New connectivity in the fragmented world

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Abstract
We are entering a significantly fragmented world that is full of extreme disruptions and adversities. New connectivity in digital form proves the essential characteristic to help international businesses better cope with these disruptions. This connectivity signifies a dominant feature of the new era of international business and a critical catalyst to address new uncertainties in today's fragmented world. However, this new normal raises a series of complex issues that extend the IB research agenda. This article illustrates this connectivity's conceptual components, theoretical framework, and broad implications for IB research. We further show how MNEs leverage new connectivity to bolster competitive vitality and organizational adaptability when facing unprecedented uncertainties in a fractured and fragile world. This study also offers insights into digital ways of improving cross-border resilience. We conclude with suggested avenues for future research and potential steps.

INTRODUCTION
Globalization is entering a new era full of extreme disruptions and adversities. Severe humanitarian crises caused by the COVID-19 pandemic and the war in Ukraine aggravate already elevated international business uncertainties and complexities, such as geopolitical turbulence, anti-globalization sentiment, regulatory interference, supply chain breakdown, social inequalities, and economic recession, to name a few. Now more than ever, international businesses cannot rid themselves of uncertainty and hardships but must cope with them.

As digitization and globalization continue to converge and shape world business, the challenges and opportunities for multinational enterprises (MNEs) have rapidly mounted. Digital global connectivity is not only an overwhelming feature of the new era for international business but also a golden thread that ties businesses together around the world, despite extreme uncertainties and disruptions that jeopardize physical flows of trade, investment, and workforce. This global new normal poses a myriad of complex questions for existing IB research. This article aims to explore some of these issues and to discuss their theoretical implications.

By new global connectivity, we refer to a digital form of globalization that connects nations, industries, companies, and individuals all over the world with flows of data, information and
knowledge, and flows of goods, services, investment, and capital that are digitally enabled or supported. This connectivity buttresses cross-border transactions and transmits a valuable stream of ideas and innovation around the world (Autio, Mudambi, & Yoo, 2021; Banalieva & Dhanaraj, 2019; van Tulder & Verbeke, Piscitello, 2018). It may enable MNEs to connect more effectively with their worldwide consumers and other ecosystem players, prompting them to reassess their business models and to create new global strategies (Nambisang, Zahra, & Luo, 2019). While this article only focuses on the digital form of new connectivity, we recognize the importance of also assessing the non-digital or physical form of new connectivity (e.g., new types of FDI, new forms of knowledge flows, and globalized R&D), and delving further into how digital and non-digital forms interact productively.

We note that MNEs, nascent or established, are not merely a passive force responding to global connectivity but also active contributors to the capability by investing in digital technologies that have facilitated the diffusion of innovation, technology, and ideas across nations. A notable feature of the COVID-19 crisis, for instance, lies in a radical shift to digital connectivity. In a matter of days, people massively stepped up their use of technologies that enable remote learning, working, services, and consumption. Digital business models and virtualized businesses proved plausible and scalable. Successful companies during the pandemic are digitally centric. As noted by Autio et al. (2021), freeing businesses from the constraints of transportation and collocation, digitization increases business resiliency in the face of global disruptions like the coronavirus pandemic. Digital technologies reinforce the centrifugal forces that favor dispersing the firm's high knowledge activities.

IB scholarship needs to strike a finer balance between accumulation of extant IB knowledge and new development of frontier insights arising from radical shifts in international business. The issue of global connectivity exemplifies a new reality that forces us to delve into and reevaluate IB theories to account for new forms and new dynamics of global enterprise. However, digital connectivity itself also creates a multitude of issues, risks, and challenges that are underestimated in the field. As Cano-Kollmann, Cantwell, Hannigan, Mudambi and Song (2016) well stated, the IB environment has evolved dramatically over the past decades, precipitating fundamental changes in the nature of connectivity, and motivating IB researchers to reassess extant literatures and theories to adequately capture the intricate, indeterminate, and sometimes even unpredictable, relationships between organizations, places, spaces, and nations. Recent research in the field (e.g., Autio et al., 2021; Banalieva & Dhanaraj, 2019; Covillio, Kano, & Liesch, 2017; Li, Chen, Yi, Mao, & Liao, 2019; Monaghan, Tippmann & Covilli, 2020; Nambisan & Luo, 2021) has remarkably advanced our understanding of digital globalization. Nevertheless, what appears to be insufficiently clear or emphasized, which spurs us to address the issue in this article, is an overarching conceptual foundation that explicitly defines digital connectivity: why it is a critical competence, how it questions some core assumptions behind existing IB theories, how MNEs organize global activities using this connectivity, and finally how research can move forward.

In addressing these issues, we engage with prior literature and theories, showing how these schools of thought may help us understand the process of global connectivity, and how global connectivity in turn opens robust avenues of inquiry for international business scholarship.

**CONCEPTUAL ESSENTIALS OF NEW CONNECTIVITY**

We define new connectivity as the state of a digital form of globalization that connects nations, industries, companies, and individuals around the world through flows of data, information, ideas, and knowledge, and through flows of goods, services, investment, and capital that are digitally enabled or supported (hereafter, we use new connectivity, digital connectivity or global connectivity interchangeably). New connectivity combines the two most critical forces in the world economy today: digitization and globalization. The convergence of these two forces has created a new normal worldwide, modifying the dominant logic behind what an MNE is, how to expand globally, where to locate and serve, what business models to employ, how to organize cross-border activities, and what capabilities are needed, among other questions. Connectivity not only reflects cross-border information and data flow but also transforms flows of physical goods and services into new digital ones, and creates digital platforms that enable small firms and individual entrepreneurs to operate on a global stage, as many IB studies have already documented (e.g., Autio et al., 2021; Stallkamp & Schotter, 2021). A digital form of flows for physical products...
and services have surged not only in global e-commerce and offshore outsourcing but also in co-development and social marketing, among others. Even in times of extreme disruption, like that caused by the COVID-19 pandemic, digital connectivity enables MNEs to digitally reach consumers worldwide and to disseminate products.

