholarship is increasingly vital as well. IR perspectives can help theorize how data sovereignty, cross-border regulation of digital services, and national security concerns shape firms' international strategies—from market entry to supply chain resilience and digital infrastructure deployment abroad. Table 3 summarizes the four research avenues outlined below, mapping each to relevant levels of analysis, disciplinary contributions, theoretical anchors, and methodological opportunities. This integrative structure enhances both the clarity and actionability of our proposed research agenda, illustrating how IB scholars can engage with digital transformation through interdisciplinary inquiry and concrete empirical strategies.

9.9. Research avenue 1: tracing digital transformation trajectories of geographically dispersed organizations

A critical research avenue concerns how organizations—viewed as socio-technical systems bounded by formal and informal structures—adapt and evolve over time in response to digital technologies and their perceived affordances. In an IB context, the geographic dispersion further shapes how such trajectories unfold across borders. This avenue encompasses two primary strands: one examines how born-analog firms, particularly those with established international footprints, transform digitally while navigating legacy systems, and another explores the trajectories of born-digital firms.

The first field of inquiry concerns how born-analog firms, particularly MNEs, integrate digital technologies into their core (production, marketing, distribution) and secondary activities (procurement, HR, IT) across global value chains. As Furr et al. (2022) emphasize, for born-analog firms, digital transformation is not a fixed end state but a series of strategic choices that executives must navigate between existing products, structures, and processes. While these tensions pose significant challenges, they also open hey also open new avenues for IB research. The concept of *legacy removal* – originating in IS (Bharadwaj et al., 2013) and recently introduced to IB (Gooderham et al., 2023)—is central to this transformation. Digital transformation enables born-analog firms to develop new value propositions, innovative products, services, and pricing models (Barrett et al., 2015; Warner & Wäger, 2019). It transforms customer interactions through digital channels (Kane, 2014; Liu et al., 2011; Yeow et al., 2017), and enhances customer relations through analytics-driven personalized marketing (Sia et al., 2016; Porter & Heppelmann, 2014; Wulf et al., 2017). Additionally, digital technologies enable customers to become active participants in company dialogue (Vial, 2019).

However, born-analog MNEs face unique challenges due to legacy IT systems—outdated yet deeply integrated systems that remain critical to existing operations. Large service MNEs often rely on complex, tightly coupled systems that embed core business capabilities into rigid architectures. While critical for current revenue generation, these legacy systems are typically unsuited to supporting 24/7 digital customer interaction and are difficult, if not impossible, to upgrade. This creates a fundamental tension: firms must sustain revenue streams anchored in legacy systems while simultaneously implementing digital solutions (Gooderham et al., 2023). As Vial (2019) notes, this misalignment between existing resource configurations and digital strategies presents unique challenges. Similarly, Svahn et al. (2017) observe the tension between retaining existing capabilities and building new digital ones. While strategic transformations typically involve legacy challenges tied to culture, identity, and resistance (Tripsas & Gavetti, 2000), digital transformation stands apart due to scale, scope, and speed (Vial, 2019), and often unfolds in more volatile and complex environments (Loonam et al., 2018). While firms may possess dynamic capabilities for sensing and seizing digital opportunities (Froehlich et al., 2025), the transformation phase is particularly challenging due to legacy removal, requiring expensive and politically challenging technological shifts (Christensen, 1997; Kammerlander et al., 2018).

A second field of inquiry concerns the organizational evolution of different types of born-digital firms over time. There is emerging evidence that these digital-native firms differ not only in their internationalization behavior but also in their development trajectories. Yet, their long-term trajectories remain underexplored. This is relevant not only for empirical reasons—given their growing economic significance (UNCTAD, 2017)—but also for theoretical advancement, as their evolution represents a key manifestation of what fundamentally distinguishes them from born-analog firms. While few studies have directly traced longitudinal trajectories, several works suggest that born-digital firms follow development logics that diverge from traditional models. For instance, Stallkamp and Schotter (2021) show how platform-based firms derive competitive advantage from within-country and cross-country network effects, implying that their firm-specific advantages are shaped—and possibly reshaped—by the dynamics of platform growth and governance over time. Shaheer et al. (2022) highlight that digital globalization decouples international reach from physical presence, enabling asset-light scaling strategies that bypass conventional internationalization; yet, how these evolve under shifting technological and institutional conditions remains underexplored. Nambisan et al. (2019) emphasize the modularity and fluidity of digital resources, arguing that digital innovation fosters iterative, non-linear patterns of firm development rooted in constant recombination. Collectively, these studies suggest that the development paths of digital-native firms are shaped by evolving technological affordances, ecosystem dependencies, and governance architectures.

