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Development Studies

From Simple Fixes to Systemic Enablers:
The Future of Digital Development

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Bangladesh, Dhaka: A member of the medical staff keeping notes on a hand held device at the International Centre for Diarrhoea Disease Research (ICDDR). The ICDDR is an international health research organisation established in 1978 and credited with discovering oral dehydration therapy for the treatment of diarrhoea and cholera. Photographer G.M.B. Akash/Panos

THE FUTURE OF DIGITAL DEVELOPMENT

CONTENTS

Advancing knowledge, shaping policy and inspiring practice on digital development is critical to achieving the Institute of Development Studies' (IDS) vision of reducing inequalities, accelerating sustainability, and building secure and inclusive societies. This synthesis paper outlines key lessons from four recent IDS Evidence Reports on the state of digital development and draws out the implications for policymakers and practitioners working in development and humanitarian organisations.

1. Introduction

Digital development is popular, and little wonder. Innovations such as personal computers and mobile phones have spread more quickly across more people than any comparable technologies in human history.

Over the past two decades the digital revolution has ushered in transformative changes to the ways we communicate and organise, with many cascading effects across social, economic and political spheres. With the advent of newer developments, including artificial intelligence, 3D printing and robotics, yet more profound changes are anticipated in the years and decades to come.

What does this mean for international development and humanitarian work? The digital revolution is a pervasive presence in low and middle-income countries thanks to inventions such as mobile money. Digital technologies are viewed as important for development because of their potential to:

- help solve development problems, such as improving health and educational outcomes, enhancing private sector efficiency and effectiveness, and supporting citizenship and voice;

The picture is not a straightforward one. The growth in internet users has led to the creation of new digital divides and inequalities, many of which are embedded in and reinforce existing socioeconomic disparities.

- enhance development processes through data-driven decision-making, technology-enabled aid deliveries and cashless payments, driving down transaction costs and expanding access to those previously excluded;

- transform development institutions, through networked, horizontal, agile business models, collaboration approaches and communications processes.

The importance of digitally enabled development is increasingly reflected in high-level policy frameworks, most notably the inclusion of universal and affordable access to the internet in least developed countries by 2020 as part of the UN Sustainable Development Goals (SDGs) (United Nations 2015).

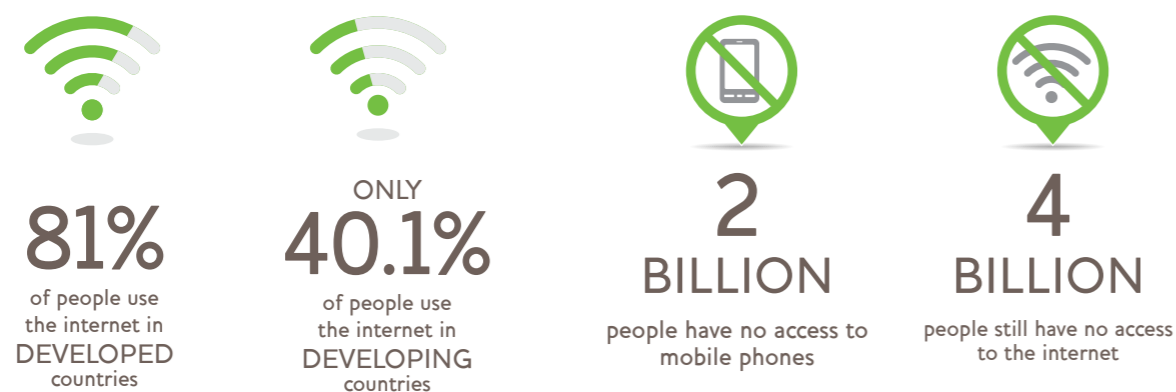Image source: www.un.org/sustainabledevelopment

However, the picture is not a straightforward one. The growth in internet users has in parallel led to the creation of new digital divides and inequalities, many of which are embedded in and reinforce existing socioeconomic disparities. In developed countries, 81 per cent of people use the internet, while only 40.1 per cent do so in developing countries. Four billion people still have no access to the internet while two billion people have no access to mobile phones. Digital divides also persist between urban and rural areas, between men and women, and between old and young people.

