

Development Implications of Digital Economies

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Digital Platforms in the Global South: Foundations and Research Agenda

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Table of Contents

ABSTRACT.....	1
1. INTRODUCTION.....	2
2. DEFINING DIGITAL PLATFORMS.....	3
2.1. TYPES OF PLATFORMS	3
2.2. PLATFORM GOVERNANCE	9
2.3. DIGITAL PLATFORMS AND THEIR ECOSYSTEMS	10
3. STUDYING DIGITAL PLATFORMS FROM A DEVELOPMENTAL PERSPECTIVE	13
3.1. SCOPING A FRAMEWORK FOR RESEARCH ON DIGITAL PLATFORMS IN THE GLOBAL SOUTH	13
4. RESEARCH PRIORITIES ON DIGITAL PLATFORMS AND DEVELOPMENT	15
4.1. HOW TO RELEASE THE DEVELOPMENTAL POTENTIAL OF INNOVATION PLATFORMS?	16
4.2. HOW DO DIGITAL PLATFORMS IN THE GLOBAL SOUTH DIFFER FROM THE ONES IN THE GLOBAL NORTH AND WHAT ARE THEIR INSTITUTIONAL IMPLICATIONS?	18
4.3. DO TRANSACTION PLATFORMS EXACERBATE INEQUALITIES?	20
4.4. WHAT ARE THE DIGITAL PLATFORM ALTERNATIVES?.....	21
5. CONCLUSION	22
REFERENCES.....	23

Digital Platforms in the Global South: Foundations and Research Agenda¹

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Abstract

Digital platforms have become integral to many of the everyday activities that people across the globe encounter in areas like transportation, commerce and social interactions. Research on the topic has largely concentrated on the general functioning of these platforms in terms of platform governance, business strategies and consumer behaviour. Despite their significant presence in the global South, the developmental implications of digital platforms remain largely understudied. In part, this is because digital platforms are a challenging research object due to their lack of conceptual definition, their spread across different regions and industries, and their intertwined nature with institutions, actors and digital technologies. The aim of this working paper is therefore threefold: to provide a conceptual definition of digital platforms, to scope their study, and to identify research strands in international development contexts. To contribute to future research in the domain, we present four research questions, illustrated with some concrete examples, which can assist in the conduct of relevant studies on digital platforms in the global South.

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1. Introduction

Digital platforms hold a central position in the business plans of some of the biggest companies of today, such as Facebook, Google, Alibaba and Apple. A survey conducted in 2015 identified 176 platform companies in the world, with an estimated global market capitalisation of \$4.3tn—larger than Germany’s gross domestic product (P. Evans & Gawer, 2016). The same study revealed that publicly traded platforms alone gave direct employment to around 1.3 million people (P. Evans & Gawer, 2016). Many of these platforms have their origins in the global North but are becoming important also to the people in the global South due to increased access to devices and connectivity in these regions. Overall, digital platforms occupy more significant roles in areas like employment opportunities, social networking and innovation activities, which are all moving online in growing quantities. In addition, more companies in the global South have built digital platforms of their own, which at first targeted local markets but have also expanded to other areas of the globe (David-West & Evans, 2015; P. Evans, 2016). A good example of this is the Latin American digital platform, *Mercado Libre*, which started in Argentina and today operates in virtually all countries in the region.

No doubt that, given these figures, digital platforms have the potential to generate social and economic value in the global South, yet their developmental impacts are not entirely understood. Practitioners and scholars acknowledge their significance for the societies in the global South (e.g. David-West & Evans, 2015; Karippacheril et al., 2013; Swaans et al., 2014), but it is less obvious how digital platforms should be studied from a developmental perspective. Part of the problem is the lack of clarity regarding the understanding of what a digital platform is, what their main features are, and how they are governed. In addition, digital platforms are a challenging research object as they spread across different regions, disrupt industries, and are intertwined with surrounding institutions, markets and digital technologies (de Reuver et al., 2018).

This working paper seeks firstly to contribute to the studies of digital technology and international development by providing a conceptual definition of digital platforms to scope their study. The intention is to offer a solid tool for conducting meaningful research in analysing the developmental role of digital platforms in the global South. Second, we argue that digital platforms are likely to have both positive and negative impacts to the people and societies in the global South. Based on the typology we offer, the paper suggests four research strands, potential theoretical angles and methods to provide digital economy and international development scholars a starting point for analysis and understanding of the developmental role of digital platforms in their respective contexts.

This work deals with these issues head on. The paper starts off by providing a typology of digital platforms. Based on extant literature from platforms research, we differentiate between three types of platforms: transaction, innovation and integration platforms, concentrating mainly on the first two. For each of these, we discuss their main features and governance mechanisms. We then propose a roadmap for the study of digital platforms in the global South and conclude with a research agenda of applications of digital platforms in a developing country context.

2. Defining Digital Platforms

Overall, most digital platforms can be seen as sharing three basic characteristics: they are technologically mediated, enable interaction between user groups and allow those user groups to do particular things (de Reuver et al., 2018; P. Evans & Gawer, 2016). For example, Constantinides et al. (2018) understand digital platforms as a set of digital resources, be those services, content or something else, which allow interactions between consumers and external producers. These interactions create value for the two, but noticeably the platform itself does not necessarily gain value in the form of product sales or does not even always have physical assets such as infrastructure resources. Following this line of thought, the argument goes that the key role of any platform is therefore to facilitate interactions between platform participants (Jacobides et al., 2018).

Traditionally the definition of digital platforms has also depended on the field under which they have been studied. In studies concentrating on their technological components, the focus has been on their technological and digital characteristics such as layered architecture and modularity (Yoo et al., 2010). Within economics, the discussion has evolved more around the demand and supply functions within these platforms and how they differ from other types of market settings (D. S. Evans & Schmalensee, 2016). In information systems research attention has been placed on the socio-technical dimensions of digital platforms like their impact on organisational structures or international standards to name a few (de Reuver et al., 2018).

Normally, definitions of digital platforms are far too broad and tend to encompass (if not mix) several elements. We suggest that in order to conduct meaningful research of digital platforms in the global South, it is important to first describe what type of platforms one is discussing. We build on Gawer (2014) and Evans and Gawer (2016), who divide platforms according to their principal purpose and identify three different types of digital platforms: transaction platforms, innovation platforms and integration platforms.² Before moving on to discuss these in more detail it is worth noting though that digital platforms also differ regarding characteristics such as market capitalisation, sector or industry they are situated in, governance model, country of origin and geographical reach (P. Evans & Gawer, 2016), all of which might alter the ways a particular platform operates. For example the issue of platform ownership may have direct consequences on whether the platform is driven by profit-making or by welfare-maximisation, and in what ways the platform is structured and financed. In addition, this may have an effect on areas such as inclusiveness in terms of whether the users have to pay for accessing and/or using the platform.