However, a clear gap remains in understanding how these features evolve over time and interact with diverse institutional, spatial, and geopolitical contexts. Moreover, as new digital technologies emerge, they may afford entirely new types of organizational configurations. In line with principles of administrative rationality and selection logics of organizational ecology, we should expect that only some of these conceptually possible trajectories will prove viable, while others will fade. Identifying the factors that drive this evolutionary selection constitutes a critical agenda for future IB research.

9.10. Research avenue 2: future-proofing our conceptualization of cross-border value creation and capture for the digital era

By juxtaposing our literature review with the integrative framework for the digital transformation of IB, we identify a pressing need to revisit and reconceptualize how firms create and capture value in cross-border contexts amid ongoing digital transformation. Existing theoretical

Table 3
Overview and synthesis of future research avenues on digital transformation of IB.

Research avenue	Relevant levels of analysis	Key research questions	Theoretical anchors (IB and broader Management)	Concepts and insights from IS	Concepts and insights from IR	Promising methods and data
Elucidating digital transformation trajectories in/of geographically dispersed organizations	Born-analog firms	What organizational capabilities enable or hinder legacy removal in globally distributed firms, and how do these vary across functions (e.g., IT vs. marketing vs. HR)? How do firms manage tensions between revenue-generating legacy systems and digital business model innovation? How do legacy system dependencies influence the sequencing, scope, and speed of digital transformation across different subsidiaries and geographies? How do strategic tensions—such as products vs. platforms, firms vs. ecosystems, and people vs. tools—manifest and get resolved during digital transformation?	Strategic Transformation and Inertia (*Christensen, 1997; Tripsas & Gavetti, 2000*) Dynamic (Digital) Capabilities (*Drnevich & Kriauciunas, 2011;Warner & Wäger, 2019*) Technology-in-Practice View (*Orlikowski, 2000*)	Digital Affordance (*Leonardi, 2011; Vial, 2019*) Legacy Systems and Challenge of IT Ambidexterity (*Bharadwaj et al., 2013; Gregory et al., 2015*) Digital Options (*Fichman et al., 2005*) Sociomateriality and Technology Enactment (*Leonardi, 2013*) Digital Modularity (*Tiwana et al., 2010; Yoo et al., 2010*) Digital Path Dependency /Architectural Inertia (*Ciborra, 2000; Henfridsson & Bygstad, 2013*	Transnational Governance (*Djelic & Sahlin-Andersson, 2006; Stone, 2013*)	Longitudinal case studies in large born-analog MNEs Process studies Comparative studies across digital firm types (e.g., UNCTAD's typology) Archival data on digital platform evolution
	Born-digital firms	How do firms evolve over time as digital technologies and affordances shift, and what trajectories emerge across digital categories? What are the long-term internationalization trajectories of platform-based firms? How do institutional, regulatory, and geopolitical factors shape the strategic adaptation and viability? Which organizational configurations among prove resilient or unsustainable over time?	Internationalization Process and Pathways (*Coviello et al., 2017; Monoghan et al., 2019*) Platform-based Internationalization (Stallkamp & Schotter, 2021) Digital Ecosystems (Adner, 2017; Wareham et al., 2014)			
Reconceptualizing cross-border value creation and capture (in the digital era)	Born-analog firms	How do firms reconfigure value creation and capture logics when digital technologies transform their GVCs? How does digital transformation reshape the strategic rationales for international expansion? What new configurations of value creation and capture emerge when entering and operating in digital ecosystems?	FSAs, LSAs; OLI Framework in the digital era (*Verbeke & Hutschenreuter, 2021*) Internalization Theory for the digital economy (Banalieva & Dhanaraj, 2019) New foreign market entry and operation modes (Brouthers et al. 2016)	Digital Platform and Ecosystem Governance (*Constantinides et al., 2018; Tiwana, 2013*) Digital Service Capabilities / Digitally-enabled Service Innovation (*Barret et al., 2015; Sia et al., 2016*) Algorithmic Personalization / Data-driven Value Capture (Dekker et al., 2025)	Regulatory Asymmetries (*Mueller, 2010*)	Multi-country platform data (app penetration, digital traffic, usage behavior) fsQCA for exploring value creation logics across digital firm types Cross-national case comparisons (e.g., platform rollout strategies)
	Born-digital firms	How do firms scale and expand internationally through platforms, and how do they create and capture value across borders through data and network effects? What theoretical revisions are needed to explain value creation and capture by firms that never rely on traditional entry modes?	Platform-Based Competitive Advantage and Competition (Stallkamp & Schotter, 2021)			Archival and longitudinal studies on digital platform performance

