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Examining ecosystems and infrastructure perspectives of platforms: The case of small tourism service providers in Indonesia and Rwanda

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Abstract:

Digital platforms are significantly affecting how firms and individuals undertake economic exchange. With their global expansion, exploring the implications of platforms for those who sell goods or provide services in the global south is an important agenda for determining their value. Yet, we argue that existing frameworks only provide a partial understanding of activities and relations.

In this paper, we examine platforms through an analysis of two theoretical perspectives. Established ecosystems perspectives focus on platform governance, centralizing the activities of the 'platform owner'. Such perspectives allow an analysis of platform strategy but can underplay the ways platform sellers and service providers engage with platforms. Infrastructure perspectives, in contrast, approach platforms as large and complex systems, which we argue allows for better analysis of the practices and agency of such actors.

An analysis of small tourism service providers in Indonesian and Rwandan tourism supports the discussion of these two perspectives. Findings highlight the growth of global platforms, but service providers face challenges to using them effectively. Infrastructure perspectives highlight risks that service providers face in being pulled into adverse relationships as platforms become ubiquitous. As platforms expand, their complexity leads to challenges in engagement but with potential for learning and collaboration.

Keywords: Platforms, Infrastructure, Digital, Development, East Africa, Southeast Asia.

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1 Introduction

Digital platforms are significantly affecting how firms and individuals engage and undertake economic exchange. In this paper, we focus on digital transaction platforms – resources that support economic exchange between multiple parties online (Gawer, 2014). Digital transaction platforms are integral to the business models of global digital firms (such as Uber, Alibaba and Google) and are beginning to operate at scale in many countries in the global south¹.

Digital transaction platforms involve three types of actors: platform consumers (those who consume products or services), platform ‘service providers’ (including platform goods sellers or those that sell their labor on platforms)² and platform owners (those who own and manage platforms) (Parker, Alstyne, & Choudary, 2016). Platforms have frequently been pitched as a ‘win-win’, enabling all actors to gain from these partnerships: platform owners through platform innovation and income; platform service providers through broader market reach and online transactions; platform consumers through convenience and diversity of products and services.

This paper makes the argument that on the supply side, the IS literature has so far tended to emphasize platform owners and their governance strategies (de Reuver, Sørensen, & Basole, 2018). This results in a diminished emphasis on the role that platform service providers play: service providers are often understood within a platform ecosystem as actors who respond uniformly to platform governance, with little understanding of their distinct contexts or decisions. This tendency is problematic given evidence that in reality, the link between platform governance and practices of service providers can appear tenuous (Loudon, 2016). In wider studies of platforms, empirical evidence has also uncovered challenging conditions for platform service providers which questions the idea that platforms are a ‘win-win’ for all parties (e.g. Graham, Hjorth, & Lehdonvirta, 2017).

We explore platform service providers through the lens of tourism platforms in the global south. Optimistic discussions on platforms in the global south have seen platforms as an opportunity for small sellers and service providers. So the argument goes, these actors would be able to trade more easily online using platforms, reaching new markets and disintermediating previous intermediaries and gatekeepers (Foster, Graham, & Waema, 2019; Koskinen, Bonina, & Eaton, 2018). However, with a lack of empirical studies, there is little analysis of the diverse contexts of such service providers, and how work patterns and relations to platforms align. It is also important to investigate the role of platform service providers in the global south, given the balance of power between platform owners and service providers is often highly unequal (Gurumurthy, Bharthur, Chami, Vipra, & Anwar, 2019;).

Our research aim is therefore to ask *how do we better conceptualize the practices, values and contexts of platform service providers in the global south as they encounter and use platforms?* Our contribution provides both empirical and conceptual insights. Platforms are rapidly expanding globally with diversity and spread of platform service providers alongside expansion. Such service providers have often been peripheral to mainstream discussions of platforms and core platform concepts have been predominantly shaped by the contexts of the global north. Moreover, as platforms scale globally, they are increasingly having an impact beyond the scale of an individual, business or organization. Platforms are now shaping labor markets, economic transactions, and social relationships. Our analysis is therefore important in providing clear strategy advice and policy-relevant knowledge around platforms in the global south.

To answer the research question, we will argue that platform research can better incorporate *infrastructure perspectives* of platforms (Constantinides, Henfridsson, & Parker, 2018; de Reuver et al., 2018). Infrastructure views fit with our research goal by embedding important assumptions about the wider ‘out of control’ spread of platforms. Infrastructure views can incorporate deeper consideration of diverse

¹ Such countries have often been described by institutions such as the World Bank and the UN as ‘developing’ or ‘low income’ countries and these terms have often been used in the IS literature. The use of the “global south” is used here given it does not suggest normative paths to development. While such countries are diverse, they have common characteristics including historic paths around colonialism and independence, paths of late technology adoption, and some common economic characteristics. They are also marked by income and power disparities in their relations with the “global north”.

² In this paper, we use the shorthand ‘platform service provider’, shortened to ‘service provider,’ to denote individuals, entrepreneurs and firms who sell goods or provide services using platforms. In contrast, ‘platform owners,’ or ‘owners’ refer to those actors who control platforms, typically a company.

practices of users, particularly in their interaction with ever more complex interlinked systems. Discussing the merits of more established *ecosystems perspectives* and *infrastructure perspectives* in this paper provides scholars with an improved understanding of how these frameworks can incorporate platform service providers holistically. It also contributes to the critical literature on platform exploitation and power which is increasingly central to socio-economic outcomes (Srnicek, 2016). This focus also responds to calls within the IS field for research agendas to focus on more marginal information system users, in order to better understand equity and power embedded in IS (Avgerou, 2008; Cordoba & Midgley, 2008).

The remainder of the paper is set out as follows. We begin, in section 2, by introducing the platform literature in IS, discussing critiques of how platform service providers have been conceptualized. We review the literature on platforms and service providers related to two perspectives, ecosystems and infrastructure. More conventional ecosystems approaches have been valuable to exploring platform strategy, but when it comes to examining more diverse service providers, they potentially embed problematic assumptions. Better integration of infrastructure perspectives offers improved conceptualization, but there is a lack of empirical studies unpacking these conceptual ideas for practical application to platforms.

Tourism has seen a rapid uptake of platforms at scale and provides the source of empirical analysis. As outlined in section 3, platforms have rapidly scaled in tourism contexts, and are increasingly used amongst marginal tourism service providers in the global south. We examine two case studies of tourism in Indonesia and Rwanda. In section 4, we examine the service providers' use of platforms in these cases. This opens up an important discussion around the merits of ecosystems and infrastructure perspectives as covered in section 5.

