How Do Platform Multinational Corporations (PMNCs) Address Emerging Challenges in the Global Landscape? A 'READ' Framework

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Abstract

The prevalence of platform-based multinational corporations (PMNCs) has been increasing, and these businesses are encountering several growing challenges. These challenges include the dynamics and diversification of the global ***R***egulatory context (R), the evolution of platform ***E***cosystems as innovative organization forms (E), the emergence of ***A***rtificial intelligence technologies as a new capability (A), and the introduction of ***D***ata as a novel resource (D). A 'READ' framework is proposed to guide the research of PMNCs based on four dimensions. This framework aims to enhance comprehension of the challenges faced by PMNCs within the global context and to

offer direction for future research endeavors.

Keywords: *Platform; Platform-based Multinational Corporations (PMNCs); Regulation, Ecosystem Dynamics, Artificial Intelligence (AI), and Data*

Introduction

The process of digitalization has had a profound impact on the global corporate environment, playing a crucial role in fostering economic development (Evans and Gawer, 2016; Teece, 2018). The advent of digitization and artificial intelligence (AI) has led to increased competition across different sectors on various platforms (Lawton & Vassolo, 2022). The expansion of platform businesses has led to significant increases in their valuations and market influence, reaching levels that have not been seen before. Since 2016, well-established platform multinational corporations (PMNCs), i.e., "FAANG" (Meta 'Facebook', Amazon, Apple, Netflix, and Alphabet 'Google'), have consistently ranked among the top ten companies worldwide in terms of market capitalization. According to Jacobides and Lianos (2021), the combined market capitalization of the five largest PMNCs in the United States represents around 25% of the overall market capitalization, suggesting their substantial influence and dominance. Furthermore, the global advancements of digital technologies serve to augment the cross-border coordination of traditional multinational corporations (MNCs) and facilitate the internationalization of PMNCs. Recently, researchers have undertaken investigations into the internationalization activities of platform companies (e.g., Banalieva & Dhanaraj, 2019; Brouthers et al., 2016; Chen et al., 2019; Gawer, 2021; Monaghan, Tippmann & Coviello, 2019; Rietveld and Schilling, 2020; Rong, Kang, and Williamson, 2022; Stallkamp & Schotter, 2021; Zeng et al., 2019), but there remains a gap in the literature regarding a systematic framework to understand

emerging changes and new challenges in international business brought by these platform companies.

Our study defines PMNCs as multinational corporations that strategically leverage digital platforms as integral elements of their business model and operational strategies, extending beyond the confines of national borders. Reflecting on the existing literature on platforms, we identify four key theoretical perspectives to understand PMNCs' emerging challenges: the institutional view to exploring platforms' interactions with external contextual factors, the organizational view to understanding the relationship between platforms and complementors from an ecosystem approach, the dynamic capability view to treating the AI as a new capability, and the resource-based view to regarding the data as a new production factor determining platform owners' competitive strategy. Building on the four theoretical view above, we identify that PMNCs are facing emerging challenges from complex context (i.e., regulation impact) (Sokol & Alstyne, 2021), evolving platform organizations (i.e., platform ecosystem) (Jacobides, 2019; Li et al., 2022; Rong et al., 2022), emerging technological capabilities (i.e., artificial intelligence, 'AI') (Dafoe, 2018; Fricke, 2020), and the new resources (i.e., data as a production factor) (Cong, Xie & Zhang, 2021; Rong, 2022; Xu, 2021; Ye et al., 2022). Considering these challenges, we propose the 'READ' framework (*R*egulation, *Ecosystem*, *A*I, and *D*ata) based on the dimensions that contribute to a greater understanding of the challenges encountered by PMNCs and allow us to provide direction for future research endeavors.

Literature Review

The development of PMNCs in the digital age has raised considerable research interest. In our examination of existing strategic literature, we identified four key theoretical perspectives, each focusing on distinct dimensions of PMNCs. The first view, the institutional view, provides a valuable theoretical lens to extend research to platforms and their interactions with external contextual factors. Then, as platforms continually shift the traditional organizational structure by connecting many complementors and

evolving into a platform ecosystem, the second view adopts the organizational view and investigates complementors within the ecosystem. Third, drawn from the dynamic capability view, the development of AI is increasingly disrupting traditional organizations' operations and business models and facilitating platforms' growth and evolutions. Fourth, rooted in the resource-based view, data as a new production factor determines the competitive advantages of platforms. We review literature from the four perspectives to provide a comprehensive understanding of PMNCs' research gaps and emerging challenges (see Table 1).

