

Ecosystem-specific advantages in international digital commerce

Jiatao Li¹, Liang Chen²,
Jingtao Yi³, Jiye Mao³ and
Jianwen Liao⁴

¹ Department of Management, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong; ² Department of Management and Marketing, University of Melbourne, Melbourne, Australia; ³ Renmin Business School, Renmin University of China, Beijing, China; ⁴ JD.com, Beijing, China

Correspondence:

J Yi, Renmin Business School, Renmin University of China, Beijing, China
e-mail: yijingtiao@rmbc.ruc.edu.cn

Abstract

We consider the applicability to digital platforms of extant international business scholarship. The organization of digital platforms has been seen to such an extent as predicated upon the bundling of external resources for collective value creation that their expansion may follow the logic of externalization. We further that literature contrasting the governance of network multinationals with that of platform-centric ecosystems. Building on and extending the theory of the ecosystem, we propose the concept of ecosystem-specific advantages. We identify costs and difficulties in the transfer of such advantages to new markets, emphasizing in particular the idea of bottlenecks. We then propose a framework that can be applied to future research on digital platforms, focusing on the users, suppliers of complementary products, and platform firms. We also call for research on the dynamic process of creating, transferring, and upgrading ecosystem-specific advantages.

Keywords: digital platforms; platform ecosystems; ecosystem-specific advantages; Internet commerce

BACKGROUND

International Business (IB) research has over the past 50 years has significantly advanced our understanding of multinational enterprises (MNEs), including how they internalize foreign operations to exploit firm-specific advantages (FSAs). Now the Internet and its related digital tools have phenomenally increased our ability to collect, store, analyze, and share information, thereby reshaping the way that goods and knowledge spread across national boundaries (Alcácer, Cantwell, & Piscitello, 2016; UNCTAD, 2017). Firms that champion the logic of value co-creation are prevalent in the modern digital economy, but have yet to be fully incorporated in IB scholarship.

Digital platforms, from this point on, will simply be referred to as platforms that have a modular architecture and provide an interface that facilitates multilateral transactions and exchanges among users and providers of complementary products and services, i.e., “complementors”. Some platforms (e.g., social networks) operate entirely on data flows, while others (e.g., multi-

sided markets) bundle physical assets and operations with Internet communications (Jacobides, Sundararajan, & Van Alstyne, 2019). Characteristically, they base their value propositions partly on the autonomous and innovative ways in which users employ their technology to provide new content, products, services, and business models. Indeed, they rely to such an extent on that, that the locus of value creation is not inside but outside the platform (Amit & Han, 2017; Parker, Van Alstyne, & Jiang, 2017). Digital transformation has lately been the subject of considerable management research and much of it suggests that understanding platforms and their ecosystems requires new theoretical insights (e.g., Gawer, 2014; Gawer & Cusumano, 2014; McIntyre & Srinivasan, 2017; Nambisan, Lyytinen, Majchrzak, & Song, 2017; Teece, 2018; Yoo, Boland, Lyytinen, & Majchrzak, 2012).

Despite many digital businesses growing internationally from their inception, studies of digitization to date have rarely accounted for this. At the same time, macro-level statistics show that globalization is increasingly driven by data and communication flows while foreign direct investment and cross-border exchanges of goods, services, finance, and people stagnate (McKinsey, 2016; UNCTAD, 2018). Since the Internet can in many cases substantially reduce the cost of deploying FSAs across national borders, many digital firms may be characterized as Born Globals (Hennart, 2014), although some scholars specify that the internationalization of digital firms is constrained by reliance on locally embedded complementary resources (Verbeke, Coeurderoy, & Matt, 2018). Recent IB research demonstrates that platforms offer important opportunities for extending theory (Banalieva & Dhanraj, 2019); scholars contend that the internationalization of digital firms may be beyond the scope of firm-centric logic, being driven more by user interaction than by unilateral firm commitment (Brouthers, Geisser, & Rothlauf, 2016; Chen, Shaheer, Yi, & Li, 2019; Coviello, Kano, & Liesch, 2017; Shaheer & Li, 2018).

In advancing this research, we show that platform-based inter-firm cooperation has unique characteristics that fall outside the scope of established internalization theory and the conventional understanding of FSAs. Moreover, the cooperative relationships essential to platforms are not fully addressed in network theories of the MNE, being better described from an ecosystem perspective. Platform-centric ecosystems are distinctly different

than MNE networks. Our contribution to the literature is threefold. First, we draw insights from the digitization literature then use these insights to inform IB theory. Second, we conceptualize *ecosystem-specific advantages* (ESAs) and describe the *bottlenecks* that restrict their transfer and exploitation. Third, based on the framework shown in Figure 1, we propose three avenues for future IB research. We also propose research questions on the dynamic process of upgrading ESAs (Figure 2).

INTERNALIZATION THEORY AND DIGITAL COMMERCE

Internalization Theory and Digital Platforms

Applying transaction cost analysis to the boundary of the multinational enterprise, internalization theory has been characterized as a general theory of how firms expand abroad (Buckley & Casson, 1976; Hennart, 1982; Rugman, 1981), according to which internationalization is driven by firms seeking to exploit their FSAs in knowledge and other intermediate products. FSAs, whether rooted in knowledge-based intellectual capital or market-based intangible assets, may be viewed as isolating mechanisms that allow MNEs to appropriate rents in foreign markets (Rugman & Verbeke, 2002). Internalization theory predicts the form internationalization will take based on the comparative efficiency of governance mechanisms in the exploitation of FSAs. When transactions can be organized more efficiently using an internal cross-border market than an external market, the likely outcome will be a vertically integrated enterprise (i.e., an MNE).

In the “new” internalization theory, emphasis shifts towards the recombination, or bundling of existing FSAs with country-specific advantages (CSAs) available in a host country (Hennart, 2009; Verbeke, 2009), and this results in a distinction between location-bound (LB) and non-location-bound (NLB) FSAs (Rugman & Verbeke, 1992). NLB FSAs are generated by strong intangible assets that a firm owns or controls that can be deployed and exploited internationally at low cost, often associated with upstream capabilities. Such assets, technology for example, can be exploited with little local adaptation. In reality, managers tend to overestimate the true transferability of FSAs and underestimate the extent of resource recombination required to exploit them abroad (Rugman & Verbeke, 2008). Location boundedness is the result

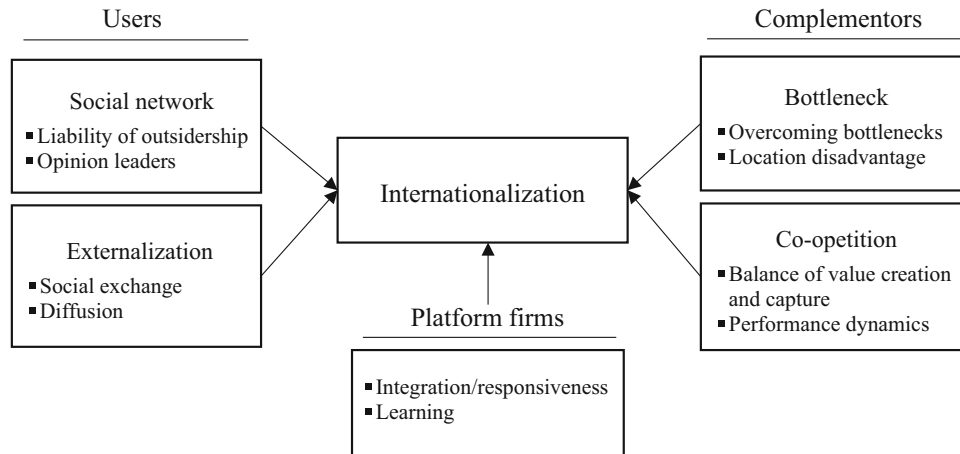


Figure 1 Framework of digital platform internationalization.