2 Theory Informing how Platforms Engage with Platform Service Providers

2.1 Platforms: Key Concepts

The platform, a resource “based on enabling value-creating interactions between external producers and consumers” (Parker et al., 2016, p. 11) is becoming a core business model for firms globally. The principal role of platforms is to facilitate networked exchange between sellers of goods and/or service providers on one hand, and consumers on the other, where platform owners will not directly provide products or services (de Reuver et al., 2018). In contrast to when exchange happens directly, platforms allow consumers to rapidly gain access to a range of sellers and services. Moreover, platforms can coordinate numerous firms and individuals in complex interactions (Eaton, Elaluf-Calderwood, Sorensen, & Yoo, 2015). Platforms are seen as a significant development in the IS and management literature given that the forms of competitive advantage differ from those within hierarchical, network and supply chain forms of firm organization (Jacobides, Cennamo, & Gawer, 2018; Van Alstyne, Parker, & Choudary, 2016).

Platforms also depart from previous norms of IS growth due to the nature of scaling. Rapid scaling has been driven by the power of ‘network effects’, drawing on the economic models of two- (or multiple-) sided markets. Network effects outline the direct and indirect economic benefits that come from the marginal effects of additional platform users (Gawer, 2014). Platform users gain directly - additional service providers can coordinate complex activities; customers can gain from interaction and communication. Platform users also gain indirectly - more customers attract a broader variety of platform service providers to meet their demands and *vice versa*. The growth of successful platforms has been attributed to a cycle of network effects and has driven rapid expansion (Armstrong & Wright, 2007; Rochet & Tirole, 2006). Thus, while platform models were initially adopted by firms in more digitally advanced sectors of the economy (such as software and online commerce), with rapid growth, platforms have expanded across a range of sectors, such as agriculture, tourism and transport (Krishnan, Banga, & Feyertag, 2020; Parker et al., 2016).

Major categorizations of platforms highlight the varying roles and functionalities they have. Transaction platforms describe platforms that manage markets whereby consumers and service providers undertake market transactions (as well as other interactions) on platforms online (e.g., Uber). Alternatively, innovation platforms describe technical architectures that standardize aspects of products and services innovation (e.g., App stores on Android and iOS) (Gawer, 2014). Both categories of platforms have similarities because they involve multiple external actors and provide the potential for rapid growth (Van Alstyne et al., 2016). In some examples, the two categories also overlap (Evans & Gawer, 2016).

In both categories of platforms, change is typically seen as driven by platform owners, with rules, strategies and functionalities of platforms acting as the main levers owners can use (Tiwana, 2014). For example, 'network effects' are seen to be accelerated through firm strategies related to attracting users, managing system engagement and provision of platform functionalities (Choudary, 2013; Parker et al., 2016). Within the IS literature on platforms, there has been an emphasis on the management of associated technical resources including technical specifications, interfacing and technological modularity amongst others that shape platform strategies (de Reuver et al., 2018). Such concepts often align with the literature in innovation platforms, building on empirical research centered on software ecosystems and cross-sectoral industry platforms (Bergvall-Kåreborn & Howcroft, 2011; Iyer, Lee, Venkatramen, & Vesset, 2007).

In sum, the platform literature has begun to outline key categorizations and explore the dynamics of growth. However, we argue that the emphasis on how platform owners can underplay the role that service providers play. There is also a need to expand theory around platforms because of the diversity of ways in which platforms (particularly transactions platforms) are expanding. Platform models have become core to many sectors and are beginning to have broad impacts on activities they mediate, and the relations and markets that they shape (Evans & Gawer, 2016). The global spread of platforms means that the practices of service providers may not necessarily align with earlier assumptions in the IS literature, particularly those centered on innovation platforms and within visions of innovative tech-orientated firms. Given these gaps in knowledge, in the following sections, we explore in more depth how service providers have been conceptualized in the platform literature. The dominant framework that has been applied is the 'ecosystems' perspective. The next section outlines what this means, and in critically reviewing the IS literature on ecosystems we suggest that incorporating infrastructure perspectives of platforms can be valuable.

2.2 Platform Ecosystems

The terminology of the ecosystem has become common in the business and IS literature to describe "a group of interactive firms that depend on each other's activities" (Jacobides, Cennamo, & Gawer, 2018, p. 2256). Ecosystems have been used in areas including business ecosystems, innovation ecosystems and platform ecosystems to emphasize the growing interconnectivity and coordination amongst firms (ibid). In platforms, ecosystems describe the relationships between platforms and 'complementors', those who add value to a platform (Hein et al., 2020).

The platform ecosystems perspective has been the primary perspective that links between platform owners and those external actors using platforms, as set out in the foundational literature on platforms (e.g. Cusumano & Gawer, 2002; Parker et al., 2016; Tiwana, 2014). The ecosystems perspective has been strongly shaped by studies of 'innovation' platforms, to outline the role of firms in adding value and driving innovation in platforms, for example, software platforms that support app developers in integrating add-ons (Tiwana, 2014). With the growth of 'transaction' platforms, ecosystems concepts have also been adopted to discuss external actors involved in a range of activities that support transactions (Cusumano & Gawer, 2002).

The ways that platforms influence their ecosystems is typically described in terms of *platform governance* (Boudreau, 2010; Gawer, 2014). This moves away from traditional ideas of management by command-and-control towards an awareness that platform owners will shape ecosystems in indirect ways through platform rules, incentives, monitoring and norms (Tiwana, 2014). The literature outlines a range of potential tools including pricing models, efficient matchmaking, monitoring and defining standard interactions which will shape ecosystems (Choudary, 2013; Parker et al., 2016). To govern effectively, platform owners need to balance openness and control of ecosystems. Openness (fewer rules or controls) typically encourages diversity in platform ecosystems and can consequently lead to more innovation. However, too much openness can reduce coherence and lead to problems, so recommendations have been for owners to guide and control platforms to some extent (Boudreau, 2010; Gawer, 2014).

The platform ecosystem perspective is important in outlining rich activities associated with the governance of platforms. Yet it presents an incomplete picture when it comes to platform service providers. First, IS discussions of 'boundary resources' have provided empirical detail on the reality of the interactions between platform owners and ecosystems (Foerderer, Kude, Schuetz, & Heinzl, 2019; Tiwana, 2014). These have highlighted the more varied behaviors of service providers than is characterized within ecosystems perspectives. For example, Eaton, Elaluf-Calderwood et al. (2015) found that software ecosystems are made up of a large diversity of actors, with external actors often having the agency to

shape platforms. Second, discussions of the ‘sharing economy’, that analyzes how systems (frequently platforms) can enable collaborative interaction between individuals, provides insights (e.g. Parameswaran & Whinston, 2007; Schultze, Prandelli, Salonen, & Alstyne, 2007). Platform interaction can be driven by shared values and collaboration and it can have empowering effects on ecosystem actors (Avital et al., 2015; Sutherland & Jarrahi, 2018). The findings of such scholarship highlight agency and collaboration that the ecosystems literature has rarely addressed. They also show how considering platform service providers can highlight desirable practices and impacts of platforms that may have previously been unaccounted for.