[------INSERT TABLE 1 HERE------]

Institutional view: external context

Digital platforms are inherently disruptive to traditional industries, which makes it likely that the external contexts will have a more differentiated regulatory impact on platforms than they do on traditional organizations. For example, the disruptive models of platforms bring significant shocks to traditional industries, such as Uber in the taxi industry and Airbnb in the hotel sector (Marano et al., 2020; Zervas et al., 2017). Moreover, platforms reshaped the labour market and employment relations through the emergence of gig workers and new technologies (Duggan et al., 2020; Wiener et al., 2023). From an institutional lens, existing literature has provided some insights into the impact of external contexts on digital platforms. For instance, new UK regulations require Disney to notify its customers about their streaming subscription every six months (McIntosh, 2023). Existing literature has shown the legitimation of platforms involves a proactive process wherein diverse stakeholders, including local users, communities, and regulators, are influenced (Garud et al., 2022; Uzunca et al., 2018). Specifically, the discussion extends to the corporate social responsibilities (CSRs) of platforms, such as environmental sustainability (Dabbous & Tarhini, 2021; Gu, 2022), redundancy and resource waste (Rong et al., 2019), indicating the platforms' role in influencing public welfare (Church et al., 2010). However, much of the existing research focuses on specific themes but fails to consider the rapid expansion of

platforms across industrial boundaries and geographical borders, which brings significant institutional challenges to the international business landscape.

Organizational view: platform and complementors

Existing literature has seen digital platforms as emergent organizations (e.g., Nambisan et al., 2017; Saadatmand et al., 2019), while technological development is facilitating the evolution of platforms to a new organizational form, i.e., the platform ecosystem (Teece, 2018; Yonatany, 2013), or meta-organizations (i.e., 'organizations of organizations') (Kretschmer et al., 2022). Different from traditional supply-chain based organizations, platforms rely on complementors to engage and co-create value (e.g., Ceccagnoli et al., 2012; Saadatmand, Lindgren, and Schultze, 2019). According to Saadatmand et al. (2019:1), "*Digital platforms are an organizational form made up of a technological architecture and governance mechanisms for managing autonomous complementors."* In short, digital platforms refer to a structural arrangement within organizations characterized by the integration of a technological framework and governance mechanisms. In terms of governance, platforms have the responsibility of effectively managing the interplay between the complementary and competitive aspects of their complementors (de Reuver et al., 2018). Furthermore, Cenamor (2021) proposed a complementor-centered approach to create competitive advantages in platform ecosystems. In terms of platform governance design, Chen et al. (2022) suggested that open governance provides platform providers with more autonomy, but it also creates a more intricate ecosystem for complementors. While the extant literature on platform ecosystems demonstrates an increasing body of research (e.g., Ceccagnoli, Forman, Huang and Wu, 2012; Cenamor, 2021; Chen et al., 2022; Cozzolino, Corbo, and Aversa, 2021; Hein et al., 2020; Kretschmer et al., 2022; Parket et al., 2017), a notable research gap persists, particularly concerning the global scope and diversity of platforms serving as complementors within these ecosystems. Existing scholarship predominantly focuses on localized contexts of digital platforms' ecosystem, e.g., Didi (Rong, Li, et al., 2021), thereby overlooking the broader and more heterogeneous

engagements of platforms on a global scale. By addressing this gap, researchers can contribute to a more comprehensive understanding of ecosystem dimensions, elucidating the intricate interplay between global complementarity and the overarching structure of platform ecosystems.

Dynamic capability view: platform owners

Existing literature suggests a growing attention should be paid to the dynamics of the platform ecosystem (e.g., Cenamor, 2021; Teece, 2018). For example, to deal with the problem of capturing value in the digital economy, Teece (2018) stressed the necessity of concerning the dynamics of platforms and ecosystems. Helfat and Raubitschek (2018) claimed that innovation capability, environmental scanning and sensing capability, and integrative capability are three essential types of dynamic capabilities for digital platforms. During the continuous digitalization process, various resources within platforms are accumulating into proprietary data assets owned by platforms (Rong, 2022). Simultaneously, the formation of various dynamic capabilities is often supported by data resources. For example, among these capabilities, artificial intelligence (AI), as a quintessential data-intensive innovation capability (Beraja et al., 2023), is exerting a significant impact on digital platforms (Cusumano et al., 2020). To illustrate, the Meta's recent AI model can allow users of Instagram, WhatsApp and Messenger to utilize it to achieve information and finish tasks (Isaac and Metz, 2024). Hence, in the future competitive landscape of platforms, AI is increasingly recognized as a new capability (Li, Rong & Shi, 2024), and further research is warranted concerning AI aspects specific to future platform competition (e.g., Rong 2022; Cusumano et al., 2020). Thus, paying more attention to the development of AI is required while studying digital platforms from a view of dynamic capability.

