



Reshaping Internationalization Strategy and Control for Global E-Commerce and Digital Transactions: A Hayekian Perspective

Hongryol Cha¹ · Masaaki Kotabe^{2,3} · Jie Wu⁴

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Abstract

As the sharing economy has grown rapidly and replaced the traditional businesses, new rules and norms for data and digital trade have emerged divergently in many countries. Such divergence in global e-commerce policies may be a major barrier to the internationalization of the sharing economy business. This paper aims to develop an internationalization theory that addresses how the sharing economy firms can internationalize under the condition of the divergence of global e-commerce policies. Drawing on Hayek's knowledge economy approach, we build a new internationalization theory for the sharing economy firms that facilitate autonomously self-organized business ecosystems and adapt to the lack of harmonized rules and norms for the sharing economy. We first theorize on the attributes of the digital platform-based transactions for the internationalization of the sharing economy firms and then provide some insights into the current international debates of e-commerce policies. Our theory offers two main insights: (1) the competitive advantages of the sharing economy firms stem mainly from digital platform algorithms to catalyze digital platform-based transactions between autonomous actors; (2) the divergence of global e-commerce policies and different internet regimes in different countries may affect the internationalization of business models based on such digital platform-based transactions.

Keywords Internationalization · Platform-based transactions · Sharing economy · Network effects · Policy

✉ Jie Wu
jie.wu@abdn.ac.uk

Extended author information available on the last page of the article

1 Introduction

In the rise of new e-commerce based on a digital economy, international business (IB) researchers and policymakers have some critical debates on the necessity of internationally harmonized e-commerce policies at the global, national, and transactional levels. Here, e-commerce (i.e., electronic commerce) transaction is explicitly defined as “the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders” (OECD, 2011). Since the first discussion on e-commerce initiated at the World Trade Organization (WTO) in 1998, many critical issues, such as customs duties on electronic transmissions, plurilateral market-access information technology, and trade-related aspects of intellectual property rights, have been discussed so far, most recently, at the 11th Ministerial Conferences (MC11) in December 2017 (Ismail, 2020).

However, detailed discussions promoted by WTO on e-commerce have not yet made significant progress in establishing global rules for plurilateral e-commerce for almost 20 years, from the first discussion in 1998 until MC11 in 2017 (Ismail, 2020). The lack of global rules and norms for the digital economy is problematic, particularly, for the internationalization of such a digital platform-based business. This is due to the different views of the internet regimes in different countries (Fefer, 2020). For example, the United States (US) takes a market-driven approach to an open and reliable internet system. Rather, the European Union (EU) has a slightly stronger focus on prescriptive regulation in an internet system than the US. In contrast to the views of the US and EU, China pursues a state-led approach to tight control over the internet environment.

IB scholars have explored the theoretical issues on how to promote the sustainable growth of e-commerce. Singh and Kundu (2002) extended the eclectic paradigm framework by adding the network-based advantages, so-called N-OLI (network, ownership, location, and internalization), to explain how network brokerage positions affect the internationally sustainable growth of e-commerce. More recently, Agarwal and Wu (2015) reviewed multiple IB-related theories, including transaction cost economics, resource-based view, N-OLI, institutional theory, and entrepreneurship theory, and applied these theoretical foundations to propose the extensive framework for e-commerce policies. Considering the recent meta-analysis study shown the overall positive impact of internationalization on multinational enterprise’s performance (Wu et al., 2022), IB scholars would keep extending attention to the internationalization of new business forms with e-commerce beyond the traditional approach. Notably, in the context of the rise of new e-commerce businesses, the sharing economy that exploits the underutilized assets of business ecosystem partners has altered organizing multinational businesses from arranging internal resources and capabilities economically to leveraging digital platforms to organize digitalized business ecosystems with autonomous actors (Parente et al., 2018).

Although there are enough discussions on the rise and growth of various e-commerce firms, the assumption behind these studies is that e-commerce

policies are well established and harmonized so that firms can focus on market strategies. Indeed, the scholarly interests in e-commerce policies have been relatively limited because the earlier form of e-commerce focused on the import and export of products subject to general trade and customs rules. This approach based on favorable e-commerce policies is no longer appropriate for sharing economy firms that provide various services in different countries where the regulatory institutions are quite different and that need nonmarket strategies to penetrate foreign markets (Parente et al., 2018). In particular, we know little about the theoretical mechanism of internationalization for the sharing economy under the divergence of global e-commerce policies in different countries. As such, this paper aims to develop an internationalization theory for the sharing economy firms that should adapt to this prominent context of the lack of well-harmonized global e-commerce policies and facilitate digital platform-based transactions between different countries. Specifically, we ask: *How can the divergence of global e-commerce policies affect the internationalization of the sharing economy firms across different countries?*

With regard to adapting to institutional complexity, current IB research has highlighted firms' global strategies from the perspective of the N-OLI framework based on existing network advantages (e.g., Brouthers et al., 2016; Chen et al., 2019; Singh & Kundu, 2002). However, this core-periphery network model offers a relatively limited view to addressing our research question because sharing economy firms are characterized by their openness to form extensively growing business ecosystems over time (Parker & Van Alstyne, 2017) and their asset-lightness to organize multinational business without ownership-based hierarchical relationships (Kachaner & Whybrew, 2014). In other words, the openness and asset-lightness of the sharing economy firms contradict the central premises of extant theories that emphasize the central role of headquarters to internalize strategic resources and capabilities for internationalization (Cha, 2020). Therefore, we need a new and comprehensive approach to analyzing how the divergence of global e-commerce policies can affect the internationalization process of sharing economy firms over time.

To address this question, we build on the ideas of platform ecosystems in the fields of strategic management (Adner, 2017; Gawer & Cusumano, 2014; Jacobides et al., 2018) and network economics (Katz & Shapiro, 1985; Parker & Van Alstyne, 2005; Rochet & Tirole, 2003) to theorize on the internationalization process of the sharing economy firms. By doing so, this study promises to contribute to IB research on the issues of e-commerce policies in several ways. First, we draw attention to the emerging challenges of sharing economy firms that want to quickly penetrate foreign markets despite the different institutional and regulatory issues in different countries. The fast penetration of global sharing economy firms through digital platforms has provoked an unpredictable backlash, such as emergent regulation and restrictions of business models, from the institutional environment designed to protect domestic markets, labors, and other social security in host countries. This study focuses on the internationalization process of such sharing economy firms that face regulatory barriers across different countries due to the divergence of global e-commerce policies. Next, we incorporate the current IB research on platform-based firms' internationalization strategies (e.g., Brouthers et al., 2016; Chen et al., 2019;

Stallkamp & Schotter, 2021). In this stream of IB research, we focus on addressing how the sharing economy firms' primary attributes, such as advantages from digital platform-based transactions, affect their internationalization, in contrast with traditional MNEs. Finally, for a new insightful approach to the unsolved issues of the sharing economy firms regarding the divergence in global e-commerce policies, we set a new boundary assumption and advance our knowledge about how digital platform-based transactions affect the sharing economy firms' internationalization. Instead of Coase's (1937) approach to hierarchical and economic organizations for traditional MNEs, Hayek's (1945, 1988) propositions on dynamics in the knowledge economy may provide a fertile ground to construct a new theory of the sharing economy with a new boundary assumption (Cha, 2020). In contrast to current IB theories, our model highlights the ecosystem-specific advantages of sharing economy firms (i.e., operating business through business ecosystems beyond the boundary of the firm), contrasting to the traditional focus on the firm-specific advantages.

2 Conceptual Background

This section offers a conceptual background in theorizing on the essential components of the internationalization process for the sharing economy firms. We first conceptualize transactions based on digital platforms, comparing them with the three types of transactions in traditional relationships, such as markets, hierarchies, and social embeddedness. In doing so, we establish the boundary condition for theorization on digital platform-based transactions from the Hayekian approach. We then describe the various business models of the sharing economy in a traveler accommodation industry, a transportation industry, and a finance industry to understand the attributes of the sharing economy in divergent regulatory environments.