2.3 Platforms and Information Infrastructure

The study of information infrastructure (II) was initially used to highlight the often ‘invisible’ role that infrastructure plays in shaping society (Graham & Marvin, 2001; Star, 1999). The IS literature has developed this concept to describe the ways information systems can have “infrastructure-like” characteristics as they expand in scope (e.g., HR or ERP systems in globalized firms, public sector databases) (Ciborra, Braa, & Cordella, 2000). II studies emerged out of the acknowledgement of more complex, interconnected information resources in the early 1990s & 2000s, suggesting a need for new types of perspectives to examine IS (Hanseth, Monteiro, & Hatling, 1996). Infrastructure perspectives have questioned whether bounded approaches to IS (within departments, firms, organizations), were able to yield substantial insights about the interaction between IT and broader social and organizational settings (Ciborra et al., 2000; Monteiro, 2000). It was argued that often such bounded analysis was not ‘fine grained’ enough to detail the interactions between social mechanisms, information, and information systems (Bowker, Baker, Millerand, & Ribes, 2009; Monteiro, 2000). Infrastructure perspectives adopt alternative theoretical ideas – such as practice-based frameworks or actor-network theory – examining the role of IT in social or organizational change to show how better to integrate a range of heterogeneous actors, technologies and relations involved in change processes (Monteiro, 2000; Sanner, Manda, & Nielsen, 2014).

Infrastructure perspectives drawing on key concepts from II can be beneficial for understanding platform dynamics because of the way that they see IT resources as complex, and their properties as emergent (Ciborra et al., 2000). Infrastructure perspectives view change through gradual cultivation and adaptation of systems amidst the tension between the need for standards and flexibility in complex systems (Hanseth et al., 1996). These negotiations place demands on both infrastructure managers/owners and users in how they can control and gain value from such infrastructures (Monteiro, 2000; Pipek & Wulf, 2009; Sanner et al., 2014). The notion of ‘path dependency’, which has been frequently used within the II literature, is useful highlight the importance of historical decisions and contexts in determining later norms and interactions (Ciborra et al., 2000). Path dependency and the resilience of infrastructure to change can limit the ability of leaders to engage in strategic management or IS design activities to shape them (Jackson, Edwards, Bowker, & Knobel, 2007; Pipek & Wulf, 2009).

There has been some debate in the platform literature around the merits of infrastructure perspectives. This initially emerged in broader social science literature of platforms which explored the histories of key platforms, with observations on the overlap with ideas from infrastructure (e.g. Helmond, Nieborg, & Vlist, 2019; Plantin, Lagoze, Edwards, & Sandvig, 2018). More recent work within information systems has also begun to discuss the value of infrastructure perspectives (de Reuver et al. 2018; Constantinides et al 2018).

Two positions have emerged from these debates. One defines a relation, but separation, between ‘platforms’ and ‘digital infrastructure’. Platforms are the digital resources that enable transactions, whereas digital infrastructures are the underlying computing and networking resources to support this (i.e., the internet, data centers, mobile devices, etc.) (Constantinides et al., 2018). While separate, interactions between platforms and infrastructure create new policy and economic challenges due to the emergence of ‘platformized infrastructure’ and scaling of platforms.

*“infrastructures are undergoing a process of **platformization** as architectural and governance control points are opened through digitization. Platforms, meanwhile, are undergoing a process of **infrastructuring** by expanding their reach and scope into supply chain management” (Constantinides et al., 2018, p. 386, emphasis original).*

An alternative view is that platforms and digital infrastructure should not be differentiated, “platforms can achieve enormous scales, co-exist with infrastructures, and in some cases compete with or even supplant

them.” (Plantin et al., 2018, p. 301 emphasis original). Platforms are rapidly expanding and their boundaries are becoming “open ended and in part out of control” (Ciborra et al., 2000, p. 4). With their tendency to rapidly scale, transaction platforms have been able to expand across different functions and actors (Srnicsek, 2016). Successful platforms as they scale also tend to invest in technical infrastructures as they grow (Evans & Gawer, 2016).

In line with the ways that transaction platforms have scaled in the tourism sector (see next section), this paper follows this latter integrative approach to platforms and infrastructure. In addition, Plantin et al. (2019) outline a useful heuristic for taking an infrastructure perspective - first to explore how platforms have changed over time and track their transformations across broader contexts; and second to identify dependencies to users through the examination of work practice, organizational culture, and structural exclusions of individuals and marginalized groups.

In sum, we argue that information infrastructure – in terms of its engagement with socio-technical systems, its focus on emergent (over firm driven) outcomes, and its positioning of users as diverse– may have merits for conceptualizing platform dynamics. However, there are many unknowns related to this approach. It is not clear how one should examine inter-relationships between actors and the complex and evolving infrastructure. As we suggest above, focusing on practice standards, dependencies on platforms and work patterns are a good starting point to begin an exploration of platform engagement.

3 The Case of Tourism Platforms in the Global South

3.1 Tourism and Platforms

Tourism is a valuable sector for the study of platforms. Platforms have scaled across multiple functions and services of the tourism sector. A focus on platform service providers is especially important in considering tourism in the global south. Service provision in tourism is an important source of income and jobs in many countries and has incorporated small and marginal service providers (Christian, 2012). Owners of tourism platforms are typically large international firms where interactions in the global south are liable to be distant and embedded in uneven relations of power.

Key functions and services supplied by platforms in the tourism sector encompass *business functions*, *customer orientation* and enhanced *information provision*. The increased scale of platform uptake in the tourism sector is apparent by examining the ways platforms are enhancing *business functions* (Buhalis & Law, 2008). Online travel agents (OTA) integrate a broader set of tourism firms, providing services such as accommodation, tours, or transport, and aim to support better coordination and simplified logistics for arranging tourism and travel. OTAs are supported by information systems that allow tracking and monitoring of hotel availability, online booking and payment systems (Buhalis & Law, 2008).