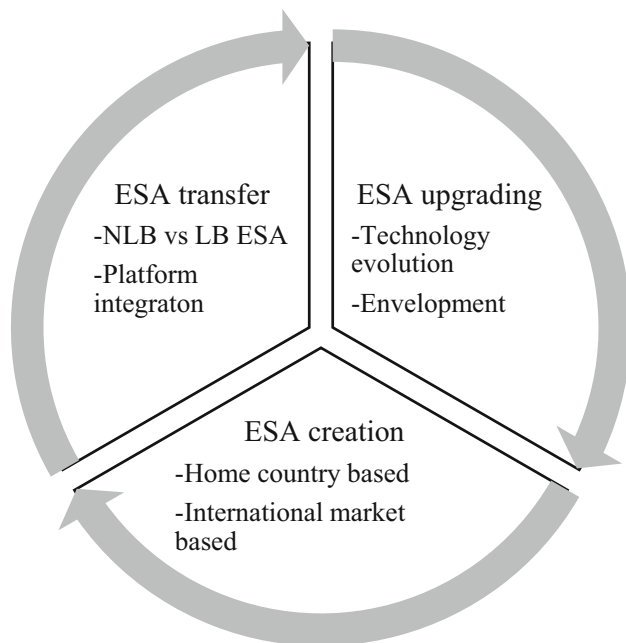


Figure 2 Dynamic process of ESA upgrading.

of value erosion across geographic boundaries (usually national borders), thus LB FSAs are often associated with downstream capabilities (Rugman & Verbeke, 2008).

Platforms call for a reconsideration of this view. A platform can be viewed as a stable set of common technological assets and standards used across a product family (Thomas, Autio, & Gann, 2014). Platforms are usually enabled by modular design principles that allow for functionality to be extended to third-party complementors who leverage standardized interfaces to create and exchange their own complementary products (Gawer &

Cusumano, 2014). This is true of social networks like Facebook and TikTok, e-commerce websites such as Amazon and JD.com, sharing economy systems akin to Uber and Airbnb, and content distributors including app stores and their associated platform technologies. Platform organization reduces bounded rationality to some extent by delegating the production of localized content to local complementors, while at the same time partly constraining bounded reliability through review systems.

An underlying assumption of internalization theory is that firms possess the FSAs needed (Rugman & Verbeke, 1992). That idea continues to be the cornerstone of the international expansion of firms in the digital age, platform firms being no exception. Potential adopters evaluate a platform's technology based on the perceived performance of whatever subset of attributes is significant to them (McIntyre & Srinivasan, 2017; Tellis, Yin, & Niraj, 2009). This means that in general more innovative features and functional improvements will lead to a perception of better quality (Zhu & Iansiti, 2012). As in any high-tech industry, platform quality is likely to be a function of firm-specific technological capabilities, which can help firms claim market leadership (McIntyre, 2011; Sheremata, 2004). IB research confirms that platform quality is positively associated with the likelihood of penetration in foreign markets (Chen et al., 2019).

In addition, platforms derive advantages from network externalities, or so-called network effects (Katz & Shapiro, 1986). More users attract more complementors due to demand-side scale economies, and vice versa. A positive feedback loop can form that can potentially result in a winner-take-all

outcome (Cennamo & Santalo, 2013; Sun & Tse, 2009). Network effects may be international. The complementary products on Airbnb, i.e., accommodation, inherently appeal to travelers. A global user-complementor network allows Airbnb to exploit demand-side scale economies and to fend off competition in global markets (Zhu & Iansiti, 2019). When transactions in a multi-sided market are tied to physical components (Lanzolla & Frankort, 2016), upstream production and downstream consumption may be structurally inseparable. In such cases, platform users and complementors need to be co-located geographically (Li, Shen, & Bart, 2018), and network effects are location-bound. In general, though, researchers agree that a platform's installed base is a key source of competitive advantage (Shankar & Bayus, 2003).

There are two distinct characteristics of digital platforms that fall outside the scope of internalization theory. First, the exploitation of FSAs by platform firms follows an externalization logic (Chen et al., 2019) and hinges on the bundling of external, complementary assets owned and controlled by autonomous complementors (Nambisan, 2017; Parker et al., 2017). To facilitate the diffusion of its platform technology, a firm may share with partners, or even relinquish to them, the rights to access and to distribute the technology on which the platform is based (Schilling, 2009; West, 2003). The rapid global adoption of the Android platform was largely the result of Google's decision to share Android's code with mobile handset makers and to make available to app developers additional platform resources (e.g., application programming interfaces and software development kits). Baidu, one of China's Internet giants, also introduced an open-source platform, Apollo, which allows auto makers worldwide to develop autonomous driving systems. Internalization theory tends to view the ability of MNEs to overcome liabilities of foreignness as stemming from their *proprietary* ownership of intangible assets, which makes their FSAs unavailable to competitors in host nations (and hence creates isolating mechanisms). Platform firms, on the other hand, are motivated to grant platform access to a range of external actors in order to initiate network effects (Boudreau, 2010), sometimes to the extent that even the installed base is not firm-specific. The same user or complementor can voluntarily affiliate with multiple platforms, i.e., engage in multihoming, to take advantage of the incentives offered by rival platforms and guard against ex post platform

expropriation (Cennamo, Ozalp, & Kretschmer, 2018; Landsman & Stremersch, 2011). Many app developers create the same apps for both iOS and Android, and many drivers offer their services via Uber as well as Lyft. Thus, the conventional understanding of FSAs no longer fully explains the advantages associated with complementary assets and an installed base.

Second, a primary motivation for organizing as a platform is to leverage the generative potential of distributed innovators while at the same time benefiting from economies of co-specialization (Nambisan, Siegel, & Kenney, 2018; Thomas et al., 2014). Partner firms not only help to promote a platform's technology, they also can augment it in ways that better meet the immediate demands of their own customers. For instance, mobile handset makers have developed various customized versions of Android that reflect their differentiated product market strategies. Internalization theory, by contrast, focuses on the relative efficiency of governance mechanisms and concerns itself mostly with the capture of rents earned in value-adding activities (Buckley & Strange, 2015). While the ability to recombine resources is considered MNEs' highest-order FSA (Verbeke, 2009), extant research concentrates on conditions for exploiting predefined FSAs – not creating new intangible assets. This is not the case, however, with Sony and Amazon e-book readers. Their competition is shaped by their core technology, specifically their unique bundles of co-specialized, complementary assets, including content and network services (Liao & Cui, 2016). Platforms differ from MNEs in that the value co-created by partners may decay internationally, even if the platform's own proprietary assets do not (Zhang & Sarvary, 2015). Research suggests that user-generated content on platforms is often tied to users' locations (Shriver, Nair, & Hofstetter, 2013). These observations lead us to the following implication:

Implication 1: To account for externalization and positive externalities associated with digital platforms, IB theorists need to examine the bundling of co-specialized resources and the value co-creation resulting from such bundling.

MNEs and Platform-Centric Ecosystems

To be sure, internalization theory has paid due attention to MNEs' external resources from an inter-firm network perspective. Some see the MNE as a global factory (Buckley & Ghauri, 2004) or

flagship firm (Rugman & D’Cruz, 1997) which constructs a hub-and-spoke network in order to orchestrate geographically dispersed value-adding activities along global value chains (Kano, 2018). MNEs organize production networks to access and internalize partner knowledge (Gulati, 1999; Li, Tian, & Wan, 2015; Li & Xie, 2011). The capacity to do so, along with the ability to capture value created by external resources, is the result of the brokerage position MNEs occupy which can ensure that partner knowledge flows through them. Network theories have been proposed that seek to explain how the hub firm manages cooperative relationships with spoke partners in light of their interdependence (Rangan & Sengul, 2009).

Platform-based networks require a new way of thinking, as they differ from conventional inter-firm networks in important ways. Network theories based on transaction cost analysis address the governance mechanisms that MNEs can use to control the behaviors and strategic directions of partners. The goal of the MNE is to minimize its bounded rationality and partner bounded reliability without necessarily requiring ownership (Verbeke & Greidanus, 2009). Recent research documents how control of production, knowledge, and innovation along the value chain can mitigate performance failures and minimize inefficiency under various conditions of power asymmetry and information codifiability (Kano, 2018; Strange & Humphrey, 2018). In contrast, control of platform architecture – the very infrastructure upon which the platform is built – gives platform firms gate-keeping rights and a highly asymmetric level of power over a host of replaceable complementors (Boudreau, 2010; Parker et al., 2017). Hence, the main goal of platform governance may not be circumscribing the conduct of complementors, but rather incentivizing those loosely coupled ecosystem partners.