2.1 The Attributes of Digital Platform-Based Transactions from the Hayekian Perspective

The notions of platform and ecosystem are essential in understanding the sharing economy firms that organize exponentially growing and scalable business ecosystems through digital platforms. In the field of strategic management, an ecosystem has been considered as "an economic community" supported by interacting organizations and individuals, including suppliers and other stakeholders (Moore, 1996), or a "meta-organization" that consists of multiple legally autonomous entities (Gulati et al., 2012). In general, Jacobides et al. (2018) define an ecosystem as "a set of actors with varying degrees of multilateral, non-generic complementarities that are not fully hierarchically controlled." Also, industry-level platforms are defined as "products, services, or technologies developed by one or more firms, and which serve as foundations upon which a larger number of firms can build further complementary innovations and potentially generate network effects" (Gawer & Cusumano, 2014, p. 420). Since sharing economy firms (e.g., Airbnb) play the central role of leading and promoting the collaboration among the ecosystem participants (e.g.,

individual owners of houses or other real estates) in the digitalized business ecosystem, they are often called “platform leaders” (Gawer & Cusumano, 2002) or “platform owners” (Alstyne et al., 2016) in the areas of strategic management. As we discuss below, transactions in the sharing economy happen within the business ecosystems through digital platforms. Specific transacting parties (actors), rules, and governance will differ from other economic formats, such as markets, organizations, and social networks.

Digital platform-based transactions in the sharing economy lie only in the relationships between business ecosystem members who connect through digital platforms. In other words, transacting parties who want to buy or sell the specific services in the sharing economy should have prerequisite memberships and set the price by themselves through digital platforms. To clarify the attributes of digital platform-based transactions, we can distinguish conceptually among four dimensions of transactions, which are rooted in different types of relations: market relations, hierarchical relations, social relations, and digital platform relations. The three types of relationships, including markets, hierarchies, and social networks (or the hybrids of markets and hierarchies), have been analyzed much in the streams of research on transaction cost economics (Hennart, 1993; Williamson, 1991) and socially embedded governance (Granovetter, 1985; Ouchi, 1980; Uzzi, 1996).

Table 1 shows the comparison in detail. First, market-based transactions are open to anyone who can make a deal to exchange goods, services, and money through explicit contracts. Under the exogenous market prices and contractual law, the symmetrical transacting parties in the markets can set the transaction instantly once both parties agree on the deal. Second, hierarchy-based transactions occur within a specific organization between asymmetrical parties (i.e., one party can become dominant over another due to the authority). Transaction cost economics predicts that uncertain, frequent, and asset-specific transactions can be internalized efficiently in an organization. Third, social embeddedness-based transactions occur in the symmetrical social relationships generated by the social gifts, favors, and other socially tied exchanges, which constitute social norms shared by the transacting parties. The social embeddedness-based transactions are relatively time-lagged and slower because the relatively long-term social relationships must be a prerequisite before the exchange occurs. Fourth, digital platform-based transactions are quite different from the others. Key attributions of e-commerce firms’ growth are their fast internationalization speed and the extensive breadth of operations across different areas (Batsakis & Theoharakis, 2021; Swoboda & Sinning, 2022). Especially, sharing economy firms set the protocols and algorithms with the formal programming language for specific digital platforms (e.g., Airbnb apps, Uber apps, etc.) in advance. Once the protocols and algorithms set the types and rules of the sharing economy, autonomous service providers (i.e., specific-assets holders) and customers are self-organized through the digital platforms and make deals autonomously under the automatically transacting mechanism that is already set before they join the membership. Here, we define *self-organization* as a distributed governance that emerges collectively from the autonomous behaviors of independent actors through common platforms. Transacting parties choose the best digital platforms autonomously for their own purposes and find the possible transacting parties to make the best deal

Table 1 Comparison of different types of transactions

Types	Market-based transactions	Hierarchy-based transactions	Social embeddedness-based transactions	Digital platform-based transactions
Governance mechanism	Contractual governance	Hierarchical governance	Relational governance	Distributed and self-organized governance
Regulatory principles	Price/law	Authority	Social norms	Protocols/algorithm code-based rules
Mode of enforcement	Exogenous enforcement by third parties (e.g., government, legal party, global institution)	Endogenous enforcement by the authority of a dominant party	Endogenous enforcement by both parties themselves	Exogenous enforcement by automatic algorithms
Terms of exchange	Explicit, legal forms	Explicit, formal forms	Implicit, informal forms	Explicit, formal programming language forms
Attributes of exchange	Fast, symmetrical, instant exchanges	Very fast, asymmetrical, instant exchanges	Slow, symmetrical, time-lagged exchanges	Very fast, symmetrical, instant exchanges

through the digital platforms. That is, each transacting agent plays the respectively distributed role in occurring digital platform-based transactions.

In contrast to transactions based on markets, hierarchies, and social networks, digital platform-based transactions allow individuals to possess distributed knowledge and rights for discretionary uses over the assets, but have not yet reached an equilibrium in prices and laws of application. Like Hayek's (1945) "dispersed knowledge" approach to the knowledge economy, a self-organizing ecosystem through digital platform-based transactions consists of independent participants, so it does not have a central intervention towards transaction behaviors generally integrated. Hayek's approach can well capture the salient attribute of the sharing economy in contrast to traditional markets, hierarchies, and social networks. Digital platform providers (e.g., Airbnb and Uber) only offer an online marketplace and adequate conveniences to facilitate transactions between underutilized asset owners and customers without central interventions. The rest of the execution of the transactions is at the discretion of the parties to the transaction. For example, LendingClub, headquartered in San Francisco, California, is the world's largest peer-to-peer lending company, providing a digital platform to facilitate loans between underutilized capital owners and loan users. Although risk management for the loan business is complicated for individuals compared to banks, this sharing economy business in the finance industry also works well through collective risk management behaviors among individuals with dispersed knowledge. Thus, the existence of dispersed knowledge distinguishes the sharing economy prominently from other traditional economies. For a boundary condition to theorize on the internationalization of the sharing economy firms throughout this paper, we assume the first condition as follows:

Assumption 1: Knowledge that is utilized for digital platform-based transactions is very tacit and continuously changeable by the individuals who have their own property rights, thereby making it difficult to integrate them all into one through a centralized order.

Based on the unique attributes of digital platform-based transactions, we consider the internationalization of the sharing economy firms differently from the existing mechanisms based on markets, hierarchies, and social relationships. To better understand the internationalization of the sharing economy, we use Hayek's (1988) notion, *extended order*, which refers to a spontaneous process of information gathering between individuals with dispersed knowledge; and we contrast it with the conventional wisdom of Coase's (1937) theory of the firm. Traditional IB thinking based on transaction cost economics (Coase, 1937; Williamson, 1985), internalization theory (Buckley & Casson, 1976, 2020), and eclectic paradigm (Dunning, 1988) addresses MNEs' internationalization from the perspective of extending MNEs' ownership-based authority. A central proposition of these theories is that MNEs organize the efficient economic structure with hierarchical authority by internalizing the specific assets they want to control. In contrast, the sharing economy firms do not organize specific assets hierarchically ex-ante but rather promote ecosystem participants to self-organize ecosystem-specific assets ex-post due to autonomously interactive patterns among them. As such, we focus on how Hayek's approach can alter our theorization of internationalization previously based on Coase's theory of the firm. In the

process, we elucidate how Hayek's approach can offer a new theory different from the traditional theory of internationalization based on Coase's theory of the firm.

Drawing on Hayek's (1988) concept of the extended order, we consider that the internationalization patterns of the sharing economy firms are fundamentally different from those of traditional MNEs. Hayek (1988) argues that a centrally managed economic model cannot solve the problem from dispersed knowledge among individuals; instead, the only method is to provide information enabling individuals to judge comparative advantages of different uses of resources for serving the needs of distant unknown individuals. The claim suggests that extending an order that enables individuals to self-organize autonomously is better for solving complex economic problems than using central authority to plan and manage resource allocation. In the management field, this perspective can be observed as the dynamics of the emergent self-organization among the interdependent agents in the organizational collectives (Chiles et al., 2004; Tsoukas, 1996). Especially in a free open-source software ecosystem, individuals can join existing projects or formulate a new project to resolve complex problems through self-organized communications (Foss et al., 2016). Through the internet and communication technology, since it is more convenient to reconfigure interdependencies between ecosystem participants, the emergence of self-organizing patterns facilitates the expansion of the e-commerce ecosystem remotely from the city to rural areas (Leong et al., 2016) and internationally from the home country to the host country (Rong et al., 2015).