Resource-based view: platform owners

Building on the classical resource-based view (RBV), existing literature suggests more about digital platform owners' firm-level strategies shape their competitive advantages (Teece, 2018; Helfat and Raubitschek, 2018; Zeng et al., 2021; Ghosh et al., 2022; Giustiziero et al., 2023). Specifically, the network effects are perceived as crucial strategic resources that play important roles in the two-sided markets (Zhu and Iansiti, 2012; Wu et al., 2022). In addition, complementary resources and technology-enabled resources also help reshape firms in the digital economy (Li et al., 2019; Giustiziero et al., 2023). Notably, from a lens of the resource-based view, existing literature suggests more attention is paid to the data as one crucial production factor in the era of the digital economy (e.g., Li et al., 2024; Rong, 2022; Ye et al., 2022). Given the emergence of data as a new resource, future research should be developed surrounding the data resource specific to future platform competition (Rong, 2022; Cusumano et al., 2020).

Emerging Challenges for PMNCs

Built on the existing literature centred on the four perspectives, it seems clear that PMNCs, in order to create value, are being confronted with emerging challenges that offer new insights into extant research. These challenges include a new worldwide level of institutional demands and regulatory systems, the formation of new organizations of global platform ecosystems, the newfound AI capabilities, and the new production factor (i.e., data as a new strategic resource).

New institutional challenges: Regulations across boundaries

While existing literature has initiated the examination of interactions between platforms and external contexts, most research is centred on specific contexts, such as certain industries or certain regions, but overlooks the characteristics of PMNCs in broadening geographical and industrial boundaries. Compared with traditional brick-and-mortar firms, platforms can rapidly expand into global markets and generate network effects across borders (Stallkamp & Schotter, 2021), leading to a new paradigm of global competition. Such rapid global expansion has also raised a wide

range of societal and public issues on a global scale, including concerns about data privacy, content moderation and disinformation, the digital divide, etc. (Cammaerts & Mansell, 2020). Although governments in various regions, including the United States, the European Union, and China, have initiated efforts to regulate platform companies (Sokol & Van Alstyne, 2021), investigating these issues effectively on a single-nation basis has become increasingly challenging. This situation indicates the emerging need for regulations across borders, calling for the development of a unified regulatory framework to facilitate international cooperation.

Moreover, PMNCs are actively engaged in the pursuit of expanding their business boundaries. They form partnerships with a wide array of external complementors, engage in mergers and acquisitions (Miric, Pagani, & El Sawy, 2021; Parker, Petropoulos, & Van Alstyne, 2021), and conduct venture capital investments (Angeren & Karunakaran, 2023). As a result, there is a growing ambiguity around the boundaries of platforms (Petit & Teece, 2021). Such complexity of stakeholders impacted by platforms, however, is often overlooked in current regulatory norms (Jacobides & Lianos, 2021), further highlighting the emerging regulation challenges for PMNCs.

New organizations: Platform Ecosystem

A business ecosystem is a group of diversified stakeholders (e.g., suppliers, competitors, government agencies, etc.) that participate in the supply of a particular product or service via both competition and collaboration, which is fulfilled with dynamics (Basole et al., 2015; Rong et al., 2015). Platform firms may not only create value for themselves but also be able to coordinate with other partners for value creation (Alstyne, 2019). The structure of the platform ecosystem will no longer be static as the logic of ecosystem development becomes more outward. The ecosystem leader and other ecosystem stakeholders will have a dynamic and interactive interaction with the external environment, constantly breaking previous ecosystem boundaries and broadening the ecosystem's scope (Moore, 1996; Jackbides et al., 2018; Rong et al., 2018). In simple terms, ecosystems are novel ways of structuring complementary

commodities and services in which multiple firms collaborate and compete to produce a complex commodity or service. A digital platform ecosystem is collectively formed by the digital platform, the platform owner(s), related participants, and diverse complementors, and managers should pay attention to the complex dynamics within platform ecosystems (Li et al., 2022). As such, PMNCs (e.g., Google, Apple, Facebook, and Uber) would experience more ecosystem dynamics and must address growing uncertainties. For instance, according to Nambisan, Zahra, and Luo (2019), digital platforms and ecosystems facilitate new approaches to the internationalization of creating knowledge and value for global consumers.

Furthermore, these innovative platform-based organizational businesses tend to have powerful brand names and remarkable delivery capabilities. Therefore, PMNCs are illustrations of marketplaces with network externalities, in which the value of joining a platform or ecosystem is proportional to the number of other people who join that platform or ecosystem (Jacobides, 2019). On top of that, an ecosystem logic can better explain the structure of platform businesses, and scholars have advocated network multinationals' ecosystem-specific advantages (Li et al., 2019). Because of network effects, PMNCs may increase the value of their platform as more users and participants join. According to Rong et al. (2022), digital enterprises must also consider the liability of ecosystem integration in the target market. In other words, while internationalizing, PMNCs must address ecosystem competition. However, these networks may require assistance in managing and scaling. Thus, PMNCs need to find a balance between attracting and retaining customers and nurturing a vibrant and healthy ecosystem of participants.