Most studies have thus far interpreted digital connectivity in terms of digital technologies. Digital technologies (e.g., ICT, cloud services, IoT, AI, and data analytics) indeed serve as the core foundation of new connectivity. We caution, however, that this interpretation is incomplete. Digital connectivity goes beyond digital technologies alone to generate intelligence that fosters constant innovation, flat decision-making, and the integration of these technologies into all functions, phases, and locations of the business. That is, new connectivity is an intermediary of (1) efficiency through intelligent decisions and streamlined processes, and (2) value development through customer experience, new business models, and innovation. John Deere is a case in point. The company creates a data-service business that collects soil samples and analyzes weather patterns to help farmers to optimize crop yields. Sensors in tractors and other machinery provide data for predictive maintenance; automated sprinkler systems sync with weather data; and an open software platform lets third parties build new service apps. This new connectivity creates precision agriculture to a point that farmers become enabled to monitor, manage, and measure the status of virtually every plant in the field. This case illustrates that new connectivity serves as a competence or capability of the firm. We hence introduce the concept of digital connectivity competence, which refers to the firm’s savviness in three interlocking and sequential constituents: connectivity technologies, connectivity architecture, and connectivity intelligence.

Connectivity technologies (e.g., ICT, AI, blockchain, cloud computing, stream, navigation, control, monitoring, IoT, and data analytics) are important yet peripheral in this competence set. Competence in this area describes the MNE’s global information and connectivity infrastructure. With these technologies, multinational enterprises connect with their business community in the following ways: (1) through customer relationship management (CRM), social media platforms, global e-commerce marketplaces, specialized marketing platforms, and an MNE’s own platform, apps, and website to connect with global customers and marketers; (2) through ERP, SCP, CRM, and open source software to connect with external network members, whether strategic partners or ecosystem comple- mentors; and (3) through global intranet and corporate resource management systems to connect and communicate with corporate members and foreign subsidiaries. We note that MNEs manage worldwide resources and relationships, not only through their own connectivity technologies but also through partnerships with other savvy multinationals who provide these specialized technologies or services.

Connectivity architecture depicts a firm’s ability to organize, combine, and integrate a portfolio of already invested digital resources that satisfies both efficiency and expansion of internationalization. In fact, some MNEs have invested squarely in digital technologies, but have been unable to improve corporate performance. Although they may have a large portfolio of digital resources in place, they lack the attention and ability to integrate the various technologies and to optimize a digital connectivity architecture within the firm and with other firms and customers. Technically, typical digital assets in this architecture include global enterprise resource planning (ERP), human capital management, CRM, data management platforms, cloud computing, social marketing platforms, and global intranet, among other features through which MNEs manage, externally and internally, worldwide resources and relationships. A more important indication of this architecture rests on the status of the MNE’s best mix and use of a set of digital technologies and systems. Some MNEs do not lack digital technologies but rather have too many, including redundant and incompatible technology (Chinn et al., 2014). A working architecture enables the MNE to transfer already invested digital technologies and systems across corporate members and subsidiaries, and also to readily adjust them in altered circumstances, such as in different regions, countries, and markets. This ability proves crucial to solving a paradoxical role of digital technologies: its transferability and modularity fosters rapid global expansion into new foreign markets, and, at the same time, its adjustability and adaptability help the company become more flexible and responsive to the peculiarities of host countries.

Connectivity intelligence, the highest level in the ladder of this competence set, transforms digital technologies and digital architecture into valuable intelligence, real-time forecasts, and inter-firm and
intra-firm sharing, which in turn significantly help critical business decision-making. Advanced intelligence systems, such as prescriptive supply chain analytics, risk analytics and control, global logistics visibility, omnichannel marketing integration, and customer lifetime value management, among others, have been recently developed and deployed by some MNEs from advanced economies (McKinsey, 2020). This intelligence system helps make decision-making quicker and/or less costly. A customized ERP system, for example, collects data and information from various business activities, such as manufacturing, marketing, sales, inventory, and shipping, while subsequently providing an integrated view of operations across various subsidiaries and units. It is important to note that this intelligence also involves unique processes that provide company managers with more intelligence in digitally connecting, collaborating, combining, and deciding. Such process knowledge is a firm-specific advantage (FSA), combining technical-side and organizing-side capabilities. Digital mindfulness of leadership and workforce, for example, forms an important element of organizing-side know-how. Although not within the scope of this editorial, the organizing-side of connectivity intelligence remains a pressing and promising agenda warranting further attention.

A multinational that develops sharpened connectivity intelligence can also more easily address new markets (Nambisan & Luo, 2021). Firms with high intellectual agility in digital areas can develop cross-collaboration and diffuse knowledge within the organization (Castellani, Lavoratori, Perri, & Scalera, 2021). This intelligence can reduce interfirm and intrafirm coordination and transaction costs, since MNEs take advantage of the expertise and knowledge that lies hidden in their own organizations and partner firms across the globe, leveraging specialized capabilities available outside the firm, and capitalizing on shared services (Choudhury, Foroughi, & Larson, 2020). Connectivity intelligence further promotes utilization of global talent, ideas, and knowledge (Hutzschenreuter & Matt, 2017). It bolsters the firm’s global spanning capabilities when expanding technologically, geographically, and culturally (Autio et al., 2021).

In a world of digital globalization, the collectivity of technologies, architecture, and intelligence functions as a core and cohesive connectivity competence that supports other critical competencies of the firm and cements combined integration and adaptation to global changes. A full set of new connectivity competence needs the above three features to work together; missing any one would render the competence incomplete and insufficient. The features build upon one another and collectively enable a multinational to successfully navigate the increasingly complex and dynamic set of both globalization and localization forces that prevail in different parts of the world (Nambisan & Luo, 2021).

As shown in Figure 1, new connectivity spurs both external and internal connectivity advantages. Externally, it creates new ways of connecting and collaborating with foreign suppliers, ecosystem partners, and global customers. The openness and linkage advantages from digital connectivity are often achieved via networks with business ecosystem players vertically (with global suppliers, distributors, and customers), horizontally (with global competitors), and diagonally (with supporting service providers) (Li et al., 2019; Luo, 2021; Nambisan & Luo, 2021). Global connectivity provokes cross-sector and cross-boundary collaboration opportunities among firms operating in significantly different industries, further extending the network. A growing number of global players use peer-to-peer product innovation and crowdsourcing customer services to gain insights, resolve problems, and save costs (Manyika, Lund, Bughin, Woetzel, Stamenov, & Dhingra, 2016).