Likewise, we consider the extended order in the sharing economy as the extension of established rules and protocols that consist of different information gathering processes to use widely dispersed knowledge among independent ecosystem participants with underutilized assets. We may use the notion of the extended order to describe the internationalization of the sharing economy firms. From this perspective, internationalization is a process of leveraging unique digital platforms that can connect autonomous actors beyond the national borders and facilitate platform-based transactions through the algorithm rules and protocols for the sharing economy as a large-scale business ecosystem. Applying unique rules and protocols through the digital platform algorithms to new participants and their transactional behaviors can be considered Hayek's extended order. Also, the large-scale business ecosystem can be seen as the result of collective actions among autonomous actors with dispersed knowledge. Thus, we assume the second boundary condition as follows:

Assumption 2: As the knowledge is dispersed among individual actors, the respective actors have their own different plans to adjust to each other, so that the accumulation of each individual action causes a collective action with an extended order.

2.2 Sharing Economy and the Divergence of Global E-Commerce Policy

Peer-to-peer transactions are not new, but they have become a rapidly growing industry. For example, sharing economy business models for home-sharing, car-sharing, and peer-to-peer lending as digital technologies have developed enormously. The growth of the sharing economy offers many opportunities for new businesses and

challenges for traditional industries. As such, some emerging regulatory issues have been raised for the sharing economy companies to sustain development and innovativeness. Table 2 shows the divergence of regulations for the sharing economy in different countries, such as the United States, the European Union, and China.

Regarding internet regimes, there are clearly different approaches to digital commerce and data management. While the US approach is based on liberal markets with an open and reliable digital infrastructure, the EU approach is relatively normative to protect customers and promote innovation. In contrast to these approaches, the Chinese approach is very strongly restrictive. Under such a different internet regime, business models based on the sharing economy must be required to satisfy the different levels of rules while competing with the traditional industries and protecting customers. For example, US home-sharing businesses must be licensed and report transaction information for taxes (Tun, 2020). EU home-sharing businesses should consider similar rules, but they are limited to the relatively more restrictive ones for the limited period of listings and short-term rental permits (O'Sullivan, 2016). On the contrary, the Chinese government requires very strict data-sharing rules and high safeguards for customers. The sharing economy firms must share all identity information about both hosts and guests for every transaction and adhere to high standards of operational safety (e.g., cleaning, maintenances, etc.). Chinese rules may be too restrictive for foreign companies and customers in terms of privacy and high costs for operational standards (Shasha, 2019; Wu & Zhao, 2015). Next, in the car-sharing business, the approach to regulations in different countries is highly divergent. US car-sharing companies should consider only safety, insurance, and taxation, whereas EU car-sharing businesses must use hybrid or electric cars for environmental sustainability, in addition to the similar regulations in the US (U.S. Department of Transportation Federal Highway Administration, 2020). In China, car-sharing businesses are considered as not just a ride-sharing service, but a sort of taxi service. They must follow the taxi industry rules. Drivers must be hired directly as licensed taxi workers and report more detailed transaction data to the Chinese government. Lastly, in the finance industry, the divergence of regulations seems extreme. Both US and EU peer-to-peer lending businesses have some rules about the license, capital requirements, and innovative business models while growing the online marketplace loans as fintech businesses (Deloitte, 2016; U.S. Department of the Treasury, 2016). Although the Chinese peer-to-peer lending companies initially emerged liberally, the industry has almost been suppressed and banned by government restrictions (Liu, 2018).

The sharing economy is based on business opportunities related to the way to create value from the reuse of underutilized assets (Hennart, 2019; Parente et al., 2018). Due to various opportunities and challenges, the regulatory focus to strengthen positive benefits and reduce negative impacts to existing businesses is divergent in different countries in the context of local industry. In particular, the extent to which business opportunities can be scaled up through internationalization depends on the internet regimes and regulatory environments for digital commerce in different countries. As such, it is critical to understand how global e-commerce policies have developed and how they will affect the internationalization of the sharing economy. E-commerce discussions in the WTO have continued since the first agreements on

Table 2 The divergence of regulations for the sharing economy

	United States	European Union	China
Internet regime for data and digital trade	Market-driven approach Open, secure, and reliable internet	Prescriptive regulatory approach Internal regional integrated and technological sovereignty internet	State-led approach Closed, restricted, and controlled internet
Regulations for home-sharing (e.g., short-term rentals, travel accommodation)	Hosts: Licenses for short-term rental, regulation-in-proportion (limited period for listings), Withholding tax Guests: Tax (sales, use, transient occupancy, hotel accommodation, etc.) Platforms: Reporting transactions and listings to governments (state, city, etc.), Withholding tax	Regulation-in-proportion (limited period for listings): Hosts can rent their primary places for guest houses only or be approved as a short-term rental with a permitted license Rental income tax	Requirements for information sharing with the government High safeguard for the operational safety of the customers
Regulations for car-sharing (e.g., transportation, short-term rentals)	Health, safety, and consumer protection: helmet laws for bike-sharing Taxation: sales tax, rental surcharge Insurance: minimum, required levels of insurance provisions Data sharing, privacy, and standardization: creating a transportation network and encouraging innovation	High sustainability regulations in Scandinavia: Electric car-sharing by 2030 Strict regulations in France: All free-floating vehicles must be electric or hybrid Regulatory conflicts with a taxi industry	Internet car-hailing license provisional rules: a required taxi license Insurance Labor contracts: Platform-providers must hire drivers as labor Data sharing with governments
Regulations for crowdfunding (e.g., peer-to-peer loans)	Exceptional high credit quality for student loan online marketplace lenders Robust small business borrower protections License by Securities and Exchange Commission (SEC) Consistent reporting data for transparent marketplaces to SEC	High capital-adequacy ratios (capital requirements) Limitations to business models Prescriptive disclosure requirements	Limitations to business models as an intermediary only matching borrowers and investors After a wave of scandals and defaults in 2018, the crackdown on peer-to-peer lending

establishing the WTO Work Programme of e-commerce and the moratorium on the prohibition of customs duties on electronic transmissions in 1998. However, the e-commerce discussions could not develop much because there were continuous conflicts between the developed countries (mainly focusing on the establishment of multilateral norms on e-commerce) and the developing countries (highlighting the development of infrastructure for e-commerce). In December 2017, the first e-commerce Joint Statement Initiative (JSI) was held to advance the discussions in the exploratory phase. The second e-commerce JSI was held to move forward the detailed discussions in the negotiations phase in March 2019. The negotiation proposals include 15 categories of issues for e-commerce policy (Ismail, 2020), but we summarize nine issues to highlight the critical implications for the sharing economy, as Table 3 represents.

The first issue (Issue 1) concerns electronic transactions and means. It is related to the nature of digital transactions per se, including electronic authentication, electronic signatures, electronic contracts, etc. It is a minimum condition for digital platform-based transactions to be carried out in different countries. The sharing economy businesses can be possible if individuals can connect with each other and establish transactions freely through digital platforms. Next, internet access (Issue 2), information flows (Issue 3), and market access (Issue 4) are associated with the conditions of the digitized businesses to internationalize beyond national borders. The different levels of openness and exchange of digital information may determine to what extent the sharing economy firm in the home country can expand its business in the host countries. Consumer protection and privacy (Issue 5) and transparency (Issue 6) are related to the problem of organizing business ecosystems with distributed governance in terms of autonomy and individualism in digital platform-based transactions. If individual economic agents are protected and have access to transparent information, they can be independent enough to have a discretionary right to set the transactions on their own motivation. In addition, Technical and trade assistance for e-commerce capacity (Issue 7) is associated with an investment in digital infrastructure in different countries, which may affect the profitability of the sharing economy firms as they internationalize in different countries. Finally, business trust (Issue 8) and customs duties on electronic transmissions (Issue 9) are associated with innovativeness in digital algorithmic development and business models. The strong business trust to protect source code and algorithms may promote digital technological development as the sharing economies grow. The low level of customs duties across countries can facilitate various business models that can be internationalized in different countries.