IB theories stress the ability of MNEs to recombine existing resources with new knowledge from outside the firm. Indeed, the capacity to do this is considered to be critical for international competitiveness (Rugman, Verbeke, & Nguyen, 2011). To achieve this, the hub or flagship firm sits at the nexus of platform relationships, keeping its partners separate from one another to maintain brokerage advantages. Thus, network theories address how hub MNEs can leverage tacit knowledge embedded in their inter-firm linkages so as to extract a higher proportion of any rents being generated (Strange & Humphrey, 2018). Platform

firms on the other hand exist to facilitate exchanges among users and complementors by eliminating the middleman, enabling instead interaction among users far apart in the social network. A platform’s effectiveness depends on the extent to which it can reduce – or at least contain – market failures and, more importantly, maintain partners’ continued investment in the focal platform (Nambisan & Sawhney, 2011).

Hub-and-spoke networks work well in stable environments where the roles of transacting firms are clearly defined. The hub MNE can employ a mix of ownership strategies to achieve optimal organization. However, unlike in traditional buyer–supplier networks, platforms draw resources from unknown complementors that are beyond its direct control (Parker et al., 2017). Platform firms do not know beforehand what kind of resources and capabilities will need to be leveraged (Furr & Shipilov, 2018). Moreover, complementors can choose to associate or dissociate themselves from a given platform at any time. Such uncertainty creates significant difficulty for platform firms, unable as they are to rely on contractual or relational governance. We contrast in Table 1 platform-based networks and conventional inter-firm networks.

The assumption implicit in most network theories is that value-adding activities can be fine-sliced, each organized by the most efficient mode. In the aggregate, an MNE seeks least-cost coordination of the disaggregated value chain, often lower than the sum of independent investments. Platform organization is based instead on the premise that value creation requires multiple co-specialized partners whose coordination will yield higher returns (Boudreau, 2017). Unlike networked MNEs which seek to control the strategies of their value chain partners and to shape the strategic options open to them (Kano, 2018; Rugman & D’Cruz, 1997), platform firms can embrace the innovations and complementary offerings of partners even though they may fall well outside the directions they expect. This is in part because of the nature of digital innovations that rely as much on *ex post* iteration and reconfiguration as on *ex-ante* planning (Ansari, Garud, & Kumaraswamy, 2016; Nambisan et al., 2017). The task for internationalizing platform firms is to continually improve the value proposition of their entire ecosystem (Helfat & Raubitschek, 2018), rather than to minimize the cost of dyadic transactions. These observations lead us to frame the following implication:

Table 1 Ecosystems versus networked firms

	Ecosystems	Networked firms
Premise	Value creation requires multiple co-specialized partners. A coordinated market yields higher returns	Firms are embedded in a network of relationships. Coordinated production yields lower costs
Challenge	Create greatest value for the platform ecosystem as a whole	Achieve least-cost coordination of disaggregated and geographically dispersed value chain activities
Structure	Multilateral The ecosystem leader acts as an orchestrator	Hub and spoke The hub firm acts as a broker
Partners	Autonomous actors possess complementary assets and come from diverse industries	Upstream and downstream partners at different stages of the same value chain
Objective	Align interdependent partners Co-create value for the entire ecosystem	Access resources that reside in the network Capture value for the hub firm

Implication 2: Internationalizing platform firms need to enhance system-level coordination of co-specialized partners beyond the scope of their organizations, beyond the traditional boundary of their industries, and beyond the borders of their home nations.

Ecosystems as a Mode of Cooperative Governance

The ecosystem perspective better describes platform organization structures than traditional theories. Ecosystems can be seen as comprising a multilateral set of autonomous firms that collaborate to realize a value proposition (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018). In the case of digital businesses, this typically means firms from different industries specializing in different domains of expertise (Thomas et al., 2014). They might provide hardware devices, networks, software services, or content (Yoo, Henfridsson, & Lyytinen, 2010). The platform firm coordinates the activities of the ecosystem participants via loosely coupled cooperative relationships centered on the platform (Kapoor & Agarwal, 2017; Tiwana, 2015). The internationalization of digital platforms largely depends on whether platforms can attract ecosystem participants in local markets and align their goals with those of the platform (Ojala, Evers, & Rialp, 2018).

We view ecosystems as a governance mechanism for cooperative relationships (Table 2). The ecosystem perspective can address transaction conditions commonly seen in the digital economy but normally left unnoticed by internalization theorists who study networks. According to internalization theory, standard manufacturing interfaces and the absence of relationship-specific investments are conducive to externalization (Buckley, 2009). When the products are modular (i.e., using standard manufacturing interfaces), different

components are often produced by autonomous partners concurrently without knowing the detailed workings of other interdependent components (Baldwin & Woodard, 2009; Schilling, 2000). At “thin crossing points” of the network, where one production system connects with another, knowledge flow is limited and relationship-specific investment not required (Baldwin, 2008). Embedded governance is seen as effective at such low levels of coordination (Sanchez & Mahoney, 1996). For example, online payment solutions such as PayPal and Alipay are integrated into various digital commerce platforms through application programming interfaces while both parties remain relatively independent. This reduces the need for direct coordination of development processes and lowers the cost of transferring tacit knowledge (Kotabe, Parente, & Murray, 2007).

When production follows an integrated approach – one featuring high interdependence between components – and involves limited relationship-specific investment, development processes need to be coordinated, and some overt managerial negotiation is required to transact for components. A tenet of internalization theory is that contracts and price mechanisms are effective in governing such cooperative relationships (Strange & Humphrey, 2018). Information technology further reduces a manufacturing firm’s need for transnational integration and favors an arm’s-length exchange with value chain partners (Rangan & Sengul, 2009). Similarly, in expanding into international markets, firms like Netflix may need to negotiate licensing deals with production studios and other content providers on a country-by-country basis. When integrated production requires relationship-specific investments, firms tend to engage in alliances in which relational governance can curtail the problems of bounded rationality and opportunism

Table 2 Governance modes for cooperative relationships

	Generic investments	Relationship-specific investments
Modular (concurrent and autonomous development of components)	Embedded governance	<i>Ecosystem governance</i>
Integrated (interdependent components along the value chain)	Contractual governance	Relational governance

(Kano, 2018). By partnering with Google, JD.com, a leading Chinese e-commerce platform, can combine its logistics and supply chain capabilities with Google's technological expertise in handling payments, order processing, and managing platforms. This allows JD.com to challenge Amazon's dominance in international retail markets. These kinds of transactions fall squarely within the realm of internalization theory and transaction cost thinking.

However, internalization theory cannot account for the modularity and the relationship-specific investments that platform firms often face. On the one hand, modular architecture allows for collaborative innovation and production in platform ecosystems (Schilling, 2000). Complementors can determine whether and when to participate in a platform ecosystem by bundling their offerings with other complementary assets, all without a close networking relationship with the platform (Baldwin & Hippel, 2011; Ojala et al., 2018). Research shows that product modularity in technology industries substitutes for relational governance in organizing the contributions of culturally distant partners (Lew, Sinkovics, Yamin, & Khan, 2016). On the other hand, complementors must customize their offerings to the specifications of the ecosystem, including the requirements of all the other ecosystem participants upon which the functioning of the complement depends (Adner, 2017). Achieving complementarity may require some platform-specific, non-fungible economic and learning investment due to asset specificity in product development (Jacobides et al., 2018). Such costs are often ongoing and non-contractible, which may discourage potential complementors (Cennamo et al., 2018; Ozalp, Cennamo, & Gawer, 2018). From the perspective of internalization theory, the concurrence of modularity and relationship-specific investment is paradoxical in that modularity reduces the need for explicit coordination while relationship-specific investments can be expected to increase such needs. From the ecosystem perspective, on the other hand, platforms can simultaneously open the ecosystem to outsiders

and use modularity as a coordination tool. This leads us to a third implication.

Implication 3: The internationalization of platform ecosystems is predicated on relationship-specific investments made by loosely coupled participants; some may join the ecosystem from a host country, and others need to customize their existing offerings to maintain the level of complementarity with local complementors in the host country.

ECOSYSTEM-SPECIFIC ADVANTAGES

The Components of Ecosystem-Specific Advantage

Ecosystems are organized around a final value proposition. A firm in an ecosystem is able to create value only when all the complementary components are present (Adner & Kapoor, 2010). E-commerce platforms function as a digital marketplace with coordination among sellers, online payment providers, logistics providers, and customer relations staff. Complementors not only benefit from platform value creation but are instrumental in achieving it (Amit & Han, 2017). To be sure, the bundling of NLB FSAs with immobile assets or intermediate products is widely accepted (Rugman & Verbeke, 2003); but platform firms have rather limited standalone advantages (or NLB FSAs) without complementary assets. This is why Uber's matching algorithm and brand equity did not provide sufficient competitive advantage in China. Furthermore, given the distributed knowledge held by complementors, the locus of innovation in platform ecosystems may well lie outside the platform firm (Parker et al., 2017). It would be misleading to focus too much on platform firm FSAs, as improving technological performance (a key FSA for such firms) can increase development challenges for complementors and discourage them from innovating, thereby damaging the value proposition of the ecosystem as a whole (Ozalp et al., 2018).