Internally, new connectivity incubates new ways of orchestrating and managing regional hubs and worldwide subsidiaries. Drastic disruptions require quick decision-making and power delegation to frontier foreign units. These forces have driven MNEs to become flatter instead of hierarchical, decentralized rather than monarchical, sharing-oriented rather than dividing, and diverse instead of parochial. The chief logic underlying this network-based structure rests on amalgamation: diffusing, sharing, integrating, and utilizing all available resources by different foreign units to benefit the MNE as a whole through a globally connected organizational web. Unfortunately, an amalgamating quality increases organizational complexity (Rangan & Sengul, 2009), but digital connectivity, when properly implemented, can drive complexity down (Cantwell, 2014; Foss, 2005). Figure 1 schematically summarizes the key concepts pertaining to new digital connectivity.
A THEORETICAL FRAMEWORK OF NEW CONNECTIVITY

Figure 2 shows our general framework that links connectivity competence with performance implications. The first main point from this framework is that connectivity competence stimulates MNE performance through connecting (with all business stakeholders), collaborating (with strategic partners and ecosystem complementors), and combining (bundling and integrating all available resources from both networking and internalization). Connectivity catalyzes simultaneously organizing globalized and localized operations (Lorenzen, Mudambi, & Schotter, 2020; Schotter, Mudambi, Doz, & Gaur, 2017). It facilitates cross-border orchestration, and this orchestration fosters coordination of key nodes (broadly, individuals, teams, subunits, and centers of excellence) that exist as global players contributing to the MNE’s large-scale reach. Connectivity also motivates progression towards a less hierarchical structure and towards heavier reliance on data flows and intelligence, not surprisingly, since MNEs increasingly vie for speed and responsiveness.

The second main point is that new connectivity’s performance implications are manifested in several important dimensions, such as organizing effectiveness, global reach, and capability enhancement. Connectivity drives down the cost of cross-border interactions and transactions, creating new markets and user communities with global scale, and providing MNEs with a huge base of potential customers and effective ways to reach them (Manyika et al., 2016). Distance-, space-, and time-related governance issues, known as monitoring costs,

Figure 1  Defining new global connectivity
have decreased as a result of this connectivity (Banalieva & Dhanaraj, 2019). However, organizing costs remain, such as those associated with connectivity issues like external shocks and information breaches, which extend the concept of organizing costs, as defined by transaction cost economics. Analytics, another illustration for this point, are used to enhance these performance implications. Many MNEs use big data and predictive analytics to improve global networking outcomes, and to provide real time feedback, knowledge sharing, and joint learning (Chinn et al., 2014). However, networking is a double-edged sword, as it can help or hamper a firm’s business continuity during extreme disruptions like the pandemic (Verbeke & Hutzschenreuter, 2021). Firms, therefore, need to minimize exposure to resource dependence on foreign vendors or network partners, and to cement essential control over key networking activities. Crisis infers the need to forge managed or controlled networks, and connectivity architecture and intelligence will be instrumental in fulfilling this goal.

Connectivity competence helps to achieve the resilience in organizing global operations. To cope with severe disruptions from the COVID-19 pandemic, for instance, many MNEs have sharpened their digitization-enabled, distinctive ability to anticipate, withstand, and rapidly adapt to or recover from adverse hardships that significantly impede their core business and performance across the world (Pedersen & Ritter, 2020). Some digitally creative MNEs are able to adapt to the crisis by using digital simulation or scenario–decision tools to quickly redesign their connections with foreign subsidiaries and global supply chains (McKinsey, 2020). Frontier subsidiaries in various hubs or countries can move faster to respond locally with the support of connectivity platforms and architecture (Baaij & Slangen, 2013). Also, connectivity competence bolsters the MNE’s ability to resiliently (re)organize their global value chain in a fragmented world.

The third main point pertains to the facilitating role of new connectivity in capability enhancement in terms of knowledge development. We emphasize the concept of connectivity competence in lieu of digital technologies precisely because this connectivity promotes knowledge. Connectivity accelerates globalizing R&D and knowledge flow in addition to facilitating access to new markets in innovative ways. Virtual team members from different units, functions, and countries can work together seamlessly and flawlessly (e.g., cooperation by a diversified R&D workforce in different countries makes co-development or co-design...
much easier; global experts can be immediately called in virtually to help solve problems). Even during a global crisis like the COVID-19 pandemic, a large pool of talent remains able to contribute to global business through digital connections (Choudhury et al., 2020). Many global firms use connectivity to draw on data flows and intelligence generated by human resource management between countries to handle many common administrative issues, while regional or country managers retain discretion over localized decisions such as hiring (Coviello et al., 2017). Globally scaled, cloud-based HR systems offer organizational consistency in talent management. To manage global talent, many leadership teams have established a digital architecture that functions as a complete global solution with multi-country capabilities, enabling them to streamline global processes, comply with local regulations, and quickly adapt to organizational and legislative changes in sourcing, hiring, and retaining best global talent (World Bank, 2016). Moreover, online communities can sustain a virtual organizational form in which knowledge can be diffused among members who share common interests, allowing individuals to add to, and to integrate, knowledge that others have contributed. Connectivity also promotes a shift toward decentralized decision-making, a condition that helps to foster the MNE’s strategic flexibility (Rangan & Sengul, 2009).

The last main point from the framework is that connectivity competence needs organizational support, such as structural agility, visionary leadership, digital mindset, and management support, in order to stimulate MNE performance in the areas noted above. Global connectivity has caused more MNE activities to become geographically dispersed and operationally disaggregated, resulting in more specialized activities that are increasingly finely sliced (Mudambi, 2008) or leading to growing centrifugal forces for MNEs to compete in a turbulent world (Autio et al., 2021). This reminds us that new connectivity alone is far from sufficient in managing complex activities, and that organizational support must be in place to work together with connectivity. Digital connectivity for organizing global operations requires a setting that fosters creativity and rewards employees eager to try out new approaches (Fainshmidt, Nair, & Mallon, 2017). Under management support, and with an agile structure in which the global workforce is recognized for new ideas on a regular basis and predefined processes exist to implement new ideas, sharing and responsiveness are likely to work better (Choudhury et al., 2020). Digital mindset is also important for dispelling a silo mentality (subsidiary silos operate on their own) and a parochial attitude (which views digital connectivity only as technical or ICT) (Gupta, 2018). Reports strongly suggest that global executives need to embrace recognition of digital excellence and organizational transformation to incubate new ways of innovation, learning, and adaptation (McKinsey, 2020). Research shows that digital intelligence and organizational support are coupled to mirror a firm’s ability to carry out novel action in a flexible manner, and to maintain a high level of attention and sensitivity to unexpected disruptions and new risks (Pedersen & Ritter, 2020). Figure 2 outlines our theoretical framework that suggests relationships among connectivity competence, process improvement, and performance implications for MNEs.