3 Theory of Internationalization for the Sharing Economy

We now theorize on the internationalization strategies of the sharing economy firms, focusing on each internationalization process: location selection, entry mode, governance, and performance implications. Figure 1 presents the conceptual diagram to clarify our theorization and discussion. It includes a series of causalities, such as the antecedents of the sharing economy, the emergent problems of organizing

Table 3 The implications of WTO e-commerce issues

E-commerce issues	Topics and debates	Implications for Internationalization	Implications for policymakers
Issue 1: Electronic transactions and means	Electronic transaction frameworks (electronic authentication, electronic signatures, electronic contracts)	Digital platform-based transactions	The standardized technical means enabling e-commerce are prerequisites for cross-border digital platform-based transactions
Issue 2: Access to the internet and data	Facilitating public access to and use of open government data On access to the internet and online platforms	Remote localization	Freely accessible internet and open database can enable firms to design algorithms to remotely meet the local customers' needs
Issue 3: Flow of information	Cross-border transfer of information Location of computing facilities and data	Remote localization Performance (the improvement of algorithms)	Firms should be able to accumulate and exploit their own data to improve algorithms continuously
Issue 4: Market access	Goods/Service market access on the basis of liberalization	Remote localization Performance (demand-side network effects)	The larger the market size, the broader digital platform-based transactions can be distributed
Issue 5: Consumer protection and privacy	Online consumer protection Unsolicited commercial electronic messages (spam) Legal frameworks for personal information and data	Self-organized business ecosystem Distributed governance	Consumer protection plans can facilitate autonomous consumer behaviors for digital platform-based transactions within business ecosystems
Issue 6: Transparency	Publication of domestic regulations on e-commerce	Self-organized business ecosystem Distributed governance	Individualism and autonomy in a transparent society can promote digital platform-based transactions extensively
Issue 7: Technical and trade assistance for e-commerce capacity	Development aspects of e-commerce policies for developing countries Reducing the gap of digital access across different countries Cooperation between stakeholders, agencies, and international organizations	Asset-lightness Performance (firms can save huge costs for establishing firm-specific assets and IT infrastructure when entering a host country)	Technical and trade assistance for the developing countries can reduce the entry barriers preventing the expansion of digital platform-based transactions from developed countries to developing countries

Table 3 (continued)

E-commerce issues	Topics and debates	Implications for Internationalization	Implications for policymakers
Issue 8: Business trust	Protection of source code and algorithm Intellectual property rights Cybersecurity	Innovation with collective intelligence Performance (motivation for innovators)	The independence of algorithms can secure the legitimacy of new automatic settlements
Issue 9: Custom duties on electronic transmissions	Prohibition on the customs duties of electronic transmissions Internal taxes, fees, and charges	Innovation with collective intelligence Performance (motivation for entrepreneurs)	Reduced costs for e-commerce can encourage firms to develop new business models with digital platform-based transactions

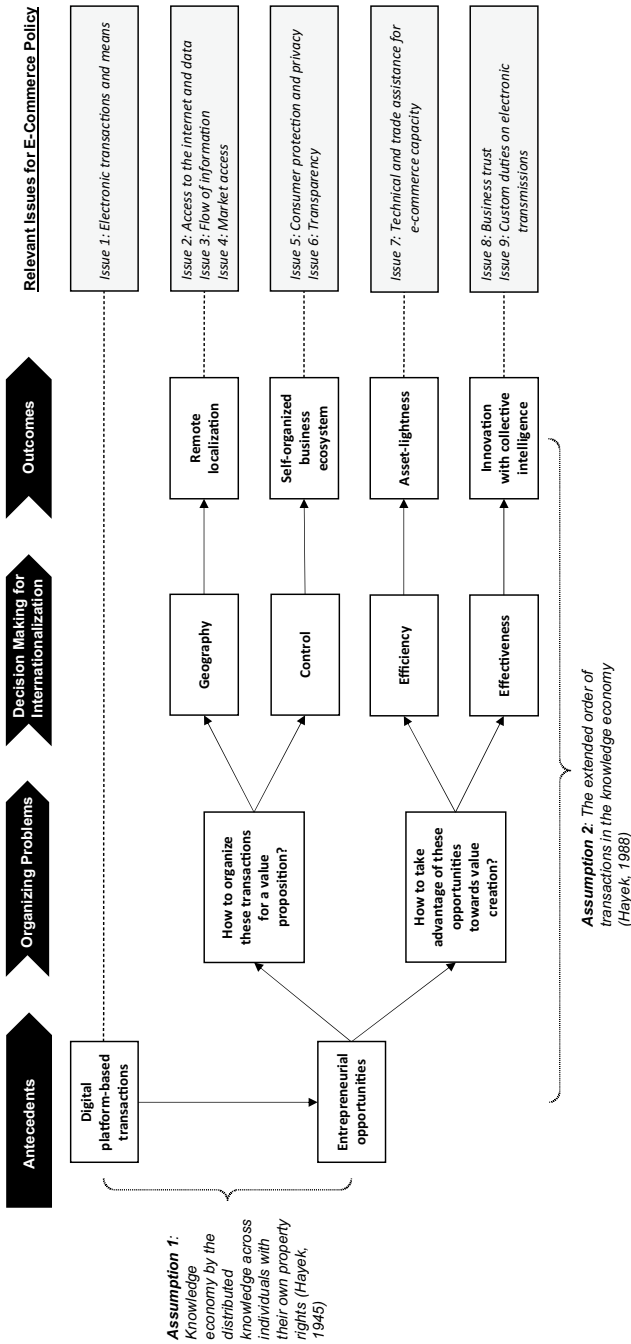


Fig. 1 The theoretical mechanism of internationalization for the sharing economy. Note: Hayek's arguments on the knowledge economy (1945) and the extended order (1988) provide a fundamental assumption for this mechanism, respectively, for the antecedents and internationalization processes. The solid lines show the conceptual relationships between the theoretical building blocks. The dashed lines link between theoretical predictions and relevant e-commerce policies. The numbering of the relevant issues for e-commerce policy is referred to as the e-commerce issues summarized in Table 3

businesses for value proposition and value creation, decision-making issues for internationalization, outcomes, and the issues relevant to e-commerce policy. We will discuss this in detail in the subsequent discussion section.

3.1 Digital Platforms and Entrepreneurial Opportunities

While traditional MNEs expand their businesses in geographic spaces, the sharing economy firms are more likely to focus on business in digitized spaces. For digital platforms, the minimum requirement is a public system of internet connection and enough users with internet-connected devices, such as computers, smartphones, and tablet computers, so-called digital infrastructure (Agarwal & Wu, 2015; Petersen & Welch, 2003). Based on the asset-light business model, the sharing economy firms have the competitive advantages from organizing business ecosystem members that operate individual assets effectively. Without ecosystem members, the sharing economy firms may not scale their business much and might not provide customers with their unique services in a digitized business. Thus, the connection among participants in a digitized business may affect the size of the business ecosystem for the sharing economy.

The extent to which the digitized business ecosystem for the sharing economy can expand depends on how much potential participation of both sides of service providers and customers in the business ecosystem. Also, the level of internet access and free use for economic agents through their own devices determines the degree of dispersed knowledge in a digitized world. According to the first assumption (dispersed knowledge), individuals with their own properties have tacit and continuously changing knowledge in different times and spaces. If many economic agents can participate in the digitized business, it is reasonable to assume that knowledge is as dispersed as the number of individuals who can access the internet. This condition of knowledge economy motivates economic agents to connect and adjust with each other to buy and sell what they want in the digitized business. The sharing economy is based on this motivation to sell and buy services (i.e., the private use of the underutilized assets of others) between economic agents with internet access in the digitized business. For instance, Airbnb (without its own real estate) sells lodging services provided by homeowners to customers by connecting them in the digitized business. Due to the different approaches of internet regimes across different countries, sharing economy firms must consider international contextual differences in the digital infrastructure to expand their business with international digital platform-based transactions and operate processes remotely.