2.1. Types of Platforms

Innovation and transaction platforms capture most, if not all, of the biggest digital platforms that currently exist, and also those active in developing countries typically fall into one of these two categories. From the perspective of the users, digital platforms almost always

² Evans and Gawer (2016) add a fourth type called “investment platforms”, which are companies that hold several platforms in their portfolios, and not necessarily digital. As a result, we do not include these in the analysis.

display themselves as either innovation or transaction platforms. Figure 1 shows these two main types of digital platforms and how they can be divided further into subsections. In what follows, we expand on these different types in more detail.

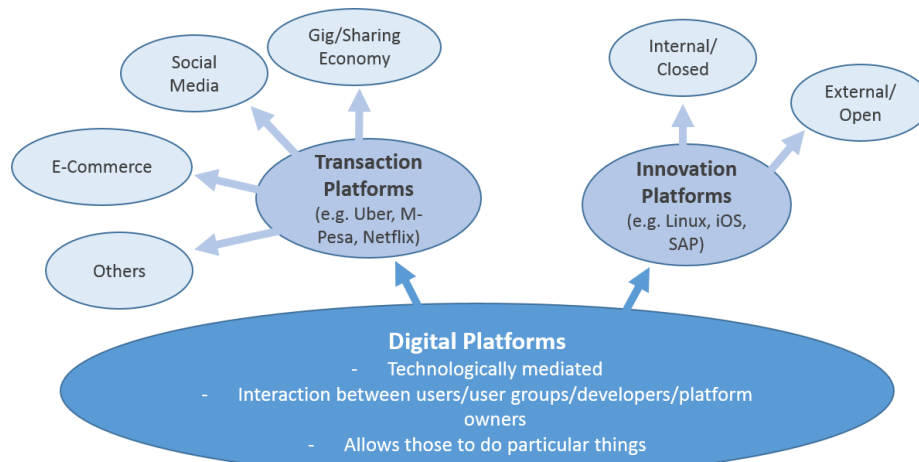


Figure 1. Typology of Digital Platforms

Transaction Platforms

Much research on digital platforms has concentrated around transaction platforms, which are sometimes referred to as multi-sided markets or exchange platforms. Their main purpose is to facilitate transactions between different organisations, entities and individuals, such as connecting buyers with sellers, drivers with passengers, composers with music companies, and so on. Transaction platforms can be especially useful in reducing transaction costs by allowing different agents to find each other more easily, and to overall reduce some of the frictions in the transaction process (P. Evans & Gawer, 2016).

Transaction platforms make it possible to exchange digital services and can be divided according to their principal purpose. Common transaction digital platforms are found in social media (e.g. Facebook), e-commerce (Mercado Libre), the 'gig' economy platforms (Upwork), or those built around the notion of the sharing economy (Airbnb). These platforms are often studied from the viewpoint of economics as their management is related to areas like pricing and contractual factors. The economic perspective places the value of transaction platforms in the possibility of connecting these seemingly disperse groups. The core value created relies on the presence of network effects, whether direct or indirect. Direct network effects, in simple terms, refer to the fact that a network (or platform) becomes more valuable to each member as more users join. For example, this would be the case of digital platforms like M-Pesa and Whatsapp, and in that respect, similar to the typical direct network effects of the telephone (Gawer, 2014). Direct network effects are evident in the type of digital transaction platforms shown in Figure 2, where the size of the pool of users from a same group is beneficial for a given individual as there are more users to interact with.

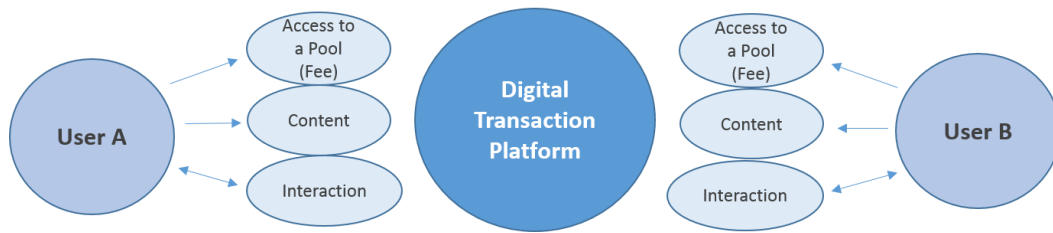


Figure 2. Digital Transaction Platform That Connects Users from Same Group

Indirect network effects are to some extent similar to direct ones but refer instead to the value created as a result of increasing the base of users in groups that are complementary to each other. That is, the decision to join a platform from the point of view of a member belonging to a given user group (e.g. sellers) depends on the amount of users in a given complementary group (e.g. buyers). Examples of these indirect effects are present in digital platforms like Domestly, Upwork and Uber (Hagiu & Wright, 2015), where the users are attracted to the platform by the number of available cleaners (Domestly), work opportunities (Upwork), and drivers (Uber) on those platforms, and vice versa. Figure 3 below illustrate these effects.

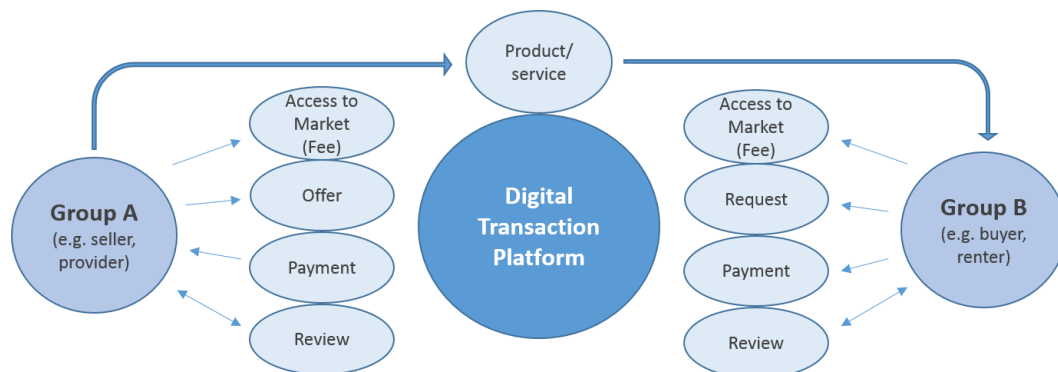


Figure 3. Digital Transaction Platform That Connects Users from Different Groups

Overall, transaction platforms highlight the importance of having large enough user bases, and the rationale is that the larger the user base, the more successful the digital platform. The worry with this approach has been that this may lead into winner-take-all scenarios among digital platforms, in which eventually only one will survive (Gawer, 2014). In the long run, this situation will lead to detrimental impacts to users in terms of decreasing competition between platforms.