**THEORETICAL IMPLICATIONS OF NEW CONNECTIVITY**

New connectivity reshapes numerous IB theories that have long been based on assumptions of tangible, often heavy, barriers involved with flows of physical goods, services, investments, and capital, rather than intangible, less or no, barriers associated with instant flows of ideas, data, and knowledge. This change may upend some important concepts and perspectives in existing IB theories (see a commentary by Monaghan et al., 2020). Chief among them are process-based views (e.g., internationalization process logic), capability-based views (e.g., dynamic capability theory), internalization-based views (see Figure 3).

**Implications for Process-Based View**

The internationalization process theory (e.g., Johanson & Vahlne, 1977) views international expansion as a process involving a series of incremental commitments, assuming that a lack of international knowledge is a major obstacle to the development of international operations, and that the necessary knowledge can only be attained through direct experience with operations abroad. A wealth of empirical findings confirm that international expansion occurs as an evolutionary process shaped by an MNE’s international experience, resource endowment, governing capability, integration requirements, entry barriers, and market conditions (for review, see Vahlne, 2020).
Digital connectivity challenges this process view. This view stressed the criticality of psychic distance, a broad term that captures perceived differences between home and host countries concerning socio-cultural, geographic, economic, and institutional dimensions. As a first major change in the digitally connected environment, distance matters less. To some extent, digital globalization nullifies geographic distance barriers and costs. This distance or diversity can be transformed into positive gains when global connectivity is fruitfully leveraged (Stahl & Tung, 2015). A previous notion that geographic distance between headquarters and subsidiaries increases communication and monitoring costs associated with knowledge flows and parent control (Johanson & Vahlne, 1977) substantially weakens with connectivity. While connectivity cannot completely mitigate the total effect of cultural distance, the importance of cultural barriers can be substantially reduced. Global connectivity makes some MNE functions and activities essentially virtual, shifting a significant portion of fixed costs into variable status through offshoring and outsourcing. This change helps MNEs provide customer value propositions that can effectively solve distance-related problems. Connectivity may also slacken the liabilities of foreignness, in the sense that firms have new, less time-bound ways of acquiring knowledge and of learning about doing business abroad (e.g., firms today can learn enormously about the host country from widely available information resources without physical presence) and establishing local legitimacy (e.g., by radical acquisitions). Of course, culture-specific experiential knowledge and learning, as well as institutionalized organizational practices, remain important. The field of IB scholarship needs to develop a more nuanced view towards the idiosyncratic effects of different process variables amid global connectivity.

Second, incremental commitment matters less. The internationalization process view argues that a multinational’s resource and market commitment to host environments is inherently incremental, and that, through this gradual process, the firm acquires site-specific knowledge (e.g., Pennings

Figure 3  Theoretical implications of new connectivity
et al., 1994). Connectivity enables MNEs to quickly access the upstream and downstream resources of other firms (protected or open), allowing them to provide total business solutions or one-stop total services to global customers, a trendy value proposition model used by many MNEs today (Casadesus-Masanell & Ricart, 2011). In particular, connectivity creates flatness in reaching global customers by linking suppliers and resources, thereby creating ample opportunities for firms to leapfrog (Kumar & Puranam, 2011). Salesforce.com illustrates how a new firm can quickly become a sizable and successful MNE by benefiting from global connectivity, through connecting worldwide customers, partners, and employees in one secure location (CRM platform).

Third, path dependence matters less. Global connectivity creates new types of MNEs and new global players (e.g., digital disrupters and emerging market MNEs) who are generally lean, agile, aggressive, and cost-advantageous (Monaghan et al., 2020). Even the MNE definition or feature has changed. Globalization was once constrained to large, long-established, and often Western economies. The digital form of globalization reduces the minimum scale needed to go global, enabling small business and entrepreneurs (i.e., mini- or micro-MNEs) to expand globally. Digital platforms provide these new players with “plug-and-play” infrastructure, and furnish opportunities to reach a vast built-in global customer base (UNCTAD, 2015). Similarly, startups are more readily “born global,” spurred by the influence of connectivity enhancers, like digital tools, platforms, communication channels, and better connections with international customers, suppliers, capital, industry designers, professional service providers, and even freelancers (e.g., for web development, graphic design, and marketing). These firms have demonstrated the ability to operate fluidly across multiple geographies and diverse product sectors (Cavusgil & Knight, 2015). Digital technologies reduce the time, capital, and minimum scale needed for startups to compete globally. Extant MNE theories have barely probed new types of global players that change the global competitive landscape and the very definition of MNEs, as Cavusgil and Knight (2015) reminded us recently.

Implications for Capability-Based View
A growing body of research highlights the importance and development of dynamic capabilities, as well as the contingencies that can affect such development in international business (Teece, 2014). Scholars have identified three essential clusters of capacities that enable emergence of dynamic capabilities, namely, (1) sensing opportunities and threats, (2) seizing (and neutralizing) them, and (3) reconfiguring organizational processes, resources, and routines (Teece, 2007), together enabling the firm to survive in and adapt to constantly changing environments at home and abroad. New realities in international business make dynamic capabilities more essential to achieve evolutionary fitness. When MNEs engage with new opportunities and threats, it is of utmost importance to assess whether the critical sensing, seizing, and transforming processes have been competently established through the visible hand of senior management (i.e., mega-process) to foster desired outcomes (Verbeke, 2022). Connectivity competence informs decision-makers to improve sensing, seizing, and transforming, fosters the mobilization and deployment of global resources, and cultivates inter-firm and intra-firm sharing. The dynamic capability lens is one important toolbox that IB scholars can deploy when they conduct process-oriented studies (Verbeke, 2022), and new connectivity competence has the potential to strengthen all the major processes of configuring and augmenting dynamic capabilities.