Online channels have also improved *customer orientation* by providing a means for tourism providers to improve visibility and connect with customers (Kracht & Wang, 2010). Consumers can access and discover an increasing range of information on different tourism opportunities, interacting with service providers and exploring feedback from other users. During the early days of the internet, engagement with small tourism providers tended to come through simple websites or partnering with larger corporations (Karanasios & Burgess, 2008). The growth of tourism-specific platforms (e.g., TripAdvisor, online booking platforms) has provided individuals and small service providers with the potential to disintermediate these larger actors (David-Negre, Almedida-Santana, Hernández, & Moreno-Gil, 2018). Platforms also play a broader role in indirect information circulation, where customers often share tourism information and feedback online. This means that tourism extends beyond dedicated tourism platforms into broader online platforms such as Facebook, YouTube, Instagram, and mobile apps that offer opportunities to push tourism services (Xiang & Gretzel, 2010).

This information-rich environment is leading to significant innovation in tourism. Customers increasingly look to build unique “experiences” rather than book standardized holiday itineraries (Urry & Larsen, 2011). Through platforms, users can book or customize flights, hotels and excursions directly online (Buhalis & Zoge, 2007). Moreover, customers can now find and be involved in niche sectors of tourism, accessing services online (Steinbauer & Werthner, 2007). On the firm side, data generated from such interactions allows firms greater agility to respond to customer demands and better customize their activities (Buhalis & Law, 2008).

Research has highlighted that in the global south as digital tourism grows, it overlaps with broader questions about the role of tourism in the economy. Tourism attracts flows of foreign investment, supports economic expansion and job creation; in the global south, tourism is an important component of socio-economic development goals (Christian, 2012; Karanasios & Burgess, 2008; Minghetti & Buhalis, 2010). Research on the role of tourism platforms in the global south must therefore address how platforms are regulated to reduce negative impacts and contribute to sustainable and inclusive development concerns.

Ultimately, the tourism sector presents a relatively novel context for study in IS that shows much potential to generate a broader understanding of platform dynamics and lessons for platform service providers in the global south.

3.2 Methodological Approach

By examining tourism in this paper as a leading sector in terms of global platform use, this paper can provide an important *explanatory* understanding of platforms (following Yin, 1994), by focusing on a sector that has “something...[that] can be taken to have implications for other situations” (Bilton et al., 2002, p. 125). The factor that makes this case important is that in this sector platforms are already more established amongst smaller service providers. Therefore, it is possible to examine some of the theoretical gaps that can be relevant to platforms more broadly (Miles & Huberman, 1994).

This work adopts an interpretive position, acknowledging the subjectivity of experiences of platform service providers, and that their platform practices and activities are not uniform but shaped by contextual conditions, relationships and power. This is especially important in positioning small service providers in the global south where, as described in previous sections, experiences are liable to depart from some key assumptions and conceptual ideas (Avgerou, 2008). Given this interpretive position, it is worth unpacking how we approach generalization within this work. In line with IS positioning around interpretive studies, the goal here is to describe enduring experiences and practices as opposed to universal rules (Gregor, 2006; Walsham, 1995), where generalization is seen as the more enduring “explanations of particular phenomena derived from empirical interpretive research” (Walsham, 1995, p. 79). Generalization emerges in the way that the work provides richer insights as well as some specific policy and practice implications, around key ideas from IS (following Barrett & Walsham, 2004), namely the need to enhance perspectives on platforms as discussed previously.

This paper includes two contexts: tourism in Indonesia and Rwanda. Taking a diversity of contexts into account is particularly important to build ‘thick descriptions’ and knowledge around the mismatches between theory and the realities of practices of service providers in the global south. Specifically, we examine how an understanding of platform dynamics emerges from the interaction between global tourism platforms and local platform service providers in context.

Indonesia and Rwanda were chosen because tourism is increasingly an important part of national economic plans in these countries. Rwanda has a comparatively small tourism sector but given the small size of the country, it makes a significant contribution to GDP, national exports and employment (WTTC, 2019). In Rwanda, most tourism has been linked with ‘Gorilla tourism’, with Rwanda being the safest destination in the world for tourists to see mountain gorillas in their natural habitat (Foster & Graham 2015). The government has, in recent years, looked to expand on their tourism successes ‘beyond Gorillas’ into a range of other activities (Behuria & Goodfellow, 2018) and it has been positioned as one of the key sectors to achieve core ‘Vision 2020’ goals (GoR, 2009). Indonesia has a more developed tourism sector, particularly in key centers such as Bali and Yogyakarta which have become global tourist destinations. Income from tourism generated more than 12 billion USD in 2015, which places the tourism industry fourth position after the oil and gas, coal and palm oil industries (MoT, 2016). Following the launch of the Government’s Master Plan for Tourism, Indonesia strives to become a world-class tourism destination by developing additional key sites of interest, called the ‘10 New Bali’s’ initiative.

Empirical data collection in the two countries was initially undertaken separately but with similar aims, methods and sampling strategies. Both projects had the goal of exploring the implications of platforms and the internet on small service providers in tourism. In Rwanda, research was undertaken from 2014-2015, while the Indonesian research took place in 2017-2018. These different periods and locations have value in terms of supporting a diverse set of contexts for our analysis (Miles & Huberman, 1994) - one exploring a context of early growth of platforms and the other where platforms were moving into more established use. Similar global tourism platforms were found to be common to both cases, including the same platforms offering similar functionality across the two countries. Given the focus of this paper on

theoretical expansion, we synthesize evidence from the two cases together to allow us to extend analytical thinking on platform dynamics and service providers.

Data was collected from qualitative interviews in both countries with a focus on small enterprise providers and tourism workers. Interviews engaged with respondents who were involved in platform-based delivery of tourism and associated services including accommodation provision (e.g., hotels, bed and breakfasts, homestays), tour operators, tour guides, artisans (e.g., gifts, handicrafts), or food production. Additional interviews were also made with those linked to broader tourism management and sectoral policy (e.g., tourism chambers, destination management organizations and policy makers). Interviews were semi-structured and covered key themes exploring ICT use by smaller enterprises (both internally and to link with other tourism actors), as well as discussing their experience and activities around platforms. In Rwanda 31 interviews (17 men 14 women) were undertaken where platforms were discussed (from a subset of a broader set of 59 interviews about internet use in tourism). In Indonesia, 139 (52 women, 87 men) participants were included in three locations, Yogyakarta, Bali and Lombok (see Bentley & Maharika 2018).