New capabilities: Artificial Intelligence (AI)

PMNCs' expansion into diverse industries has endowed them with a heightened sensitivity to the potential applications of different digital technologies (Cusumano et al., 2020; Gawer, 2021; Zhou et al., 2022). Especially in AI, PMNCs have emerged as pioneers, leading the way in both technological innovation and practical application of

AI scenarios (Rai et al., 2019; Stahl et al., 2021; Tatarinov et al., 2022). With the advent of ChatGPT in 2023, there has been a resurgence of interest and a notable shift in attention towards AI-generated content (AIGC), with several PMNCs establishing themselves as dominant players in AIGC. For example, Microsoft is one of the major shareholders of OpenAI, which developed and maintains ChatGPT (Jin & Kruppa, 2023). Specifically, Microsoft has successfully integrated ChatGPT into numerous services, showcasing its commitment to leveraging AI technologies. Moreover, Microsoft has recently announced plans to introduce a new AI assistant named "Copilot" within the Windows operating system. Meanwhile, many other PMNCs are also intensifying their research efforts in developing their own AIGC products (e.g., Google's Bard, Meta's LLaMA, Alibaba's Tongyi, etc.). Considering the widespread adoption of AI technology and the evolving regulatory landscape surrounding PMNCs, there is a clear need for extensive research that examines PMNCs and AI from a global perspective.

The primary objective of research should be to investigate the effects of PMNCs' global AI race on various fronts, such as AI technology innovation, AI-related industries, AI markets in various countries, and the multinational companies themselves. Indeed, PMNCs have unparalleled access to vast amounts of data resources from global markets (Beraja et al., 2020; Marciano et al., 2020), which can fuel the continuous improvement of AI algorithms and pave the way for further breakthroughs in AI technology (Hartmann & Henkel, 2020; Bessen et al., 2022). Moreover, with ecosystems and various complementors, PMNCs hold a significant advantage in integrating AI technology with business model innovation. Rong et al. (2021) show that AI and machine learning technologies can improve sharing platforms' matching services, thus facilitating the wider adoption of the sharing economy business model. Undoubtedly, such an advantage enables PMNCs to apply AI across various industries and international markets swiftly (Brynjolfsson & Mcafee, 2017; Brynjolfsson et al., 2019; Garud et al., 2021). Artificial intelligence (AI) has emerged as a disruptive technology that is fueling innovation across various sectors. It has the potential to

significantly alter the competitive dynamics of platform-based multinational corporations (PMNCs) on a worldwide scale (Cusumano et al., 2020). Thus, multinational corporations that possess advanced expertise in AI are positioned to acquire a more pronounced monopoly over the market.

The rapid development of AI driven by PMNCs presents significant risks that warrant careful consideration. Using labour displacement as an illustrative case, Eloundou et al. (2023) findings indicate that around 80% of the United States workforce may see a minimum of 10% impact on their work duties due to the implementation of extensive language models. Acemoglu and Restrepo (2020) point out that the implementation of AI and robotics has the potential to displace workers in some job activities, thus causing a powerful displacement effect. Furthermore, the use of AI technology has the potential to enhance the market dominance of PMNCs, presenting governments in different countries with challenges regarding antitrust measures and regulations concerning technology platforms (Hovenkamp, 2020; Sokol & Van Alstyne, 2021). Additional concerns associated with AI technologies for PMNCs include the potential worsening of social inequalities, political risks, and ethical risks (Dafoe, 2018; Fricke, 2020).

New strategic resources: Data

Data has gained significant recognition as a novel factor of production (Cong, Xie & Zhang, 2021; Rong, 2022; Xu, 2021; Ye et al., 2022), exerting a substantial influence on the global economy. Consequently, the field of data governance is currently gaining prominence in academic literature, as evidenced by the works of Alhassan, Sammon, and Daly (2019), Janssen et al. (2020), and Ye et al. (2022). Janssen et al. (2020) conducted a study in which they identified many challenges and approaches to data governance and proposed a system-level governance model. PMNCs therefore face challenges associated with governance concerns related to data.

The treatment of data as an asset (Fernandez et al., 2020; Otto, 2015) carries significant implications for PMNCs. In contrast to traditional technology or brand assets, it would be challenging for PMNCs because data assets' exploitation or exploration behaviors in target foreign markets relate to complex problems such as cross-border data trading, data privacy, data collection and processing, etc. When PMNCs engage in international expansion, they encounter a novel data factor market in the target country. An example of a regulation that addresses data privacy during data processing is the General Data Protection Regulation (GDPR) in the European Union (Peukert et al., 2022). Furthermore, when considering the issue of data privacy (Cong, Xie, & Zhang, 2021; Peukert et al., 2022), the establishment of platform ecosystems by PMNCs would pose significant challenges. Furthermore, with regards to the establishment of a data factor market, it is important to acknowledge that various nations or regions possess distinct data-related regulations and have not yet achieved consensus on matters pertaining to data privacy.