(*continued on next page*)

Table 3 (*continued*)

Research avenue	Relevant levels of analysis	Key research questions	Theoretical anchors (IB and broader Management)	Concepts and insights from IS	Concepts and insights from IR	Promising methods and data
		What novel FSAs emerge from within-country and across-country network effects, and how do these reshape global competition?				
Contextualizing Digital Transformation of IB Amidst Rising Geopolitical Tensions	National and supranational institutions Global value chain Firm	How do firms adapt their strategies to navigate divergent national regulations and digital protectionism? What political capabilities (e.g., diplomacy, lobbying, alliances) help mitigate geopolitical risks in digital operations? How do firms manage tensions between regulatory compliance and maintaining global digital competitiveness? How does geopolitical fragmentation reshape platform internationalization? How do national AI policies and techno-nationalist agendas shape cross-border value creation and innovation trajectories?	Non-Market Strategy and Political Capabilities (*Boddewyn, 2016*) Liability of Foreignness (adapted for political blocks and geopolitical rivalry) Deglobalization and Decoupling (*Witt., 2019; Witt* et al., *2023*) Techno-nationalism (*Luo, 2021b*)	Digital Sovereignty and Data Localization (*Chander & Lê, 2015; Han, 2024*) Cybersecurity Risk Management (*Golz & Somaini, 2017*)	Digital Protectionism / Data Regime Complexes (*Aaronson, 2018; Aaronson & LeBlond, 2018*) Regulatory Souvereignty (*Farrell & Newman, 2019*) Political Risk and Strategic Decoupling (*Baldwin, 1985; Chen & Evers, 2023; Farrell & Newman, 2023*) Tech Diplomacy (*Giacomello* et al., *2021; Montgomery* et al.*, 2022*)	Comparative policy analysis (e.g., digital acts, cybersecurity regimes); Content analysis of national AI and data policy frameworks Longitudinal studies on regulatory impact Case studies of firms navigating divergent digital governance frameworks
Squaring Digital Transformation and Sustainability Challenges in an IB Context	National and supranational institutions Global value chain Firm	How do digital technologies help MNEs reduce the negative externalities of international operations (e.g., emissions, labor abuses, inefficiencies)? How do MNEs navigate the "twin transition"? How can firms leverage digitalization to implement and scale sustainable business models across diverse institutional contexts? How do regulatory, infrastructural, and cultural differences across countries shape the deployment of digital sustainability tools (e.g., AI-based ESG tracking, blockchain, product-as-a-service models)? How do MNEs balance shareholder value creation with broader social and environmental goals?	Sustainable (International) Business Models (*Tian* et al.*, 2024; Ciulli & Kolk, 2023*) Non-Market Strategy in Global Sustainability Governance (*Poisson-de Haro & Bitektine, 2015*) Global Value Chain Governance (*McWilliam* et al.*, 2020; Wilhelm, 2024*)	Corporate Digital Responsibility (*Lobschat* et al.*, 2021; Mueller, 2022*) Digital Sustainability Metrics and Smart Disclosure (*Tan* et al.*, 2025; Xu* et al.*, 2024*) Digitally Enabled Sustainable Business Models (*Broccardo* et al.*, 2023*) Sustainability-oriented Socio-technical Affordances (*Seidel* et al.*, 2013; 2023*)	Global Sustainability Governance (*Biermann & Pattberg, 2008*) Sustainability Standard Setting and Institutional Voids (*Mena & Palazzo, 2012*) EU-Studies/Twin Transition (*Meckling* et al.*, 2015; Benedetti* et al.*, 2023*) Climate Clubs (*Hale, 2020; Nordhaus, 2015*) Environmental Geopolitics (*Dalby, 2020*)	Analysis of ESG and digital reporting data fsQCA to identify scalable business models that leverage synergies between digitalization and sustainability