Analysis was undertaken through a combination of deductive and inductive analysis in line with common interpretive approaches to analysis (Walsham, 1995). The deductive analysis was based on coding interview material according to a predefined set of themes within NVivo 9 software. Initial codes for analysis were shaped by the literature review, which informed overarching themes such as relationships, finance, capabilities and practices. These codes were used to categorize key explanations and processes aligned to platforms. This then led to a more inductive coding of data in more detail which allowed additional themes to emerge according to the empirical findings³. This was important in this research to ensure that the relatively understudied empirical context was able to shape the agendas of research (Bryman, 2001). A socio-technical approach orientates the presentation of the empirical findings which are discussed in the next section. Based on these findings we reflect on what this means for conceptual thinking on platform service providers in section 5.

4 Findings: Tourism Service Providers and Platforms

4.1 How Tourism Services Providers use and Depend on Platforms

In this section, we focus on the level of adoption of platforms by tourism service providers and their common uses. Overall, in both countries, tourism sectors were marked by a high level of adoption of the Internet with the growing use of platforms within certain segments. In Indonesia, a detailed analysis was conducted in accommodation provision in the popular tourism destination Yogyakarta that illustrates this. Of the 280 providers surveyed, 45% had websites discoverable through Google, 70% were listed on TripAdvisor (Figure 1). When mapping a range of other tourism platforms (such as Traveloka, booking.com etc.) 98.6% of accommodation providers were listed on at least one platform (Bentley & Maharika 2018). In Rwanda, many accommodation providers, tour operators and attractions, had an online presence of some form whether that be a website, platform or social media presence. The use of dedicated tourism platforms was only common amongst specific sectors such as hotels, tours and higher-end guides, although interest and use of platforms such as TripAdvisor and Expedia were growing rapidly.

³ For example, we had initially not expected to see significant discussion around algorithms and other automation on platforms. But analysis highlighted that these ideas were quite commonly discussed. This emergent theme has become an important part of our discussion on the infrastructure perspective.

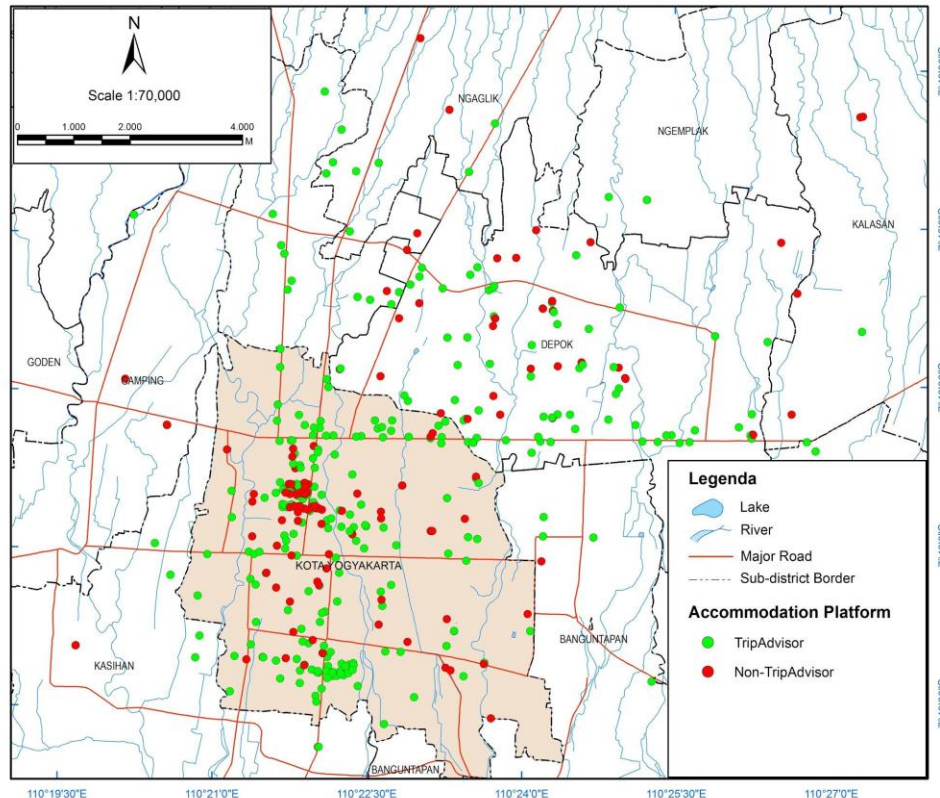


Figure 1: Map of accommodation in Yogyakarta listed on TripAdvisor
Source: Bentley & Maharika 2018

Platforms have become an important component of the tourism experience and growing use by tourists was driving adoption by service providers. In Rwanda, during an earlier stage of the growth of platforms, providers were aware that they were being mapped, rated and discussed, whether or not they were choosing to participate on platforms. This was outlined by one small Rwandan tour operator.

“Definitely you have to check on the travel advisory [TripAdvisor] ... some people put very good comments. But in reality it’s a pathetic place - others they put bad comments.”

In Indonesia, the extent to which platforms were influencing tourism varied. Tourism service providers, like travel agents, drivers, restaurants, homestays and cultural tour providers were integrating with platforms particularly in popular tourism destinations. However, this did not imply universal use. For example in the popular tourist destination of Ubud, Bali, ride-hailing platforms were completely banned (Uber, Grab) to protect the working conditions of taxi drivers. In research in Lombok, an island close to Bali, tourism is still being developed. With a less established tourism industry, it was much more common for actors to rely on patronage networks than platforms. When asked why drivers chose not to participate, most replied that they were satisfied with the level of business acquired through connections with hotels and associations. Lower language skills may also account for some of the differences.

In sum, platform adoption was not identical across contexts but related to local patterns of tourism and types of collaboration, rules and dependence across contexts. Platform presence is growing, but the assumption that actors are willing participants in platforms is not necessarily true in the case of all tourism.

4.2 Engaging in Platforms: How Platforms Shape Service Providers

As tourism service providers adopt platforms, they must take action by improving their reputation and ultimately their sales. Tourism platforms offer a range of functions, such as reviews and listings which rank service providers based on categories or reputation. Platforms also provide standard formats to guide businesses on what to include in platform listings alongside dashboards to help businesses track their

performance. Technical tools are also available to allow for automated booking and information availability as well as the integration of platforms into company websites.

We found the common way of connection was using mobile devices, particularly amongst marginal platform service providers. In some platforms, mobile-first access provided restricted use of platforms. For instance, Indonesian service providers complained that dashboard services offered were difficult to use on mobile devices. A broader challenge was that basic mobile internet can be characterized by slow speeds, patchy coverage and/or saturation of users. During the earlier period of research in Rwanda in 2015, the saturation of mobile internet was prevalent in the capital Kigali which is the center for many tour operators. The outcome of such challenges was that small operators were wary of relying too much on online features for essential activities when they may have difficulty using them or have unreliable connections to the internet.