Examples of digital transaction platforms

WhatsApp Messenger: WhatsApp Messenger is a messaging and telephone application, that enables its users to send text messages, do voice and video calls, share images and other media, documents, and user location to the other users on the platform. The application can be run from mobile devices as well as desktop computers and laptops, and requires a standard mobile number. In 2017 the service had 1.2 billion users (Wikipedia, 2018b). WhatsApp is a good example of a type of digital transaction platform described in Figure 2, as direct network effects become clearly visible in this digital platform. The more people there are using WhatsApp, the more benefits it can provide to all of its users. This is because the mere amount of users increases the likelihood that someone a person knows is using the platform and therefore can connect with each other. WhatsApp is the most popular mobile messaging app in most of the sub-Saharan African countries, South America and India, partly because of its relatively low usage of data and ability to function in low bandwidth environments (DAI, 2016; Hakim Bobrov, 2018).

Airbnb: Airbnb is an online marketplace which mainly functions to enable people to lease or rent short-term accommodation. The company does not own any real estate itself but is an online broker instead that connects renters with rentees and receives a percentage service fee from bookings. In 2018, Airbnb had over 5 million accommodation listings in 81,000 cities and 191 countries and had facilitated over 300 million lodging transactions (Airbnb, 2018). In addition to direct network effects, Airbnb is an example of the type of platform described in Figure 3, where the value of the platform for users in one group (renters) is dependent on the amount of users in another group that the platform aims to connect (those who want to rent their property). Airbnb is looking to increasingly expand in developing countries with the intention of providing local households with income opportunities by renting rooms in their homes to tourists (Saldinger, 2017).

Although network effects are among the most important features of transaction platforms, they provide a rather stable view of digital platforms and may easily miss other important research areas such as how platforms evolve over time. In addition, the focus on network effects often simplifies platform users to mere consumers and tends to view transactions generally as buyer-seller situations, where in reality, the relationships between platform users can be more varied. Eisenmann et al. (2008, 2011) have taken note of these limitations and discuss platforms as multi-sided networks that have both supply and demand side users instead of only buyers and sellers. The authors also view platforms as constantly changing and evolving. In sum, the main point is that if platforms are seen as stable and consisting only of sellers and buyers, it risks ignoring relevant research areas such as how a platform came to be (or how it might change in the future), and to exclude digital platforms whose user base contains groups that do not neatly fit the characterisations of buyers and sellers (Gawer, 2014). This is the case for example for innovation platforms, which will be discussed next.

Innovation Platforms

Innovation platforms are formed of technological building blocks that provide a basis for developing services and products. A typical example of an innovation platform is Google's mobile operating system Android, which enables third party developers to build applications on top of the operating system (P. Evans & Gawer, 2016). Innovation platforms can be compared to Lego box sets: when building Lego constructs, a builder picks the bricks that are needed for the construction and overall combines them in a particular way. Similar to Lego, innovation platforms provide third party developers their own set of tools and resources that developers then combine and use in ways to enable new applications for commercial use. Figure 4 below shows innovation platforms enabling innovations in the form of digital services.

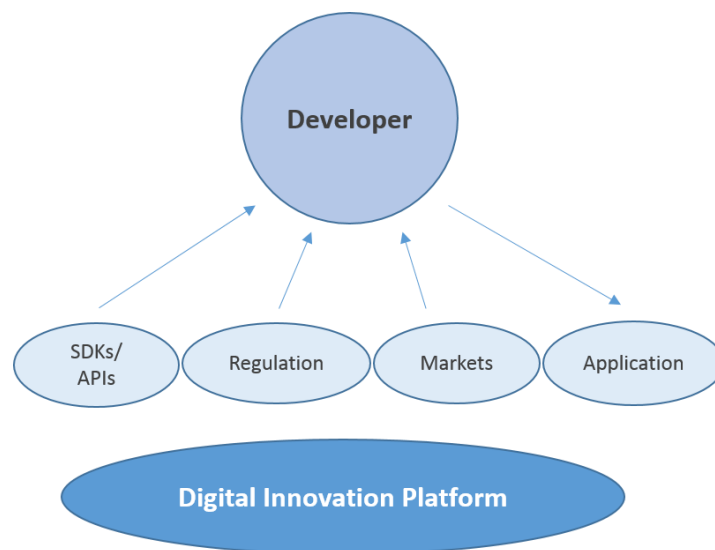


Figure 4. The Relationship between Digital Innovation Platform and Its Complementors³

Some of the notions put forward by the economic perspective do not quite fit to innovation platforms. In part, this is because those leave out areas such as the possible competitive nature of interaction between the platform owner and developers. The economic perspective, it is argued, does not take into account design related factors and their implications to incentivise innovation (Gawer, 2014). As a result, studies on innovation platforms have often adopted an engineering, information systems or product management perspective. Their emphasis has often been on the technological architectures that enable innovation, in addition to the design and production aspects of these platforms as well as on the role of interfaces in the interaction between the platform and the third party complementors (Baldwin & Woodard, 2009; Eaton et al., 2015; Tiwana et al., 2010; Yoo et al., 2012). Similar to the economics perspective, these views share some limitations as they tend not to discuss platform evolution (Gawer, 2014), which is often crucial in order to understand how particular platforms come about.

³ SDKs or Software Development Kits are tools, which enable the development of software applications for a certain digital platform and APIs (Application Programming Interfaces) are methods of communication between software components, which enable applications to either draw resources from other applications or alternatively offer those for other applications.

Baldwin and Woodard (2009) have addressed the often lacking notion of platform evolution. They state that in order for an innovation platform to survive it needs to be able to evolve and adapt to unanticipated changes in its external environment. The authors see innovation platforms consisting of a core, which is the platform itself, and a periphery, which consists of those complementary services that are built around the platform. In order for a platform to adapt to changes, it should consist of a relatively stable core with low levels of variety. This means that the resources the platform offers do not constantly change so they can be reused with continuity by the periphery. From the perspective of the platform's periphery – that is, the agents and artefacts that create the complementary services and products to a platform – the situation is the opposite. Their key feature is to be able to offer high levels of variety in terms of the products and services that are being produced while not allowing much reusability. The rationale is that by combining these two factors, the core or the platform itself would be able to adapt to changing environments: the periphery would keep on accommodating the changes through providing a variety of services and products, while the core could remain relatively stable and cost-efficient, allowing it to serve a large pool of external contributors (Baldwin & Woodard, 2009).