More importantly, various actors within the ecosystem are supermodular complements – one actor made more valuable by the activities of another

(Jacobides et al., 2018). For instance, a logistics firm's investment may increase the range of products that sellers can offer. That might in turn draw in still more buyers, creating additional value for all parties. Platforms often seek to diversify into various lines of business for similar reasons. Amazon's cloud computing services help to draw to its online marketplace third-party traders with limited IT capabilities of their own, while its smart devices and cloud-based voice services can improve the customer experience and perhaps reduce shopping on multiple platforms (i.e., multihoming). Thus, Amazon retains users through ecosystem externalities. Hence, competitive advantages in digital commerce do not derive solely from platform firms' internalized knowledge, but arise in part from positive externalities among co-specialized complementary products. Competition between the standalone products and services of flagship firms has given way to competition between platform-centric ecosystems in which multiple actors cooperate to create value (Thomas et al., 2014). In this case, it is more useful to speak of ecosystem-specific advantages (ESAs) rather than traditional FSAs.

The ESA is a composite construct comprising three distinct but interrelated components. The first is heterogeneous resources and distributed innovation contributed by ecosystem participants, including user-generated content (Sun & Tse, 2009). The greater the amount of complementary resources, the greater the ecosystem's value. Indeed, such resources may consist of individual complementor FSAs. The second ESA component arises from cooperation among ecosystem participants. Users are more likely to stay with an ecosystem with greater supermodular complementarity than one containing homogenous or unrelated activities, and complementors too are more likely to want to bind with and invest in such ecosystems because their offerings are made more valuable by other actors and their activities. Network effects are a special case of supermodular complementarity with the strength of network effects being a function of the number of "hit" complements or the diversity of complementors (Boudreau, 2012; Zhu & Iansiti, 2012).

The third component is somewhat different. While IB theorists implicitly segment the inter-firm ties in a production network into bilateral relationships, the ecosystem approach emphasizes multilateral interdependence among ecosystem participants (Adner, 2017). The relationship between sellers and logistics firms may, for example,

inadvertently affect the relationship between sellers and buyers. There is asset specificity not only in platform-complementor dyads, but also at the system level. Complementors are autonomous and pursue their own goals. They may well act without regard to – or even against the interests of – the ecosystem as a whole. Without explicit intervention, autonomous participants may fail to prioritize complementarities, resulting in opportunities to create positive externalities being missed. Hence, the third ESA component is governance, i.e., rules and actions by which platform firms manage the interdependent relationships of ecosystem participants and align their behaviors (Helfat & Rautbitschek, 2018; Iansiti & Levien, 2004). Governance may take the form of formal rules addressing pricing, subsidies, and gatekeeping. It may also involve more subtle "nudges" including certification, selective promotion, and knowledge sharing (Rietveld, Schilling, & Bellavitis, 2018). Platform governance provides access, support, guidance, and incentives to various ecosystem participants (Tiwana, 2014). Table 3 summarizes ecosystem categorization. These discussions lead us to propose the following implication:

Implication 4: To outcompete local and international rivals, platform-centric ecosystems need advantages arising from a greater range of external resources, positive externalities among their activities, and effective governance that keeps ecosystem participants aligned with the interests of the ecosystem.

Transferring ESAs Across Countries

When an MNE relocates production or customizes products for a new market, transaction costs may arise from bounded rationality, i.e., whether the hub is able to coordinate efforts, or from bounded reliability, i.e., whether the "spokes" remain compliant (Kano, 2018; Verbeke & Greidanus, 2009). Similarly, ecosystem leaders, i.e., platform firms, may suffer from limited information processing capacity, which hampers their ability to effectively respond to the ways in which interdependent relationships with local ecosystem participants can vary across countries. In fast-changing digital industries, bounded rationality can arise when multilateral interdependence within the ecosystem impairs the platform firm's *ex ante* coordination. An ostensibly well-designed platform may have organizational features in one location that complementors in another find undesirable. Bounded

Table 3 Components of ecosystem-specific advantage

Ecosystem component	ESA	Example
Resources	Complementary assets and distributed innovation by ecosystem participants	Airbnb's global accommodation offerings
Structure	Complementarity and positive externalities between ecosystem participants	Mutually reinforcing synergy among Amazon's lines of business
Governance	Rules aligning the participation of autonomous actors	Google Play's annual best practices awards recognizing app developers using Android

reliability can also intrude. Exogenous changes in one participant, e.g., a payment processor, can paralyze the entire ecosystem. Participants are rarely bound exclusively to a single platform; in fact, many tend to multihome, which allows them to quickly reverse their commitment if they find new and better opportunities for value co-creation and value capture in other ecosystems. Ecosystem participants might also choose to depart from an original course of action and when doing so will prioritize their own goals over ecosystem interests. Multilateral interdependence means that one actor's multihoming or switching may have repercussions for overall ecosystem alignment, thus damaging ESAs. In such cases, the cost of transferring a platform firm's ESA to another country consists in realigning the contributions of ecosystem participants without suffocating their commitment to innovation or discouraging them in other ways. For ecosystem participants, ESA transfer costs arise from the need to increase ecosystem-specific investment in order to maintain the same level of complementarity with new local partners.

An MNE's FSAs can compensate for the liability of foreignness, but the transfer and exploitation of FSAs is conditioned by cultural and institutional entry barriers (Rugman & Verbeke, 2004). In addition to cross-country distance, which gives rise to bounded rationality and bounded reliability, expanding an ecosystem usually also means encountering *bottlenecks*. Hannah and Eisenhardt (2018: 3172) single out bottlenecks as "...the component that most constrains the growth or performance of the ecosystem due to poor quality, poor performance, or short supply." Unlike structural holes in a network of inter-firm ties, bottlenecks have to do with technical performance. In a structure of complementarity and multilateral interdependence, they impede the exploitation of ESAs, thus interfering with all the other ecosystem participants delivering the focal value proposition (Adner & Kapoor, 2016). A platform firm that seeks

to extend its ecosystem into new markets – especially foreign ones – will find that constraints on ecosystem growth differ from place to place; bottlenecks may arise from weaknesses in local infrastructure or a lack of complementary assets (Ojala et al., 2018).

Networked MNEs reduce transaction costs by forming close relationships with partner firms. They restrict the number and diversity of their transaction partners to better direct the access, accumulation, dissemination and sharing of knowledge across the value chain (Kano, 2018). In the process, they generate stronger relational capital, which can safeguard existing exchanges. Granted, this kind of narrowing of boundaries may apply to bottlenecks, but it seems to defy the logic of a platform and its ecosystem, as it would risk impairing the externalities that depend on diversity and the comparative advantages of independent complementors (Boudreau, 2017). The lock-in effects commonly associated with platforms imply that the value created through network externalities significantly outweighs transaction costs (Amit & Zott, 2001). By extension, the goal should be to enable greater value co-creation in the ecosystem in order to offset any incremental transaction costs. One could argue that the success of a platform ecosystem ultimately depends on the positive externalities it can create for various participants. They may not materialize without the active coordination of platform firms (Hagi, 2014). Hence, platform firms may seek to widen, rather than restrict, the array of transaction partners in attempts to augment network effects (Boudreau, 2012). Ideally, that also improves knowledge spillovers among the complementors (Parker & Van Alstyne, 2018). There is no doubt that cost control through boundary narrowing is important, but boundary-widening for value creation also has merit, as it facilitates the exploitation of ESAs in new markets. These observations lead us to propose the following implication:

Implication 5: The transfer of ESA is constrained by bottlenecks which interfere with the functioning of the ecosystem in a new market. Both cost reduction and value creation approaches may help mitigate bottlenecks.

DIRECTIONS FOR FUTURE RESEARCH

We provide an integrative framework that synthesizes the latest IB studies and our conceptualization. Using it, we propose a direction for future research on platform internationalization. We begin with the user side, emphasizing social network structures and the concept of externalization, then discuss in more detail bottlenecks and the co-competition between complementors and platform firms. We then consider platform firms, i.e., the ecosystem leaders, outlining their challenges and the strategies they might use to tackle them. Finally, we discuss how ESAs evolve in response to changing international environments. Figure 1 illustrates our platform internationalization framework.