There are two reasons why different market sizes and regulatory conditions can affect the evolution of digitized business ecosystems. First, the new entrants in the small markets are more likely to accept and adopt the rules and protocols established in the large markets for “the discovery of entrepreneurial opportunity” (Kirzner, 1997; Shane, 2000) than develop their own in the digitized business. They are less motivated to develop a new business opportunity on their own in small foreign markets due to a relatively undersized demand. Accessing the huge demand and the much-accumulated information of prior transactions in the large domestic

markets, the new entrants from the small foreign markets can discover an entrepreneurial opportunity effectively by using their assets and specific knowledge (Oliva & Kotabe, 2019). By expanding its business areas from guesthouses to travel and entertainment accommodation, Airbnb's digital platform connects the total needs of travelers (not only places to stay but also things to do), underutilized real estate owners, and talented individuals who can produce intangible content such as online experiential classes and special travel guides. Through such a digital platform, it is possible that small markets can be recombined with other small and large markets that can be synergistic for value creation. Various travel and entertainment accommodation products and services may apply to this mix-and-match mechanism.

Second, due to the demand-side economies of scale by the indirect network effect (Gawer, 2014), digital platform-based transactions tend to occur repeatedly in the large markets, as long as new and old transactional parties continue to join the ecosystem through digital platforms with the positive feedback loop of network effects. New entrants in the relatively small foreign host country markets can increase the value of their properties by following the rules and protocols established in the large domestic markets. As Stallkamp and Schotter (2021) point out, this can be seen as global strategies that the sharing economy firms can independently enter culturally similar countries or countries with good socioeconomic connections to their home countries when they have cross-country network externalities. By the indirect network effect, a strong demand already developed in one side of the market can increase the value of another side of the market. For example, Airbnb exemplifies that the sharing economy firms from large domestic markets can leverage the advantage from the demand-side economies of scale. The number of outbound travelers from the United States is large enough for the sharing economy firms in the U.S. to get motivated to enter Europe and Asia. In other words, the large demand size can attract new ecosystem members owning underutilized real estate in the rest of the world through digital platforms because real estate owners can access a large demand base at relatively low marginal costs.

In the two mechanisms of the mix-and-match strategy and network effects, differences in regulatory conditions between different countries may impede the delivery of the value of standardized services and experiences to customers. Although industry standards or technological compatibility may be critical to an efficient recombination strategy and network effects by common platforms, such a standard technological approach may not simply be applied to the sharing economy, as regulatory divergence arises from different situations of opportunities and challenges in different countries.

Hayek states that many economic agents have their own property rights and participate in economic actions with dispersed knowledge. Indeed, we can observe similar characteristics of the knowledge economy in digitized business. An elite company cannot solely develop the most valuable knowledge and operational practices but tends to open its innovation process to various agents, such as users, complementary application developers, and other external partners. In contrast to Coase's theory, sharing economy firms do not depend on the ownership of specific assets that may generate unique services and values for customers. It is not just because the specific assets are no longer valuable as a firm-specific asset. Instead, sharing

economy firms focus on connecting their ecosystem participants and facilitating digital platform-based transactions so that they benefit from open innovation by independent property owners who can autonomously discover entrepreneurial opportunities and create value for customers. In light of this, we propose the first proposition as follows:

Proposition 1: In a dispersed knowledge economy, economic agents connected through a sharing economy platform are more likely to discover entrepreneurial opportunities by adjusting their respective knowledge with each other.

3.2 Remote Localization

IB scholars emphasize the impact of entry modes, such as exports, alliances, joint ventures, acquisitions, and the establishment of wholly-owned subsidiaries, on internationalization (e.g., Brouthers, 2002; Hill et al., 1990; Morschett et al., 2010). According to the internalization theory and the Uppsala model, traditional MNEs tend to enhance the degree of local involvement and market commitment when incrementally scaling up the foreign business (Buckley & Casson, 1976; Johanson & Vahlne, 2009). In other words, previous experience in host country markets is important for successful internationalization. Likewise, the sharing economy firms need to consider how to enter the foreign host country markets and localize their rules and protocols for new ecosystem members. The geographical scope of network effects by global platforms varies among industries due to the difference in users' consumption patterns and the transferability of products and services across national borders (Stallkamp & Schotter, 2021). According to the PwC report (Price-waterhouseCoopers, 2015), approximately 19% of the total US adult population as of 2014 engaged in sharing economy transactions, including the entertainment and media sector (9% of adults in the U.S.), transportation sector (8% of adults in the U.S.), hospitality sector (6% of adults in the U.S.), and consumer goods sector (2% of adults in the U.S.). Those sectors of the sharing economy can be characterized by cross-country network externalities in that international travelers can consume foreign services, such as transportation, hospitality, and the rental of consumer goods, and even media and entertainment contents can be easily transferable or consumable internationally. Digital platforms that generate the cross-country network effects allow firms to enter host country markets independently and adopt global strategies (Stallkamp & Schotter, 2021).

Assuming the extended order in the knowledge economy where economic agents with dispersed knowledge want to adjust to each other, the sharing economy firms are more likely to collect the big data of their users' digital footprints and perform remote localization. We refer to *remote localization* as providing local products and services to the host country through control and coordination in the home country. While the traditional MNEs increase firm-specific advantages from human capital and assets to localize products and services in host country markets, the sharing economy firms focus on building ecosystem-specific advantages from digital platform-based transactions within ecosystems in the digitized business. For example, Airbnb and Tujia (the largest home-sharing company in China) offer lodging, local

travel programs, and even transportation services to customers who can access their respective digital platforms. It seems that their digital platforms generate a specific online marketplace in which ecosystem participants with underutilized assets connect with travelers who want to use those assets temporarily. The antecedent condition that all economic agents within this online marketplace ecosystem can have their own individual knowledge, experience, and preference dispersed across different times and spaces will increase the possibility of adjusting to each other to satisfy heterogeneous needs among them. That is, the ecosystem-specific advantages create value by sharing a variety of underutilized assets on the supply side to satisfy the economic and unique consumption of specific assets on the demand side. The dynamic matching process between the supply and demand sides through network effects can be seen as an autonomous adjustment between economic agents who want to satisfy needs by their own planning within the business ecosystem, as Hayek claims it as an extended order.

From this perspective, the entry strategy of sharing economy firms is related to how they can enable asset owners to provide high-quality services to customers. Rather than internalizing unique company-specific assets to serve them, sharing economy firms focus on facilitating digital platform-based transactions that ecosystem participants and customers can be connected well to meet their individual needs. For remote localization, the sharing economy firms may consider three adjusting elements to enable local ecosystem participants for local adaptation of their global strategies: language, payment systems, and contents. First, when internationalizing, at the very least, the sharing economy firms must translate their rules and protocols so that new ecosystem participants in the host country markets can understand them to join the digital ecosystem. This is the lowest level of local involvement with which the sharing economy firms can penetrate foreign markets. Second, various payment systems are essential for customers in different countries. Since customers want to use convenient payment methods, the sharing economy firms can secure more customers by providing various payment systems such as credit cards, mobile payment services, and available currencies in different countries. Third, providing various local contents is a critical factor for remote localization. The sharing economy firms can organize what products and services can be traded on online marketplaces through platform-based transactions.

For instance, the Airbnb case exemplifies that broad support in many languages extends its services in digitized spaces beyond geographical spaces. As of 2020, the Head of Localization at Airbnb, Salvo Giammarresi, announced that supporting a total of 62 languages covering around 4.3 billion native speakers globally makes Airbnb reach more native speakers for its service across the web, iOS, Android, and mobile web than any other companies (Giammarresi et al., 2020). Also, various payment systems are essential for the sustainable success of the sharing economy firms. Airbnb offers many options of globally acceptable methods like major credit cards, Apple Pay, Google Pay, and PayPal. More localized, Tujia integrated with Chinese mobile payment systems like Alipay and WeChat Pay to enter Thailand, where Tencent introduced mobile payment systems (Chakraborty, 2017). Moreover, Airbnb's platform provides an open online marketplace for hosts to offer local travel experiences, the same mechanism that the homeowners share their spaces.