In an era of digital globalization, resource mobilization will hinge more on new connectivity. Capabilities and resources are becoming more globally deployed as connectivity increases (Teece, 2014), since connectivity platforms, technologies, and intelligence enable the MNE to identify where, when, and what capabilities and resources should be deployed in the most productive way, thus helping the firm to reconfigure, maneuver, and repurpose existing resources and capabilities for global operations. Space is no longer an independent, exogenous variable, and we should focus more deeply on the progressive interactions between the MNE’s strategic locations (Cantwell, 2014). Connectivity distributes the firm’s critical knowledge to its foreign units and global workforce, helping these units surmount problems, find complementary skills, and orchestrate the process of new capability development. The geocentric approach becomes essential for capability reconfiguration, deployment, and upgrading (Teece, 2014), and new connectivity augments this approach. That said, specific pathways through which connectivity-based capabilities fortify global resource mobilization remain insufficiently emphasized, indicating a direction for further exploration.
Further, global knowledge and innovation will be more deeply mingled with new connectivity. Many MNE innovations today are intermingled with some forms of digital technologies or connectivity platforms (Ghemawat & Altman, 2014). With connectivity in place, complex interactive systems now evolve in real time across organizations and locations (Cano-Kollmann et al., 2016). The MNE has developed into a knowledge network or community (Kogut & Zander, 1993), but the organization of this community and how knowledge diffuses hinges on connectivity architecture. Lorenzen and Mudambi (2013) conclude that a globally networked innovation process must be predicated on high bandwidth connections that carry both codified and tacit knowledge. Cano-Kollmann and his colleagues (2016) point out that a key objective of MNEs is to codify and systematize tacit knowledge in order to transform specialized, non-repetitive activities into standardized, repetitive processes. Subsidiaries that were previously subservient operating “arms” driven by the headquarters’ “brain” are now generating critical knowledge used throughout the MNE network (Govindarajan & Trimble, 2012). Digital flows become instrumental for this diffusion and development. Moreover, innovation co-evolves with connectivity, such that technological innovation nourishes connectivity while connectivity stimulates business model and marketing innovation. Connectivity provides MNEs with new opportunities to create value by innovatively combining technology, capital, products, brands, brainpower, and other value-creation activities (Nambisan et al., 2019). This co-evolution occurs as an interactive process that reinforces innovation. We caution that the links forged by global connectivity can foment unexpected volatility and give birth to new competitors. Connectivity only speeds up global competition, creating many new arenas with many new competing firms (Schotter et al., 2017).

Finally, connectivity opens more avenues for knowledge sharing. Cross-border knowledge sharing requires three distinct yet interrelated elements: codification, search, and access. Connectivity plays an integral role in implementing and facilitating each of these three elements. First, it increases the degree of codification of knowledge. For difficult-to-codify knowledge, connectivity opens the door to new codification methods. For example, computer or cloud-based blueprints can identify and code limitless amounts of relevant information, and stored information becomes easily searchable and retrievable. For tacit knowledge, such as know-how, procedural knowledge, and personal experience, ICT-enabled methods, such as video and simulation integrated with rich textual narratives, may help facilitate knowledge codification. Moreover, intranets and the internet allow the source and recipients to uniformly adopt ICT-based codes. Further, connectivity enables individuals, units, and organizations to easily access shared knowledge. Unlike “transfer”, which usually entails a unilateral flow of organizational knowledge between a source and a recipient (Szulanski, 2003), “access” emphasizes a pattern of open sharing characterized by multi-party involvement. For example, a firm’s best practices database can be accessed by employees anytime and anywhere. We should acknowledge that some knowledge can be externalized into an explicit or digital form, while other forms will always remain tacit. New connectivity may contribute less to global flows of tacit or sticky knowledge compared to flows of explicit and codified knowledge, but at least advances the communications needed in the dissemination process of the former.

Implications for Internalization-Based View
Internalization is viewed as a governance mechanism for MNEs to exploit and further develop firm-specific advantages (knowledge assets) across national borders, and to overcome the liability of foreignness. Over time, the internalization theory has undergone several revisions and extensions to adapt to some of the changes in the global business landscape, and has led to the development of the new internalization theory (e.g., Benito, Petersen, & Welch, 2009; Buckley, 2009; Hennart, 2012; Rugman & Verbeke, 2003; Verbeke & Kano, 2015). The main thrust of these changes has been to acknowledge the significance of the complementary assets of foreign economic actors in enabling an MNE to exploit its own firm-specific advantages (through novel resource combinations), thereby emphasizing the MNE’s network capabilities, or, more broadly, the dynamics of international governance. As Verbeke and Kano (2015) note, “In contrast to conventional, mainstream internalization theory, the new internalization theory focuses on the dynamics of international governance, whereby value creation hinges on successful knowledge recombination and governance choices (e.g., foreign location and operating mode choices) that are assumed to change over time” (p418).
New connectivity, firstly, accentuates value creation from combining foreign location advantage and governance choice in an adaptive manner. Digitization enables MNEs to rapidly refashion existing pathways and to open new pathways to create value through knowledge recombination, as well as to redefine the very structures that they employ to organize for and manage such value creation with foreign partners in different locations. Thus, the digitization of international business enhances the imperative for more dynamic knowledge recombination and international governance on the part of MNEs (Nambisan & Luo, 2021). Second, new connectivity offers new ways of internalizing through governance choices and orchestration choices. Digital connectivity brings rich potential in facilitating orchestration of intra-MNE and inter-MNE linkages through a digital architecture, vitally and virtually supporting many aspects of coordination, sharing, and mobilization (Banalieva & Dhanaraj, 2019). A viable digital architecture makes the firm’s knowledge and intelligence accessible by its foreign subsidiaries and global workforce. Research shows that this capability advances orchestration of global value chain activities unfolding in different locations (Kano, Tsang, & Yeung, 2020). In particular, connectivity intelligence helps automate these activities and deploy global resources more wisely in a manner that satisfies this automation and synchronization.

Third, connectivity bridges complementarity between internal organizing and external organizing. Nambisan and Luo (2021) document that digital connectivity offers a loosely coupled system, allowing MNEs to maintain both distinctiveness and responsiveness, and thereby inform them how to manage the competing ends between control and adaptability in organizing IB activities internally and externally.