Platform Users

Users may derive considerable benefits from a platform with a growing user base. That draws them to a platform without necessarily requiring the platform firm's market commitment. Extending network effects internationally does not always go smoothly, in part because platforms often face liabilities of outsidership (Brouthers et al., 2016). Rather than creating an integrated global network, a platform's ecosystem may become fragmented into local clusters that seldom interact with one another (Zhu & Iansiti, 2019). For instance, increasing the number of Uber drivers in one city does not influence users in another one, rendering limited indirect network effects across geographic units. In other words, demand-side scale economies cannot always preempt local competition, meaning it is unlikely that the result will be winner-take-all on an international scale. At least some of the ESAs are location-bound.

Even fully digital platforms may be confined to one or a few national markets, as user interaction is usually defined by the immediate natural and social surroundings, thereby generating localness in network effects (Shriver et al., 2013). The preferences of online users tend to be influenced to a greater extent by strong ties, like social network friends, than by the population at large, and still less by foreign users (Suarez, 2005). Thus, social distance

among users may hamper the realization of network effects and impede a platform's market penetration (Lee, Song, & Yang, 2016). Nonetheless, there are ways to mitigate liabilities of outsidership. For instance, a platform firm might enlist opinion leaders to appeal to a broader range of potential adopters. This line of reasoning points to a new internationalization mechanism for platforms based not on the internalization of intermediate products but on the logic of externalization (Chen et al., 2019). This assumes that in addition to economic considerations, the social exchanges of users can drive the process of internationalization (Coviello et al., 2017). In sum, internationalization may come about as a result of spontaneous user interaction, and that may lead to a diffusion trajectory unanticipated by the platform firm *ex ante*. Since the demand side has been relatively under-represented in IB theories, future studies might fruitfully dive deeper into the mechanisms by which users influence the pace and scope of a platform's diffusion and explore how platform ecosystems can leverage social network structures to enhance international success. These observations lead us to propose the following question:

Research Question 1: How do the drivers and mechanisms underlying the international diffusion of digital platforms differ from those affecting the internationalization of MNEs?

Platform Complementors

According to conventional IB theory, firms use the mode of foreign entry that maximizes the exploitation of their FSAs in response to cross-country distance. We suggest that complementary asset bottlenecks are another foreign market entry barrier for platforms. One strategy to overcome them is to follow a boundary-narrowing approach and occupy the bottleneck (i.e., produce the bottleneck component) and exercise market power to coordinate ecosystem participants (Gawer & Henderson, 2007). For example, Fulfillment by Amazon can be used by third-party sellers in a number of countries where logistical constraints are a key bottleneck for e-commerce. Once sellers depend on Amazon to "pick, pack, ship and provide" they become less likely to defect (i.e., to multihome). Thus, rather than attempting to internalize the activities of every possible cooperative actor based on dyadic transaction costs, platform firms may specialize in resolving the most critical bottlenecks that hamper ecosystem operations. Such an approach is likely to

be most effective when dealing with uncrowded bottlenecks, as in that case complementors are obliged to cooperate given a limited selection of partners in the bottleneck position.

Moreover, bottlenecks may move away from the original position during industry evolution (Hannah & Eisenhardt, 2018). That renders vertical integration designed to deal with them less universally desirable. An alternative strategy, also following a boundary-widening approach, is to incentivize complementors to enter the activity that is causing the bottleneck while improving their capabilities. Prior research suggests that bottlenecks determine where innovation resources should be focused (Ethiraj, 2007). Platform firms may devote resource support to complementors who have occupied the bottleneck position of the ecosystem, or subsidize prospective complementors to enter the bottleneck (Katz & Shapiro, 1986). If there are multiple bottleneck breakers, no single complementor, or limited number of them, will be able to unduly exploit a position to capture value, thereby reducing the likelihood of hold-up and misalignment of cooperative relationships. This is especially effective if the bottleneck components are also highly complementary (i.e., having greater externalities) to a wide range of ecosystem components (Jacobides, Knudsen, & Augier, 2006). Go-Jek, one of the leading digital firms in Southeast Asia, serves as a good example. It has recruited more than a million motorbike drivers in a bid to solve traffic congestion. Drivers for Go-Ride (Go-Jek's ride-hailing platform) also deliver small parcels for Go-Box (its courier service) during off-peak hours to supplement the ecosystem's delivery capacity.

These approaches may involve continual adaptation, as bottlenecks shift from one position to another across host countries and also over time. In other cases, bottlenecks cannot be overcome. Some sharing economy platforms may require a sizable population density to generate the network effects essential for their business models. Many are critically dependent on adequate digital infrastructure, well beyond the realm of the platform firm (de la Torre & Moxon, 2001). This means that there are certain locations that are less desirable for platform internationalization. In much the same way as host-country institutions can erode the value of FSAs, the transfer of ESAs is affected by location and bottlenecks. Identifying those may be the first step towards understanding when, where, and how platform firms internationalize.

MNEs seek to exploit their FSAs partly based on the positional advantage they enjoy in a production network. Platforms, in contrast, seek to expand ESAs by cooperating with other ecosystem participants to create value. This is not to deny that ecosystem leaders, typically platform firms, and ecosystem participants are co-creators of value but competitors in value capture (Brandenburger & Nalebuff, 1996). Platforms may indeed imitate the products of complementors and foreclose their access to consumers in an attempt to appropriate more co-created value (Zhu & Liu, 2018). This creates a dilemma; deploying ESAs in a foreign country does not necessarily lead to short-term profits, yet efforts to improve profits may involve the platform firm expropriating rents from complementors. That would ultimately undermine ESAs. Thus, platform firms may forgo short-term profits and instead pursue growth and market dominance. This explains why the international performance of a digital platform may be vastly different depending on whether value creation or value capture is the prime objective. Various alternative performance metrics (e.g., scale, scope, and growth) relevant to a platform ecosystem's competitiveness should also be taken into account. The balance between value creation and value capture also demands attention. The dynamics we have outlined are largely a function of competitive intensity in a local market. Greater competition may well lead platforms to emphasize value creation over value capture chiefly because they rely critically on retaining complementor support. The dynamics are likely to change when complementors seek to occupy a bottleneck position. The challenges we outline here prompt us to propose the following question:

Research Question 2: How does the location-boundedness of existing complementors and the availability of local complementors in a new market influence the location, mode, and performance of platforms as they expand?

Platform Firms

Platform businesses, like other businesses, might lean towards global integration or towards concentrating on local responsiveness, and how they decide where they want to be on the continuum depends on the geographic scope of externalities, among other factors. For instance, the interaction on a social network or the content that is provided may well transcend national boundaries. Thus,

platform firms may seek to build an integrated global ecosystem that maximizes network effects and draws users from many countries. Conversely, platforms such as these that are characterized by fragmented clusters may have to reconfigure governance rules (e.g., subsidies) in light of local market conditions to attract ecosystem-specific investment (e.g., in localized content) by local complementors and to maintain the complementarities that give rise to ESAs in the first place. The geographic scope of externalities may thus influence platforms to choose between more global integration and more local responsiveness.

Previous research has shown that the success of a platform technology is not only a structural function of externalities but also depends on platform firm's learning orientation (Schilling, 2002). Platform firms learn how to better coordinate the activities of external partners (Helfat & Campo-Rembado, 2016). However, because of multilateral interdependence among ecosystem participants and the sheer number of actors involved, realigning partners as market conditions evolve is not easily done. A distinct characteristic of platforms is that the malleability of digital innovation allows for platform designs, governance rules, and ecosystem scope to be altered after the platform has been launched (Helfat & Raubitschek, 2018). This makes experimental learning especially valuable, and allows platform firms to identify the best approaches for improving complementarities within the ecosystem as they go along. For instance, they could run randomized controlled experiments (e.g., A/B testing) in selected markets to explore possible outcomes of proposed changes (Eisenhardt & Bingham, 2017). This is to some extent like asset-augmenting investment and reverse knowledge transfer, both commonly seen among MNEs. That said, experimental learning can only occur where the platform is in use – which is not necessarily where superior intangible assets are located (Autio, 2017). Furthermore, experimentation might be done in countries where the platform operates on a sizable scale, something that allows for running parallel experiments and more efficient learning (Biglaiser, Calvano, & Crémer, 2019). Learning has long been viewed as a mechanism for reducing uncertainty, but more research is needed on new patterns of learning in digital ecosystems and their implications for platform firms' integrative capabilities. The choices platform firms must make leads us to propose addressing the following question in future research:

Research Question 3: What are the key elements of integrative capability for platform firms orchestrating ecosystems that transcend national borders, and how can they best improve their integrative capability?