So far, we have discussed the adjusting elements between sharing economy firms (i.e., digital platform providers) and ecosystem participants in different countries. Considering the extended order among all relevant participants, including platform providers, ecosystem participants, and customers in the digitized business, we now focus on adjusting between ecosystem participants and customers through cross-country network externalities. As many digital platform-based transactions occur, sharing economy firms can accumulate and share big data on the digital footprints of the users and asset-providers (e.g., internet access log files, consumption patterns, evaluations, and any other interactive results between transacting parties). One well-known example is the customer review system for evaluation scores and users' feedback on the quality of service. For instance, sharing economy firms do not directly handle the operational issues of the independent service providers; instead, they share the relevant data of evaluation scores and user feedback to allow the service providers to develop their own planning. As the transactions repeatedly occur, sharing economy firms can accumulate more data on interactive results so that service providers and customers will find the best fit for their own purposes later. Another example of such adjusting processes is the various combinations of connections between heterogeneous ecosystem participants, including underutilized asset owners and complementary service providers. Self-check-in service providers in Airbnb (e.g., Keycafe) and cleaning/maintenance service providers in Tujia are such examples. These complementary service providers also independently participate in the sharing economy.

Once various interactive results among heterogeneous ecosystem participants are accumulated, sharing economy firms in a home country can localize services in a host country remotely by utilizing the accumulated data to improve their algorithms and rules. Sharing economy firms focus on improving algorithms and rules to facilitate better digital platform-based transactions for remote localization. As a platform provider, their role in affecting the transaction is quite indirect in that the transactions occur autonomously among transacting parties and that sharing economy firms only offer digitized marketplaces for transactions to occur. Although sharing economy firms form a very loose connection with service providers in the host country, they can reinforce the ecosystem-specific advantages for internationalization by using accumulated data through positive network externalities (Brouthers et al., 2016; Chen et al., 2019; Eisenmann et al., 2006). This implies that the digital information and data gathering process for sharing economy firms to accumulate and analyze big data is essential for remote localization. Furthermore, the divergence of internet regimes leads to digital trade barriers and limit investment flows for digital commerce by blocking cross-border data flows and limiting market access by foreign firms. This may impede the application of digital algorithmic logic from one country to another. Therefore, we claim the following propositions:

Proposition 2: On the condition that digital protocols and code-based algorithmic rules for a sharing economy are extended, a sharing economy firm in a home country is more likely to operate services remotely in a host country by using accumulated data from digital platform-based transactions.

Proposition 3: Differences in national internet regimes will negatively affect the remote localization process by blocking cross-border data flows and limiting market access of foreign firms.

3.3 Distributed Governance in the Digital Ecosystems

In the post-investment internationalization stage, choosing the governance structure for organizational design is fundamental for determining how internationally operating businesses and knowledge transfer between different countries can be generally managed (Buckley & Strange, 2011; Kogut & Zander, 1993). Transaction cost economics analyzes the choice of governance modes, such as external markets, social embeddedness, and internal hierarchies, pertaining to efficient organizations minimizing transactional costs (Williamson, 1991). Conventional wisdom is that efficient organizations govern the actors' behaviors through incentives and rewards (markets), social capital (embeddedness), and bureaucratic authority (hierarchies).

However, for our study of the sharing economy, we assume Hayek's extended order regarding the economic problems of dispersed knowledge effectively (Hayek, 1945, 1988) rather than efficient organizations to manage resource allocation (Coase, 1937). This shift of the assumption about organizational systems may lead to a new approach to explaining the governance mode of digital ecosystems (Cha, 2020). It involves the essential structural characteristics of ecosystems, that is, totally open boundaries and a system in constant change by autonomous actors. Self-organization may be the best option to meet this need. In particular, organizational design scholars have adopted the notion of self-organization to address a collective behavior of agents connected by a feedback loop in the complex system (Anderson, 1999; Drazin & Sandelands, 1992) and a distributed system consisting of autonomous actors (Ticoll, 2004). The distributed governance system allows autonomous actors to recognize problems and opportunities, identify suitable collaborators, and form relationships collectively (Fjeldstad et al., 2012). Collective actions among self-organizing actors who can use their own creativity sufficiently can realize truly open and non-proprietary projects on a large scale through commons-based peer production such as Wikipedia and NASA (Benkler, 2002).¹ The common understanding of the self-organizing system, including autonomous actors, commons, and collective actions among actors, can be closely associated with key features of digital ecosystems (Leong et al., 2016; Rong et al., 2015). Likewise, as Brouters et al. (2016) explained, digital platform-based transactions occur as collective interactions among

¹ Wikipedia, the largest online encyclopedia in the world, is a product of the voluntary participation of individual experts who publish information/knowledge and correct errors with each other. "In 2000, NASA scientists created a small experimental project that uses public volunteers (nicknamed "click-workers") for scientific tasks that require human perception and common sense but not a lot of scientific training. Originally used to count craters on celestial bodies, this technique crowd sources tasks to many people and statistical corrections aggregate the input into a format of scientific utility for researchers." Accessed from <https://www.nasa.gov/open/plan/peo.html> on August 1, 2021. Both Wikipedia and NASA's experimental project depend upon the collective intelligence that arises from the voluntary participation of individuals.

ecosystem members, including goods/service providers and platform users (i.e., customers), facilitating the co-creation of values.

In the sharing economy, a digital platform provider offers digital protocols and code-based algorithmic rules that contribute to the value proposition of business models within the business ecosystem. The digital algorithms can be different from what values the sharing economy firms want to provide to their customers. For example, Uber and Lyft compete with each other in the car-sharing service market. However, their respective value proposition is quite different. Uber considers the various service categories in different types of vehicles or premium services (e.g., Uber pool for carpool services, Uber black for premium limousines, and Uber Van for large vehicles), and Uber even enter various service markets, such as a food delivery services, to provide various mobility experiences to its customers. Lyft focuses on transportation services with affordable, friendly, and safe mobility experiences. Lyft offers various promotions and takes into account the high expectations of drivers' experiences and customer service to be selected. In this case, their respective algorithmic logic may be different so that the ecosystem participants (i.e., both drivers and customers) are also different based on their skills and preferences.

Differences in platform providers' policies and leadership affect platform participants' strategies. When platform leadership is clear enough to offer open access and considers the feedback of external participants to govern the ecosystem, the external participants tend to increase their contributions to the value proposition for the ecosystem by creating collective governance (O'Mahony & Karp, 2020). The reasoning behind these self-organization patterns among ecosystem participants is associated with the perspective of "ecosystem-as-structure" (Adner, 2017). The ecosystem-as-structure approach highlights that the interdependencies of all participants and collective governance can lead to the performance of value proposition within ecosystems rather than the ecosystem-as-affiliation consisting of a central platform leader and the rest of the peripheral participants such as a social networked system (Ganco et al., 2020). Likewise, the sharing economy does not simply consist of external participants captured and socially embedded by digital platform providers (Parente et al., 2018). Rather, the sharing economy can be very dynamic due to the self-organizing patterns of independent and discretionary external participants that are interdependent with each other to establish the respective digital platform-based transactions. Thus, we suggest the following proposition:

Proposition 4: On the condition that digital protocols and code-based algorithmic rules for a sharing economy are extended, a sharing economy firm is more likely to govern business ecosystems by facilitating self-organization among ecosystem participants based on digital algorithmic rules.

Although self-organization fits well with the distributed governance of digital ecosystems, it is not just a sole option for the internationalization of the sharing economy firms. It is also possible for the sharing economy firms to combine multiple modes of governance, depending on where and how to enter foreign markets in the different regulatory environments in different countries. Differences in national internet regimes and the divergence of global e-commerce policies may force the sharing economy firms to internationalize their business models with a plurilateral

approach. In other words, the lack of integrated and standardized global e-commerce policies may require sharing economy firms to develop distributed governance in different countries rather than centralized governance. This context of plural institutional environments motivates the sharing economy firms to nurture their own business ecosystems by proactively attracting and adjusting local participants when they enter different countries (Rong et al., 2015). In light of this, we propose:

Proposition 5: Differences in national internet regimes will positively affect the self-organization process by promoting a plurilateral approach at different levels of digital infrastructure in different countries.

