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Wynn, Martin G ORCID logoORCID: https://orcid.org/0000-0001-7619-6079 and Jones, Peter ORCID logoORCID: https://orcid.org/0000-0002-9566-9393 (2020) The sustainable development goals, the ICT industry and ICT4D research. In: Struggles and Success in the Pursuit of Sustainable Development. Routledge, London. ISBN 9781351140560

Official URL: https://doi.org/10.4324/9781351140560
DOI: http://dx.doi.org/10.4324/9781351140560
EPrint URI: https://eprints.glos.ac.uk/id/eprint/5820

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THE SUSTAINABLE DEVELOPMENT GOALS, THE ICT INDUSTRY AND ICT4D RESEARCH

Martin Wynn and Peter Jones

Abstract

The Sustainable Development Goals (SDGs), agreed to at the United Nations (UN) in 2015, were an agenda for global change and sustainability for the next 15 years, but the program made little mention of the potential role of the information and communications technology (ICT) industry. ICT is a key enabler of such widespread change, and this chapter assesses the potential involvement of the ICT industry in the advancement of the SDGs. A review of key reports from major industry entities reveals the significant business opportunities perceived by these ICT companies and highlights the critical role of governments in creating appropriate infrastructures for, and funding of, ICT. The chapter also discusses key issues emerging from these reports in the context of current research in the ICT for Development (ICT4D) field. The rapid pace of technological development may revolutionize how the SDGs will be pursued and achieved around the world, but there are tensions between the imperatives of the SDGs and the pursuit of economic growth.

Key Words: SDGs, Sustainable Development Goals, ICTs, ICT industry, technology change, ICT4D research.

Word Count: 4492 excluding Abstract, Author biographies and Key Words.

Introduction

It has been suggested that there are two issues of particular importance regarding the development of global economies and societies – "the challenge of environmental sustainability and the potential of information and communications technology" (Souter et al., 2010). This article examines the implications of the Sustainable Development Goals (SDGs) for the information and communications technology (ICT) industry, and how this may align with current and future research initiatives in the developing world context (ICT for Development – ICT4D).

The 17 SDGs represent "the scale and ambition" of the UN 2030 Agenda for Sustainable Development, which is designed to "shift the world on to a sustainable and resilient path" (United Nations, 2015: webpage). To address these goals, the role of the business community, along with that of national governments, was highlighted by the UN. However Tim Unwin, Director of the ICT4D Collective, argued that "the almost complete omission of ICTs from the final agreed SDGs was a very serious failing" and that "those determining the SDG agenda for the next 15 years barely gave them any recognition at all" (Unwin, 2015:2). This chapter puts forward a preliminary review of some key perspectives surrounding the relationships between ICT and the SDGs, and comments on their resonance with current thinking in ICT4D research.

ICT and the SDGs

ICT is mentioned in just four of the 169 targets linked to the SDGs (Table 1). However, a number of frameworks have been developed for considering and measuring the relationships between ICT and both the environment and development. The Organisation for Economic Co-operation and Development (OECD), for example, outlined a model, which identified both "ICT supply (producers, production and products) and ICT demand (users and uses)", as agents to improve environmental outcomes as well as a number of "indirect factors affecting ICT and the environment" (OECD, 2009:8-12). Qureshi (2017:7) offered a "theoretical lens" to help in "investigating ICTs in ways that offer development outcomes" and suggested that "this lens offers a view through which interventions, often seen as projects in which ICTs are used to support healthcare, education or agriculture, are investigated".

A number of ICT companies and organisations have suggested that their sector can play a central role in contributing to the achievement of the SDGs. Hans Vestberg, Ericsson's President and Chief Executive Officer, for example, argued that "Information Communication Technology offers an incredible platform for achieving the SDGs" (Ericsson, 2016:6). Matt Granryd, Director General of the *Groupe Spécial Mobile* Association (GSMA) suggested "as an industry we have an important opportunity to leverage the mobile networks that we have built and the services we deliver to help achieve the Sustainable Development Goals" (GSMA, 2016:5).

[Table 1 about here]

Table 1. ICT targets related to the SDGs
Source: United Nations, 2015.

Some key perspectives on the relationships between ICT and the SDGs emerge from a reading of reports on the SDGs published by two leading ICT companies, namely Ericsson and Microsoft, and two industry bodies, GSMA and the Global e-Sustainability Initiative (GeSI). GSMA represents the interests of more than 800 mobile telephone operators through industry programs, working groups and industry advocacy initiatives. GeSI works in conjunction with

some of the major global technology companies and provides information, resources and best practice guides aimed at achieving integrated social and environmental sustainability through ICT. A key theme in all four reports cited above is the leading role that the ICT industry believes it can play in the future achievement of the SDGs.

The Shared Value of ICTs

Ericsson visualised ICT as a catalyst for achieving the SDGs, and argued "ICT, especially mobile broadband, will be the essential infrastructure platform for the SDGs" and that "rapid action is needed to harness the contribution that ICT can make toward the achievement of the Global Goals" (Ericsson, 2016:8). It is clear that the ICT industry regards the SDGs as a major new business opportunity. For example, GeSI estimated that "the digital solutions that catalyse SDG achievement" could generate "$3.1 trillion of additional annual revenue to the sector" (GeSI, 2016:32). It also noted that there could be a range of softer benefits, including brand enhancement and the increased demand for data-driven products and services generated by the improvements in lifestyles brought about by the advancement of the SDGs.