ESA Creation, Transfer, and Upgrading

Like FSAs, ESAs tend to evolve with changes in technology and markets and in response to competitive dynamics. According to received wisdom, international expansion presupposes FSAs that are primarily home country-based (Rugman & Verbeke, 2003). ESAs can also be created in the home country where the platform firm is most familiar with user preferences. For example, Alibaba's success is often traced to its introduction of instant messaging between buyers and sellers using its Taobao platform, a feature well suited to the Chinese market. This allowed Alibaba to oust eBay. Nonetheless, ESAs may not be a necessary condition for the internationalization of digital platforms. They could develop in foreign countries as platform firms seek to establish ecosystems in local clusters or to build an integrated global network. This is in part because digitization obscures the country of origin and so helps to mitigate liabilities of foreignness. Southeast Asia's e-commerce giant Lazada eventually launched in its home country of Singapore but only after successfully building platform ecosystems in five neighboring countries. In the case of globally integrated ecosystems, ESAs tend to emerge unchallenged when the user network has already grown to a critical mass beyond its home borders. Airbnb's advantages are only sustainable when it has recruited hosts from a wider range of locations and attracted a critical mass of international travelers.

Some ESAs are not inherently location-bound. External resources may be transferable to a foreign market and remain complementary to other products offered by local complementors. Some governance rules may also be applicable in diverse markets. Much of the YouTube content appeals to users around the world, and the sponsorship model seems to function effectively around the world in drawing the good-quality and diverse content that are key to its network effects. Some of the external resources contributed by users and complementors may be novel and valuable to other users, including complementors, by force of externalities, on the other hand they may be location-bound and only work well – or be available at all – in certain markets. Thus, to transfer ESAs, platforms may need

to recalibrate their governance rules; they might introduce in other markets valuable third-party innovations as their own offerings so as to expand their scope and attract more users and complementors. Previous research confirms that platform integration as such can guide the allocation of innovation resources among ecosystem participants (Foerderer, Kude, Mithas, & Heinzl, 2018). This may have implications for the competitiveness of the ecosystem as a whole and can constitute a unique, dynamic advantage for platforms operating in multiple markets.

ESA upgrading may also be driven by technology. A new technology such as augmented reality can enhance ESAs when it is supported by renewed governance rules that favor complementors utilizing the new technology. The governance changes can help to build a stronger resource base with more and more innovative complementary offerings and perhaps increase the value of existing offerings (e.g., hardware) by allowing better complementarity. An expanding resource base and greater externalities encourages more frequent use of the platform and a wider ecosystem scope, which in turn is likely to produce more extensive user data to improve predictive algorithms and help identify new additions to the ecosystem.

ESA upgrading can follow the logic of platform envelopment discussed in strategy research (Eisenmann, Parker, & Van Alstyne, 2011). Envelopment consists of extending the reach of an established platform into an adjacent market such as Go-Jek has done by adding food delivery to ride-hailing. It tends to work best when the value of an existing user base can be fully leveraged to generate a critical mass in a related market (Parker & Van Alstyne, 2014). This often entails imitation. While imitative learning is usually associated with latecomers, outsiders, and new ventures (Fernhaber & Li, 2010; Wu & Salomon, 2016), leading platforms may imitate the offerings and functionalities of newer ones in a bid to preempt differentiation and exploit existing network effects to expand the scope of their ESAs. This makes it possible to fend off local competition and upgrade ESAs. This leads us to propose the following interrelated questions:

REFERENCES

- Adner, R. 2017. Ecosystem as structure. *Journal of Management*, 43(1): 39–58.
- Adner, R., & Kapoor, R. 2010. Value creation in innovation ecosystems: How the structure of technological

Research Question 4: To what extent are ESAs created in the home market vs. other markets? Under what circumstances are some ESAs transferable across countries and how do platform firms increase their transferability? How is the mechanism of ESA upgrading different from that of FSA upgrading?

CONCLUSION

The *Journal of International Business Studies* is celebrating 50 years of publishing IB scholarship including an impressive body of MNE studies. We have explored how MNE theories do, or do not, apply to digital commerce, and particularly to digital platforms. While firm-specific advantages remain critically important, for platform firms, value creation involves coordinating the platform and its complementors, i.e., creating an ecosystem. Our conceptualization is thus based on an emergent recognition of ecosystems as a governance mechanism for inter-firm cooperative relationships emphasizing incentives and value creation. This is in contrast to traditional concepts of MNE governance that emphasize control and value capture. Our core contribution is an informed discussion of ecosystem-specific advantages and of the constraints associated with ESA transfer. In our view, focusing on value co-creation and ecosystem governance can extend current research on networked MNEs and on new international business practices.

ACKNOWLEDGEMENTS

We thank Alain Verbeke, Editor-in-chief of JIBS, for his guidance and detailed suggestions. We thank the industry experts and corporate executives who shared their insights in our interviews, and comments from participants at the 2018 AOM specialized conference on big data and managing in a digital economy at the University of Surrey, and the 2018 SMS annual conference in Paris. The research is supported in part by the Research Grants Council of Hong Kong (HKUST#16505817) and the National Natural Science Foundation of China (Grant No. 71873136). Any errors remain our own.

interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3): 306–333.