Given these contrasting pictures, it is worth asking: what is the reality of digital development? Does the digital revolution represent an important new horizon for development efforts in the twenty-first century, or is it a mirage, destined to join the other technology-driven fashions that litter the history of international cooperation?

This paper synthesises lessons from a series of recently published *IDS Evidence Reports*, with the aim of providing insights and ideas for policymakers and practitioners within development and humanitarian organisations seeking to better understand and realise the promise of the digital revolution for poor and marginalised communities.

81%
of people use the internet in DEVELOPED countries

ONLY **40.1%**
of people use the internet in DEVELOPING countries

2 BILLION
people have no access to mobile phones

4 BILLION
people still have no access to the internet

DIGITAL DIVIDES ALSO PERSIST BETWEEN:

Urban and rural areas

Men and women

Old and young people

From Simple Fixes to Systemic Enablers What does the evidence tell us?

From Simple Fixes to Systemic Enablers What does the evidence tell us?

2. Digital development: what does the evidence tell us?

The IDS Evidence Reports took an unbiased, rigorous and comprehensive look at the evidence for the impact of digital technologies on four major areas of development work:

- Economic growth and productivity (Hernandez *et al.* 2016)
- Citizenship, accountability and rights (Seth *et al.* 2016)
- Environmental sustainability and resilience (Rudram *et al.* 2016)
- Service delivery in health and education (Sharmin *et al.* 2017)

This section sets out the major findings from each review in turn.

2.1 How does digital technology contribute to economy and productivity?

Kenya, Nairobi
Lisa Wanjiru makes a cash payment to M-Pesa agent Jane Njuguna at a M-Pesa kiosk in South B, a residential area of the city. M-Pesa, (M for mobile, pesa is Swahili for money), is a Kenyan cellphone-based money transfer service. The majority of its customers have no bank accounts, but they withdraw cash and make payments or send money using their cell phones. A network of appointed agents, scattered all over the country, provide the cashing handling services.
Photographer Sven Torfinn/Panos

The evidence suggests a strong correlation between digital technologies and economic growth and productivity – especially at the macro level. However, research findings are divided as to whether digital technologies cause growth and productivity, growth drives digital uptake, or both cause each other simultaneously.

Moreover, high-quality studies identify variable effects across different countries, regions, sectors and businesses. As such, there are few, if any, examples of technologies where policymakers can unambiguously point to potential development contributions: good context analysis to explore the possibilities will always be necessary. Episodic, snapshot research is less valuable, therefore, than regularly updated data and information to reflect the status of a particular country or sector at a given point in time.

The processes by which Information and Communication Technologies (ICTs) and economic growth interrelate are also poorly understood, if at all. Some studies point to the potential of digital tools to enable leapfrogging effects, whereby developing countries skip over entire stages of technological development to deliver the latest services to individuals, communities and firms. More effort is needed, however, to understand what is being leapfrogged, what benefits are being generated, at what cost, and for whom.

In terms of poverty reduction, ICTs have been shown to be correlated with poverty reduction in some settings, but have also been shown to divert spending from essential resources, further placing financial burden on the poor in other contexts. The most substantiated argument is that ICT uptake leads to poverty reduction under the right circumstances – namely, when the analogue complements of social, political and institutions are in place.

Remote microwork and freelancing over the internet have been identified as an opportunity for developing countries. However, online outsourcing employment outcomes tend to be heavily unequal and subject to difficult market conditions.

At a micro level, ICTs seem to be used to enhance productivity and information provision, and to reduce costs. There is evidence, however, that mobile technologies can entrench inequalities between those with and without access to ICTs. In addition, despite historical anecdotal accounts that ICTs create jobs, there are widespread concerns about technology-driven unemployment, especially in developing countries. Here the question moves beyond the threat of job automation and digitisation, and focuses on societal ability to create and sustain good jobs in the long run. Some argue that in the future, humankind and machines will augment each other's work, while others suggest that this is only true for a small, elite group that are capable of working with and complementing technology.

