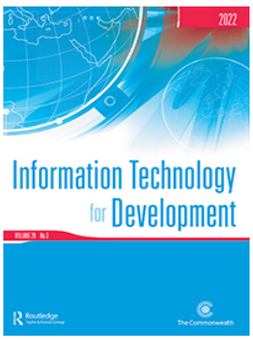

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Digital inequality beyond the digital divide: conceptualizing adverse digital incorporation in the global South

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ABSTRACT

Digital systems are significantly associated with inequality in the global South. That association has traditionally been understood in terms of the digital divide or related terminologies whose core conceptualization is the exclusion of some groups from the benefits of digital systems. However, with the growing breadth and depth of digital engagement in the global South, an exclusion worldview is no longer sufficient. What is also needed is an understanding of how inequalities are created for some groups that are included in digital systems. This paper creates such an understanding, drawing from ideas in the development studies literature on chronic poverty to inductively build a model of a new concept: 'adverse digital incorporation', meaning inclusion in a digital system that enables a more-advantaged group to extract disproportionate value from the work or resources of another, less-advantaged group. This new model will enable those involved with digital development to understand why, how and for whom inequality can emerge from the growing use of digital systems in the global South. It creates a systematic framework incorporating the processes, the drivers, and the causes of adverse digital incorporation that will provide detailed new insights. The paper concludes with implications for both digital development researchers and practitioners that derive from the model and its exposure to the broader components of power that shape the inclusionary connection between digital and inequality.

KEYWORDS

Adverse digital incorporation; digital divide; digital inequality; digital development; global South

1. Introduction

Inequality is one of the major challenges facing the world, and there are significant concerns about the contribution of digital technology to inequality (UN, 2020). The dominant lens for understanding the relation between digital and inequality has to date been that of the digital divide: of nations, regions, groups, individuals, etc., absolutely or relatively excluded from the benefits of digital technology (van Dijk, 2020).

That view has particularly shaped understanding of the relationship between digital and inequality in the low- and middle-income countries of the global South. Yet it is challenged by the growing pace of digitalization in these countries; a pace that has only accelerated during the Covid pandemic (Oldekop et al., 2020). The majority of the population is now included in digital systems of some kind. While this digital inclusion has brought undoubted development benefits, it has also, in some instances, been associated with a growth in inequality (Gurumurthy et al., 2019).

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To understand this – for digital development research, policy and practice – a conceptual model is required that explains how digital inclusion leads to inequality. The current digital divide and digital inequality models that link inequality to digital exclusion cannot do this. The aim of this paper is, therefore, to fill this knowledge gap by answering the question: how can we conceptualize the connection between digital inclusion and growth in inequality in the global South?

Drawing from the development studies literature on chronic poverty that presents the idea of 'adverse incorporation', the paper answers this question by introducing a new concept: 'adverse digital incorporation', which it defines as inclusion in a digital system that enables a more-advantaged group to extract disproportionate value from the work or resources of another, less-advantaged group. The main task of the paper is to build a conceptual model of adverse digital incorporation, given no such model – nor, even, of adverse incorporation generally – yet exists.

It does this through an inductive review of the literature on adverse incorporation and the illustration of key components of adverse incorporation through their application to digital systems in the global South. Putting these components together, the paper then creates a conceptual model of adverse digital incorporation. The paper concludes by summarizing the contribution to digital development research and practice of this new model. Researchers can use it to better understand the causes, processes and dimensions of inequality arising from digitalization in the global South. For digital development practitioners, the model provides a new basis for intervening in existing, unequal digital systems, and for implementing 'digital development alternatives' that reduce inequality by designing more just digital systems.

2. Perspectives on digital, inequality, and development

This section reviews perspectives found in literature on the relationship between digital technologies and inequality in development contexts; instantiating general patterns drawn from reviews in Ayanso et al. (2010), Armenta et al. (2012), Heeks (2018), and Ragnedda and Gladkova (2020). These perspectives were initially positive; seeing computers along with telephony and broadcast media as elements in the more general contribution of technology and information flows to a reduction in the global inequalities between 'Third World' countries and their richer counterparts in the global North (Bennett & Kalman, 1981; Hamelink, 1979). This thread – deriving from a modernization perspective on development – remains to this day but it was joined fairly soon by a more negative mirror image: the concern that those who could not access the benefits of these technologies would lose out in relative terms compared to those who could; thus increasing inequalities between these groups (Reddi, 1986; Schware & Choudhury, 1988; Slamecka, 1985).

These latter views crystallized in the mid-1990s with advent and growing use of the term 'digital divide'; an idea which was soon applied on a global scale and became part of the parlance of international development (James, 2003). The digital divide was initially understood in Manichean terms: a dualism of 'haves' vs. 'have nots' that related to technology access; be it devices like PCs or services like Internet connectivity. Over time, the notion of the digital divide evolved and expanded in at least two ways (Ragnedda & Muschert, 2013; van Dijk, 2020) (see Figure 1, adapted from Heeks, 2018):

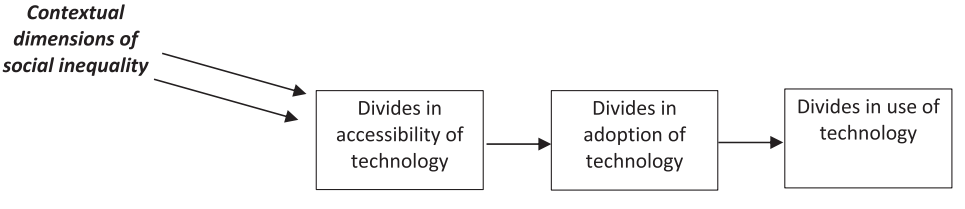

Figure 1. Expanded view of the digital divide. Source: author.