**Implications for Network-Based View**

Most companies operate in a network environment. The fundamental logic of network theory is to allow participating members to achieve cooperative advantages under uncertainty (Gulati & Gargiulo, 1999; Jones, Hesterly, & Borgatti, 1997). To reduce the search costs and alleviate the risk of opportunism associated with networks, organizations tend to create stable, preferential relationships characterized by trust and rich exchange of information with specific partners. Thus, inter-organizational networks are viewed as the emergence of alliance networks as a dynamic process driven by exogenous interdependencies that prompt organizations to seek cooperation, and by endogenous network embeddedness mechanisms that help them determine with whom to build partnerships (Gulati & Singh, 1998). Digital connectivity echoes the network logic, in that organizations create ties to manage uncertain environments and to satisfy their resource needs. Nonetheless, new connectivity differs from the network theory in social embeddedness. The network theory underscores the importance of social exchange. Embeddedness shifts a member firm’s motivations away from the narrow pursuit of immediate economic gains toward enrichment of relationships through trust and reciprocity (Jones et al., 1997). This social embeddedness, however, is generally not a precondition for digital connectivity. Network governance involves a select, persistent, and structured set of governance mechanisms (contractual and relational) to safeguard exchanges, but is not necessarily required by many digital connectivity forms.

New connectivity enriches both internal and external network effects, creating new ways of collecting, collaborating, and combining with peer subsidiaries and ecosystem partners. This connectivity increasingly involves a broader, more diverse, and often continuously evolving, set of network partners, a shift from a predefined, focal agent as the conventional network theory assumed, to a dynamic collection of agents with varied goals, motives, and capabilities (Nambisan et al., 2019). Digital platforms, digital innovation platforms, digital marketplaces, crowdfunding systems, and sharing economy platforms all exemplify such extended network effects. In addition, connectivity fosters networking with new type of network players that have been unattended in conventional network or alliance theory: worldwide consumers, freelance talent, and other players who may contribute open resources at home and abroad. For example, one important economy of linkage is to identify and leverage global freelancers. MNEs today use about 44 million worldwide freelancers (e.g., for web development, graphic design, marketing, training, industry design, dashboard development) as a new source of global talent because of this connectivity (McKinsey, 2020). Superior connectivity capability may ensure success in harnessing global freelancers who are experts in areas in which the multinational is deficient. Open source communities, virtual co-development, and crowdsourcing customer insights form other examples of
this nature. To better serve global customers, digital connectivity also affords MNEs powerful, “unusual” resources or channels. As social media exposes hundreds of millions of consumers from around the world to what is available, products can be launched globally and go viral in unprecedented ways. Finally, in contrast to the network theory assumption, digital connectivity with external partners is less structured and less institutionalized, thus free from boundary-spanning constraints. New connectivity is characterized with high discretion (structural, behavioral, and cognitive) in inter-organizational networking (Nambisan & Luo, 2021).

DISCUSSION AND FURTHER EXPLORATION

Extreme disruptions such as the pandemic and the war present enormous ramifications on international business, especially on global operations. While we do not think that globalization will be reversed, due to continued needs for cross-border resource interdependence and amplified facilitation of digital connectivity, international business will be redefined, reoriented, reshuffled, and restructured at the national, business, and even individual levels. In the post-pandemic era, we expect to see interfered globalization – more complexity, more regulations, and more emphasis on public interests and national security – as well as fragmented globalization – growing geopolitical, economic, and even sociocultural tensions between blocs or countries that are often divided by competing or contradicting ideologies and values. To cope with such unprecedented challenges, MNEs, large and small, need to rethink virtually every strategic foresight to accommodate for the extreme level of uncertainty and disruption. In this new normal, a rigid, deterministic plan will not be the right alternative for long. However, incorporating flexibility into all areas of business may be expensive and possibly lead to inefficient paths. Strategic resilience becomes more important than ever. Digital global connections, and, more importantly, connectivity capabilities, will be central to establishing and harnessing this resilience. Winners will be those vigilantly participating in globalization who control dependency (thus improving immunity) and embrace digital connectivity (thus improving vitality).

In our view, connectivity competence is an essential FSA in a digitally connected world. In fact, the COVID-19 pandemic, in exacerbating geopolitical fractures and giving more credence to anti-globalization movements around the globe, has underscored the need for MNEs to focus more on new ‘relational’ FSAs (Verbeke & Hutzschenreuter, 2021). For example, reliable relationships with global network partners may become more important relative to other FSAs, so as to more easily access location-bound contextual intelligence (Verbeke & Kano, 2015). Connectivity competence will be instrumental in accomplishing this goal. Facing a global disruption, MNEs are also likely to consider more home region-oriented relocation strategies rather than global ones, and to prioritize nearby foreign countries within their home region (Lee & Rugman, 2012; McKinsey, 2020). Connectivity catalyzes this global or regional posture adjustment to respond to disruptions.

As forces of digitization and globalization continue to converge, firms inevitably undergo radical changes, strategically and organizationally. This progression presents enormous research opportunities that can extend our understanding of the nuanced processes of internationalization. First, how does connectivity change the internationalization processes for MNEs that differ in their development stage, international experience, ownership structure, country of origin, firm size, and technological capabilities? Second, path departure or radical change can be destructive (Bock, Opsahl, George, & Gann, 2011). How should MNEs succeed in achieving connectivity-enabled leapfrogs and big jumps, while retaining performance stability and organizational continuity? How does resilience or flexibility work concertedly with connectivity in propelling this process? And third, connectivity does not weaken social, cultural, institutional, or economic distances as significantly as it does a geographical one. How should MNEs take advantage of connectivity in order to capture values from these distances while alleviating the negativity and disturbance that they cause? Table 1 displays more detailed questions.

While recognizing the multitude of opportunities stemming from global connectivity, we cannot ignore the associated risks and challenges. For example, global connectivity makes MNEs more dependent on other actors, and thus subject to contagion from risks that these other actors or firms face. Information security threats, including cyber attacks and cyber crimes, represent a new type of international risk for virtually all MNEs (Luo, 2021; Verbeke & Hutzschenreuter, 2021). Global connectivity has also fostered the emergence and growth
## Table 1  Future research on new global connectivity