At the level of individual firms, digital tools have enabled new kinds of employer-employee relations. Remote microwork and freelancing over the internet have been identified as an opportunity for developing countries. However, online outsourcing employment outcomes tend to be heavily unequal and subject to difficult market conditions since the majority of work comes from anglophone countries; placing a barrier on non-English speakers. The majority of freelance work also requires a high level of expertise which is often only attainable with further education.

Digital technologies seem to have increased inequality through the digitalisation of analogue tasks, the facilitation of disproportionately small number of winners and superstars, the creation of winner-takes-all markets, and by making more and more jobs susceptible to automation. These mechanisms have led to a decoupling of wages and productivity, and a shift in the distribution of wages in developed countries into the hands of fewer people. Although most of the literature concerned with digital technology's effect on income inequality tends to focus on developed countries, evidence is now surfacing that shows the same relationship in developing countries. Technological change also seems to be leading to a hollowing out of the middle class in most developing countries.

2.2 How does digital technology contribute to government and service delivery?

The use of digital technologies is being increasingly advocated to address service delivery challenges in low and middle- income countries, with a particular emphasis on the use of technologies to strengthen basic service systems for health and education provision.

Most solutions, expertise and research originate in developed countries and are not adapted to environments that are fundamentally different, posing significant challenges. For the most part, these issues are framed as implementation challenges, and the focus is on overcoming local and national barriers to technological adoption.

In recent years, there has been a rush to seek simple quick fixes in new technologies. Despite the emphasis on 'designing with users' the 'appropriate technology' approach of finding and developing solutions that fit with local contexts has seen relatively little traction. Evidence suggests that the best approaches start with the identification and in-depth understanding of the problem and mapping out the full range of possible solutions. This process can also determine whether including digital can facilitate an optimal solution and help resolve the problem. If technology is deemed to be part of the solution then a step-by-step approach is needed which integrates all parts of the system through design, implementation and scaling. Successful approaches require a holistic strategy that will guide innovation to address evidence-based needs and result in broader user adoption.

The broad lesson set out above also applies to funding models: many government-led digital projects in developing countries have failed because they have replicated funding models from the developed world. In any government-led scenario

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involving digital technology to improve the delivery of services, such as health and education, the funding model used and the cost incurred in conceptualisation, design, implementation and evaluation defines the likely levels of sustainability that it will achieve. Inadequate financial resources and poor cost-benefit analysis can limit the flow of investment at the levels necessary and can derail future government-led service delivery, implementation and innovation.

In the field of health care in particular, mobile health (mHealth) systems are reaching significant scale in many developing countries, but there is still a lack of concrete evidence with which to fully assess the economic impact of these technologies. With the rapid growth of digital interventions in health and education in developing countries, there is an urgent need for evidence of its impact to justify and guide the investment of resources in such systems. Despite growing numbers of assessments in recent years, most large-scale

implementations have little or no evaluation data. Where there is data on specific interventions, they are concentrated in developed countries, focus on process indicators rather than outcomes, and are performed mostly by academics or research institutes. Greater focus should be placed on including evaluations as an integral part of digital development implementation processes, and for critical analysis to be undertaken by those organisations funding and implementing such systems.

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China, Hong Kong
Student activists from the Occupy Central movement in Hong Kong in 2014 look at their mobile phones. Photographer Eric Rechsteiner/Panos

2.3 How does digital technology contribute to citizenship and accountability?

Increasing attention is being paid to the potential of digital technologies to integrate people, processes, information and technology to improve public services delivery, ease access to information and services, and improve public accountability and transparency.

There is a widespread assumption that technology can improve accountability, transparency and the effectiveness and efficiency of government. Digital technologies are seen to offer the potential to close the gap between citizen voice and state responsiveness. As producers of information, citizens can become more involved in local political processes, boosting communication within the community and between the community and the government, creating more inclusive and equal channels of communication.

The literature identifies three main approaches for using digital tools to improve participation, transparency and accountability:

• Collection, analysis and visualisation of data. There are vast amounts of digital information that, if well managed, can be used to hold governments to account. To exploit this promise of data-driven techniques for governance reform, energy is being directed towards generating and collecting data. Once gathered,

data gains meaning through analysis and visualisation, with a growing number of tools devised to this end. To date, the vast majority of cases in transparency and accountability focus on data collection and analysis.