Note: The concepts and insights from Information Systems (IS) and International Relations (IR) listed under the respective columns are not intended to be exhaustive but represent carefully selected perspectives from each field that seem particularly relevant for advancing IB research on digital transformation. These entries were chosen for their conceptual fit with each research avenue or its substrands and their potential to inform future theorizing and empirical work at the intersection of disciplines.

approaches in IB were developed in a pre-digital without anticipating how digital technologies would reshape the three canonical questions of *why, where*, and *how* firms expand and compete across borders, organize operations, and structure market interactions. This evolving challenge applies both to born-analog and born-digital firms. While these two groups differ in origin and legacy constraints, they increasingly operate in overlapping spaces—facing similar questions about how to scale, govern, and extract value across borders in an evolving digital economy. As such, future research should explore both in tandem to develop robust, future-proof theoretical foundations for IB in the digital age.

For born-analog firms, digital transformation often requires simultaneously pursuing demand-pull (e.g., servitization) and technology-push (e.g., Industry 4.0) strategies, creating dual pressures on the firm's business model (Frank et al., 2019). Further, as Furr et al. (2022) argue, the strategic logic of going abroad increasingly hinges not only on accessing markets or efficiency gains, but on embedding the firm within dynamic, digitally connected ecosystems that offer complementary capabilities. This shift implies that traditional asset- or efficiency-seeking motives may be superseded by the imperative to participate in innovation-centric and data-intensive value creation networks. Moreover, digital technologies are altering how born-analog firms enter and operate in foreign markets: rather than relying solely on physical presence or ownership-based control, they can increasingly engage in remote service delivery, digitally enabled partnerships, and hybrid governance structures that challenge the assumptions of conventional entry mode theory (Brouthers et al., 2022). These developments suggest that value capture will in the future depend more on ecosystem positioning and real-time orchestration than on hierarchical control or market-based contracting. As global coordination becomes increasingly digitally mediated, future IB research must reconsider the boundaries of the firm, the logic of internalization, and the organizational architecture through which value is created and appropriated in a digitally transformed international environment (Buckley et al., 2023).

For digital-native firms, the need for new theorizing is particularly urgent—both in relation to their scaling and international expansion, and to the governance of value creation and capture on digital platforms. While foundational work has begun to address these issues, substantial gaps remain. Future research can build on contributions such as Brouthers et al. (2022), who show how advances in digital technologies enable these firms to enter foreign markets rapidly via direct service delivery. The IS literature offers critical insights, particularly into how digital transformation reshapes capabilities (Warner & Wäger, 2019).

Existing IB theories provide a useful starting point but must be adapted to better reflect the unique characteristics of born-digital firms. This can be achieved by relaxing core assumptions and incorporating new conceptual dimensions. A notable example is Stallkamp and Schotter (2021), who extend traditional notions of firm-specific advantages (FSAs) by introducing within-country and across-country network effects as new types of FSAs relevant to digital platforms. IS literature further enriches this perspective by showing how digital business strategies reshape competitive dynamics (Bharadwaj et al., 2013) and how digital technologies transform customer interaction (Kane, 2014; Liu et al., 2011; Yeow et al., 2017). IS research demonstrates that digital transformation involves complex tensions between existing resources and emerging digital strategies, requiring fundamentally different management approaches (Vial, 2019). These insights help explain why established frameworks may struggle to fully capture the new mechanisms and strategic dynamics at play.