Example of digital innovation platforms

Linux OS: Linux is an operating system that at the same time functions as a digital innovation platform that enables the creation of applications across various different devices. Due to its portability, Linux as an operating system has found its way to mobile phones, desktops and laptops, televisions, inflight entertainment systems and various other systems and gadgets. What this also means is that any application that is developed for these devices gets its technological resources from the Linux kernel and therefore has to be built according to standards and protocols defined into the Linux operating system (Wikipedia, 2018a). Due to its organisational characteristics and open source nature, many entities have taken Linux and shaped the operating system to serve their needs, for example Google with Android. When doing this, they also define on their part the requirements that the complementors on the platform must meet in order to create applications for the platform. Overall, Linux can be seen as an example of the type of digital innovation platform described in Figure 4. Being open source, Linux has been seen as an affordable alternative for many developing countries and the operating system of the OLPC was based on Linux (Lyman, 2006; OLPC, 2018).

As a result, when studying digital innovation platforms it is necessary to understand how the relationship between the core (platform) and the periphery (the third party developers or complementors) is structured, what kinds of resources are being provided for the complementors, and what the usage of those resources implies. It is important to notice that in addition to enabling creation of innovations, platforms also pose constraints for the complementors. For a platform owner, the issue is one of balancing between these two, as the platform owner needs to provide the complementors the necessary resources for them to build services on top, while at the same time controlling the platform and keeping it as stable as possible (Ghazawneh & Henfridsson, 2013). When platforms grow, this relationship becomes even more complex, and may vary between different regions and areas. As an example, the relation between the core and the developers may differ from one country to another for instance in terms of monetisation, giving rise to differentiated groups of winners

and losers (Caribou Digital, 2016). When trying to understand how innovation platforms operate, the relationship between the platform and the complementors is one of the key areas that helps the researcher to explain the actions of both parties.

Integration Platforms

Integration platforms combine aspects of the two principal platform types, i.e. transaction and innovation platforms (P. Evans & Gawer, 2016). It could be argued that any digital transaction platform requires an innovation platform beneath it, since as the name implies, transaction platforms are always built on a particular platform--be that for example Android, Linux, Windows or something else. An example of an integration platform is Apple mobile operating system Apple iOS. Apple iOS provides an innovation platform for third party developers, yet it also functions as a transaction platform for the developers to sell their applications for the users and resembling the type of platform described in Figure 3. Integration platforms can be understood as a combination of the type of platforms presented in Figures 3 and 4. The key points of transaction and innovation platforms also apply to integration platforms, and therefore are not discussed in this study.

Overall, in order to investigate platforms the suitable perspective depends on the type of platform as well as the focus and purpose of the study. We argue that it can be useful to be aware of the limitations of each of the approaches regarding different platform types and the specific characteristics of the platforms within a particular category. Furthermore, a researcher may also add elements from the other perspectives if needed. In addition to the type of platform one is researching, another relevant question to look at is the governance model of the platform and where to draw the boundaries for the platform. This relates closely to the chosen research scope and how holistic a view of the platform is needed. In order to do that, we argue that an understanding of what kind of platform and key characteristics the research focuses on is fruitful to frame the analysis.

2.2. Platform Governance

In order to understand digital platform evolution, the issue of platform governance is of particular importance. Tiwana et al. (2010) define platform governance as “*who makes what decisions about a platform*” (p. 679). They argue there are three main decisions to consider, namely decision rights partitioning, control, and proprietary versus shared ownership. The first one refers to how authority and responsibility regarding the different areas of decision-making are divided between the different stakeholders such as platform owner and users. This can be seen particularly well in innovation platforms in the relation between the owners and the developers but it is also something that one needs to take into account in studies on transaction platforms as well. The second, control, focuses on the different mechanisms that are put in place (usually by the platform owner) to encourage actors to follow the norms and rules of the platform. For example, these kinds of control rules can lead to excluding actors like third party developers, as Eaton and colleagues show in their study of Apple iOS (2015). Finally, the type of ownership, whether proprietary or shared, is relevant for platform governance because it has implications on the decision-making processes (Tiwana et al., 2010). For instance, there is a difference in the way Linux OS is governed compared to private companies like Uber. Ownership can further be expanded into two main categories: publicly

owned at one end of the spectrum, and privately at the other. Whereas the latter is often linked to profit-making objectives, the former may have other goals (i.e. social, transparency, cooperative) that may override the profit-making aspect.

When studying the effects of digital platforms in developmental contexts and how those impacts come about, a view into the decision-making processes of the platform owner can shed light. As a result, understanding issues related to the governance of the platform in question may be important especially if one's objective is to comprehend how a platform could change its way of operating and which stakeholders may have (or not) the power to do so. This is also linked to the issue on how far-reaching a platform's impacts on development may be, including those users that may not even be part of or using the digital platform in question. In a similar vein, platform governance may also come from sources other than its owners, such as public regulatory authorities, which in the early days may have little if nothing to do with the platform directly.

2.3. Digital Platforms and Their Ecosystems

Innovation and transaction platforms are rarely isolated. Although the definitions and categorisations all reveal important aspects of digital platforms, they mainly concentrate on looking at platforms from a macro-perspective and concentrate less on their impact to the everyday lives of individuals, especially in the global South. As a result, mere definitions provide a basis for studying digital platforms but stop short in describing how platforms may or may not help in contributing to developmental factors, such as inclusion and equality in access. The latter requires taking a context-sensitive approach that extends beyond their mere technological constructs and organisational effects. De Reuver and colleagues (2017) echo this claim and point out that *"the platform debate should also seek to address the broader issue of how digital platform innovation directly relates to issues of societal and global interest"* (p. 132).

Innovation and transaction platforms tend to be linked to other platforms, organisations, regulators and other different types of entities and actors. Together these form entire ecosystems, in which different parts of the ecosystem are in constant interaction and overall can capture a multitude of social, political and technological factors, agents and attributes. An example of a digital innovation platform ecosystem can be seen in the so-called "app economies", which have been defined as *"a collection of interlocking innovative ecosystems [where] each ecosystem consists of a core ecosystem, which creates and maintains a platform and an app marketplace, plus small and large companies that produce apps and/or mobile devices for that platform"* (Mandel, 2012, 2-3). This definition of app economies also shows how platforms have both a technological as well as more business-driven, largely social dimensions built into them. More importantly, it sets the question on where to draw platform boundaries.