• Dissemination of information and knowledge. Communicating the significance of data to tell a story that is accessible for citizens is critical for collaborative governance and improved public services. Tools for disseminating information from government to citizen, and for providing easier access to service-related information by citizens, have been leveraged in a variety of efforts to date.

• Organisation and development of communities. While community organising may traditionally occur through offline strategies, technologies have been integrated into participatory approaches to hasten progress and enhance their effectiveness. Many projects that involve collecting, analysing and disseminating information also include working with communities; however, community-building can be seen more often as a by-product rather than a central approach to reform, perhaps due to the kind of deep, long-term engagement that is required to increase impactful citizen participation and to foster active and vocal communities.

Bangui, Central African Republic
A teacher uses a tablet to teach her maths class. Photographer Sven Torfinn/Panos

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While digital technology can, theoretically, be transformational, the expansion of opportunities for the poor and middle class, and the spread of accountable governance, have so far been lower than expected.

The evidence suggests that despite widespread use, digital platforms have had limited impact on some of the most significant challenges faced in governance and accountability, such as improvement in service provider accountability, broadening public involvement, and giving a greater voice to the poor and disadvantaged. While digital technology can, theoretically, be transformational, the expansion of opportunities for the poor and middle class, and the spread of accountable governance, have so far been lower than expected. The reasons for this limited impact include a number of issues highlighted already in this synthesis, for example, digital divides that limit access to the most marginalised, and operational challenges when implementing ICT initiatives. Perhaps the most significant is that many digital platforms are simply not suited to the task of navigating the inherent complexity associated with citizenship, accountability and rights. Many of the reasons why ICT-based systems fail to enhance participation and accountability go beyond the scope of technology. To maximise digital dividends, a better understanding is required of how technology interacts with other factors that are important for a healthy citizen–state relationship. This means investment of time, effort and resources to better understand and strengthen the 'analogue complements' that underpin and support the use of technologies for enhancing citizen–state relationships.

2.4 How does digital technology contribute to environment, sustainability and resilience?

Digital technologies offer many possibilities for innovative approaches to environmental sustainability and resilience, particularly in the fields of conservation and natural resource management; food security and agriculture; and climate change adaptation and disaster risk reduction.

Across these areas, digital innovation can lead to impacts through citizen-led usage of digital technology. Examples include citizen-initiated, devised and led digital volunteerism in the aftermath of disasters; and digitally supported participatory interventions, such as climate-smart agriculture in which data and feedback are gathered from farmers using simple automated, voice-activated mobile phone services.

The impact of the application of digital innovation for environment, sustainability and resilience is multi-dimensional, and spans process, product and business model impacts. The existing evidence is more focused on how digital technology supports specific intervention processes, as opposed to generating development results. As such, increased internal efficiencies are widely cited as the major benefit of digitalised approaches, followed by opportunities for improved information exchange and knowledge sharing. Although there is some mention of empowerment and engagement around environmental issues, the real extent of these benefits and how they are generated is seldom spelt out in detail in existing studies.

The effectiveness of digital innovations for environment, sustainability and resilience is a result of both the technology itself and the external and contextual factors surrounding its application. Successful interventions have been shown to consider both contextual and technical issues. Of special importance is the need to integrate new technologies with existing socially accepted systems for information sharing and communication. The need for more culturally sensitive and context-specific approaches to integrating technology into an intervention is an important cross-cutting lesson. A major gap in the literature is the explicit consideration of power dynamics and the digital divide, which was less apparent in the environmental literature than in the other areas looked at in this review.

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On the whole, it is the indirect and unintended negative consequences of digital technologies that are most significant for environment, sustainability and resilience.