- Adner, R., & Kapoor, R. 2016. Innovation ecosystems and the pace of substitution: Re-examining technology S-curves. *Strategic Management Journal*, 37(4): 625–648.
- Alcácer, J., Cantwell, J., & Piscitello, L. 2016. Internationalization in the information age: A new era for places, firms, and international business networks? *Journal of International Business Studies*, 47(5): 499–512.
- Amit, R., & Han, X. 2017. Value creation through novel resource configurations in a digitally enabled world. *Strategic Entrepreneurship Journal*, 11(3): 228–242.
- Amit, R., & Zott, C. 2001. Value creation in E-business. *Strategic Management Journal*, 22(6–7): 493–520.
- Ansari, S., Garud, R., & Kumaraswamy, A. 2016. The disruptor's dilemma: TiVo and the U.S. television ecosystem. *Strategic Management Journal*, 37(9): 1829–1853.
- Autio, E. 2017. Strategic entrepreneurial internationalization: A normative framework. *Strategic Entrepreneurship Journal*, 11(3): 211–227.
- Baldwin, C. Y. 2008. Where do transactions come from? Modularity, transactions, and the boundaries of firms. *Industrial and Corporate Change*, 17(1): 155–195.
- Baldwin, C., & Von Hippel, E. 2011. Modeling a paradigm shift: From producer innovation to user and open collaborative innovation. *Organization Science*, 22(6): 1399–1417.
- Baldwin, C. Y., & Woodard, C. J. 2009. The architecture of platforms: A unified view. In A. Gawer (Ed.), *Platforms, markets and innovation*. Cheltenham: Edward Elgar.
- Banalieva, E. R., & Dhanaraj, C. 2019. Internalization theory for the digital economy. *Journal of International Business Studies*, <https://doi.org/10.1057/s41267-019-00243-7>.
- Biglaiser, G., Calvano, E., & Crémer, J. 2019. Incumbency advantage and its value. *Journal of Economics & Management Strategy*, 28(1): 41–48. <https://doi.org/10.1111/jems.12307>.
- Boudreau, K. J. 2010. Open platform strategies and innovation: Granting access vs. devolving control. *Management Science*, 56(10): 1849–1872.
- Boudreau, K. J. 2012. Let a thousand flowers bloom? An early look at large numbers of software app developers and patterns of innovation. *Organization Science*, 23(5): 1409–1427.
- Boudreau, K. J. 2017. Platform boundary choices & governance: Opening-up while still coordinating and orchestrating. In J. Furman, A. Gawer, B. S. Silverman, & S. Stern (Eds), *Entrepreneurship, innovation, and platforms (advances in strategic management)*. Bingley: Emerald.
- Brandenburger, A., & Nalebuff, B. 1996. *Co-opetition*. New York: Doubleday.
- Brouthers, K. D., Geisser, K. D., & Rothlauf, F. 2016. Explaining the internationalization of ibusiness firms. *Journal of International Business Studies*, 47(5): 513–534.
- Buckley, P. J. 2009. The impact of the global factory on economic development. *Journal of World Business*, 44(2): 131–143.
- Buckley, P. J., & Casson, M. C. 1976. *The future of the multinational enterprise*. London: Homes & Meier.
- Buckley, P. J., & Ghauri, P. N. 2004. Globalisation, economic geography and the strategy of multinational enterprises. *Journal of International Business Studies*, 35(2): 81–98.
- Buckley, P. J., & Strange, R. 2015. The governance of the global factory: Location and control of world economic activity. *Academy of Management Perspectives*, 29(2): 237–249.
- Cennamo, C., Ozalp, H., & Kretschmer, T. 2018. Platform architecture and quality tradeoffs of multihoming complements. *Information Systems Research*, 29(2): 461–478.
- Cennamo, C., & Santalo, J. 2013. Platform competition: Strategic trade-offs in platform markets. *Strategic Management Journal*, 34(11): 1331–1350.
- Chen, L., Shaheer, N., Yi, J., & Li, S. 2019. The international penetration of ibusiness firms: Network effects, liabilities of outsidership and country clout. *Journal of International Business Studies*, 50(2): 172–192.
- Coviello, N., Kano, L., & Liesch, P. W. 2017. Adapting the Uppsala model to a modern world: Macro-context and microfoundations. *Journal of International Business Studies*, 48(9): 1151–1164.
- de la Torre, J., & Moxon, R. W. 2001. E-commerce and global business: The impact of the information and communication technology revolution on the conduct of international business. *Journal of International Business Studies*, 32(4): 617–639.
- Eisenhardt, K. M., & Bingham, C. B. 2017. Superior strategy in entrepreneurial settings: Thinking, doing, and the logic of opportunity. *Strategy Science*, 2(4): 246–257.
- Eisenmann, T., Parker, G., & Van Alstyne, M. 2011. Platform envelopment. *Strategic Management Journal*, 32(12): 1270–1285.
- Ethiraj, S. K. 2007. Allocation of inventive effort in complex product systems. *Strategic Management Journal*, 28(6): 563–584.
- Fernhaber, S. A., & Li, D. 2010. The impact of interorganizational imitation on new venture international entry and performance. *Entrepreneurship Theory and Practice*, 34(1): 1–30.
- Foerderer, J., Kude, T., Mithas, S., & Heinzl, A. 2018. Does platform owner's entry crowd out innovation? Evidence from Google Photos. *Information Systems Research*, 29(2): 444–460.
- Furr, N., & Shipilov, A. 2018. Building the right ecosystem for innovation. *MIT Sloan Management Review*, 59(4): 59.
- Gawer, A. 2014. Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43(7): 1239–1249.
- Gawer, A., & Cusumano, M. A. 2014. Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, 31(3): 417–433.
- Gawer, A., & Henderson, R. 2007. Platform owner entry and innovation in complementary markets: Evidence from Intel. *Journal of Economics & Management Strategy*, 16(1): 1–34.
- Gulati, R. 1999. Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20(5): 397–420.
- Hagiu, A. 2014. Strategic decisions for multisided platforms. *MIT Sloan Management Review*, 55(2): 71–80.
- Hannah, D. P., & Eisenhardt, K. M. 2018. How firms navigate cooperation and competition in nascent ecosystems. *Strategic Management Journal*, 39(12): 3163–3192.
- Helfat, C. E., & Campo-Rembado, M. A. 2016. Integrative capabilities, vertical integration, and innovation over successive technology lifecycles. *Organization Science*, 27(2): 249–264.
- Helfat, C. E., & Raubitschek, R. S. 2018. Dynamic and integrative capabilities for profiting from innovation in digital platform-based ecosystems. *Research Policy*, 47(8): 1391–1399.
- Hennart, J.-F. 1982. *A Theory of multinational enterprise*. Ann Arbor: University of Michigan Press.
- Hennart, J.-F. 2009. Down with MNE-centric theories! Market entry and expansion as the bundling of MNE and local assets. *Journal of International Business Studies*, 40(9): 1432–1454.
- Hennart, J.-F. 2014. The accidental internationalists: A theory of born globals. *Entrepreneurship Theory and Practice*, 38(1): 117–135.
- Iansiti, M., & Levien, R. 2004. Strategy as ecology. *Harvard Business Review*, 82(3): 68–78.
- Jacobides, M. G., Cennamo, C., & Gawer, A. 2018. Towards a theory of ecosystems. *Strategic Management Journal*, 39(8): 2255–2276.
- Jacobides, M. G., Knudsen, T., & Augier, M. 2006. Benefiting from innovation: Value creation, value appropriation and the role of industry architectures. *Research Policy*, 35(8): 1200–1221.
- Jacobides, M. G., Sundararajan, A., & Van Alstyne, M. 2019. *Platforms and ecosystems: Enabling the digital economy*. World Economic Forum Briefing Paper.