In relation to digital platforms and their societal impacts, an important aspect is to decide how far and in which direction one should follow the implications of platforms. In other words, a common problem is to draw clear lines on what to include and what to exclude. This is particularly the case if platforms are understood as socio-technical constructs, as we argue in this work. Furthermore, a platform may exist within other platforms, be interlinked,

connect various user groups, be regulated by different institutions and have impacts on groups that are not even directly linked to the platform. The notion of the “sharing economy” offers a good example to highlight this point. Within sharing economies, research has focused not only on the technological base or the users using the particular platform, but also incorporated aspects from legislation such as workers' rights or impacts on people's lives such as possible increased income opportunities. Obviously, the contextual or related areas a researcher should focus on will depend on the scope of the study, but it is important to be aware of what areas may be left out. The notion of network effects can also be useful to illustrate this point further. As noted above, one user group's participation in a platform may determine the action of another user group, as indirect network effects predict (Gawer, 2014; Hagiu & Wright, 2015). Similarly, platforms can have direct effects on a large base of users from one group, for example, in the form of increased employment or innovation opportunities. However, indirectly, the activities on a given platform can also impact people who are not even part of it. This is for example the case of a taxi driver who faces the entry of Uber into their market. The taxi driver may now face a drop in her own income as a result. Network effects can therefore generate positive but also negative externalities, which is an economics concept used to refer to the effects derived from producing or consuming a good or service on third parties not directly related to the transaction. Similarly, platforms are likely to affect other user groups, either positively and negatively, that are not directly connected to the platform.

It is also worth noting that platforms themselves can be linked to other digital platforms and services via application programming interfaces (APIs). This is the case for example when a platform uses authentication services provided by other platforms such as Facebook. As a result, platforms may either draw results from or provide results to other digital services and thus have a role in the functioning of other platforms or even be dependent in their own functioning from other platforms. This again might have further implications for example in terms of what the platform can or cannot do, or the type of actors the platform itself relies on. Figure 5 illustrates a set of possible actors and areas that might be relevant in understanding platform ecosystems. As can be seen from the figure, the different stakeholders and areas of importance in platform ecosystems depend on the type of platform in question, and not every area is equally important to all the different digital platforms.

Table 1 below lists the key characteristics of both main types of digital platforms, i.e. transaction and innovation platforms. Currently, a vast majority of digital platforms with the potential to generate societal impacts in developing countries are transaction platforms. However, as noted above, these transaction platforms have a technological basis that in some cases also offers tools to create complementary services and therefore holding characteristics of an innovation platform. A typical example would be Facebook, and its division Facebook for Developers. Therefore, we argue it is important to be aware of the key factors that underlie the functioning of innovation platforms as well. As the technologies needed for the creation of applications are reaching people in developing countries at an increasing pace, the importance of innovation platforms, and with that their societal impact, is likely to increase.

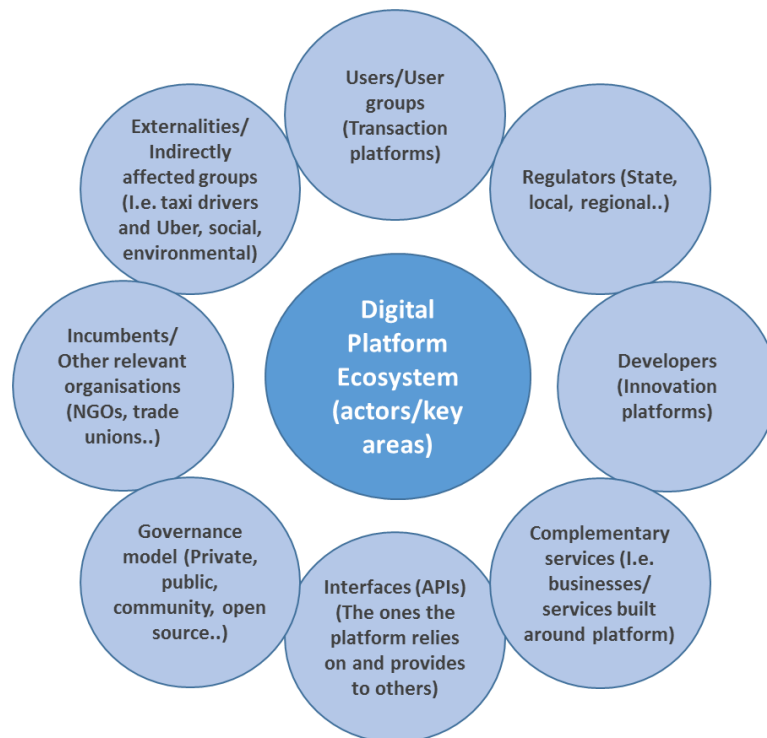


Figure 5. Some Key Actors and Areas of Digital Platform Ecosystems

Type of Digital Platform	Transaction	Innovation
Purpose	Matches users or user groups, the value for a user increases with the number of users in a user group	An extensible codebase as a core that enables the adding of third-party modules that complement the core
Key target groups	Participants to a transaction	Application developers
Key governance issues	Attracting users from the relevant groups (indirect/direct)	Relationship between developers and platform owners
Theories	Multi-sided markets, indirect and direct network effects	Boundary resources, platform openness, platform ecosystem
Developmental questions	Income/job opportunities, filling institutional voids, removal of market frictions	Creation of app economies, development of tools (apps) to solve local challenges
Examples	MPesa, Whatsapp, Skype. Airbnb, Mercado Libre, Uber	Apple iOS, Linux, Android, SAP

Table 1. Key Characteristics of Innovation and Transaction Platforms

3. Studying Digital Platforms from a Developmental Perspective

Digital platforms are often studied from the perspective that best fits the field under which the research is carried out. For development-centred research on digital platforms, it may be worth placing the relevant agents acting or interacting on the platforms at the centre. A useful approach is proposed by Annabelle Gawer (2014), who presents a framework for studying digital platforms that integrates views from engineering, strategic management and economics and focuses on different agents within platforms. The agents can be firms or individuals, that in turn have different roles in relation to the platform, be those consumers, innovators, platform owners, among other roles. The agent-based perspective helps to concentrate on the micro-level actions and foundations in platform research, but also to study broader macro-trends in a given ecosystem. An agent-based perspective can provide insights that easily go unnoticed in research that only concentrates on the larger macro structures of digital platforms.

This is in line with development theories such as the capability approach (Nussbaum, 2011; Sen, 1999), which often takes the view of individuals or smaller collectives. A further example is presented in the United Nations' Sustainable Development Goals (SDGs). The first seven SDGs (United Nations, 2015) concentrating on areas such as poverty, hunger, education, clean water, health and well-being all demonstrate themselves through individuals or smaller groups of people. Also other goals like decent work, reduced inequalities and affordable and clean energy can best be evaluated through people and how likely they are to fulfil these goals in their daily lives. By analysing first how a particular digital platform changes the lives of certain individuals and groups, it becomes easier to have an understanding of the real implications of these platforms. Once the impacts on the chosen users are understood, the scope of the research can then be widened to include other relevant agents or user groups that seem relevant for having a more holistic understanding of those impacts. For example, when studying the role of Uber from the perspective of their drivers, the research can then move on to study the implications the platform has on competitors, such as regular taxi drivers. By first understanding the effects on particular agents and micro-groups, research could later go beyond and theorise on the type of impacts digital platforms can have at the macro-level of structures such as institutions.