Building upon the existing literature and the identified emerging challenges, Figure 1 elaborates on the connections between various dimensions and the identified emerging challenges that PMNCs encounter, which introduces the 'READ' framework directing future research on PMNCs.

[------INSERT FIGURE 1 HERE------]

A Proposed Research Framework for Studying PMNCs

In this section, we introduce our comprehensive research framework based on the four key dimensions that should guide future research on PMNCs. The framework is termed 'READ.' The discussion of the four dimensions within our framework leads to a comprehensive research agenda and future directions (see Table 2).

[------INSERT TABLE 2 HERE------]

Next, we discuss and elaborate on each of the dimensions of our proposed

framework.

The 'R': Regulations dimension

The unique characteristics of platform businesses, along with the rapid expansion of platform ecosystems, provide significant challenges to effectively regulating the market dominance of large PMNCs with the aim of promoting market competition and innovation. Moreover, the externalities of PMNCs have the potential to reshape the global value chain, raising concerns about addressing diverse economic, social, and environmental challenges. Platform firm regulation (Hovenkamp, 2020), platform business boundary blurring (Petit & Teece, 2021), and privacy and content moderation (Cammaerts & Mansell, 2020) constitute some of the challenges.

As such, future research is needed to advance the field regarding regulating PMNCs. How do PMNCs navigate diverse regulations in different countries to strengthen their innovation and competition? How do PMNCs address regulatory complexities and promote compliance while internationalizing? Given the ongoing antitrust practices worldwide, research that offers empirical evidence on the performance of existing regulatory rules and initiatives in different jurisdictions would be highly valuable. How do PMNCs incorporate local cultural and legal factors to ensure regulatory compliance and customer trust? Do existing theories explain PMNC internationalization? Finally, researchers need to develop new theories that include the distinctive features of platforms and ecosystems, providing a solid theoretical foundation.

The 'E': Ecosystem dimension

The dynamic platform ecosystem, which is changing, can be an important factor for PMNCs (Li et al., 2022; McIntyre et al., 2021), causing the internationalization of PMNCs to become more complex and uncertain. Thus, in the context of the digital economy, it is imperative that we adopt a perspective that focuses on understanding

PMNCs to provide direction for future research. How do PMNCs implement ecosystem strategies to foster cross-border collaboration and value creation? What are the key components and actors within PMNCs' ecosystems, and how do they interact? How do PMNCs address the liability of ecosystem integration? How do PMNCs evolve? How can MNEs manage relationships with ecosystem partners?

The 'A': Artificial Intelligence dimension

AI has emerged as a significant catalyst for enhancing the global economy. We argue that PMNCs and AI research require continuous investigation and analysis. The growing use of AI has raised major concerns over the diversification of AI scenarios on digital platforms (Rai et al., 2019; Stahl et al., 2021; Tatarinov et al., 2022). Moreover, while Li, Rong and Shi (2024) proposed types of human-machine relationships in situating AI in organizations, the further concern would be whether there are variations in the role of AI in achieving competitive advantages in traditional organizations and platform-based organizations. In addition, there is increased attention towards issues of platform antitrust and the need for technological regulations in relation to AI (Hovenkamp, 2020; Soko & Van Alstyne, 2021). This involves doing research on AI developments within PMNCs and analyzing the potential hazards connected with the implementation of AI in the specific context of PMNCs. Specifically, we believe the following research questions need further consideration. How does AI impact PMNCs' innovation, investments, operations, and other strategies? How does AI-driven innovation reshape the global competition of PMNCs? How can we regulate PMNCs with advanced AI technologies? How can PMNCs effectively address the diverse challenges arising from the widespread adoption of AI?

The 'D': Data dimension

The recognition of data as a novel factor of production will result in a more distinct differentiation between the research of PMNCs and typical MNCs. The relevance of

data-related qualities, including the recognition of data as valuable assets, the protection of data privacy, and the establishment of user trust in data will be significant for PMNCs. The present study highlights the growing challenges associated with PMNCs, specifically focusing on two key areas: data governance (Alhassan, Sammon, & Daly, 2019; Ye et al., 2022) and data privacy (Cong, Xie, & Zhang, 2021; Peukert et al., 2022). Thus, data factors can open a new dimension for future research on PMNCs. How do PMNCs exploit and explore data assets while expanding to foreign countries? How can PMNCs determine the value of their data assets? How can PMNCs leverage data assets to sustain competitiveness? How do PMNCs nurture the data ecosystem in the target country? How do PMNCs influence cross-border data trading businesses?