(a) Forwards along the information value chain: particularly expanding from a focus on divides in technology access and then adoption to consider divides in technology use – for example, deriving from differences in user skills and knowledge.
(b) Backwards and outwards from the information value chain: particularly encompassing contextual social inequalities (gender, race, disability, income, etc.) that were seen as precursors to or even causes of the digital divide.

This broader and more contextualized view of the digital divide was sufficiently different from its origins that some sought to attach new labels, including 'digital inequality' (Ho & Tseng, 2006; Kaba & Meso, 2021). However, a review of recent literature using the terminology of digital inequality indicates a recurrent worldview, of which the following are illustrations (emphasis added):

> In the case of Africa, global digital inequalities have reinforced existing racial as well as economic chasms, *shutting out* a huge proportion of the continent from access to the internet. (Robinson et al., 2015, p. 274)

> These *digitally excluded* 4 billion are unable to access income-generating opportunities, goods and services based on information and communications technologies. (Ramalingam & Hernandez, 2016, p. 68)

> Inequality in the use of digital technology can reinforce inequalities in other spheres of life, and thus *digital exclusion* is one of the major problems that contemporary societies must address as an underlying factor in inequality beyond the digital sphere. (Ozsoy & Muschert, 2020, p. 179)

The foundational concept, therefore, remains that of exclusion and the underlying narrative is that particular groups or geographies are being prevented from accessing the benefits of digital technologies.

This conceptualization of digital and inequality in the global South was particularly useful in the first years of the twenty-first century to help analyse the situation of the majority of the population who were unable to access or use computers or mobile phones or the Internet. The approach remains relevant today; for example, to understand the hundreds of millions still without a mobile phone, the nearly three billion estimated to not use the Internet (ITU, 2021), and all those unable to benefit from advanced digital applications like robotics or artificial intelligence. However, exclusion-based perspectives and analyses are challenged in a world in which a significant majority of the global South's population have a mobile phone and a majority have Internet access (ITU, 2021). They are now included in, not excluded from, digital systems.[1]

The singular relevance of exclusion-based analysis could still be argued if the relationship between digital and inequality could be shown to relate solely to the declining category of those excluded from the use of digital systems. Yet evidence demonstrates this is not the case; that, instead, inequality is increasingly associated with those included in digital systems in the global South – small businesses and farmers trading on digital platforms, workers employed by gig platforms, communities that have been digitally mapped, etc. (Gurumurthy et al., 2019; Heeks & Shekhar, 2021; Murphy & Carmody, 2015). To add to the in-depth exclusion-based conceptualization of digital and inequality in the global South already available from the literature, an inclusion-based conceptualization is therefore also required. As visualized in Figure 2, we have understood well how

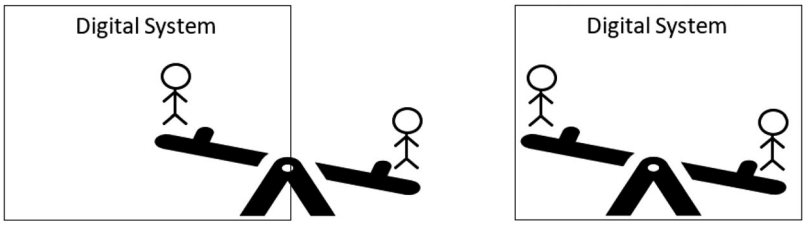

Figure 2. From an exclusion-based to an inclusion-based perspective on digital inequality. Source: author.

those excluded from digital systems have suffered inequalities compared to those included in those systems (left side of the diagram). But what we have not yet understood is how one group fully-included in a digital system can suffer inequalities compared to another group that is part of that system (right side of the diagram). This leads to the question addressed in this paper: how can we conceptualize the connection between digital inclusion and growth in inequality in the global South?

Apprehensions about inequality and inclusion in digital-related systems are not entirely new, and one possible answer could draw on the dependency perspective within development studies. This saw the transfer and use of information technologies of the global North as causing 'underdevelopment' of the global South through an outflow of financial and informational resource that was 'perpetuating existing inequalities' (Shields & Servaes, 1989, p. 51). Such an approach could be valuable for global-scale analysis but would be less readily applicable to understanding the mechanics of inequality within individual digital systems. Therefore, instead, this paper seeks to address the question by recognizing similarities to an inflection point in the earlier debate around poverty and development.

Initial views in that debate saw poverty from the perspective of social exclusion: 'the process through which individuals or groups are wholly or partially excluded from the society in which they live' (Hickey & du Toit, 2013, p. 135). The economic prescription flowing from this was to integrate the poor into markets through the globalization and marketization of developing economies. Yet, poverty and inequality persisted following these actions. As a result, a new perspective was needed that could link the inequality of poverty to inclusion rather than exclusion. Referred to, for example, by Sen (2000, p. 29) as 'unfavourable inclusion', this came to be associated more with the term 'adverse incorporation': an understanding of the process by which some groups could be differentially disadvantaged through their inclusion in markets or states or civil society (Hickey & du Toit, 2013).