3.1. Scoping a Framework for Research on Digital Platforms in the Global South

When studying digital platforms in a developing country context, and in order to define what type of platform one is talking about, a first set of questions should address what the platform aims to do, where it is located, and rooted, and what other general characteristics of the platform are known (e.g. its governance model). A second group of features could help define whether the main platform in question is a transaction or an innovation one. Following this, and depending on the research question in mind, a third aspect should address the contextual features that are likely to affect the developmental impacts of the digital platforms. That is, understanding what relevant institutions exist, be those formal or informal, legal, social,

economic or organisational, any relevant governance arrangements in place, and the time frame under analysis. Finally, choosing the agents the study wants to focus on, and understanding who they are, what they do, what other groups are likely to be linked to them, who is included or excluded, and what digital or traditional tools they make use of to participate. A given study may not need to cover all four aspects. But we believe that thinking about these four can, at a minimum, help to guide the research in terms of the platform's developmental impacts. As noted, a platform may have both positive and negative effects—or externalities, in the economics vocabulary—and those effects may vary considerably between different agents. As already suggested, a platform like Uber can have detrimental impacts for existing taxi drivers while enabling new income opportunities to others. Choosing one user group or set of agents does not mean leaving others automatically outside. Instead, it provides a starting point for mapping the scope of the study, and understanding what should be included and what not. Some limits are likely necessary, and this may help to put them upfront to make the research project manageable.

Overall, these limits should be set in a manner that they allow the inclusion of the relevant agents, actions and institutions while at the same time keeping the research manageable and possible to carry out. Setting the boundaries is done in conjunction with defining the possible effects on the user groups that form the centre of the research. In conjunction to this, digital platforms should be seen as constantly evolving, which also implies that a timeframe for studying the platform and its impacts might have to be set, as some of the impacts may take time to evolve and to be witnessed by the researchers.

If seen from the agent-perspective, the motivations, requirements for use and number of users are of importance. Different platforms may require different skill sets and pose differing conditions for people to participate, and depending on the purpose of the platform, users may have varying motivations for using the platform. For example, innovation platforms often require participants to possess skills in programming and indirectly also in developing a company around the created digital services. Similarly, institutional factors may for example alter certain societal groups' such as women's possibilities to participate in the platform (Heeks, 2017).

We believe these four critical areas will enable design of an initial framework for studying digital platforms and their developmental dimensions. In what follows, we will introduce particular research strands and conceptual angles on how to further analyse digital platforms on a developing country context. These angles combine perspectives from different academic fields such as information systems, development studies and economics, and overall can be used in isolation or as a combination, depending on the purposes of the research in question. The research for all of these angles can be started off by first looking at the platform characteristics discussed above and described in Table 2.

<p>1. General characteristics of digital platform</p> <ul style="list-style-type: none"> - Purpose - Users - Country of origin/geographical reach - Technological base 	<p>2. What type of platform one is studying?</p> <ul style="list-style-type: none"> - Transaction <ul style="list-style-type: none"> - Reducing frictions - Direct/indirect network effects - Innovation <ul style="list-style-type: none"> - Core/periphery - Modularity/Interfaces - Integration
<p>3. What is the relevant context?</p> <ul style="list-style-type: none"> - Institutions and agents - Governance - Time period (platform evolution) 	<p>4. What do the agents in question do?</p> <ul style="list-style-type: none"> - Relevant groups - Motivation for them to participate - Who's included/excluded - Tools needed to participate

Table 2. Initial Steps for Platform Research

4. Research Priorities on Digital Platforms and Development

On a global scale, the overall advantage of digital platforms is that they are able to cross the geographical and other barriers that have historically often had a negative impact in the global South, for example by making it more difficult for businesses to access global markets and financial flows. However, this breaking of barriers works both ways, and until recently most of the major digital platforms with a global reach have originated from the Global North, prime examples of this being companies like Facebook and Google. These existing companies have also been keen on entering markets in the global South. This is not surprising, as a larger mass of newcomers are coming from there. However, recent years have witnessed more digital platform companies emerging from countries in the South, notably from China and India, and new businesses and initiatives based on the usage of digital platforms are being constantly created across the globe. With these developments, digital platforms have started to have an increasingly important role for people across the globe and impacting various areas of people's daily lives.

As a general rule, digital platforms are seen particularly useful in removing market frictions (D. S. Evans & Schmalensee, 2016). These frictions exist in abundance in many developing countries for example, due to insufficient information, weak institutions and poor infrastructure (Drouillard, 2017). As a result, digital platforms hold promise especially in the context of global South in terms of solving various societal and developmental challenges. However, the impacts of digital platforms come in various forms, some of which are more positive and others also negative (Donner, 2018) and as happens sometimes with technology, may work only to amplify existing conditions (Toyama, 2011).

Because of the difference in general societal characteristics, the impacts of digital platforms are likely to be different in the global South and in the global North. Among other things, in many developing countries there are challenges for example in terms of weaker infrastructure and institutions as well as information availability and quality. These are also all areas where platforms are likely to have greater impact in the global South, as in many cases these are factors that many platforms depend on in their functioning and need to provide solutions for

or run the risk of not entering at all. Digital platforms also come with their own set of norms and guidelines, which may convert into local institutional forces, perhaps even filling institutional voids.

Although there is optimism for the types of changes digital platforms may bring into development, there are also possible negative impacts. For example, as certain parts of transactions are hidden in a platform it may not be entirely known by the users how those are carried out and what kinds of implications that may have. Such a lack of transparency can strengthen the existing asymmetries between capital and labour, between the ones excluded and those included such as gender biases regarding opportunities to use the platforms. On a more macro level, there is also a danger of unfair distribution of resources and work between the global South and North, resonating with the arguments made by dependency theorists (e.g. Frank, 1967).

In sum, studying digital platforms' effects on development is complex where both negative and positive consequences of platform deployment and usage are likely to be found. In order to properly analyse their meaning for global development it is in any case necessary to have an accurate understanding of the types of platforms there are and the principal differences among them.

Below we provide four research questions that we consider relevant for future research on the domain. We believe that each would enable us, in its own way, to have a better understanding of digital platforms operating in developing countries. They all share the objective of uncovering the effects and development implications that digital platforms may have in a developing country context.