On the whole, it is the indirect and unintended negative consequences of digital technologies that are most significant for environment, sustainability and resilience. These issues need much more urgent and concerted attention. In particular, the production and disposal of electronics is becoming a major issue for the environment, human health and future economic productivity. The current approach to digital waste may, at the extreme, threaten the digital advances of the future by using up precious minerals and other resources. With increasing demand from both developing and developed countries for digital technologies, the problem looks set to increase. Another significant issue is within environmental work itself, where there are risks that digital technologies are being used to extract and exploit information from participants in conservation and natural resource management, especially if data are of a sensitive or personal nature. If not managed correctly, digital technologies risk exacerbating power differences for elite gains.

Digital innovation looks poised to play a growing role in the development of environment, sustainability and resilience. However, there is a need for much greater focus on comprehensive evaluations to ascertain the systemic impacts of technology. Operational research should aim to ensure that intervention approaches are context-specific, culturally sensitive, well informed across disciplines and sustainable, and that they combine the technological innovations with the existing effective analogue foundations, and mitigate potential negative outcomes.

Ghana, Accra: Children break apart CRT (cathode ray tube) monitors to salvage metal from inside at Agbogbloshie dump, which has become a dumping ground for computers and electronic waste from all over the world. Credit Andrew McConnell/Panos

3. Implications for development organisations

The overarching implication of the findings from this synthesis of the four IDS Evidence Reports relates to the need to move away from development driven by technological 'fixes'. Instead, there is a need to focus on developing creative and contextually grounded ways of solving development problems by using technology as an enabler of change.

If development organisations are to maximise the potential impact of digital technologies for development gains, there are a number of areas where concerted efforts are needed. These are set out below.

3.1 Focus on context, politics and institutions

The World Bank argues in the *2016 World Development Report* that although digital technologies hold great potential to foster economic growth by promoting inclusion, innovation and efficiency, they will not be able to do so on their own. Instead, digital technologies are most likely to lead to 'digital dividends' in the form of growth, jobs and service delivery when accompanied by 'analogue complements'. They propose three main analogue complement policy objectives:

Regulations
An enabling business environment established through regulations that promote competition and remove entry barriers for both domestic and international firms, allowing them to innovate with digital technologies in ways that ultimately benefit consumers.

Skills
A populace with the required skillset to capitalise on digital opportunities so that technology augments human capacity rather than replaces jobs.

Institutions
Governmental and wider institutions that are accountable and capable of effectively leveraging digital technologies to deliver services and empower its citizens.

Digital development interventions need to include a focus on these elements from initial inception, through to design, implementation, adaptation and evaluation.

India, Noida, Uttar Pradesh
A tutor signs lessons for deaf students in a classroom at the Noida Deaf Society. Credit Sanjit Das/Panos

3.2 Tackle access and gender inequalities directly

Divisions in access and use of digital tools reflect existing social, economic, gender, age and geographic divides. Given the widespread digitisation of society, the impact of digital inequalities is wide ranging. Policy interventions are needed to prevent the possibility that digital inequalities might compound other types of inequality, including gender and age.

Cost is a key barrier to internet access and this is recognised in Sustainable Development Goal Target 9c which calls for universal and affordable access in the world's least developed countries by 2020. But on current growth trajectories, this target will not be achieved until 2042. More effort is needed here, by powerful players coming together to shape prices – perhaps borrowing from efforts in other areas, such as drug development.

It has long been recognised that gender affects both access to and use of technology – women are about 50 per cent less likely to be connected than men in the same age group with similar levels of education and household income. Globally, women are on average 14 per cent less likely to own a mobile phone than men. Handset cost is a concern for women, particularly those from rural areas or poorer households. Among rural women, for example, 53 per cent reported this was a

Policy interventions are needed to prevent the possibility that digital inequalities might compound other types of inequality, including gender and age.

barrier compared to 40 per cent of rural men. Addressing gender equality in technology directly is vital, both to ensure that development projects acknowledge gender-based inequalities in their design and implementation, and to identify ways that technology can help achieve gender-related development goals.

Somaliland, Boroma
People gathered in a cafe where they drink tea and coffee and use and discuss social media communications with friends and family who have gone abroad.
Photographer Sven Torfinn/Panos

3.3 Anticipate and offset the negative impacts of digital technologies

There is also an urgent need for policymakers to consider and address the negative development impacts of digital technologies, including e-waste, threats to privacy, and the impact on livelihoods from increased automation.