The current situation vis-à-vis digital development, therefore, resembles the earlier situation for poverty and development: while an exclusion-based perspective will continue to be important, an additional inclusion-based perspective is needed. The ideas of adverse incorporation into broader systems like markets would seem to be a potentially-fruitful foundation for understanding the specific differential disadvantages experienced by some groups as they come to be included in digital systems – what we can refer to as 'adverse digital incorporation'. However, this line of conceptualization has yet to be explored. While adverse incorporation has occasionally been referred to in passing in the literature on digital and development (e.g. Adam, 2019), it has not been used so far as a core analytical concept and, indeed, there have been calls for research that does this (Takavarasha et al., 2018).

This paper, therefore, addresses its core question by developing the concept of adverse digital incorporation. There are a number of avenues through which this exercise could be undertaken but a notable lacuna of the adverse incorporation literature is the absence of any clear and systematic framework for its application (Meagher, 2021). The methodology for this paper, therefore, had to be inductive: deriving and building a model for understanding adverse digital incorporation in three steps. First, identification and extraction of key concepts from the adverse incorporation literature. Second, illustration of those concepts from the digital development literature; refining and specifying the concepts to the particular context of digital development. Third, synthesis of those concepts into an overall new model that could be used by both digital development researchers and practitioners to better understand and intervene in the growing phenomenon of inequality relating to inclusion in digital systems in the global South.

Although presented as three steps, this was an iterative process, with particular iteration between the first two steps to develop congruity between what was found in the adverse incorporation and digital development literatures. This also led to a more precise definition of adverse digital incorporation, as inclusion in a digital system that enables a more-advantaged group to extract disproportionate value from the work or resources of another, less-advantaged group (adapted from Phillips, 2013).

The first step involved a review and analysis of the existing literature on adverse incorporation. The literature is not extensive and a small number of core, highly-cited papers – notably Hickey and du Toit (2013) and Phillips (2013) – were particularly rich in terms of the concepts they presented, which then recurred elsewhere in the literature. As concepts were identified, they were coded and then re-coded until three high-level and core conceptual categories emerged: systemic processes of unequal incorporation, drivers to incorporation, and causes of adverse incorporation. Next, and particularly reflecting the second step of the methodology, each of these will be analysed and illustrated in turn as elements in the development of a conceptual model.

3. Adverse digital incorporation concepts

3.1. Process patterns of unequal incorporation

To explain why inclusion in a system leads to inequality, the literature on adverse incorporation discusses a number of process patterns that benefit an advantaged group at the expense of a disadvantaged group. Drawing from the definition, then central to adverse incorporation is *exploitation* in the sense of the unfair extraction of value by one group from the efforts of others (Phillips, 2013). This is principally understood in economic terms and relating to workers and their labor. An illustration of this as adverse digital incorporation would be the gig economy digital platforms that extract financial value from the labor of their workers, leaving too little value for the workers themselves and increasing the inequality between labor and capital. Thus, for example, some of those working for gig economy platforms in South Africa find themselves earning below minimum wage and almost all find themselves earning below the living wage: the minimum amount deemed necessary to fulfill basic needs (Fairwork, 2020). Exploitation can also be seen at the level of enterprises. For example, small enterprises like hotels and travel agencies in Africa increasingly seek to participate in the global tourism markets run by digital platforms, in the hope of reaching direct to tourists particularly from the global North. However, inequalities increase between the enterprises and the platforms which are the main economic beneficiaries: 'the promise of disintermediation remains unrealized for many as new kinds of foreign, internet-enabled intermediaries have emerged (e.g. TripAdvisor) to concentrate market power, control information about destinations, and achieve significant levels of capital accumulation outside Africa' (Murphy & Carmody, 2015, p. 203).

One part of this pattern of exploitation would be *commodification* in which something previously untraded is turned into a traded item; thus incorporating the owner or producer into a market (Bracking, 2003). An extreme global South example would be the women – and children – from countries such as the Philippines who participate in webcam sex (Kuhlmann & Auren, 2015; Mathews, 2017). Their bodies are commodified for the disproportionate financial benefit of the platform and for the sexual gratification of Internet-connected others in distant places and, certainly in the case of children, often with long-term traumatic results for themselves.

This shows that adverse digital incorporation is not merely about differential distribution of positive value but also of negative value – the psycho-social harms of inclusion are borne here by the women and children, not by the consumers or the platform hosts, thus increasing the inequality between these groups. One can see a similar pattern in the growing use of social media in the global South, which commodifies the previously untraded thoughts, feelings, photographs, videos, etc. of users. While the platform captures positive financial value from the unpaid labor of users, here also, the negative psycho-social value is loaded onto particular groups. This includes the women who suffer abuse on social media (Vashistha et al., 2019), and the content moderators who suffer trauma from continual viewing of violent and pornographic images (Roberts, 2019).

It may therefore be appropriate to identify this *cost-shifting* as a pattern; meaning the way in which inequality arises from negative value – the harms, risks and other costs of incorporation into a digital system – being differentially loaded onto particular disadvantaged groups and

shifted away from others. Meagher (2018, p. 26) identifies another instance of this, in which those joining a disadvantageous system have to pay in some way to join, and cites the example of the Grameen 'Phone Ladies' program among others that 'transfers risk onto poor women by requiring them to buy equipment or goods up front on credit, leaving them to cope with increasingly saturated markets, falling returns and in some cases the social opprobrium of transgressing cultural boundaries'.