4.1. How to Release the Developmental Potential of Innovation Platforms?

One of the key characteristics of innovation platforms is to act as the foundation upon which other firms can build complementary products, services or technologies (Gawer, 2009). A relevant case to study the developmental potential of innovation platforms is presented in the realm of open government data—data released by governments in digital format, publicly available for anyone to use. New digital social innovation ventures based on open data promise to contribute to global development goals, such as economic growth, job creation, social and economic inclusion and access to public services such as healthcare. Whilst open government data implementations may have been referred to as platforms, there has been little research from a platform perspective. This is curious when, actually, a lot of what is happening in the field of open data is about growing and nurturing an ecosystem of third party innovators, which can capitalise on the datasets of an open data platform to provide services to citizens or the government itself. In this context, Bonina and Eaton (2018) draw on boundary resource theory to study how to cultivate a vibrant ecosystem of open data innovators in Latin America. In particular, the authors compare and analyse three open government data initiatives in the cities of Buenos Aires, Mexico City and Montevideo to identify how platform governance evolves over time. The outcome of the analysis proposes a theoretical model which describes a set of tools and rules open data platform authorities can use to stimulate, support and grow both data suppliers and data re-users with an innovation

focus. This is an example on how theoretical strands from innovation platforms could be applicable to an international development context.

Another angle to study innovation platforms in the global South is to look at the particular affordances they offer. Affordances have been defined in slightly different ways, but in principle affordances are the acts and functions an artefact affords to its users. In relation to digital platforms, affordances provide a tool to analyse the impacts digital platforms have in terms of development. The key question therefore is what it allows its users to do and similarly, what kinds of actions it prevents. The analysis can start from this basic foundation of the purpose of the platform in question, i.e. what it hopes to enable its users to do and also what are the constraints it places on them. Other relevant questions related to this are what is required from the users to participate, can the users perceive and make use of the provided affordances, and equally importantly, what does the digital platform prohibit its users from doing through its constraints.

In general, the affordance lens places emphasis on how platforms are designed and developed. It is good to remember though that affordances and the impacts that come with them can also be unintended by the platform developers. Despite this, by starting from the perspective of what platforms enable agents to do and also in which ways these agents are being constrained by the platform gives the researcher a better view of where the platform impacts can be seen. Furthermore, if the research can take the form of action research by allowing the users and researchers to participate in the platform design process, the affordances can be shaped in a manner that they provide the best possible developmental outcomes. In this kind of research, the contextual factors are also crucial since those can also impact the ways platforms are perceived by the agents in question.

Usage of affordances in the study of platforms can be illustrated through the example of the Ugandan marketplace application Kudu (Ssekibuule et al., 2013). Kudu enables farmers selling their harvest to connect with buyers and it uses simple SMSs to function. Despite this, the backend technology of Kudu is quite developed as it relies on specifically designed matching algorithms that connect the buyers and sellers (i.e. the matching is done by the application itself instead of the buyers and sellers themselves). What Kudu affords to the sellers is better access to the buyers while also providing certain protection for them of having a fair price. Similarly, it enables the buyers to connect with sellers that might otherwise be hard to reach. As a whole, the affordances Kudu provides enable the removal of market frictions and while doing so replacement of old or even creation of new institutional settings.

On Affordances

The term affordances originates from the field of ecological psychology and was first presented by Gibson (1977), who used affordances to describe the type of options an environment provides to animals in terms of what it allows animals to do and also not to do. Affordances can also be seen as relative to the actor or agent and her capacity to make use of the affordance. Gaver (1991) argued that an affordance could exist in four different ways in relation to the user: a perceptible affordance was both real and perceived, hidden affordance real but not perceived, false affordance perceived but not real, and finally a rejected affordance did not exist since it was neither perceived nor real. Related to this, Norman (1999) argued that good design states its affordances clearly, making it easy for the user to recognise the affordances designed into an artefact. Affordances emerge in the process of individuals engaging with the artefact or object in question (Hutchby, 2001; Markus & Silver, 2008), and the available affordances are not only context dependent but display themselves differently to the users (Leonardi, 2013). In addition to being relative to users, affordances and the opposite of those, constraints, have a temporal character. Corral et al. (2014) discuss this in terms of evolving and inherent constraints. Evolving constraints are seen as being constraints that will most likely be solved in the near future for example due to developments in the technology that is linked to the constraint. Inherent constraints are more stable and difficult to change, as those are often the result of design decisions, forming part of the execution environment of the artefact in question and in this sense intrinsic to the artefact. Zammuto et al. (2007) further note that as technologies shape their environments, a constraint stemming from the environment may also disappear over time instead of a change in the technology.

4.2. How Do Digital Platforms in the Global South Differ from the Ones in the Global North and What Are Their Institutional Implications?

Due to the socio-technical nature of digital platforms, the surrounding contextual factors are likely to impact the ways digital platforms are designed and the way they operate in different locations. The global South often faces challenges in areas like weaker infrastructure, institutions and also the local customs that vary when moving from one culture or society to another. As a result, digital platforms operating in the global South require certain adaptations or can be quite different in relation to their purpose, design or operation. One example of this can be seen in Facebook's drive to make its platform more usable in low bandwidth areas (Cabral & Kandrot, 2015; Jackson, 2015), but also the types of platforms that are being developed often differ considerably from those that are being targeted for users in the global North as can be seen in the above mentioned agricultural market place application, Kudu (Ssekibuule et al., 2013).

On Institutions and Digital Platforms

Institutionalisation is understood as the process where norms, patterns of activities and the social order as a whole becomes accepted and deployed within a particular society (Avgerou, 2002). Scott (1995) sees that "*institutions are social structures that have attained a high degree of resilience*", and "*are composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life. Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines, and artifacts. Institutions operate at different levels of jurisdiction, from the world system to localized interpersonal relationships. Institutions by definition connote stability but are subject to change processes, both incremental and discontinuous*" (p. 33).

Digital platforms can be viewed as aiming to change the current institutional settings and as a result, impacting the rules and norms and the general institutional logics of following these norms. Institutional logics refers to "*the socially constructed historical patterns of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, and provide meaning to their social reality*" (Thornton & Ocasio, 1999, 804). The argument made here is that platforms can be either challenging the prevailing institutional logics and replacing those or alternatively, they set the basis for creating institutions in societal areas where there have not necessarily been any, which is claimed to often happen in a developing country context and has been referred to as filling institutional voids (Khanna & Palepu, 2010). In the process of replacing existing institutions digital platforms de-institutionalise current norms and practices and put in place their own. The users of digital platforms become therefore exposed to new ways of performing particular practices, and if those are accepted by users, the institutional characteristics offered by the platforms become the new norm and get institutionalised into the surrounding society.