| Key topics                                      | Important research questions                                                                                                                                                                                                 | Theoretical contributions                                                                                                                                 |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. **Values of new connectivity**               | How does connectivity affect an MNE’s organizational behavior, structure, and resilience?  
Direct values (communication, integration, sharing, etc.)  
Indirect values (innovation, resource deployment, resilience, etc.)  
Does connectivity reduce liability of foreignness and newness? If so, how?  
How does connectivity help MNEs prepare and respond to global crises?  
Can we identify the processes and mechanisms through which connectivity ameliorates ownership, location and internalization advantages?  
How does connectivity improve flexibility, agility, and adaptation amid extreme uncertainty?  
How does connectivity work together with innovation for global operations?  
Where and when does connectivity prove particularly valuable in launching and harnessing new global business models?  
Will connectivity create value differently between new born global and incumbent firms? | Specify new OLI (openness, linkage and integration) advantages  
Unveil complementarity between new and old OLI advantages  
Develop a connectivity-based value framework that views the MNE as an advantageous organizational form of harvesting digitization |
| 2. **Risks of new connectivity**                | Does connectivity exposure exist? If yes, how can we measure it, and how can we manage this exposure and hedge against related risks?  
New types of IB risks and new uncertainties  
Loose coupling via connectivity  
Managing digital risks in IB  
Overcome digital risks by collective actions  
How should MNEs balance between external ecosystems and self-control? What is the optimal level of dependence on external resources?  
What are effective mechanisms by which to avoid overdependence or overexposure to single or dominant resource providers while still benefiting from network gains?  
How should MNEs globally coordinate with multi-tier external resources suppliers to alleviate overreliance and vulnerability associated with connectivity?  
How should MNEs deal with emergencies and crises caused by connectivity (e.g., cyber attacks, information breaches) or managed through connectivity? | Develop a new perspective of managing interdependence in a globally connected world  
Advance IB risk theory by delineating new types of risk (e.g., information security)  
Present a process view of contagion and ripple effects of global connectivity risk |
### Table 1 (Continued)

| Key topics | Important research questions | Theoretical contributions |
|------------|-----------------------------|---------------------------|
| **3. New connectivity and internationalization process**
Connectivity as a modifier of distance effects
Born global firms
Plug-play micro-MNEs
Digital channels of international entry
Creative ways of reaching global consumers | How can connectivity foster leapfrogging and change the conventional processes of internationalization?
What are the significant differences between traditional MNEs and new types of MNEs built upon digital global connectivity, such as platforms? What ramifications does this have for existing, large MNEs?
How should MNEs use connectivity to capture more value from diversity and distance, and to curb negativity and disturbance from barriers, differences, and distance?
In what specific ways does connectivity significantly change our views and findings toward location, timing, and diversification strategies?
Should we include connectivity as an additional determinant of entry mode choice? How does connectivity affect entry mode? Will connectivity push MNEs toward a more collaboration-oriented process? | A finer-grained view toward the internationalization process in a new global reality
A paradigm shift from distance-centric logic to connectivity-centric logic
A connectivity-enabled innovative, radical process of foreign market entry and global competition |

| **4. New connectivity and global capability**
Role and process of connectivity in fostering MNE knowledge and dynamic capability
Connectivity as an enabler for organizational resilience
Connectivity as an architecture for global resource deployment | How does connectivity accelerate globalizing R&D and other knowledge-intensive activities?
How do connectivity and knowledge development create a virtuous cycle to advance knowledge sharing and upgrading?
What are important structural, behavioral, cultural, and managerial routines, processes, and capabilities that MNEs must possess, and that are complementary and synergetic to connectivity’s value creation?
Can we identify processes by which MNEs use connectivity to search, access, internalize, and integrate critical knowledge that may be challenging to codify?
An MNE is an internally differentiated yet globally integrated community. How should connectivity be properly used to serve this purpose? How can connectivity be employed to generate differentiated identities and mandates of different subunits?
How should MNEs establish connective intelligence and capabilities in identifying and appropriating from open resources and linkages?
Global connectivity bolsters potential values from both externalization (inter-firm) and internalization (intra-firm) advantages. How can the MNE harness such juxtaposed pursuits, and resolve possible tensions or fallout? | An MNE’s connectivity-based capabilities or connectivity competence in organizing global operations
A complementary view toward connectivity and dynamic capability for MNEs
A recursive and reinforcing framework of connectivity and global knowledge
Global connectivity competence as an MNE’s additional core competence |
of many new types of global rivals, especially those on digital platforms. Despite their small size and lack of experience, these players are fast and agile, often adopting a connectivity-enabled business model that allows them to appropriate new and niche customer value propositions. These challenges open a host of important questions for the IB research community to explore. Managing risk forms one of the primary objectives for firms operating internationally. Yet IB scholarship has so far only focused on political, financial, and transactional risks in international business (Luo, 2021), leaving connectivity-related risks largely unaddressed, both theoretically and empirically. Scholars seeking to understand connectivity risks need to define and delineate what these risks constitute, because, as we briefly stated above, they range from risks of overdependence to risks of cyber attacks.

Table 1 (Continued)

| Key topics                                                                 | Important research questions                                                                                                                                                                                                                                                                                                                                 | Theoretical contributions                                                                                           |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 5. New connectivity and organizing international business                  | Connectivity pushes MNEs toward network-based organization, but how exactly does connectivity make MNEs structurally flexible and resilient, while maintaining coupling with network partners? Connectivity changes parent–subsidiary links in many ways. How does virtual (e.g., data, ICT, intranet) monitoring actually work, and how can connectivity help circumvent tensions and conflicts between parent and subsidiaries and between subsidiaries?  How does global connectivity contribute to the I–R balance? In what ways can connectivity facilitate both integration and responsiveness? Can we expect connectivity to be vital regardless of the type of global integration strategy (multi-domestic, transnational, or global)? How is connectivity designed and employed differently under these different global strategies? Connectivity changes the global value chain system. How should MNEs co-develop and co-evolve with their global ecosystem? How does connectivity change an MNE’s location advantages and location strategies? What does it take to create new internalization advantages via global connectivity? | Connectivity-enabled orchestration of global operations Connectivity as a solution to organizing and managing geographically dispersed and operationally disaggregated activities Connectivity as a new channel of global orchestration Connectivity as a compensation for loose coupling |

researchers should delve into a series of juxtaposed or ambidextrous management styles, such as co-development of an MNE and its global value chain, collaboration with global competitors, and managerial control over shared critical activities. Scholars have richly investigated entry modes, but underexplored how multinationals can use these entry modes or governance choices to avoid overdependence risks or overexposure to single or dominant resource providers. Company leaders need contractual and operational flexibility to circumvent these dependence risks, yet how such flexibility is designed and exercised through renegotiations, exit, renewal, shriveling options, as well as through the multi-tier global value chains, warrants future attention. To extend this area of inquiry further, scholars in the IB field may consider strategic or real option theory, diversification theory, and loose coupling theory to explain the processes under which MNEs can blueprint interdependence in global planning and handle
overdependence. This suggestion echoes a recent view that MNEs must be skilful in bundling, organizing, and rejuvenating global resources, knowledge, partnerships, and networks (Lavie & Miller, 2008; Schotter et al., 2017).