This also highlights the important point that adverse digital incorporation should be associated with particular groups in a system rather than necessarily with the particular digital application or system. Consumers of online pornography; male, ethnic majority users of social media; and users placing calls with the 'Phone Ladies' program can all benefit from these digital systems even while other groups associated with these systems are suffering harms. Inequalities may therefore be reinforced between different groups that use the same digital system. Identification of adverse digital incorporation must therefore analyse the specific experiences of groups as they interact with digital systems rather than seek to categorize at the system or application level.

Another fraction of exploitation is *criminal exploitation*; particularly associated in the adverse incorporation literature with workers illegally forced to work under conditions of modern slavery (Natarajan et al., 2021). Within digital systems, there may be examples akin to this, e.g. for some of those forced to participate in online pornography, but the more common instance of criminal exploitation would be where individuals are drawn into participation in online activities in which financial value is illegally extracted from them by criminals. While the stereotype of one type of this – '419ers', 'Sakawa Boys' – has focused on those in global South countries as the perpetrators of fraud, they are also the victims. The Wangiri phone scam – after one ring, the call is cut and, when the recipient calls back, they are connected to a very high-cost premium-rate international call – has snared victims in Indonesia, Kenya, Pakistan and many other low-/middle-income locations (Priezkalns, 2020).

These examples focus on the extraction of financial or psycho-social value from labor or money but a further pattern of adverse incorporation is *legibility*: giving powerful external actors knowledge of people or resources that they can therefore exploit to their own advantage (de la Cruz, 2012; Hickey & du Toit, 2013; Meagher & Lindell, 2013). In terms of adverse digital incorporation, this can readily be understood to relate to differential extraction of political or other value by a more-powerful entity from data captured in a digital system about the existence or characteristics or resources of a less-powerful group. When that data relates to people, the inequality is typically an enhancement of the former group's power and control relative to the latter group – a subordination of the latter by the former. Digital state surveillance systems throughout the world exhibit this pattern. China's Social Credit System is the current apotheosis of this, integrating data about citizens and their online behavior from public and private digital systems that has 'exponentially increased [*state*] capabilities to monitor the populace' (Liang et al., 2018, p. 434) and constitutes a form of 'data-driven authoritarianism' (Lee, 2019, p. 953).

While legibility's tropes of surveillance and control are particularly associated with the state, they are increasingly seen to affect workers in global South countries, as digital systems make them more legible and more subordinated to managers (Helmerich et al., 2021). Factory managers in China, for example, have required that workers all have mobile phones; that workers must respond immediately when called, even outside normal working hours, under threat of punishment for failure to do so; and that all messages are available for surveillance. As a result, this digital device has become 'a 'wireless leash' that shop-floor management can use as a nearly complete control and surveillance system over employees' (Qiu, 2009, p. 188).

While not an option generally available to workers, some members of marginalized groups are responding to the threats associated with legibility by self-excluding from digital systems. For example, the informal settlement residents who refuse to be included in digital mapping of their communities, the refugees who refuse to register with digital identity systems, and the undocumented migrants who refuse health treatment that would involve digital registration (Heeks, 2021). In all

cases, they perceive adverse consequences from digital incorporation: identification to agencies of the state that would then evict or deport them.

Where the data made legible by a digital system relates not to people but to local resources, then the more-powerful external groups can appropriate financial value from those resources without recompense to those who previously held knowledge about them. In some instances of this, legibility could be understood as *enclosure*: transfer into a privately- or state-owned system of what had previously been communally owned (Hickey & du Toit, 2013; McCarthy, 2010). An example of digital enclosure[2] would be expropriation of traditional community knowledge into a privately-owned digital system. For instance, a USAID-funded project captured from the Shuar indigenous community in Ecuador the details of hundreds of local plants and their medicinal uses (Nagan et al., 2010). This was then passed on to the US government National Cancer Institute which placed this knowledge into a closed-access information system for use by large pharmaceutical companies.

3.2. Structural components of adverse digital incorporation

3.2.1. Drivers to incorporation

Why do users join digital systems that have adverse consequences for them?

In some cases, this arises from *ignorance*: a lack of knowledge of those adverse consequences and a belief that incorporation will be beneficial. In the adverse incorporation literature, this is linked to deception by the more-advantaged group of the less-advantaged group (Fortin, 2011; Mishra, 2020). We can see this at work in criminal exploitation. Criminals involved in scams targeting South Asian victims use Middle-East country codes; deceiving the recipients into thinking they have a call from relatives working in those countries (Javaid, 2020). In this example, there is no benefit from incorporation into the scam, but in other examples of adverse digital incorporation, the ignorance is more nuanced: the benefits do exist, even if not quite in the form or to the extent anticipated, and the ignorance is either of the existence of adverse consequences or of their likelihood and extent. For example, gig workers in Africa join digital platforms with the expectation of certain levels of income and without a clear understanding of the risks involved (Anwar & Graham, 2021).

This highlights an important point about adverse digital incorporation: it may well not be solely adverse; i.e. solely negative in its consequences. Those participating in China's Social Credit System can receive benefits 'such as deposit-free sharing economy services, fast-tracked check-ins for hotels, and mobile payment options' (Kostka, 2018). Those working on webcam sex platforms receive some level of income and some form of livelihood (Mathews, 2017). Lack of benefit is not the essence of adverse digital incorporation. The essence, as noted above, is differential disadvantage – that a more-advantaged group disproportionately extracts value from the digitally-mediated actions or resources of the less-advantaged group; denying that latter group the value that could accrue to it and thus increasing relative inequality.