Especially in relation to weak institutions and institutional voids, digital platforms and the affordances they provide can form a basis for institution building. At very least, they need to take these institutional factors into account in their operation, and this alone is likely to make them quite distinct from the digital platforms operating mainly in the global North. Institutions often display themselves through the relevant agents, making agent-focused research relevant also under this particular research area. The above discussed notion on platform ecosystems is important as well since it indicates the users or groups of agents that must be taken into account and also the areas that need to be included in the analysis, such as regulation, platform governance and platform purpose.

This institutionalisation of new norms and forms of practices can have both negative and positive impacts for developing countries as a whole. In order to better understand this, it is also important to study how digital platforms in the global South differ from the ones in the global North by mapping the key differences between them. From there one can adopt the institutional lens and investigate the impacts of the institutional settings that digital platforms are putting in place. This enables the researcher also to assess whether platforms originating from the global South are better positioned to take into account the contextual and

institutional factors in their targeted locations and as a result, provide more positive developmental impacts to local communities and agents.

Go-Jek in Indonesia

Go-Jek is an Indonesian ride-hailing app that started off by providing motorcycle taxi services in the form of passenger rides as well as food and package delivery. It has then expanded to other business areas, for example by launching its own payment system. What made Go-Jek particularly successful for example in comparison to Uber was its usage of motorcycle taxis: in places like Jakarta that suffer from traffic congestion, motorcycle is a much faster method of transportation than car. Go-Jek also provides employment to the motorcycle taxi drivers, and although many of them were motorcycle taxi drivers already before, they see that they have more work now and spend less time idle, seeing their incomes increasing. Go-Jek also gave loans to drivers so that they could buy a smartphone and provided assistance for drivers who lacked paperwork to register as a legal Go-Jek driver. By growing fast and employing hundreds of thousands of drivers and serving millions of users Go-Jek also had the political capital that helped it when a ban on ride-hailing transport apps was declared; leading to the ban being overturned only 12 hours later. Overall, Go-Jek has to some extent institutionalised the ways motorcycle taxi services are used via an app, changing the existing landscape. At the same time, worries exist of the type of work that Go-Jek and other similar services provide, often providing little working protection if any (Davis, 2018; Nastiti, 2017).

4.3. Do Transaction Platforms Exacerbate Inequalities?

The majority of biggest digital platforms operating in the global South are transaction platforms, which have the capability of shaping local institutional settings in various ways. As the above discussed example of Go-Jek demonstrates, these platforms can have both negative as well as positive impacts for their users. From a developmental perspective, the question that follows is whether the positives outweigh the negatives, and if not what can be done to rectify the situation. One clear research area on the developmental impacts of these transaction platforms is the issue of whether those actually diminish or exacerbate inequalities between different users and agents, be those connected to the platform or otherwise indirectly affected by the platform's existence.

For example, Heeks (2017) has noted that online labour platforms have had positive impacts in developing countries in terms of employment opportunities, inclusion, objectivity, reasonable earnings, career development, flexibility and in reducing travel as well as environmental costs. Regarding opportunities and inclusion, platforms enable transfer of employment opportunities from global North to global South and at the same time help to remove some of the institutional barriers that may inhibit certain groups such as women from accessing work opportunities. Similarly, online labour platforms tend to be more objective as traditional cues like disability, accent or age are not necessarily present in an online environment. On average, online labour also pays better than many traditional jobs, allows workers to update their skills and progress in their careers, and enables flexibility regarding time and location. The latter also helps to cut down travel, and with that, environmental costs. At the same time, online labour may also have negative impacts such as low levels of stability, limited or often non-existent social protection. Sometimes the type of work that labour

platforms offer is repetitive and even to some extent harmful. In a similar manner, even some of the positive impacts are debatable as the flexibility in working hours may in some cases mean working late at night. Career development is neither guaranteed and can also be practically non-existent. As this example shows, it is entirely possible for a platform to have both negative and positive impacts, and in some cases the impact from a particular area like career development is likely to depend on the research perspective, the person doing the job or the point of reference that the situation created by the online platform is being compared to.

In terms of inequalities, the key questions that are to be answered revolve around factors that are needed to participate in the platform and overall who or which agents are able to do so. If understood from the perspective of frictions, transaction platforms are seen capable of removing many of those, but at the same time it is also necessary to understand if they actually also put some market frictions in place. Furthermore, not all frictions are automatically bad, and the removal of particular frictions may also entail negative consequences for particular agents or user groups. Finally, it is vital to have a holistic view on what are the reasons that make certain agents excluded from using the platform and others included.

4.4. What Are the Digital Platform Alternatives?

All of the biggest transaction platforms and many of the innovation platforms are governed by private companies. However, digital platforms also offer public institutions and co-operatives a tool to drive their objectives. In such cases the main objective for the platforms is not necessarily profit-making. That may have a role in terms of the purposes of the platforms and also in the way the platforms have been designed, but it may not be the dominant logic. As a result, one important research area on the developmental impacts of digital platforms are the alternatives that exist to the privately run platforms and what kinds of implications that may entail in relation to the platforms' impacts. Furthermore, platforms that have alternative governance models don't necessarily have to be strictly public, private or community-owned, but can also take the form of hybrids where several ownership types are present.

These platforms can also take a slightly different approach in terms of their offerings. Already many governmental institutions but also some private ones (e.g. Uber Movement) are providing data for third party developers that can then be used for research purposes but also for building applications on top of these data sources. As mentioned above, these kinds of data platforms fall under the innovation platform category, yet their objectives and overall functioning might differ quite a bit from the likes of Apple's iOS or Android. By being possibly primarily motivated by reasons other than profit and having more social goals built into them, these types of alternative digital platforms may also be more capable of delivering developmental results. Whether this actually occurs or not and what is their general impact, is a matter that requires further research.

5. Conclusion

That digital platforms are becoming pervasive globally is of no doubt. In this work, we set out to provide a typology of digital platforms that could help to bring more clarity and better equip researchers to investigate the developmental implications of these platforms. We also provided a guiding tool to scope studies on the matter and outline four particular research strands we believe could be of interest and relevance for international development scholars. Of course, the strands we propose are by no means exhaustive. We suggest that understanding the developmental impact of digital platforms will benefit from an interdisciplinary view on the matter. We hope this foundational work can inspire both scholars and practitioners to move our understanding of both the benefits and costs that digital platforms have to offer for international development. We hope a broader engagement with this increasingly important phenomenon can guide future interventions, including the need for regulation, the provision of fairer rules or the generation of new institutions in the world of digital platforms.

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