- Kano, L. 2018. Global value chain governance: A relational perspective. *Journal of International Business Studies*, 49(6): 684–705.
- Kapoor, R., & Agarwal, S. 2017. Sustaining superior performance in business ecosystems: Evidence from application software developers in the iOS and Android smartphone ecosystems. *Organization Science*, 28(3): 531–551.
- Katz, M. L., & Shapiro, C. 1986. Technology adoption in the presence of network externalities. *Journal of Political Economy*, 94(4): 822–841.
- Kotabe, M., Parente, R., & Murray, J. Y. 2007. Antecedents and outcomes of modular production in the Brazilian automobile industry: A grounded theory approach. *Journal of International Business Studies*, 38(1): 84–106.
- Landsman, V., & Stremersch, S. 2011. Multihoming in two-sided markets: An empirical inquiry in the video game console industry. *Journal of Marketing*, 75(6): 39–54.
- Lanzolla, G., & Frankort, H. T. W. 2016. The online shadow of offline signals: Which sellers get contacted in online B2B marketplaces? *Academy of Management Journal*, 59(1): 207–231.
- Lee, J., Song, J., & Yang, J.-S. 2016. Network structure effects on incumbency advantage. *Strategic Management Journal*, 37(8): 1632–1648.
- Lew, Y. K., Sinkovics, R. R., Yamin, M., & Khan, Z. 2016. Trans-specialization understanding in international technology alliances: The influence of cultural distance. *Journal of International Business Studies*, 47(5): 577–594.
- Li, H., Shen, Q., & Bart, Y. 2018. Local market characteristics and online-to-offline commerce: An empirical analysis of Groupon. *Management Science*, 64(4): 1860–1878.
- Li, J., Tian, L., & Wan, G. 2015. Contextual distance and the international strategic alliance performance: A conceptual framework and a partial meta-analytic test. *Management and Organization Review*, 11(2): 289–313.
- Li, J., & Xie, Z. 2011. Global R&D strategies in an emerging economy: The development and protection of technological competencies. *European Management Review*, 8(3): 153–164.
- Liao, J., & Cui, Z. 2016. Eco-advantages: A new dimension of advantages. *Harvard Business Review (China)*, 37: 111–118.
- McIntyre, D. P. 2011. In a network industry, does product quality matter? *Journal of Product Innovation Management*, 28(1): 99–108.
- McIntyre, D. P., & Srinivasan, A. 2017. Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, 38(1): 141–160.
- McKinsey. 2016. Digital globalization: The new era of global flows. New York: McKinsey Global Institute.
- Nambisan, S. 2017. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, 41(6): 1029–1055.
- Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. 2017. Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, 41(1): 223–238.
- Nambisan, S., & Sawhney, M. 2011. Orchestration processes in network-centric innovation: Evidence from the field. *Academy of Management Perspectives*, 25(3): 40–57.
- Nambisan, S., Siegel, D., & Kenney, M. 2018. On open innovation, platforms, and entrepreneurship. *Strategic Entrepreneurship Journal*, 12(3): 354–368.
- Ojala, A., Evers, N., & Rialp, A. 2018. Extending the international new venture phenomenon to digital platform providers: A longitudinal case study. *Journal of World Business*, 53(5): 725–739.
- Ozalp, H., Cennamo, C., & Gawer, A. 2018. Disruption in platform-based ecosystems. *Journal of Management Studies*, 55(7): 1203–1241.
- Parker, G., & Van Alstyne, M. 2014. Platform strategy. In M. Augier, D. J. Teece (Eds), *The palgrave encyclopedia of strategic management*. London: Palgrave Macmillan.
- Parker, G., & Van Alstyne, M. 2018. Innovation, openness, and platform control. *Management Science*, 64(7): 3015–3032.
- Parker, G., Van Alstyne, M., & Jiang, X. 2017. Platform ecosystems: How developers invert the firm. *MIS Quarterly*, 41(1): 255–266.
- Rangan, S., & Sengul, M. 2009. Information technology and transnational integration: Theory and evidence on the evolution of the modern multinational enterprise. *Journal of International Business Studies*, 40(9): 1496–1514.
- Rietveld, J., Schilling, M. A., & Bellavitis, C. 2018. Platform strategy: Managing ecosystem value through selective promotion of complements. *Organization Science*, <https://doi.org/10.2139/ssrn.3061424>.
- Rugman, A. 1981. *Inside the multinationals: The economics of internal markets*. New York: Columbia University Press.
- Rugman, A., & D’Cruz, J. 1997. The theory of the flagship firm. *European Management Journal*, 15(4): 403–412.
- Rugman, A. M., & Verbeke, A. 1992. A note on the transnational solution and the transaction cost theory of multinational strategic management. *Journal of International Business Studies*, 23(4): 761–771.
- Rugman, A. M., & Verbeke, A. 2002. Edith Penrose’s contribution to the resource-based view of strategic management. *Strategic Management Journal*, 23(8): 769–780.
- Rugman, A. M., & Verbeke, A. 2003. Extending the theory of the multinational enterprise: Internalization and strategic management perspectives. *Journal of International Business Studies*, 34(2): 125–137.
- Rugman, A. M., & Verbeke, A. 2004. A perspective on regional and global strategies of multinational enterprises. *Journal of International Business Studies*, 35(1): 3–18.
- Rugman, A. M., & Verbeke, A. 2008. The theory and practice of regional strategy: A response to Osegowitsch and Sammartino. *Journal of International Business Studies*, 39(2): 326–332.
- Rugman, A. M., Verbeke, A., & Nguyen, Q. T. K. 2011. Fifty years of international business theory and beyond. *Management International Review*, 51(6): 755–786.
- Sanchez, R., & Mahoney, J. T. 1996. Modularity, flexibility, and knowledge management in product and organization design. *Strategic Management Journal*, 17(S2): 63–76.
- Schilling, M. A. 2000. Toward a general modular systems theory and its application to interfirm product modularity. *Academy of Management Review*, 25(2): 312–334.
- Schilling, M. A. 2002. Technology success and failure in winner-take-all markets: The impact of learning orientation, timing, and network externalities. *Academy of Management Journal*, 45(2): 387–398.
- Schilling, M. A. 2009. To protect or to diffuse? Tradeoffs in appropriability, network externalities and architectural control. In A. Gawer (Ed), *Platforms, markets and innovation*. London: Edward Elgar.
- Shaheer, N. A., & Li, S. 2018. The CAGE around cyberspace? How digital innovations internationalize in a virtual world. *Journal of Business Venturing*, <https://doi.org/10.1016/j.jbusvent.2018.08.002>.
- Shankar, V., & Bayus, B. L. 2003. Network effects and competition: An empirical analysis of the home video game industry. *Strategic Management Journal*, 24(4): 375–384.
- Sheremata, W. A. 2004. Competing through innovation in network markets: Strategies for challengers. *Academy of Management Review*, 29(3): 359–377.
- Shriver, S. K., Nair, H. S., & Hofstetter, R. 2013. Social ties and user-generated content: Evidence from an online social network. *Management Science*, 59(6): 1425–1443.
- Strange, R., & Humphrey, J. 2018. What lies between market and hierarchy? Insights from internalization theory and global value chain theory. *Journal of International Business Studies*, <https://doi.org/10.1057/s41267-018-0186-0>.

- Suarez, F. F. 2005. Network effects revisited: The role of strong ties in technology selection. *Academy of Management Journal*, 48(4): 710–720.
- Sun, M., & Tse, E. 2009. The resource-based view of competitive advantage in two-sided markets. *Journal of Management Studies*, 46(1): 45–64.
- Teece, D. J. 2018. Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world. *Research Policy*, 47(8): 1367–1387.
- Tellis, G. J., Yin, E., & Niraj, R. 2009. Does quality win? Network effects versus quality in high-tech markets. *Journal of Marketing Research*, 46(2): 135–149.
- Thomas, L. D. W., Autio, E., & Gann, D. M. 2014. Architectural leverage: Putting platforms in context. *Academy of Management Perspectives*, 28(2): 198–219.
- Tiwana, A. 2014. *Platform ecosystems: Aligning architecture, governance, and strategy*. Burlington, MA: Morgan Kaufmann.
- Tiwana, A. 2015. Evolutionary competition in platform ecosystems. *Information Systems Research*, 26(2): 266–281.
- UNCTAD. 2017. *World investment report 2017: Investment and the digital economy*. New York, Geneva: United Nations.
- UNCTAD. 2018. *World investment report 2018: Investment and new industrial policies*. New York, Geneva: United Nations.
- Verbeke, A. 2009. *International business strategy*. Cambridge: Cambridge University Press.
- Verbeke, A., Coeurderoy, R., & Matt, T. 2018. The future of international business research on corporate globalization that never was.... *Journal of International Business Studies*, 49(9): 1101–1112.
- Verbeke, A., & Greidanus, N. S. 2009. The end of the opportunism vs trust debate: Bounded reliability as a new envelope concept in research on MNE governance. *Journal of International Business Studies*, 40(9): 1471–1495.
- West, J. 2003. How open is open enough? Melding proprietary and open source platform strategies. *Research Policy*, 32(7): 1259–1285.
- Wu, Z., & Salomon, R. 2016. Does imitation reduce the liability of foreignness? Linking distance, isomorphism, and performance. *Strategic Management Journal*, 37(12): 2441–2462.
- Yoo, Y., Boland, R. J. J., Lyytinen, K., & Majchrzak, A. 2012. Organizing for innovation in the digitized world. *Organization Science*, 23(5): 1398–1408.
- Yoo, Y., Henfridsson, O., & Lyytinen, K. 2010. The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, 21(4): 724–735.
- Zhang, K., & Sarvary, M. 2015. Differentiation with user-generated content. *Management Science*, 61(4): 898–914.
- Zhu, F., & Iansiti, M. 2012. Entry into platform-based markets. *Strategic Management Journal*, 33(1): 88–106.
- Zhu, F., & Iansiti, M. 2019. Why some platforms thrive and others don't. *Harvard Business Review*, 97(1): 118–125.
- Zhu, F., & Liu, Q. 2018. Competing with complementors: An empirical look at Amazon.com. *Strategic Management Journal*, 39(10): 2618–2642.

ABOUT THE AUTHORS

Jiatao Li is Chair Professor of Management and Lee Quo Wei Professor of Business, Hong Kong University of Science and Technology. He is a

Fellow of the AIB and an editor of the *Journal of International Business Studies*. He served as the Senior Associate Dean of the HKUST Business School from 2013 to 2017. His current research interests are in the areas of organizational learning, strategic alliances, corporate governance, innovation, and entrepreneurship, with a focus on issues related to global firms and those from emerging economies.

Liang Chen is Senior Lecturer in Management at the Department of Management and Marketing, The University of Melbourne, Australia. He received his Ph.D. from the Centre for International Business at the University of Leeds. His recent research examines international business in the digital economy, with a particular focus on competitive strategy and technology innovation within and between platform ecosystems.

Jingtao Yi is a Professor of Economics at the Renmin Business School, Renmin University of China. He received his Ph.D. in Economics from the University of Nottingham. His current research interests lie in international business in the digital economy, with a focus on platform ecosystems, platform competition, and globalization.

Jiye Mao is a Professor of Management Information Systems at the Renmin Business School, Renmin University of China. Previously, he was a tenured faculty at the University of Waterloo. He received his Ph.D. from the University of British Columbia in 1995. His research interests include digital transformation, IT outsourcing, and big data capabilities and applications.

Jianwen Liao is the Chief Strategy Officer of JD.com, one of the largest e-Commerce companies in China. In this role, Dr. Liao spearheads JD's strategy, global partnerships, and investment. His work is at the center of JD's transformation into a technology and service company with retail at its core. Previously, he was the Associate Dean and Professor of Strategy and Innovation at Cheung Kong Graduate School of Business (CKGSB) in China.