Another key factor shaping platform engagement was the skill levels of tourism service providers. Customer service, clear communication and language skills are vital in delivering online tourism services. Platforms also place many demands on digital skills, such as platform updating, social media curating and media production that are essential for presenting a professional face to customers. The most common way by which smaller service providers learned these skills was through learning-by-doing. This included the use of the web and platforms to find information and join relevant discussion groups as outlined by two small tour operators in Rwanda.

"Yeah, I check websites about what other tour companies are doing, maybe companies outside Rwanda; I have to make some research about tourism outside Rwanda."

"... of course you have to research and see like log on other websites of the people who are in the same business."

Learning-by-doing often came through mirroring successful competitors that they saw on platforms. In one community-driven farm and cooking school in Indonesia, for example, a manager learned how to make their website on his own. He watched videos on YouTube, searched the internet, and used WordPress, a free publishing platform. The manager then found a similar cooking school in Thailand and copied and pasted the English text from their website to create their own.

With many platform service providers relatively new to going online, learning-by-doing was supplemented by a delegation of platform tasks - onto friends, families or connections. Issues often arose when those actors moved on. Platform service providers in marginal contexts might also engage in building relationships with tourists to support their platform businesses. This might occur in simple ways. For women weavers in Indonesia, when asked what they thought about tourists coming around taking photos of them, they responded favorably, stating that they thought that tourists could share the photos online to attract more tourists to the area. In Rwanda, several guides and cultural tour operators went one step further, reporting that they have attracted customers through becoming included in social media, a tactic explicitly outlined by a regional tour consultant.

"Something that people will commonly do now, is post their photos while they're there [Rwanda]... They doing the marketing for you but you need to leverage that, if they can check in to a place on Facebook, if they can tag their photos and content that they putting up there to your place page, it comes successfully to you and to your potential clients - and obviously to their friends and family who are going to respond."

Moving beyond basic platform tasks, service providers found platforms engagement more complex. When they engage with platforms they are thrown into a world of web design code, search engine optimization, rankings, algorithmically set pricing and data dashboards. Negotiating these is not a side issue, but essential to use platforms effectively. The rapidly changing and opaque nature of such aspects of platforms posed significant challenges for small service providers and learning-by-doing was not sufficient. We highlight platform ranking as an example of this. Achieving higher positions within listings or searches are a driver of customer attention and bookings. In Indonesia, providers were unclear about how to best optimize their position on TripAdvisor. In Rwanda, several local tour operators had employed the services of expensive search engine optimization (SEO) firms.

In sum, engagement with platforms was affected both by technical resources and the skills of service providers. Platform service providers often attempt to develop their platform activities through learning-by-

doing and drawing on local connections. However, the complexity of platforms and lack of transparency of operation limits such strategies.

4.3 Balancing Economic Goals with Development Goals

In Indonesia and Rwanda, the impacts of tourism were perceived by small service providers not only in terms of economic gains but as a targeted source of *sustainable development*. Existing platform ecosystems concepts have rarely emphasized both social and economic outcomes. Thus, an infrastructure view prompts us to examine practices, standards, and the service providers in context, to see how technology impacts them holistically.

Small tourism businesses are closely entwined with the lives of these citizens. The family unit, for example, is an important basis for running businesses and a source of financing. Platform-based tourism services are, therefore, just one income stream to broader financial trajectories of a household. In Indonesia, drivers and homestay owners reported that they or their spouses were employed by hotels as managers, cleaners and admin roles. In Rwanda, tourism platforms offered entrepreneurs an opportunity to gain income - a taxi owner moved into tour logistics in peak seasons, and a translator began to offer tour guide services to supplement his income. Platform tourism was not necessarily in their long-term plans and this affected the way platform services were engaged with.

Social norms also influence platform usage considerably. We highlight gender norms as an example which were explored in detail in the Indonesian setting. In Ubud, it was common for women to own and run tourism businesses including homestays, warungs (small restaurants), and massage parlors. Usually, when women take on such leadership roles this can lead to claims of greater gender equity. However, in Indonesia, capable women business owners frequently deferred to their husbands or sons to manage their business' online. This meant that even if they ran tourism businesses, platform use might be controlled by the husband or son, suggesting potential cultural barriers to platform use because women frequently preferred this division of labor. Nevertheless, when asked about their ability to access and use mobiles or laptops for the management of their business activities, all but two women responded confidently. It is therefore not clear whether this lack of engagement is entirely voluntary. Their lack of engagement with platforms implies that social norms around gender are impacting practices, where these challenges will not be solved simply by providing training in the use of technology and platforms.

Another key sustainable tourism development concern is around supporting the development of local community organizations. Examining how these sorts of tourism providers interact with platforms, we found mixed effects. Platforms can have a positive impact due to how they enabled marginalized groups to gain acceptance within the local community. A female-run hiking tour company in Lombok, Indonesia demonstrates this. Gender norms often shape certain tourism professions, as certain activities are traditionally male-dominated and culturally inappropriate for women to undertake. For this group, platforms have been a source of defiance, which helped them to establish a professional reputation without being affected by local gatekeepers. In cases of community-based and environmental- tourism groups using platforms, outcomes were more challenging. While some community-based groups had attracted customers online, many service providers project their community, environmental and sustainable objectives even when these were minimal. An analysis of travel platforms in Indonesia highlights this. Many tourism businesses (~24%) co-opted terms, like 'cooperative' or 'eco-tour' as marketing tools. With no standards or quality control on platforms, it is difficult differentiate genuine groups and cooperatives.

In sum, platforms can contribute to economic goals, gender equality or sustainable development objectives, but this is not assured. It is only through a clearer analysis of practices in context that a clearer picture of development claims can be made.

4.4 Work Patterns and Service Provider Composition

As alluded to in previous sections, there was often a mismatch between platform governance and activities of platform service providers. Taking an infrastructure perspective, the premise in this section is to consider how a diverse set of different platforms intersect with tourism service providers, rather than centralize platform governance of a single platform.

Most tourism platforms provide relatively simple sign-up procedures and offer a range of additional services for small service providers (such as online training content, payments, and calendars) which can allow small providers to rapidly operate online with low entrance costs. Even with these opportunities, there were many areas where platforms misaligned with marginal service providers, and there was little

evidence that these were being actively resolved by platform. This particularly occurred when small tourism service providers looked to move from signing up on platforms towards more strategic business use.