IB scholars may be uniquely positioned to examine the ripple effects of information breaches, supply shortage, cyber crimes, disaster-triggered breakdown of the global supply chain, and other external shocks like the COVID-19 pandemic. Computer simulations, complexity analytics, and modeling techniques constantly advance, allowing us to probe such ripple effects and ultimately present a process view of risk spillover under global connectivity. Contagion risk also refreshes the need to study global crisis management for MNEs, as also suggested by Fainshmidt and his associates (2017). Ripple effects of contagion exist in various forms, and are caused not merely by the above reasons but also by other forces, such as corporate wrongdoing, executive malfeasance, and foreign unit misbehavior. We know little concerning global crisis and emergency management, yet these aspects provide great value to the academic and business community to investigate how MNE leaders plan, prepare, and handle crises, which may otherwise have huge contagion effects and cause vast damage to their global reputation.

This study is parsimonious in delineating global connectivity with a focus on digital connectivity that links companies (and their stakeholders) around the globe through flows of data, information, and knowledge (i.e., firm-level connectivity). We did not specify the effect of broader or national-level global connectivity, nor the process through which national-level connectedness affects firm-level. These two levels of connectivity are mutually buttressed (Potrafke, 2015). As the IB field progresses in analyzing global connectivity, it will be natural to diagnose the reinforcing cycle between these two levels, especially on processes and mechanisms through which the latter stimulates the former. This effort will provide more insights to generate a multilevel, cross-disciplinary, and holistic view towards more broadly defined global connectivity.

While we have tackled the general implications of new connectivity on innovation and knowledge flows (corporate to subsidiary, subsidiary to subsidiary, and subsidiary to corporate). A typology or taxonomy, similar to what Gupta and Govindarajan (1991) have proposed regarding the types of knowledge flow and structure within an MNE, may be one of the research directions that could fulfill these goals. Another direction lies in unpacking the unknown elements of connectivity, and unveiling how it can be used to enhance the MNE's market, technology, opportunity, country, and competition intelligence. Such intelligence marks the first step of development in launching global initiatives and building a global value chain (Castellani et al., 2021). It is specifically worth studying how connectivity accelerates globalizing R&D, knowledge process outsourcing, and other knowledge-intensive activities, as well as how the strength solidifies reverse innovation and reverse deployment, a question similarly asked by Govindarajan and Ramamurti (2011).

CONCLUSIONS

International business enters an era of extreme uncertainties and adversities. Yet digital connectivity is a golden thread that ties together worldwide businesses, consumers, and other stakeholders. Opportunities enabled by such connectivity are, however, accessible only to MNEs fully prepared digitally, intelligently, and strategically. This new reality compels IB scholarship to extend and refine existing IB theories, and to embrace new views and insights into global businesses that are changing in an unprecedented, drastic, and fractured manner. The impact of external shocks becomes magnified in an operationally and digitally interconnected world, with digitization itself being a potential source of risks and uncertainties. Connectivity competence, which goes far beyond digital technologies, will determine the MNE’s success in harnessing digitization-enabled opportunities and in managing rising disruptions in a fragmented world.

ACKNOWLEDGEMENT

The author appreciates Professor Alain Verbeke and three anonymous reviewers for sharing their excellent comments and suggestions that help improve revision of this work.
New connectivity in the fragmented world

Y. Luo

NOTES

1 According to the World Bank (2016), there were 914 million individuals having cross-border social media connections and 361 million cross-border e-commerce shoppers in 2014. By 2020, some 940 million online shoppers are expected to spend almost US$1 trillion on cross-border e-commerce transactions. The United States remains as the largest producer of digital content for internet users across the globe.

2 For example, Johnson & Johnson (J&J) analytics capabilities play a critical role during the Covid-19 pandemic crisis. It uses the product flow visualization and risk analysis tools to get those foreign supplies to its manufacturing plants through alternative paths. J&J also uses simulation tools to increase manufacturing capacity, smart glass technology to help quality experts work remotely, global collaboration tools to use real-time data to researchers working on a vaccine, and digital interactions to enable healthcare professionals around the world.

3 Three digital connectivity measures exist to measure a country-level connectivity with other countries. These include (1) McKinsey’s MGI Connectedness Index developed by McKinsey Global Institute 2016 (see Manyika et al., 2016), (2) DHL Global Connectedness Index (Ghemawat & Altman, 2014), and (3) Huawei’s Global Connectivity Index (GCI). These reports reveal that countries, such as Singapore, the Netherlands, the United States, Germany, Ireland, the United Kingdom, and China, top the latest connectivity index. It seems plausible to develop a global connectedness index at the firm (MNE)-level using firm-level data that reflect an MNE’s connectivity technologies, intelligence, and capabilities.

4 The notion of harvesting also acknowledges the importance of in-house development of critical capabilities. However, it addresses the juxtaposed necessity of using global resources outside of the firm, which, when combined creatively and complementarily with existing resources, can create new competitive advantage and faster responsiveness. Japanese MNEs, Sony and Panasonic included, have been struggling to compete globally, not because of lacking in-house development but because of an overly conservative approach to innovatively integrating with external resources and thus experiencing slow market responsiveness.

5 This connectivity allows for the orchestration of a multitude of suppliers or vendors stretching around the world with greater precision and efficiency, opening up new possibilities for procurement. It enables MNEs to synthesize information from sensors, actuators, RFID tags, GSP tracking, and more into up-to-the-minute visibility, helping international managers to grasp accurate and comprehensive information in real time.

6 The COVID-19 pandemic and the war in Ukraine are not the only global crises recently that bring extreme uncertainty and adversity. Other hardships and uncertainties may come from climate change, social inequalities, cyber attacks, global supply chain breakdown, terrorism, geopolitical commotions (e.g., trade tensions), ideological stigmatization and confrontations, and natural disasters, among others.

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Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Accepted by Alain Verbeke, Editor-in-Chief, 2 April 2022. This article has been with the author for one revision.