In sum, our "READ" framework helps to explain the distinct challenges PMNCs encounter in domestic versus international settings. In terms of the R (Regulation) dimension, in an international context, PMNCs face a variety of regulatory challenges due to different legal systems and cultural characteristics. These may include compliance with diverse laws, navigating varying regulatory standards, and understanding different cultural norms. Domestically, the regulatory environment is more familiar and consistent, posing fewer challenges. In terms of the E (ecosystem organization), PMNCs operating abroad may struggle with integrating into new ecosystems in the target country, i.e., the liability of ecosystem integration (Rong et al., 2022). This could involve establishing new partnerships, understanding local market dynamics, and overcoming the absence of established networks that they might have domestically. In terms of A (artificial intelligence), internationally, PMNCs may face limitations due to the digital infrastructure or the level of technological development in the target country. This may include the availability of digital talent and the development level of AI and other digital technologies. Domestically, PMNCs typically operate in a more mature, developed environment with greater access to relevant skilled personnel and developed digital infrastructure. In terms of the D (data), there are diverse and multifaceted regulatory challenges related to data usage and cross-border data transactions. Each country may have different data protection laws, privacy regulations, and standards for data handling and transactions. Domestically, PMNCs are more familiar with the data

regulations and can navigate them more efficiently.

Another important aspect of our "READ" framework is that it can provide a clear differentiation between the challenges of PMNCs and traditional MNCs, which can be included in the four dimensions of our framework (R, E, A, and D). The R (regulation): PMNCs face unique regulatory challenges that differ from traditional MNCs. PMNCs must navigate regulations specific to digital platforms, data privacy, and cybersecurity, which are less important issues for traditional MNCs. The E (ecosystem): PMNCs need to integrate into digital ecosystems that are constantly evolving and differ significantly across regions. Traditional MNCs often deal with more established and stable industrial ecosystems. The dynamic nature of digital ecosystems poses a unique set of challenges for PMNCs. The A (AI): The core operations of PMNCs are deeply embedded in digital technologies. Thus, they face greater challenges related to technological advancement and digital infrastructure compared to traditional MNCs, whose operations might rely less on cutting-edge digital technologies. The D (data): The challenges surrounding data are more significant for PMNCs. They deal with vast amounts of data and need to comply with varying data regulations across different countries. For traditional MNCs, data management is often not as central to their operations, making data-related challenges less significant. Using the "READ" framework, we can clearly see how PMNCs encounter more complex challenges in both their domestic and international operations compared to traditional MNCs.

Discussion and Implications

Research suggests that platform businesses are exerting a significant impact on the global business landscape and having a profound effect on the lives of individuals around the globe. As such, it is evident that PMNCs would have to directly encounter global competition in the international business communities. First, digital platforms (i.e., PMNCs) would be influenced by diverse regulatory challenges, such as taxation, competition policy, and data protection (Meyer et al., 2023). Second, owing to the ecosystem dynamics for platform firms, PMNCs tend to suffer the liability of ecosystem integration in the target market (Rong et al., 2022). Then, the collaborations,

partnerships, and strategic alliances in the target country play a crucial role in expanding engagement and mitigating risks in the course of digital internationalization. Third, in the era of the digital economy, PMNCs heavily rely on digital data analytics (i.e., AI) to understand user preferences and market trends. Notably, the current techno-nationalism hinders MNCs, particularly those reliant on the global technology supply chain and the market contribution from the target market (Luo, 2022). Fourth, unlike TMNCs that focus on manufacturing and distribution, PMNCs thrive on network effects and the size of their user base. This data-driven approach raises concerns about data privacy, security, and regulatory compliance, which can affect international digital platforms' (i.e., PMNC) competitive strategies in international business in the digital age (Meyer et al., 2023).

Accordingly, our perspective paper proposes a 'READ' framework formulated by synthesizing and integrating existing literature on four key dimensions pertaining to the challenges faced by PMNCs: (1) the impact of changing institutional regulations owing to growing uncertainties, leading to a diversification of the operating context; (2) the evolving organizational forms or structures, exemplified by platform ecosystems and ecosystem dynamics; (3) the emergence of advanced digital technologies, a new capability, i.e., AI; and (4) the introduction of a new strategic resource, specifically data.

Moreover, our proposed 'READ' framework draws upon the four theoretical perspectives of institutional theory, organizational view, dynamic capabilities, and resource-based view to directly address the existing research gaps and emerging challenges in the literature on PMNCs. By integrating these perspectives, the 'READ' framework offers a holistic approach that enhances our understanding of the strategic management of PMNCs. Specifically, it elucidates how these PMNCs navigate and leverage diverse institutional environments, optimize organizational structures, develop and maintain dynamic capabilities, and strategically manage data-oriented strategic resources. This multifaceted approach not only bridges the identified gaps in current MNC theories but also provides novel insights into the distinctive characteristics and strategies of PMNCs.

Specifically, external institutional environments exert regulatory control (R) on PMNCs over strategic data resources, and internal organizational characteristics also drive the continuous evolution of platform ecosystems (E); the emerging development of artificial intelligence (A) is poised to significantly alter PMNCs' competitive advantages, especially when the data is believed to be a new strategic resource (D). In essence, the four dimensions of the READ framework are interconnected, with external institutional regulation (R) and internal strategic data resources (D) empowered by artificial intelligence (A) playing pivotal roles in influencing the evolution (E) of platform ecosystems.