In this respect, we depart from perspectives suggesting digitalization primarily reduces communication costs and facilitates virtual delivery of services, making it comparable to traditional modes of internationalization (Hennart, 2022). Instead, we align with Birkinshaw (2022: 624), who argues that digitalization is "obviating many of the market-entry concerns that used to be central to our [IB] theories." IS research supports this view, showing how digital transformation enables fundamentally new approaches to value creation (Barrett et al., 2015) and requires organizations to develop new digital capabilities while managing existing ones (Svahn et al., 2017). Moreover, IS perspectives on how digital technologies enable ubiquitous customer access and dialogue (Wulf et al., 2017) inform new theoretical frameworks for understanding value creation and capture in global digital markets. This may ultimately reduce the need to establish formal foreign-based subsidiary units as digital channels provide new pathways for serving global demand.

Future theoretical development will benefit from IS insights. First, we need new frameworks to explain how born-digital firms create and capture value across borders through data and network effects. IS research on digital service capabilities (Sia et al., 2016) and automated personalization (Porter & Heppelmann, 2014) provides valuable foundations for such theorizing. Second, theories must account for how born-analog and born-digital firms alike manage the tension between global scale advantages and local market demands—particularly when grappling with legacy constraints (Gooderham et al., 2023). Third, drawing on IS perspectives on the complexity of digital transformation (Loonam et al., 2018), we need new theories that address how born-digital firms develop and deploy capabilities across borders.

9.11. Research avenue 3: contextualizing digital transformation in IB amid rising geopolitical tensions

The third avenue in our proposed research agenda recognizes that digital transformation in IB is increasingly shaped by geopolitical forces, as states compete for control over critical digital technologies, data infrastructures, and—more recently—AI capabilities. Recent developments underscore how digital transformation is not just a technological shift, but an inherently political process in which national security concerns, economic power struggles, and techno-nationalist policies shape firms' global strategies (Buckley et al., 2024; Luo, 2024). While IB scholarship has traditionally centered on firm-level responses to internationalization challenges, emerging research indicates that digital transformation demands a more nuanced understanding of geopolitical risks and state-driven regulation (Cui et al., 2023; Luo, 2022; Saittakari et al., 2023). Integrating perspectives from IR into IB research is increasingly essential for theorizing geopolitical constraints and opportunities that firms face.

Recent IR scholarship has examined how digital sovereignty, regulatory divergence, and state intervention shape the digital economy, offering important insights for IB research (Nambisan & Luo, 2021; Verbeke & Hutzschenreuter, 2021). The concept of techno-nationalism (Luo, 2021) has become central to understanding how governments increasingly treat technological infrastructure as a strategic asset requiring protectionist measures. This trend is evident in the expansion of foreign investment screening laws, such as the European Union's Foreign Direct Investment Screening Regulation and the U.S. National Security and Investment Act, which scrutinize MNEs' digital operations based on national security concerns (Cui et al., 2023). The accelerating fragmentation of technology markets (Luo, 2022a) is further driven by concerns over digital sovereignty, as countries seek to localize data storage, protect critical digital infrastructures, and impose greater scrutiny on foreign technology firms (Schotter & Andrews, 2024). A particularly pressing issue is digital protectionism, wherein regulatory barriers impede global technology flows. The European Union's General Data Protection Regulation (GDPR), China's Personal Information Protection Law, India's Digital Personal Data Protection Act, and the U.S. CHIPS and Science Act all reflect a shift toward regulatory sovereignty over digital infrastructures (Saittakari et al., 2023). These measures impose significant compliance burdens, requiring MNEs to develop country-specific digital strategies that account for divergent regulatory frameworks. While digital protectionism presents operational challenges, it also creates opportunities for firms that can align their digital strategies with local regulations. Some MNEs are restructuring their operations to establish regional digital hubs, ensuring compliance with national data governance frameworks while maintaining global competitiveness (Bughin & Manyika, 2020). As exemplified in Table 3, future research should explore how firms develop political capabilities (Boddewyn, 2016) to navigate these geopolitical complexities, leveraging alliances, public-private partnerships, and regulatory diplomacy to shape digital governance structures.