In other cases, the driver to joining an adverse system is *direct compulsion*: a coercive requirement of powerful others to join (Barrientos et al., 2013; Phillips, 2013). Many state surveillance systems would fall into this category, for example, where linked to a digitally-mediated identity that is then required in order to access public services. In India, there has been much criticism of the national identity database, Aadhaar, including its role as a state surveillance tool, and a capture of benefits by private interests, both legitimate and – in the case of privacy breaches – illegitimate (Khera, 2019a). But 'what started as a voluntary ID gradually became compulsory' (Khera, 2019b, p. 4): a 'coercive application' of digital technology that leaves citizens with no choice but to participate (Basu & Malik, 2017).

Compulsion can also be seen not simply in relation to joining a digital system but in pressure to agree to particular disadvantageous terms. For example, farmers in Kenya joining agricultural finance platforms find that

> Platform managers can exert enormous bargaining power over access to the wider market and can, therefore, pressure smaller actors [*the farmers*] into data sharing protocols that allow them to corral valuable data and determine the framework through which the data is transformed into tangible markets and assets. (Iazzolino & Mann, 2019)

One way the platforms are able to monetize the farmers' data that they gather is by sharing it with financial institutions. Yet this leads to bad credit scores and hinders access to future loans for 'farmers who default on even small amounts … [*so*] that those supposedly most targeted by the financial inclusion agenda end up being blacklisted by the Kenyan Central Bank's Credit Reference Bureau' (Iazzolino & Mann, 2019).

Neither of these drivers, though, satisfactorily explains many examples of adverse digital incorporation into economic digital systems. The literature on adverse incorporation provides a further explanation where individuals join an adverse system because of a lack of choice: an *exclusion* from better alternatives (Hickey & du Toit, 2013; Phillips, 2013). Why is it, for example, that migrant workers join gig economy platforms even though they may well earn less than minimum wage? Such workers in South Africa explained that they did so because they were excluded from other employment opportunities either by legal requirements or lack of social capital or by discriminatory hiring norms (Heeks et al., 2021). Likewise for parents prostituting their children online in the Philippines, 'the first factor is poverty … they tend to engage in that so that they can have enough food to eat' (Kuhlmann & Auren, 2015, p. 38). These families live physically, socially, and economically on the margins of cities and they are excluded from systems of formal employment and welfare.

Exclusion and adverse incorporation are thus not mutually-exclusive perspectives in understanding digital inequality but can be closely connected (see also Hickey & du Toit, 2013). Historical and contextual patterns of exclusion from particular economic, social and political systems can significantly increase the likelihood that marginalized individuals and groups will participate in digital systems that are disadvantageous. Any understanding of adverse digital incorporation must therefore encompass *temporality* and *contextuality* – the historical and contextual processes by which those incorporated have come to be excluded from alternative systems.

Such a perspective also helps explain why different groups have different experiences of incorporation into the same digital system. Most middle-class Indians, for example, are not adversely incorporated into the Aadhaar system. They are not particularly dependent on the state for the provision of services, being quite significantly included – where necessary and by virtue of their relative wealth – in systems of private provision. Historical advantages also mean that they are included in circuits of political power and social capital that enable them to navigate or circumvent problems. Instead, it is those on the lowest incomes and with least socio-political capital who suffer the 'degenerative outcomes' of this digital system including impoverishment (Masiero & Arvidsson, 2021). These differential outcomes further exacerbate historical inequalities between the different groups.

3.2.2. Causes of exploitation

Once incorporated into a digital system, why is it that the value of actions and/or resources is differentially distributed? The literature on adverse incorporation is repetitively clear that the root cause for this is inequality of power and control: the way in which a more-advantaged group has power over the less-advantaged group and the system into which it is incorporated (Bracking, 2003; Hickey & du Toit, 2013). That control allows the former to determine the flows of value – extracting and capturing positive value generated by the latter group and/or directing negative value towards that group. The adverse incorporation literature does not offer a dimensional framework of power, so that provided here is built inductively from examples of adverse digital incorporation.

In a very direct sense, inequitable outcomes can emerge from digital systems because the more-advantaged group has control of the design of the system: a *design inequality* compared to the exploited users. This was the case in almost all of the instances given above, in which states or platform companies are able to design the processes and governance of digital systems in such a way that value flows unequally. This is often most visible when alternative designs exist, which indicate

there is nothing inherent in the inequalities that are found. For example, some mapping systems are extractive: using outsiders to take data from low-income communities and then present it online for the use and benefit of others. But alongside such designs are participative alternatives planned by or with the community. These use community members to undertake the mapping and make specific efforts – through low-tech interfaces, paper-based maps, presentations at community meetings and the like – to enable communities to make use of that data (Heeks & Shekhar, 2019).

Resource inequality can lie behind unequal outcomes of using digital systems. Users with lower access to financial, human, social, physical and informational capital will be differentially incorporated into digital systems compared to those with higher endowments, where those endowments enable the latter to capture value from the former. In the enclosure example given above, for instance, it is the global North actors who know the economic value of local plants when the Shuar do not, and it is the former who have the financial resources, socio-economic contacts and physical machinery necessary to monetize the plants into pharmaceutical products (Nagan & Hammer, 2014).