Therefore, one limitation of this paper is that the 'READ' framework, while critical, is built on established research, and we have intentionally refrained from specifically delineating the framework's connections with distinct types of PMNCs because we would like to emphasize that the 'READ' framework is designed to be generalizable and applicable to various types of PMNCs. Above all, grounding this 'READ' framework, our research systematically sorted out future challenges that PMNCs must address to suggest the framework to improve understanding of the PMNCs and guide future research initiatives. Thus, our research offers an opportunity to elevate PMNCs to a prominent position within the field of strategic management studies.

Appendix

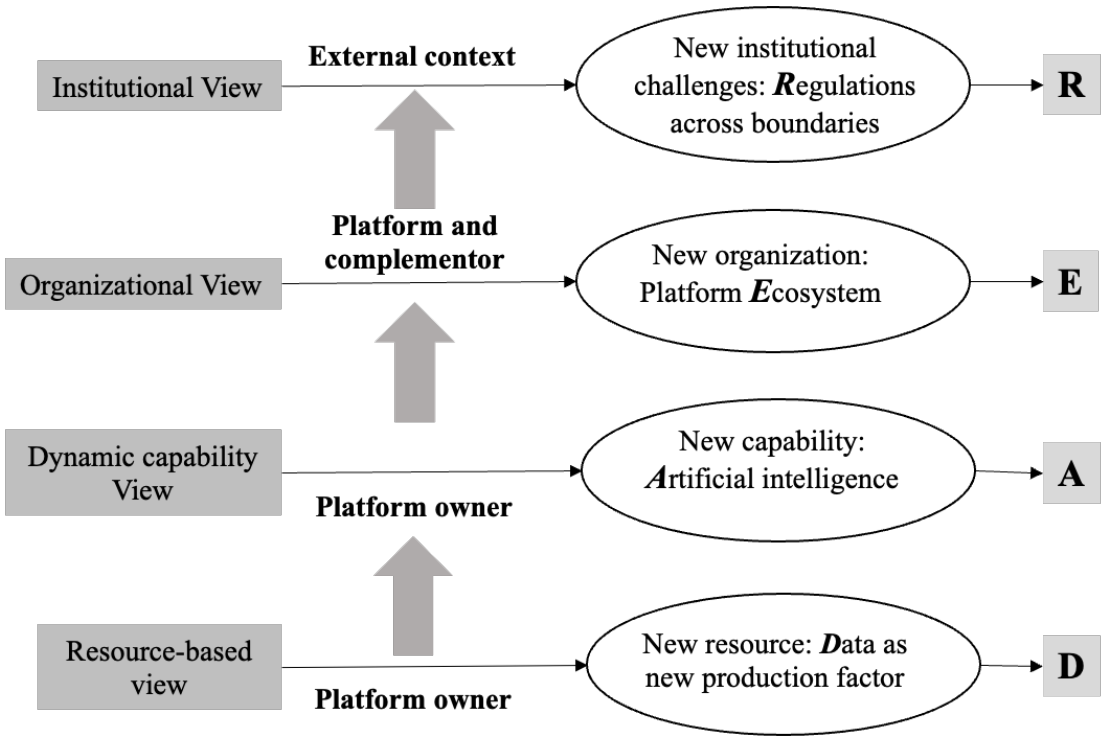

Figure 1. *Research portfolio on PMNCs' rising challenges*

Table 1. Existing Literature and Emerging Challenges for PMNCs

Four perspectives	Existing literature	Research gaps	Emerging challenges
Institutional view: • **External contexts**	• Legitimacy of platforms (e.g., Garud et al., 2022; Uzunca et al., 2018); • Economic and social influence of platforms (e.g., Marano et al., 2020; Zervas et al., 2017) ; Corporate social responsibility (CSRs) of platforms (e.g., Dabbous & Tarhini, 2021; Rong et al., 2019)	Examined specific contexts but the broadened industrial and geographical boundaries of PMNCs are not well addressed (e.g., Petit & Teece, 2021).	***New institutional challenges: regulation across boundaries*** • A wide range of societal and public issues on a global scale making investigation on a single-country basis challenging (e.g., Cammaerts & Mansell, 2020); • Complexity of stakeholders impacted by platforms is overlooked in current regulatory norms (e.g., Jacobides & Lianos, 2021); • Difficult to regulate platform firms (Hovenkamp, 2020); • Blurred boundaries of platform businesses (Petit & Teece, 2021); • Wide range of societal and public issues, such as data privacy, content moderation and disinformation, and labour market disturbance (Cammaerts & Mansell, 2020)
Organizational view: • **Platform and complementors**	• The platform ecosystem (Teece, 2018; Yonatany, 2013); • Meta-organizations (i.e., 'organizations of organizations') (Kretschmer et al., 2022); A complementor-centered approach to create competitive advantages in platform ecosystems (Cenamor, 2021)	A notable research gap concerning the global scope and diversity of PMNCs serving as complementors within these ecosystems; The broader and more heterogeneous engagements of PMNCs on a global scale	***New organization challenges arising from ecosystem organization and governance:*** • More growing uncertainties due to the existence of ecosystem dynamics, and the ecosystem leader and other ecosystem stakeholders may constantly breake previous ecosystem boundaries and broadening the ecosystem's scope (Moore, 1996; Jackbides et al., 2018; Rong et al., 2018); • To address ecosystem competition: PMNCs need to find a balance between attracting and retaining customers and nurturing a vibrant and healthy ecosystem of participants; • Difficult for ecosystem governance with the dynamic evolution and overseas expansion of the platform ecosystem (Li et al., 2022; McIntyre et al., 2021); • Increased difficulty and complexity for platforms' internationalization with their ecosystem complementors (Jacobides, 2019; Li et al., 2019; Rong et al., 2018; Zahra & Luo, 2019).