3.4 The Outcomes of Digital Platform-Based Transactions

Now, we theorize the financial performance and innovation of the sharing economy firms that internationalize through the extended order of digital ecosystems. In the post-investment stages of internationalization processes, the performance analysis is important for the sharing economy firms to evaluate investments and manage sustainable growth. In general, firms can improve financial performance and innovation by leveraging many other partners in the business ecosystems (e.g., Adner & Kapoor, 2010; Moore, 1996; Tanriverdi & Lee, 2008). In terms of creating value from taking advantage of entrepreneurial opportunities through digital platform-based transactions, there are two aspects of the performance implications: efficiency and effectiveness (Oliva & Kotabe, 2019).

First, shaping the business ecosystem with external participants enables the sharing economy firms to reduce direct investment in specific assets and leverage the resources and capabilities of others to create and deliver value to customers. By a direct network effect and an indirect network effect, digital ecosystems can exponentially grow (Alstyn et al., 2016; Jacobides et al., 2018). The economies of scale enable the sharing economy firms to minimize the average costs of providing customers with services. The attribute of the sharing economy firms that invest less in acquiring strategic resources and capabilities implies asset-light business models, in contrast to traditional asset-heavy business models. According to the Boston Consulting Group's industrial report, firms using asset-light business models earn a better return on assets on average across different industries (Kachaner & Whybrew, 2014). This characteristic of the sharing economy is associated with the decoupling of value chains and their reconnection as an intermediary (Parente et al., 2018).

For example, in the hospitality industry, the average annual return on operational assets in the fourth quartile group (lowest asset intensity) is three times that of the first quartile group (highest asset intensity). Compare the returns on assets of Marriott International which invested hugely in buying real estate and establishing resorts in many famous places worldwide, with the high returns of Airbnb's relatively small assets. It is true that Airbnb's light assets inherently increase ROA. In addition, as traditional MNEs, Marriott International integrated the sourcing, management, and sales, which may generate huge costs to operate assets, for example, annual depreciation costs of assets, salaries for large numbers of employees, and so on. However, Airbnb can save those costs generated by operating heavy assets. Thus, the

sharing economy firms that make profits from platform-based transactions independently without heavy investment in the acquisition or equity-based alliances with local partners may be better positioned with financial performance as long as cross-country network externalities exist (Stallkamp & Schotter, 2021).

This strength of the sharing economy business stems from the reconnection of decoupled value chain activities that can be conducted by the underutilized resources of others. However, the emerging digital trade barriers established by the divergence of global e-commerce policies in different countries may only disrupt global value chains and prevent their reconnection through digital platforms. Also, the extensively high level of institutional diversity beyond some threshold can affect new product introduction across different countries negatively (Wu, 2013). This potential risk in global decoupling in global value chains will reduce the benefit of asset-light business models and expose the vulnerability problem of business ecosystems that depend on external conditions for recoupling (Cha et al., 2021). Without the technical and trade assistance from the developed countries for the developing countries with a lack of digital infrastructure and e-commerce capacity, direct investment by the sharing economy companies themselves to reduce these gaps between countries can weaken the efficiency of asset-light businesses. Hence, we propose the following propositions:

Proposition 6: On the condition that digital protocols and code-based algorithmic rules for a sharing economy are extended, a sharing economy firm is more likely to benefit from lower profits volatility and greater flexibility by continuously facilitating digital platform-based transactions for the economies of scale.

Proposition 7: Differences in national internet regimes will negatively affect the efficiency of asset-light businesses by creating digital trade barriers and disrupting global value chains.

Second, from the perspective of ecosystem-as-structure, the sharing economy firms can benefit from some ecosystem-specific advantages to enhance innovative effectiveness as autonomous actors with complementary assets from various sectors contribute to the co-creation of values at the ecosystem level (Adner, 2017; Jacobides et al., 2018; Li et al., 2019). In particular, collective intelligence accumulating dispersed knowledge through digital platforms can boost innovation performance (Malone et al., 2010) and accelerate internationalization for digital entrepreneurs (Gabrielsson et al., 2022). By assuming Hayek's extended order in the knowledge economy, collective intelligence as an ecosystem-specific advantage emerges from ex-post actions among self-organized participants with respectively dispersed knowledge in different times and places. Due to the open nature of the digital ecosystem, any ecosystem member can access collective intelligence. The large-scale collective intelligence emerges from the historically accumulated platform-based transactions among diverse ecosystem participants (Brouthers et al., 2016; Chen et al., 2019). This collective intelligence for potential collaboration can serve as an excellent source of innovation to drive sustainable business initiatives (Elia et al., 2020). For example, Airbnb supports a cross-disciplinary

group of experience (so-called Airbnb Design), including production designers, researchers, technologists, writers, and other talents, to facilitate collective intelligence in many areas and topics. Furthermore, this knowledge is open and shared with many other members of the Airbnb ecosystem and even in public, such as the community in general. As such, the collective intelligence that emerges at the level of business ecosystems can lead to community-based innovation, such as firm-community collaboration, innovation contests, and crowdsourcing, through open access and high interaction among participants, especially in the early stage and in the pre-dominant product (or service) design phases (Seidel et al., 2017).

The active collective intelligence within the sharing economy ecosystem drives effective innovation due to openness and interdependencies. However, if the openness and interdependencies among participants establishing digital platform-based transactions are reduced, such collective intelligence may be weakened. The lack of global rules for digital trade and data sharing can limit the application of emerging digital technologies from one country to another. Without a solid policy for business trust (issue 8), a weak intellectual property rights regime and a lack of source code protection for digital algorithmic development can reduce the motivation for the new digital algorithm and impede the sustainable development of the sharing economy. In addition, the lack of consensus on the prohibition of the customs duties on electronic transmissions (issue 9) may increase the costs of e-commerce transactions and discourage firms from internationalizing their business models beyond national borders. Reduced digital platform-based transactions will decrease the transactional frequency, resulting in fewer interdependencies among participants within the sharing economy ecosystem. Therefore, the divergence of internet regimes in different countries might weaken effective innovation by preventing the emergence of collective intelligence due to a lack of openness and interdependencies. Considering this, we suggest propositions as follows:

Proposition 8: On the condition that digital protocols and code-based algorithmic rules for a sharing economy are extended, a sharing economy firm is more likely to continually innovate by leveraging the ecosystem-specific advantage of the collective intelligence among business ecosystem participants.

Proposition 9: Differences in national internet regimes will negatively affect the effectiveness of innovation by limiting the potential use and benefits of emerging digital technologies.

4 Discussion

4.1 Theoretical Implications for IB Research

We have developed a model of digital platform-based transactions and internationalization where the divergence of internet regimes in different countries works as a salient context. In this study, we promised three main areas of contribution.

First, our theoretical model is based on the new boundary assumption using Hayek's concepts about the knowledge economy and focuses on the attributes of

digital platform-based transactions instead of on the assumption of Coase's hierarchical and economic organizations. Since Coase's hierarchical firms' assumption is a critical foundation of most IB theories that address MNEs' internationalization of expanding the boundaries of the firms through ownership, our work provides new insight into how the sharing economy firms without a considerable investment in ownership could expand business by promoting collective actions of complementary agents in the host country. In addition, the existing theories of internationalization have focused on the central roles of MNEs in managing and governing the internationally operated businesses (e.g., Dunning, 1980, 1995; Rugman, 2010), whereas our model sheds light on the distributed and collectively governed MNEs. By shifting from Coase's assumptions (the theory of the firm) to Hayek's assumptions (the dispersed knowledge economy), our theoretical model can capture reality in highly leveraging strategic resources and capabilities of others to utilize entrepreneurial opportunities for value propositions and value creation through ecosystem-specific advantages.