Institutional inequality can play a role, where formal laws and regulations and informal norms and values favor the more-advantaged group. For example, East African small enterprises digitally integrating into global value chains often struggle; suffering greater volatility and risk with the potential for profits to be reduced (Foster et al., 2018). The beneficiaries are the lead firms in the global supply chains; those which determine the specifications and standards that African small enterprise must adhere to, and which use the flows of digital information to more tightly control their suppliers and to switch from less- to more-adherent suppliers. In other cases, digital inequality may arise from a lack of institutional protections for the less-advantaged group. The children engaged in cybersex, the women abused on social media, the workers who must be available 24/7 to their managers, and the gig workers earning less than minimum wage, all suffer these outcomes in part because of an absence of regulatory protections or an absence of effective implementation of such protections as exist.

Relational inequality can be understood in terms of the relative dependencies between the actors within a digital system. In the economic sphere, the substantial reserve army of labor in many global South countries creates asymmetrical dependency. For example, physical gig platforms employing drivers and deliverers can readily replace any individual worker (Gomez-Morantes et al., 2022). The platforms, therefore, do not depend on specific workers and are able to treat them adversely. On the other side, individual workers may depend significantly on the platform; particularly if – based on the expectation of a certain, stable income – they have taken out loans. It has been shown that the greater the dependency of the worker on the platform, the more willing they are to allow themselves to be exploited (Schor et al., 2020). The asymmetry of dependency in this relationship is exacerbated by the atomization of gig workers in the general absence of trade unions or associations for such workers (Graham et al., 2017). The structural relationship of platform to workers is thus many individual one-to-one relations rather than a one-to-many relation mediated by a worker association; the former being considerably weaker and more open to exploitation.

4. Discussion

The main contribution of this paper is in moving our understanding of digital inequality in the global South beyond the perspective that currently dominates the literature, which relates inequality to exclusion from digital systems. This paper has added a new perspective by enabling digital development researchers and practitioners to now understand inequality in relation to those who are included in digital systems. However, the concept of adverse digital incorporation adds more than just this.

The literature to date on digital inequality in the global South typically treats disadvantaged groups either as free-standing – to be understood solely on their own terms; or as relative to other user groups – women as lacking access to particular ICTs in comparison to men, the elderly

lacking skills to use ICT in comparison to younger users, and so on (Karakara & Osabuohien, 2021; Pal et al., 2020). Adverse digital incorporation, instead, has at its heart a relational view of those involved with digital systems – its very definition is based on a relationship of inequality between one group and another. As seen in the analysis above, this is an inequality that both precedes and proceeds from use of the digital system. The two groups are not typically homologs, as seen in the comparative more-included vs. more-excluded user categories of the digital divide literature, but tend to perform different roles in relation to the digital system, e.g. user vs. owner, or data provider vs. data user. It is this differential relationship that lies at the heart of differing flows of value seen between these two groups, which is the foundation for the inequality associated with these digital systems.

Existing digital inequality literature has tended to be quite outcome-focused; evaluating the inequalities arising as a result of exclusion from availability, accessibility, adoption and use of digital technologies, and the broader impact on development outcomes of the relative exclusions seen (Loh & Chib, 2019; Ramalingam & Hernandez, 2016). As discussed next, that literature has also discussed causes. But where it differs most from the analysis developed here is in the investigation of process. Digital inequality literature has analysed process in terms of whether and why users do / do not adopt, or do / do not use digital systems (Islam & Inan, 2021; Kaba & Meso, 2021). What adverse digital incorporation contributes is the analysis of the process of creating and capturing value, whether it be exploitation in the case of economic value, subordination in the case of political value, or abjection in the case of psycho-social value (Hickey & du Toit, 2013). Thus adverse digital incorporation leans towards a production-centered view; seeing those inside digital systems as producing value in some way, as a product of the value of their data, their knowledge, or by the value addition of their labor in converting inputs into higher-value outputs. By contrast, digital inequality literature to date has leaned more towards a consumption-centered view, seeing those included in digital systems as consumers of information and services provided by those systems, and those excluded as thereby lacking access to this information and services (Zheng & Walsham, 2021). But a production-based view becomes increasingly necessary as global South users are increasingly contributing their data, their digital content, their labor, their goods and services, etc. to digital systems.

What adverse digital incorporation also contributes is a new insight into the causes and contexts of digital inequality. As noted earlier, literature about digital inequality in the global South has readily encompassed context and the way in which broader dimensions of inequality – gender, geography, income, etc. – impact who is more likely to be excluded from digital systems (e.g. Okunola et al., 2017; Pick & Azari, 2008). The literature has, though, been criticized for its rather simplistic handling of context and specifically for its relative lack of engagement with power as an explanator (Zheng & Walsham, 2021). Such an engagement is inherent to analysis based on the ideas of adverse digital incorporation because of the relational view at its center. To understand what facilitates the process of disproportionate value extraction by one group from another, one has to understand the power dynamics between those groups – power dynamics reflected in the constituents of power that are the dimensions of inequality outlined in the previous section: access to and control of design processes, resources and institutions; and power reflected in social structures. Adverse digital incorporation, therefore, contributes a basis for analysis of digital inequality founded on in-depth understanding of context and power.