Beyond regulatory challenges, the geopolitical dimensions of digital transformation extend to cybersecurity risks and supply chain vulnerabilities. The increasing digitization of global supply chains has made MNEs more susceptible to cyber threats, with state-sponsored cyberattacks—such as the 2024 cyberattack on Taiwan Semiconductor Manufacturing Company (TSMC), widely attributed to Chinese state actors—posing systemic risks to digital infrastructures. Similarly, the U. S. CHIPS and Science Act aims to reduce dependence on foreign semiconductor manufacturers, prompting MNEs to reconfigure global production networks around friendshoring and reshoring strategies

(Schotter & Andrews, 2024). These shifts align with IR theories on strategic decoupling and economic security (Cui et al., 2023), which suggest that firms must integrate geopolitical risk assessments into their digital transformation strategies. As supply chains become more politicized, IB research should examine how firms balance cost efficiency with national security imperatives to manage digital supply chain resilience.

While digital transformation facilitates global connectivity, it also amplifies regulatory uncertainty, particularly platform-based businesses (Stallkamp & Schotter, 2021; Nambisan et al., 2019). The European Commission's Digital Markets Act and Digital Services Act are imposing stricter compliance requirements on U.S. tech giants, including Meta, Apple, and Google (Lv & Schotter, 2024), raising questions about regulatory asymmetry between regions. Similarly, China's 2023 Cybersecurity Review Measures have tightened restrictions on foreign firms' digital operations, limiting access to its digital economy while strengthening domestic champions (Schotter & Andrews, 2024). These developments highlight how platform internationalization is becoming more challenging due to growing interventionism in digital markets (Shaheer et al., 2024).

AI has emerged as a central battleground in this geopolitical landscape, reflecting how technological leadership is increasingly linked to national security and economic power. Following his re-election in 2025, U.S. President Donald Trump announced a $500 billion AI initiative aimed at securing American leadership in AI research, semiconductor manufacturing, and allied technological collaborations. This move is part of a broader effort to counterbalance China's rapid advancements in AI, which include the recent launch of DeepSeek—a large language model designed to compete with OpenAI's ChatGPT - by offering a cost-effective alternative for emerging markets. These developments exemplify the intersection of IB and IR, where AI is not only a driver of digital transformation but also a geopolitical asset shaping international competition. The strategic implications for firms—-whether born-analog or born-digital—are profound: How do they align their AI strategies with shifting geopolitical alliances? What role do governments play in shaping the development and deployment of AI technologies? By integrating insights from political risk analysis, technology diplomacy, and international regulatory frameworks, IB research can offer a more comprehensive understanding of how firms navigate digital transformation amid rising global uncertainties.

9.12. Research avenue 4: squaring digital transformation and sustainability challenges in an IB context

Internationally operating firms—both born-analog and digital-native firms—play a critical role in addressing global sustainability challenges, such as those described in the UN SDGs (Van Tulder et al., 2021). Many of these sustainability challenges, including climate change, resource depletion, and labor rights violations, transcend national boundaries, making firms with globally dispersed operations and subsidiary networks key actors in advancing sustainable practices at a global scale (Lashitew et al., 2023). By leveraging their international reach, position in global value chains, economic clout, and technological capabilities, these firms can accelerate the global adoption of the Sustainable Development Agenda (Van Tulder et al., 2021). They do so by driving sustainable innovations (De Marchi et al., 2022), shaping supply chain practices (Marano et al., 2024), and setting industry standards (Buckley & Liesch, 2023). IB scholars are well-positioned to investigate these challenges (Buckley et al., 2017). Notably, as firms face increasing pressure from consumers, investors, and regulators, sustainability has shifted from a voluntary ethical consideration to a strategic imperative (Bansal & Song, 2017; George et al., 2016). Firms that fail to integrate social and environmental sustainability considerations risk regulatory backlash, reputational harm, and operational inefficiencies. In contrast, those that proactively embed sustainability into their business models can enhance resilience, gain competitive advantages, and unlock new market opportunities (Ioannou & Serafeim, 2012).