In Rwanda, most of the successful service providers on tourism platforms were larger hotel chains and international firms. Strategic platform use involved a host of activities. This included the creation of professional platform pages, photography, marketing plans, web design, financial systems and even call centers that allow service providers to signal their professionalism and reliability. In Indonesia, few service providers were able to employ dedicated staff to curate social media, respond appropriately to platform reviews and rarely had a clear process to communicate with customers. As one communications manager in Ubud described:

[We have] me who has a minor supervisory role, one person who is full-time dedicated to running the website, and then we have a web maintenance team, they are part-time, and then there is hosting. We send out email newsletters, there is the cost of the email sending software. It's very real costs to run [our online services].

As outlined in the previous section, some providers were able to overcome certain challenges through learning-by-doing and the use of their social connections. However, the mismatches between the everyday work norms and patterns of service providers and requirements for successful platform provision are systemic.

To deal with such challenges, platform tourism service providers were not passive. They were making decisions not just about using a single platform, but the range of platforms in use. In Indonesia, this includes competing platforms 'horizontally' (e.g., traveloka.com, booking.com, tiket.com, hotels.com, expedia.co.id, agoda.com in booking) and across different types of platforms 'vertically' (e.g. travel booking, travel review, social media, search platforms, mapping platforms). Configuring and combining platforms gave small platform service providers some agency. In Rwanda, we found examples of small hotels and entrepreneurial tour guides who were able to fuse a variety of services and platforms for effective operation including online calendars, apps, cloud file sharing, social media and apps that fit their needs. In other cases, service providers tactically disengaged with platforms in certain ways. For example, in Indonesia one homestay owner monitored Agoda.com because this booking platform would regularly impose room rate discounts without consultation

"I just put no availability [laughs]. Too cheap, cheap, cheap. How I'm gonna make it? Already low price, Ubud... Breakfast, cleaning, then cut the price again. No one's even asked me or tell me. Have to look every day."

As this owner's reflection highlights, for some seceding control of pricing and room booking introduced new unknowns and complexities. The solution was partial disengagement - engaging in platforms but keeping certain information offline. While such approaches may limit platform gains, tactical disengagement at least allowed these service providers to maintain control of what they see as key resources in the context of expanding platforms.

In sum, in both countries, there can be a systematic mismatch between platform governance/design and the work patterns of platform service providers. For platforms operating with global business models, modes of engagement come embedded with assumptions that may cause problems for small service providers. However, with a range of different platforms and services, tourism service providers have some agency to make choices regarding which platforms to engage with, and in some cases may choose to selectively disengage.

5 Discussion: Ecosystems and Infrastructure Perspectives of Platforms

A detailed analysis of tourism in Indonesia and Rwanda provides significant insights on platforms. Firstly, we summarize the major findings on small service providers. These insights have implications for the design and control of platforms as they expand globally. Secondly, returning to the review, we reflect on what these findings mean in terms of ecosystem and infrastructure perspectives on platforms. We highlight that as platforms scale, incorporating ideas from infrastructure on complexity, agency and context can enhance our understanding of service providers.

5.1 Key Findings on Platforms and Service Providers in the Global South

Our findings illustrate the expansion and growing global importance of transaction platforms in tourism. It highlights that platforms incorporate significant numbers of small service providers. The use of platforms has been facilitated by the expansion of affordable internet access, and accessible devices. While not to ignore the exclusion of some more marginal actors, our findings indicate that challenges of exclusion are reducing including amongst small enterprises and entrepreneurs.

Tourism service providers were frequently engaging with a range of different transaction platforms. Nearly all the platforms were well-known platforms, operating at a global scale. As alluded to in the literature review, we found that such platforms in the global south were frequently associated with hopes of small service providers being pushed into vibrant and global tourism markets. However, the reality was that adoption of tourism platforms and their impact on small tourism service providers was different across contexts.

A closer analysis of the values, contexts and work patterns of these service providers highlight why this might be, relating to significant challenges they faced. At a technical level, we have highlighted the challenges of reliable networks and mobile use of platforms. In terms of skills, small service providers face significant challenges in providing professional service and gaining trust that requires a whole constellation of different resources. A lack of skills, whether they be digital skills, language and customer service skills limit platform expansion, but these challenges are not solely about the capabilities of service providers. Limits to platform growth relate to a mismatch between the functioning of platforms and the patterns of small tourism service providers in the global south.

The platform literature assumes that platform expansion and platform gains will go hand in hand. Our findings show that this is not necessarily the case. Platforms, as they scale, pose a range of challenges for service providers that change over time. Platforms can also enhance inequalities by favoring large service tourism providers (including international providers) operating from afar over local ones. These issues of inequity become more pressing as service providers become dependent on platforms. Tourism providers, big or small, may have little choice but to use transaction platforms as they become so central to the sector.

5.2 The Merits of Ecosystem Perspectives

The platform ecosystems literature has been the principal approach in IS to analyze the interaction between platform strategy and platforms service providers. Our research shows that taking a platform ecosystems perspective can provide an important perspective. As exemplified in the Rwandan context, platforms were initially introduced at a small scale where service providers 'opted in' as a business opportunity. This helped entrepreneurial actors who were looking to gain from new sources of income through the early adoption of platforms. Platform ecosystems highlight the role of platform governance in supporting this goal. Tourism platforms may support lower commissions, simple platform features and provide essential services that aid adoption by these small service providers. However, rules and requirements around technical platform integration have been limiting factors for growth. Here governance rules set by platform owners have negative impacts on what is viable for platform service providers.

Through a deeper exploration of the realities of platform service providers, we have been able to provide a richer outline of the motivation for, and practices of, platform engagement. This has highlighted factors outside the typical framing of platform governance. A multidimensional view of platform service providers' work patterns highlights important factors orientating their values. It is also important to consider the way that broader societal structures systematically shape platform use. Our focus on gender highlights its importance in shaping the ways that platforms are used amongst female-run service providers. An understanding of how platform enterprises fit into the broader practices and livelihoods of service providers (such as the role family units, social connections and strategies of running multiple businesses) can also be useful to explain patterns of platform use.

With the global expansion of platforms (including in tourism), assumptions around strategies and management of platform ecosystems, therefore, need to be augmented, where diversity in platform service providers - their use patterns, and the barriers that they encounter need to be addressed. Rather than think about platform governance as a 'one-shot' strategic decision, there is a need for more adaptive relationships between platforms and service providers in diverse context. There are complimentary ethnographic research on platform practices emerging that can contribute to such goals (Kasera, O'Neill,

& Bidwell, 2016; Prabhat, Nanavati, & Rangaswamy, 2019). But there is scant evidence, at least in the tourism cases we explored, that platform owners are willing to initiate such wholesale changes in platform governance.