Having drawn out the key components of adverse digital incorporation, the third step of the methodology can be completed – and the initial research question fully answered – by putting them together into a single overall conceptual model, as shown in Figure 3.[3] This centers on the digital system and the patterns of adverse digital incorporation described in the first sub-section above. Drivers to incorporation are identified on the left and the main outcome of unequal extraction of value is identified on the right side. Around the system are the other structural components that enable adverse digital incorporation, including the historical perspective of temporality.

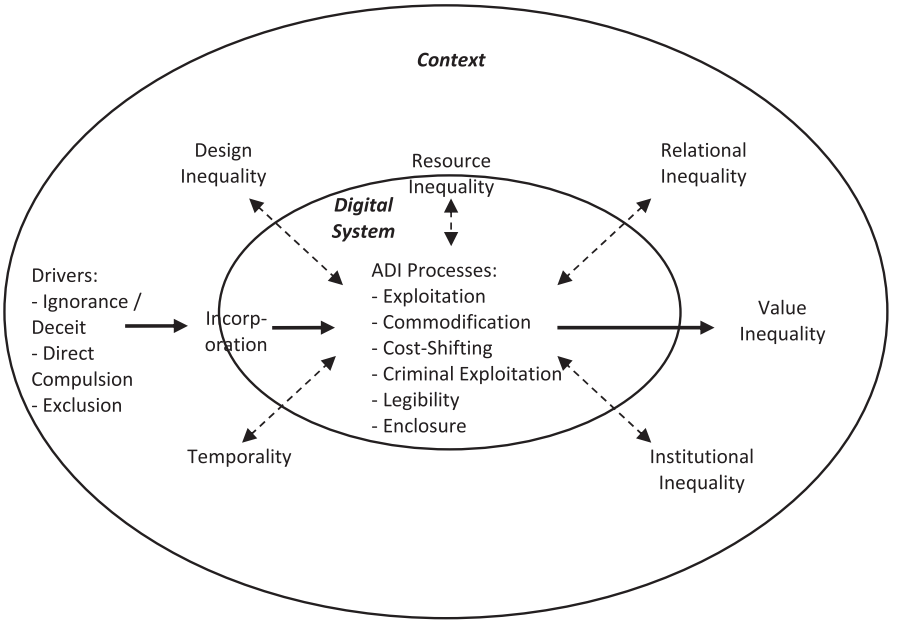

Figure 3. Conceptual model of adverse digital incorporation. Source: author.

Structural perspectives like this can suggest social determinism: that incorporation into digital systems merely reproduces – perhaps exacerbates – prior inequalities and provides no space for the agency of those who are exploited or subordinated. But power-based conceptualizations do provide a space for agency; for example, in the resources that the relatively powerless have at their disposal or in the processes of negotiation around inclusion that can occur between less- and more-powerful actors (Drydyk, 2013; Hearn, 2012). This was already seen in the presence of choice for those who decide that the benefits of incorporation into a digital system are less than the potential costs and, therefore, self-exclude from that system. We can also see it in the work-arounds, resistances and other ways in which disadvantaged groups seek to exert some control over their adverse digital incorporation. One illustration would be the workarounds that have been used to avoid adverse and exclusionary impacts of Aadhaar, including undertaking transactions but not recording them on Aadhaar-linked systems, and making use of a relative's or friend's Aadhaar identity (Masiero, 2018; Singh et al., 2018).

5. Conclusions

The future of digital technologies in the global South will be marked by many developmental benefits of digital systems. Equally, the problems associated with such systems will not be confined to inequality: the growing carbon footprint of digital systems is but one example. However, digitally-related inequality is likely to be a major challenge throughout the century for those involved in digital and development.

The concept of the digital divide and related ideas such as conceptions so far of digital inequality have moved beyond their initial simplistic origins. However, they have to date remained rooted in a worldview of exclusion from the benefits of digital systems. As we move into a greater intensity of digital impact on development, this worldview remains necessary, but it is no longer sufficient. We need as well to account for the inequalities that arise in the global South when less-advantaged individuals and groups are included in rather than simply excluded from digital systems, and this has been the central focus of this paper. Drawing from development studies, this paper has presented

the concept of 'adverse digital incorporation' that can assist in understanding the emerging relation between digital and inequality. To help operationalize this new concept and meet its central aim, the paper then built a model of adverse digital incorporation.

The paper's core contribution is thus to provide for the first time a systematic understanding of the growing inequalities arising for some of those in the global South who use digital systems. The conceptualization developed here contributes not just to a general understanding but provides researchers with a specific and operationalizable framework that can address a variety of questions, including the hows, whats, whos, and whys of this emerging form of digital inequality in the global South. By providing a relational view that incorporates the constituents of power, it can contribute rich and in-depth insights, thus addressing prior critiques of the digital inequality literature. It also provides a basis for analysis more attuned to the changing realities of the global South: not merely the growth of digital inclusion but the changing role of users from being relatively passive consumers to increasingly being producers of value within digital systems.

What, then, are the implications of this new conceptualization for digital development researchers and practitioners?

The future research agenda will have a number of elements but given the inductive development of the adverse digital incorporation model, one immediate next step will be for digital development researchers to apply the model deductively as the basis for analysing case studies in which the use of digital systems is associated with unequal outcomes. Case examples have already been suggested above but others will increasingly emerge. While the unit of analysis for such cases is, as reflected above, likely to be mainly individuals or enterprises, researchers could also set a global frame. This would ask whether and how low- and middle-income countries as entities are being adversely digitally incorporated, with the value of digital systems flowing disproportionately to higher-income countries – principally the US, Europe and China – and thus increasing global inequalities.