Dynamic capability view: • **Platform owners**	• Dynamic capabilities for digital platforms (e.g., Teece 2018; Helfat and Raubitschek, 2018)	Future research could enhance the research on the dynamics of platform ecosystem (Cenamor, 2021); AI as a newfound capability, further research is warranted concerning AI aspects specific to future platform competition (e.g., Rong 2022; Cusumano et al., 2020).	***Challenges arising from the AI as a new capability:*** • The technology innovation and scenario application of AI are highly challenging and uncertain for digital platforms (Rai et al. 2019, Stahl et al. 2021, Tatarinov et al. 2022); • Difficult to integrate AI into platform services to achieve business model innovation (Rong et al., 2021), difficult to situate AI into platform-based organizations to create competitive advantages (Li, Rong, and Shi, 2024); • Uncertain impact of AI on PMNCs' internationalization (Brynjolfsson and Mcafee 2017, Brynjolfsson et al. 2019, Garud et al. 2021); • Stronger platform antitrust and tech regulation concerns for PMNCs with AI technology (Hovenkamp, 2020; Sokol & Van Alstyne 2021).
Resource-based view **Platform owners**	• Network effects (e.g., Zhu and Iansiti, 2012; Wu et al., 2022) • Complementarity resources (e.g., Li et al., 2019; Giustiziero et al., 2023)	Explored platform resources but given the emergence of data as a new resource, further research is warranted concerning the data resource specific to future platform competition (e.g., Rong 2022; Cusumano et al., 2020).	***Challenges arising from the data as a new strategic resource:*** • Difficult to manage data governance (Alhassan, Sammon & Daly, 2019; Janssen et al., 2020; Ye et al., 2022); • Difficult to control the negative externality of data privacy when using data for value creation (Cong, Xie, & Zhang, 2021; Peukert et al., 2022); • Difficult to determine data ownership, resulting in potentially high transaction costs (Dosis & Sand-Zantman, 2022).

Table 2 A Research Agenda of the '*READ*' Framework on PMNCs

Framework	Perspectives/Mechanism	Future directions
To ***R***: complex ***Regulation*** context	**Institutional view:** • **External contexts**	● *How do PMNCs navigate diverse regulations in different countries for strengthening innovation and competition?* ● *How do PMNCs address regulatory complexities and promote compliance while internationalizing?* ● *How do PMNCs incorporate local cultural and legal factors to ensure regulatory compliance and customer trust?* ● *Do extant theories explain PMNC internationalization?*
To ***E***: ***E*cosystem** organizations	**Organizational view:** • **Platform and complementors**	● *What are the key components and actors within PMNCs' ecosystem, and how do they interact?* ● *How can MNEs manage relationships with ecosystem partners?* ● *How do PMNCs implement ecosystem strategies to foster cross-border collaboration and value creation?* ● *How do PMNCs address the liability of ecosystem integration? How do PMNCs evolve?*
To ***A***: New ***Artificial intelligence*** capabilities	**Dynamic capability view:** • **Platform owners**	● *How does AI impact PMNCs' innovation, investments, operations and other strategies?* ● *How does AI-driven innovation reshape the global competition of PMNCs?* ● *How to regulate PMNCs with advanced AI technologies?* ● *How to effectively address the diverse challenges arising from the widespread adoption of AI by PMNCs?*
To ***D***: New ***Data*** *resources*	**Resource-based view:** • **Platform owners**	● *How do PMNCs exploit and explore data assets while expanding to foreign countries?* ● *How can PMNCs determine the value of their data assets?* ● *How can PMNCs leverage data assets to sustain competitiveness?* ● *How do PMNCs nurture their data ecosystem in the target country?* ● *How do PMNCs influence cross-border data trading businesses?*

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