In particular, the role of digital technologies in enabling firms to meet these challenges remains underexplored. Based on our review, we identify three key research pathways for IB scholars to advance understanding of how digital transformation intersects with sustainability in an IB context. The first pathway explores how digital technologies can mitigate the negative externalities of conducting business across borders. By enabling firms to measure, monitor, and internalize the adverse impacts of cross-border operations, digital technologies hold significant potential to enhance sustainability. Although our review identifies a handful of studies beginning to explore this intersection, major gaps remain. For instance, Zhang and Deborah (2024) examine how digitization and internationalization strategies drive green innovation and sustainability in Chinese manufacturing firms. Digitalization also bolsters corporate transparency and accountability, with Wang et al. (2024) demonstrating how 'smart disclosure' enhances supplier visibility and pressures firms to uphold human rights standards. Meanwhile, Margherita and Braccini (2021) highlight the socio-technical interplay necessary for MNEs to balance capital efficiency with labor welfare, demonstrating how Industry 4.0 technologies automate repetitive tasks while enriching workforce roles. Yet, these contributions remain fragmented, offering fertile ground for future IB to explore how digitalization can reduce the negative externalities of IB activities.

Secondly, the adoption of digital technologies can introduce new ethical dilemmas and unintended consequences for internationally operating firms. While digital technologies enhance efficiency and transparency, they may also exacerbate labor displacement, energy consumption, and regulatory challenges across different institutional settings (Srinivasan & Eden, 2021). To systematically investigate these digitalization-induced externalities, IB scholars could draw on the concept of Corporate Digital Responsibility (CDR), an IS-based framework that addresses the ethical, social, and environmental responsibilities firms must uphold when deploying digital technologies (Lobschat et al., 2021; Mueller, 2022). CDR offers a valuable lens for exploring how internationally operating firms align digital transformation with broader accountability goals. For example, automation and AI-based analytics can optimize operations but disrupt employment patterns in global value chains (Adhikari, 2024), thereby raising questions about how firms can implement worker-centric digital transformation strategies across diverse regulatory environments. Similarly, blockchain technologies enhance supply chain transparency (Cui et al., 2024), but face adoption barriers due to uneven infrastructure, regulatory readiness, and environmental costs. IB scholars are well positioned to explore how firms can use digital sustainability metrics to enhance genuine transparency—rather than as compliance tools—and how institutional differences shape these outcomes. Incorporating responsible digitalization perspectives can help IB research illuminate the trade-offs between technological efficiency and sustainability accountability, offering a more critical understanding of how firms leverage digitalization while mitigating technology adoption-related externalities.

The third path explores how digital technologies can help firms reconcile tensions between economic viability and sustainability demands. IB scholars can advance this agenda by drawing on the literature on sustainable business model innovation (Geissdoerfer et al., 2018) and corporate digital responsibility (Lobschat et al., 2021; Mueller, 2022), examining how firms leverage digital tools to balance economic and sustainability objectives. Despite its growing importance, the role of digital technologies in enabling sustainable business model innovation in international contexts remains underexplored. Early studies have provided some promising leads: Ringvold et al. (2023) show how a telco multinational deployed a sustainable digital health model in Bangladesh, while Oghazi et al. (2024) demonstrate how digitally enabled circular business models enhance resource efficiency and supply chain resilience. However, the effectiveness of such business models depends on institutional conditions, data governance frameworks, and regulatory alignment across markets. More research is needed to examine how digital technologies, such as AI and blockchain, can integrate sustainability at the core of firms' international strategies, enabling them to deliver on environmental sustainability imperatives while ensuring economic viability.