Further research is also needed into the digital within adverse digital incorporation. As presented so far in this paper, adverse digital incorporation has been portrayed as an instance of adverse incorporation, specifically within digital systems. But is this simply a reproduction of existing processes of adverse incorporation in a digital milieu? Or is there something inherent in the functionalities and affordances of digital systems that makes them more likely to facilitate, or even to create, unequal outcomes? Here, we can only start to identify some of the paths that digital development researchers may take to explore this issue in the future. Digital platforms typically demonstrate network effects, which create a tendency towards monopoly and, hence, an asymmetry of power that can enable unequal outcomes between system owner and those incorporated (Schmidt, 2017; Yoo, 2020). Research on the institutional work of digital platforms suggests that they enable an aggregation by the platform and its owners of market institutional functions and power that were previously distributed and dissipated (Heeks et al., 2021). Processes of datafication associated with many current digital systems tend to be inherently unequal because users necessarily give over their data to the system owners, but there is no inherent basis for the reverse process of making the owners' data transparent (Taylor & Broeders, 2015). Digital has also – via machine learning and algorithms – made systemic processes such as decision-making or distribution of value more opaque, but particularly to system users rather than owners (Burrell, 2016). All of these digital affordances enable an aggregation of power well beyond that feasible in most traditional, non-digital systems, and a greater asymmetry of power between system owner and systems users. While this does not necessarily drive a disproportionate extraction of value, these asymmetries and opacities are likely to facilitate that process. However, these points are just suggestive, and further work is needed on this, including an investigation of whether the type of digital systems – e.g. those based on open vs. proprietary technology – might impact the potential for unequal outcomes.

The focus here has been on the victims of adverse digital incorporation but one other future direction for digital development researchers will be the beneficiaries. What drives them to design and implement exploitative digital systems? Can we find some systematic difference

between those creating systems that increase inequality and those creating systems that decrease inequality?

This last question moves us into the realm of practice, and the implications of the new conceptualization for digital development practitioners. In practical terms, countering adverse digital incorporation would mean identifying digital systems that unequally include already-disadvantaged groups and seeking to address the drivers, causes or processes of adverse digital incorporation. An example would be the activists who took the Indian government to court over the adverse impacts of the Aadhaar digital identity system, including the impact on the poor (Singh, 2021). As noted above, a danger of contextual models such as the one developed here is that they lapse into structural determinism: assuming that only external structural interventions can improve the impact of adverse digital systems and failing to recognize the agency of those who have been adversely incorporated. But that agency can be seen, say, in the example of women in Africa who have suffered online misogyny taking action against it (Iyer et al., 2020). The potential for the agency of disadvantaged groups must therefore be part of the agenda for development practice.

Alongside actions to reverse existing adverse digital incorporation, the new practitioner agenda would include alternative digital development design strategies for new systems. 'Neutral digital incorporation' would design digital systems in which value was evenly rather than unevenly distributed between system actors. 'Advantageous digital incorporation' would design digital interventions that specifically sought to reduce existing inequalities. This would mean more than simply digital system design. Based on the understanding developed above, the key insight is that these digital development alternatives to adverse digital incorporation can only occur if digital interventions in some way address underlying inequalities, both historical and contextual.

This can be framed as a call for digital justice. Some public writings on inequality differentiate between perspectives of equity and of justice (Anthis, 2020; Maeda, 2019). Equity seeks to address the proximal causes of inequality by enabling equality of access to resources such as digital systems. Justice seeks to address the underlying and systemic causes of inequality, not just its manifestations. It is the latter that emerges as the main practical recommendation from the analysis of adverse digital incorporation.

As Figure 3 model demonstrates, the implication for digital development policy-makers and practitioners is to substantially widen their focus for intervention. It takes that focus away from the practices and procedures of digital development systems and towards the need to impact the wider institutions, structural relations, design processes and resource distributions that surround such systems. One instance would be the creation of platform cooperatives in the global South (Mannan & Pek, 2021). While centered around the digital system of the platform, these create a new organizational form based on structural equality, with more equal distribution of resources, participatory design, and both formal rules and informal institutional norms that provide an alternative to the typical context of the wider economy. The role of digital development policy-makers and practitioners is thus seen no longer as a-political but as political. Only by undertaking this shift and by impacting the constituents of inequalities of power can there be a move from adverse to advantageous digital incorporation and to delivery of digital justice in the global South.

Notes

1. Defined here as socio-technical systems of digital data, digital technology, people and tasks (data processing and presentation, decisions, transactions, learning) (adapted from Heeks, 2018).
2. Digital enclosure has also been rather more broadly applied to the capture of individual data (Andrejevic, 2008). As with exploitation of unpaid labour, the most obvious example would be the actions of social media platforms which gain licence to distribute, use, and monetize the thoughts, feelings, photographs, videos, etc. of individual users.
3. While it has not been the focus of this paper, the formation of this model contributes to the development studies literature on adverse incorporation. It has been systematic in extracting the processes and drivers of adverse incorporation from that literature; it has drawn out one way of understanding the inequality of power that

facilitates adverse incorporation; and it has put this all together into a single framework that could fairly readily be modified to apply to other types of system.

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