Waste of electrical and electronic equipment (WEEE) or 'e-waste' has major impacts on the environment and human health, through both its production and disposal. Environmentally sound treatment of e-waste requires regulation, establishment or improvement of recycling infrastructure and workers' safety standards, which could create numerous 'green jobs'.

There is also a major global issue around human rights online. Some 1.8 billion people face severe limitations to their rights online because their governments extensively censor politically or socially sensitive content. In development contexts, there is increasing pressure on donors and aid agencies to save money by collecting data and replacing human resources with technology. Development programmes need to better consider the impact of new data analysis sources and techniques on individual and group privacy and rights.

Some 1.8 billion people face severe limitations to their rights online.

3.4 Engage with frontier technologies in inclusive ways

Interest has surged in the potential of novel frontier technologies to contribute to positive changes in international development and humanitarian contexts.

Frontier technologies for international development (including 3D printing, the Internet of Things, drones, solar desalination and household-scale batteries) are new or emerging innovations that have the potential to impact on economic, social and political activities in ways that can drive widespread changes and positive impacts for development goals. As highlighted in the recent IDS report *Ten Frontier Technologies for International Development*, these new technologies and digital business models reshape economies and disrupt incumbencies. Interest has surged in the potential of novel frontier technologies to

contribute to positive changes in international development and humanitarian contexts.

But while frontier technologies can rapidly address large-scale economic, social or political challenges, they can also involve the displacement of existing technologies and carry considerable uncertainty and risk. Although there have been significant wins in bringing the benefits of new technologies to poor consumers, such as through mobile money or off-grid solar energy, there are many other areas where the applications may not yet have been developed into viable market solutions, or where opportunities have not yet been taken up in development practice. More work is needed to ensure frontier technology opportunities are considered in a systematic and inclusive fashion, in terms of both opportunities/potential value added and the possible downsides.

4 The future of digital development: from simple fixes to systemic enablers

The future still hangs in the balance in terms of whether there will be meaningful and net contributions to development gains from development technologies

At the present time, the evidence suggests that digital development is neither mirage nor horizon, but is somewhere in between. For every gain identified in the literature, there are related risks and costs. The future still hangs in the balance in terms of whether there will be meaningful and net contributions to development gains from development technologies. Paradoxically, perhaps the major challenge is the focus on the technologies as simple fixes for development problems.

Far too often the implicit theory of change in digital developments, as with technology for development more generally, is that importing technologies can fix development. This does not acknowledge the political and social

transformations that are needed to address and overcome economic and power asymmetries.

Although understandable, the focus on simple fixes places too great an emphasis on the visible aspects of technology, which, at best, provide incremental gains in developmental terms. This leads to less attention on the less visible but fundamental aspects of capacity, skills and institutions, where arguably the potential for transformational development gains truly lie. The most significant digital development gains - as with technology for change more generally - have involved a dynamic interplay between technological developments and institutional change.

As such, the success of digital development efforts may well be reliant on how far they can break out of the technology silo in which they find themselves, to be seen less as a solution to simple problems and more as a catalyst for systemic change.

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The Digital and Technology Research Group is a team of internationally recognised thought leaders and researchers with multi-disciplinary expertise across a range of areas, including mobiles for development, inclusive innovation, civic technology, globalisation, epidemiology, resilience, data-driven development, complexity science and participatory approaches.

We bring critical, constructive, participatory, systemic and politically grounded perspectives to advance knowledge, shape policy and inspire practice across the growing field of digital and technology for development.

Our current research programme explores the impacts of digital and technology in four key areas: economy and productivity, government and service delivery, citizenship and rights, and environment, sustainability and resilience.

The group is part of the Institute of Development Studies (IDS), a leading global institution for development research, learning, teaching, impact and communications.

The IDS programme on Strengthening Evidence-based Policy works across seven key themes. Each theme works with partner institutions to co-construct policy-relevant knowledge and engage in policy-influencing processes. This material has been developed under the Digital and Technology theme.

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