10. Concluding remarks

This review synthesizes insights from international business (IB), information systems (IS), and international relations (IR) to place digital transformation squarely within IB's core concerns. Although IB research has begun to examine digital transformation, the literature remains fragmented and bounded by legacy theoretical paradigms. The rise of digital firms challenges foundational IB assumptions and requires new concepts to capture platform-based competition, digital ecosystems, and AI-driven internationalization (Nambisan et al., 2019; Stallkamp & Schotter, 2021). At the same time, geopolitical forces—techno-nationalism and cross-border data sovereignty among them—are rewriting the rules of global business, making IR perspectives essential to IB scholarship (Buckley et al., 2024; Cui et al., 2023; Luo, 2024). Without these insights, IB risks applying outdated frameworks to phenomena that demand new theorization. Our integrative framework offers a lens for analyzing firm-level digital strategies and their interaction with broader institutional and technological forces. A key implication is that IB should redevelop, rather than merely defend, its core theories. Traditionally, IB views firm-specific advantages (FSAs) as central to international success and as assets to be internalized (Rugman & Verbeke, 2001). Digital transformation reshapes these FSAs, shifting emphasis toward creating network effects and orchestrating ecosystems (Stallkamp & Schotter, 2021). Likewise, classic internationalization theory (Johanson & Vahlne, 1977) assumes gradual, experience-based expansion, whereas digital firms often scale rapidly through platform-mediated reach, bypassing traditional entry barriers and models. These developments call for new conceptual categories to explain internationalization dynamics in the digital era.

The geopolitical dimension of digital transformation adds another layer of complexity. The politicization of technology and economic decoupling create new risks for international firms (Schotter & Andrews, 2024). Research must develop theories of geopolitical adaptability, exploring how firms navigate regulatory shifts, cyber risks, and state-imposed digital barriers while maintaining global competitiveness. The growing influence of techno-nationalism, digital sovereignty laws, and AI governance frameworks further reinforces the need for IB scholars to expand their analytical lens beyond firm-centric strategies and to encompass the broader institutional and political forces shaping digital globalization (Cui et al., 2023; Luo, 2024).

From a practical standpoint, our review underscores that digital transformation is not merely an operational shift—it is a strategic imperative. Firms must develop geo-strategic intelligence, build adaptive regulatory strategies, and adopt resilient digital architectures to survive in an era of increasingly fragmented globalization. Policymakers, in turn, must consider the unintended consequences of digital regulations, ensuring that national security concerns do not undermine innovation and international cooperation in the digital economy. We are at a defining moment for IB scholarship. Digital transformation does not simply extend traditional globalization or the way firms compete and organize internationally; it reconfigures both. The question is not whether IB theory needs to change—it is how rapidly it can evolve to remain relevant in an era where the boundaries between digital, geopolitical, and economic power are increasingly blurred. Our multidisciplinary review serves as foundation for this paradigm shift and calls for theorizing the new realities of digitally mediated globalization.

Looking forward, the flow of ideas should be two-directional. IB scholars are uniquely positioned to give something back to IS and IR in return for what it may draw from these fields: decades of theorizing about cross-border frictions in business activities—and how to mitigate, overcome, or even turn them into advantages—offer exactly the granularity that IS and IR now seek as they grapple with digital transformation's border-spanning realities. Precisely because this phenomenon is *international*, it offers IB an exceptional opportunity to contribute outward. By exporting its distinctive constructs—liability of foreignness (Hymer, 1960; Zaheer, 2002), multidimensional distance frameworks (e.g., Berry et al., 2010; Ghemawat, 2001), and governance of complex systems of value creation and capture (P.J. Buckley et al., 2024; McWilliam et al., 2020)—IB can illuminate how non-technological frictions shape technology diffusion and how MNEs, established or born-digital, as powerful actors in globalization, can, alongside national states, co-create emergent governance regimes. Such engagement advances a genuinely interdisciplinary agenda and underscores IB's continuing relevance to the wider social science conversation on digital transformation.

CRediT authorship contribution statement

Björn Schmeisser: Writing – review & editing, Conceptualization. **Tina Saebi:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Andreas P. J. Schotter:** Writing – review & editing, Writing – original draft, Project administration, Formal analysis, Conceptualization. **Paul Gooderham:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Supplementary materials

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Data availability

No data was used for the research described in the article.

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