5.3 The Merits of Infrastructure Perspectives

Our analysis of tourism platform service providers emphasizes that platforms, as they grow, move from being an 'opt in' choice, to become a non-negotiable aspect of tourism. Many other elements of platform engagement should also be seen as *dynamic* – platforms scale and evolve, service providers learn and gain reputations, and algorithms change – and this is crucial to understanding the needs and practices of small service providers. The discussion of platforms from an infrastructure perspective can play an important role in understanding such dynamics through a closer analysis of the ongoing negotiation between (multiple) platforms and platform service providers.

A key emphasis of information infrastructure has been the centrality of standards and complexity of systems. Our research highlights how these concerns play out within the context of marginal tourism service providers. Many platform providers had to confront challenges around the complexity of platforms when performing tasks and building their skills. Examples included interacting and trying to understand how algorithms work, handling search engine optimization and integrating with APIs. How these were negotiated by service providers is not a peripheral issue. Mastering platform rankings, technical integration and understanding of operation is core to success of platform service providers. These findings align closely with notions of the complexity of infrastructure, where obscure or non-transparent mechanisms embedded in infrastructure can shape actions (Star, 1999). Actors engaging with infrastructure will need to engage in ongoing processes of 'configuration' in order to capture value (Ciborra et al., 2000). Practically, this should provoke further consideration to what appropriate platform knowledge means for these service providers, and how one best engages in learning the tasks and functionalities of platforms.

Infrastructure perspectives imply a more critical approach to the effectiveness of platform governance. Our analysis concurs with this and argues that it is problematic to assume the platform owner will orchestrate ecosystems in an effective and benign way for all service providers. These assumptions need to be carefully contested, particularly when service providers are as diverse as in tourism. Our research has shown that as diverse service providers engage with platforms they are shaped by their context, social norms and work patterns. The mismatch to platforms governance often leads to unanticipated outcomes. In such cases, service providers, through their negotiation with an array of different platforms and systems may gain some room to manoeuvre, even if this is somewhat limited. Infrastructure perspectives then reposition how we might perceive the balance of control and agency on platforms.

Beyond individuals, as platforms become the norm in tourism, they are beginning to have a more systematic role in shaping tourism processes and outcomes. This was particularly true in our research in Indonesia – in tourism locations such as Bali in Indonesia with dense numbers of service providers. In such cases, "platforms as infrastructure" necessitates consideration of platforms impacting not only the fortunes of individual service providers but shaping the orderings of the whole sector. Given the substantial role platforms play in tourism, there is evidence that governments may wish to consider a stronger stance on developing appropriate platform policy for tourism and wider local economic development. An infrastructure perspective may be best positioned to grapple with platform dynamics for policy-making purposes.

5.4 Limitations and Further Research

Reflecting on this study, we highlight limitations and areas for further analysis. The selection of case studies from two countries, Rwanda and Indonesia, provide benefits in terms of understanding how similar types of actors engage with tourism platforms across different contexts, often with the same global platforms. A useful step forward would be to draw on further cases within similar regional contexts (Asia or Africa) to provide closer contrasts around key issues, which could allow an improved reflection on practice and policy that support platform service providers.

This paper has specifically engaged with platform service providers that are more diverse than previous studies and this has yielded useful insights. We have attributed broader practices and mismatches to the local context and specifically linked this to the marginal and sometimes informal nature of platform services providers in Rwanda and Indonesia. However, key issues brought forward, such as challenges of

digital skills and engaging with algorithms, are likely to be ones that also pose challenges to a broader array of platform integrated SMEs, including those involved in platform tourism in the EU or US. Therefore, further research exploring specific issues can be important to generalize the nature of challenges across different types of platform service providers.

6 Conclusion

The research aim was to better conceptualize the practices, values and contexts of platform service providers in the global south as they encounter and use platforms. Our approach to conceptualizing platform service providers has been grounded within critiques of the platform literature that are dominated by platform strategies. Here platform service providers are seen to be a relatively homogeneous set of actors who respond in very specific ways to platform governance.

Analysis of platform tourism service providers in the global south (in Indonesia and Rwanda) has important implications for theory and practice. The overarching findings are that platforms are scaling rapidly with platform use growing in sectors such as tourism in the global south. Challenges of platform inclusion are still prevalent for some, but smaller service providers can become integrated and use platforms to improve their businesses. Adoption is expanding, but there are still limitations in terms of connectivity, skills and resources that have limited many tourism providers in expansive use of these platforms. Such challenges suggest that the introduction of generic platforms from afar is unlikely to trigger broad-based impacts in sectors such as tourism.

Detailed insights come from analyzing two key perspectives on platforms (ecosystems and infrastructure) and their implications for platform service providers. Platform ecosystems perspectives illustrate that as platforms expand globally, platform owners need to better integrate consideration for marginal service providers into how they govern platforms. Closer consideration of the increasingly diverse practices and values of platform service providers is crucial. Moreover, service providers may not always respond in expected ways to platform governance or may learn, adapt and coordinate with each other using context-appropriate strategies. This offers opportunities for platform owners to rethink how they design and adapt platforms to ensure full engagement with these global users. For example, incorporating relevant services, training and context-appropriate governance can provide important capacity and scaffolding for platform service providers. This leads to important future research questions as to how platforms and globally diverse service providers can better engage.

Having critically explored platform ecosystems perspectives, we have suggested that incorporating an infrastructure perspective can better align with the reality of transaction platforms in the global south. With their expansionary nature platforms are moving from 'opt in' to being non-negotiable complex systems involving multiple platforms simultaneously. For service providers, the complex elements of infrastructure, algorithms and systems can limit platform engagement. In some cases, platform service providers may have the agency to undertake diverse tactics in their interactions with such systems.

Given the potential for scaled platforms to have broader sectoral impacts, findings should also prompt future questions about the control and ownership of platforms, as platforms move beyond scattered service providers to shaping relationships, power and profits. Given the links to marginal service providers in the global south, this would also suggest that platforms will need to be considered in terms of socio-economic impacts.

Overall, these aspects provide a basis to think about platform service providers more systematically. The future promise of 'digitalization' of the economy alongside the impacts of the COVID-19 pandemic outbreak suggest that platforms will continue rapidly expanding across sectors and geographies, becoming more central in shaping interactions. Considering platform service providers is especially important in thinking about platforms and development in the global south. With popular domestic platforms rare, the productive value from platforms will come from those domestic platform service providers. Building knowledge of the activities of these users and developing knowledge for policy and practices is crucial given the broader potential for development.

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