Second, our study has applied the recently emergent perspectives in platforms and ecosystems research to understand how the sharing economy can internationalize its business modes based on digital algorithmic rules. Although extant research on internationalization theory has integrated insights from strategy research on platforms and network economics into the IB literature, it focuses on the network economics principles (i.e., a mediating role of common platforms in creating network effects to promote self-organization across separated markets that connected by the common platforms) regarding the growth mechanism of platform-based ecosystems to address the internationalization patterns through digital platforms (Nambisan et al., 2019; Stallkamp & Schotter, 2021; Zeng et al., 2019). The reasoning behind this perspective is the ecosystems-as-affiliation where a common platform provider plays a central role to coordinate the dynamics of peripheral external participants. To some extent, this centralized form of networks seems a good fit with the traditional thinking on Coase's theory of the firm. However, we have placed more emphasis on the roles of self-organizing participants to contribute value proposition and value creation for the entire ecosystem from the perspective of ecosystem-as-structure. This perspective considers the interdependencies between participants within the ecosystem and their contribution to the entire ecosystem-level performance (Adner, 2017; Ganco et al., 2020; Jacobides et al., 2018; Li et al., 2019). Thus, our work contributes to offering different approaches to the dynamics of a sharing economy in the context of different countries in the IB field.

Third, we have considered the lack of global e-commerce policies discussed in the WTO as the salient context for the internationalization of the sharing economy because it is growing exponentially, but regulatory environments are increasingly divergent. Since the first discussion on e-commerce policies in the WTO in 1998, the debates and consensus have not yet developed much so far due to the different contexts of digital technology development and investments in different countries. Also, the different approaches to internet uses and regimes in different countries, such as the US (open internet), the EU (normative internet), and China (state-led internet) prevent the emergence of global e-commerce policies. Although regulatory environments are highly divergent in different countries, many sharing economy firms are

increasingly internationalizing to expand their business models. In this context, our work provides insights into the contextual factors for the internationalization strategy and control in the IB field. Especially, we focused on the differences in national internet regimes leading to divergence in e-commerce policies in different countries as a salient context for internationalizing the sharing economy businesses. To answer our research question about the effect of global e-commerce divergence on the internationalization process of sharing economy firms, we built a set of propositions in terms of the four aspects of decision making for internationalization, such as geography, control, efficiency, and effectiveness, as shown in Fig. 1. The propositions that we established can address the question in the respective four aspects as follows: Regarding the data and market access issues, Proposition 3 focuses on the negative effect of internet regime divergence on remote localization. Consumer protection and transparent internet issues are related to Proposition 5 which articulates the positive effect on self-organization for the autonomous plurilateral approach. Proposition 7 points out the negative effect of internet regime divergence on asset-light efficiency due to digital trade barriers stemming from different e-commerce capabilities with limited technical and trade assistance in different countries. Concerning business trust for electronic transmissions issues, Proposition 9 highlights the negative effect of internet regime divergence on the effectiveness of innovation in sharing economies.

4.2 Implications for E-Commerce Policymakers

In emerging economies, the low level of digital infrastructure is the primary hurdle to nurturing the sharing economy's business ecosystems. Due to the enormously high costs for firms to establish the digital infrastructure to enter the emerging markets in developing countries, the lack of digital infrastructure can be considered the critical entry barrier for e-commerce. To reduce the gaps in digital infrastructure between developing and developed countries, WTO member countries need to standardize the technical means and e-commerce technologies across different countries. For example, the standardized means of electronic payment systems, electronic signatures, and electronic contracts will make the e-commerce processes fast and straightforward, including payments, operations, and customer services. Most developing countries have fewer resources and technologies so they cannot easily catch up with the global standards and norms. In this case, trade and technical assistance from the developed countries to the developing countries could serve as an essential stimulus to developing the globally standardized digital infrastructure in the developing countries. Once the digital infrastructure is set up globally, digital platform-based transactions can become pervasive globally, contributing to sustainable firm performance by cross-country network externalities (Stallkamp & Schotter, 2021). Thus, the current debates on digital infrastructure gaps need to address how to make a smoother transition to a harmonized global digital infrastructure than ever before.

Facilitating e-commerce is associated with the pervasiveness of digital platform-based transactions. The quality of digital platforms matters from this perspective. If the digital platform algorithms set the valuable protocols and automatic rules for transacting parties, many local service providers will participate in the digital platform-based transactions through high-quality digital platforms. To enhance digital platform algorithms' quality, firms need to accumulate big data on prior purchasing information, customer satisfaction, consumer behaviors, and other best practices of matching goods and service providers with customers (Brouthers et al., 2016; Chen et al., 2019). The market access liberalization increases the volume of big data. By analyzing the big data on the prior digital platform-based transactions, firms can improve the existing algorithms by fixing programming errors or developing an entirely new business model for new customers. Thus, internet access and cross-border data transfer must be resolved to allow firms to access sufficient information and big data. In particular, the e-commerce discussion on information flows has been a critical issue because of its importance in facilitating e-commerce by supporting firms to develop high-quality digital platforms and its broad scope of topics, including national security problems and privacy. In this case, detailed and well-organized e-commerce policies are needed to separate the trade-offs between value creation from data ownership and control in national security threats.

The well-designed policies regarding control issues are essential for the sustainable growth of e-commerce. As we discussed above, the control problems of data transfer and the location of data facilities are related to national security and privacy. Resolving the control issue may enable firms to conveniently access and use their own data to implement remote localization for fast growth. In addition, the existing digital platforms must be continuously improved to hold the existing digital ecosystem members and attract new digital ecosystem members. From this perspective of distributed governance among digital ecosystem members, WTO member countries should make a comprehensive agreement on the issues of consumer protection, privacy, transparency, and business trust. In particular, the solid global norms on regulatory transparency and protection of source codes (or algorithms) are important in facilitating autonomous digital platform-based transactions. Thus, the sustainable growth of digital ecosystems is possible because the greater the demand-sided network from the point of view of market access liberalization, the more extensive the supply-sided network.

Finally, WTO member countries may find a suitable solution for some issues on e-commerce, considering what factors will enhance the financial and innovative performance of the firms related to e-commerce. One is the direct factor, like taxation. Custom duties and domestic internal taxes on electronic transmissions are essential for firms to reduce costs for operating e-commerce and maximize profits from facilitating digital platform-based transactions. This profit-maximizing condition on e-commerce will motivate entrepreneurs to discover a new opportunity from designing high-quality digital platforms. The others are the indirect factors that can generate network effects within the digital ecosystems. The digital ecosystems consist of three elements: online platforms, ecosystem members (i.e., goods/service providers and customers), and protocols and rules (e.g., digital platform algorithms). Online platforms can emerge on the basis of the well-established digital infrastructure

(i.e., the issues on standardized electronic transactions and means). Also, ecosystem members increase under the environmental conditions of individualism and autonomy (i.e., consumer protection and privacy). The protocols and rules are associated with the quality of the digital platform algorithms (i.e., the issues on information flows, source codes, intellectual property rights). Once these factors satisfy the needs of both goods/service providers and customers, the digital ecosystem will grow sustainably through the network effects (Stallkamp & Schotter, 2021).

5 Conclusion

While we theoretically addressed the internationalization pattern of the sharing economy firms under the divergence of global e-commerce policies, future research may test large-scale empirical data to analyze its generalizability. We also provided the potential implications of applying our theoretical framework to the issues of global e-commerce policy. Maybe, the issues of e-commerce policies can be associated with practical challenges rather than theoretical problems. Nevertheless, we have focused on theoretical problems of internationalization for a sharing economy. This is not only due to the lack of internationalization theory for the emergent business models in the IB field but also due to the urgent need to solve the challenges to companies related to the divergence of e-commerce policies. For future research, we hope that this study will serve as a stepping stone for further opportunities for theoretical and empirical studies to advance our understanding of the sharing economy, platforms, and ecosystems in the international and institutional contexts.

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Authors and Affiliations

Hongryol Cha¹ · Masaaki Kotabe^{2,3} · Jie Wu⁴

Hongryol Cha
h.cha@qub.ac.uk

Masaaki Kotabe
masaaki.kotabe@aoni.waseda.jp; masaaki.kotabe@hawaii.edu

- ¹ Queen's Management School, Queen's University Belfast, 185 Stranmillis Road, Belfast BT9 5EE, UK
- ² School of Commerce, Waseda University, 1-6-1 Nishiwaseda, Shinjuku-ku, Tokyo 169-8050, Japan
- ³ Department of Marketing, The Shidler College of Business, University of Hawaii at Manoa, 2404 Maile Way, Honolulu, HI 96822, USA
- ⁴ King's College, University of Aberdeen Business School, Old Aberdeen AB24 3FX, Scotland, UK