The industry's belief that it can make a major contribution to the achievement of the SDGs reflects the spirit of the concept of shared value, which has been defined as "policies and practices that enhance the competitiveness of a company while simultaneously addressing the economic and social conditions in the communities in which it operates" (Porter and Kramer 2011:78). However, Crane et al. (2014:131) have highlighted some concerns regarding the shared value model, and suggested it is "naïve about the challenges of business compliance". In a more positive vein, the Shared Value Initiative (Shared Value Initiative, 2015:webpage) suggests that the SDGs offer an "opportunity for people running businesses to cash in on the huge market potential in solving the most pressing issues of our time".

Microsoft prioritized eight SDGs because of their "particular alignment with Microsoft's business and philanthropic strategies" (Microsoft, 2016: webpage). These are: SDG#3 – Good Health and Well-being; SDG#4 – Quality Education; SDG#5 - Gender Equality; SDG#8 - Decent Work and Economic Growth; SDG#9 - Industry, Innovation and Infrastructure; SDG#11 - Sustainable Cities and Communities; SDG#13 - Climate Action; and SDG#16 - Peace, Justice, and Strong Institutions. In addressing SDG#8, Microsoft claimed to work with a number of agencies around the world to promote economic development and to empower entrepreneurs and business leaders with the tools, skills and opportunities to stimulate and facilitate economic growth. In addressing SDG#3, Microsoft reported on its role in providing products, services and training to help governments and health care providers to "understand how to apply technologies like advanced data analytics and cloud solutions to transform healthcare" (Microsoft, 2016:webpage). In a slightly wider context, the ICT industry as a whole has a vital role to play with regard to SDG#17 - Sustainable Development through Global Partnerships – in encouraging and facilitating international cooperation and coordination, promoting technology transfer and capacity building, and strengthening partnerships at local, national and global levels.

In the context of ICT4D research, this debate underlines the relevance of research approaches that recognise different ideologies of development (Figure 1). Van Biljon and Alexander (2014) have put forward a conceptual map of discipline, research paradigm, underlying theory, research methodology, data capturing strategy, and data analysis. Heeks (2014) used the post-2015 development agenda to identify priorities for future ICT4D research within such a framework. Different development theories used in the ICT4D literature highlight the fact that a single development theory is unlikely to be sufficiently strong and widely accepted to provide overall coherence.

[Figure 1 about here]

Figure 1. ICT industry perspectives and related ICT4D research themes

Walsham (2017:29) has stressed the importance of creating "a cumulative research tradition" through "the development and application of theory" which enables "moving from a particular setting or application to more general statements or conceptual frameworks". Similarly, Sein and Harindranath suggest that to better understand the role ICT can play in national development, "ICT needs to be conceptualized in its many facets, perceptions, and in its manifold impact in societies". They go on to propose an integrative framework to study the role of ICT in development which "policymakers and donor agencies may find useful in evaluating the potential impact of development interventions using ICT" (Sein and Harindranath, 2004:15).

The Variable Impact of ICT Deployment

The four reports point out that the role and impact of the ICT industry in contributing to the SDGs will vary in different contexts, for example in urban and rural areas and in developed and less developed economies. More specifically, GSMA reported on variations in the future opportunities for the mobile industry to affect economies at different stages of development and in different geographic regions. GSMA (2016:73) reported that within developed economies, the mobile industry would have a high impact on SDG#13 (Action for Climate Change), SDG#5 (Gender Equality), SDG#8 (Decent Work and Economic Growth) and SDG#11 (Sustainable Cities and Communities).

Alternatively, GSMA predicted that the overall impact of the mobile industry within developing economies will be lower than the global average and that it would be most marked in relation to SDG#13 (Action for Climate Change) and SDG#7 (Affordable and Clean Energy). Variations in the future opportunities for the mobile industry to impact on the SDGs were also identified across geographical space. For example, in Sub-Saharan Africa, there are concerns that the impact of ICT on the SDGs is limited by low penetration of mobile services. GSMA also suggested that, in this region, "in addition to increasing the reach of its services, it is equally important for the industry to play a leading role to promote transparency and ethical business practices within its own operations" (GSMA, 2016:83).

Within Europe, however, the impact of the mobile industry is seen to be high across most of the SDGs. GSMA suggested that there is scope to increase the impact of SDG#17 (Sustainable Development through Global Partnerships), particularly in enabling information sharing, diffusion of practices and other partnership-facilitating activities. This could be achieved through the ICT industry's leadership of "multi-stakeholder partnerships, driving co-ordination of the sustainable development agenda, as well as continuing to develop and implement open platforms that enable innovation ecosystems and provide a blueprint for other regions to follow" (GSMA, 2016:79). New ICT-enabled models are relevant here because they can provide examples of where ICTs appear to make a significant difference. Unwin (2017:49) has similarly called for the private sector to "draw on examples of existing good practices to develop new business models that focus on increased durability and sustainability of their technologies, whilst maintaining affordability". The research community has an important role to play in clarifying the agendas of various agencies involved, the impact on processes, the overall costs and benefits to all parties, and the nature of socio-political transformation.

Balanced Governmental Intervention

The ICT industry has also argued that governments have a vital enabling role. Ericsson (2016:17) suggested that "to harness ICT effectively for the 2030 Agenda…… governments need to ensure that the entire public sector, including service delivery in health, education, energy and infrastructure, is fully supported by high-quality ICT infrastructure". Unwin (2017:53) suggests that "governments should engage pro-actively in open, transparent and honest conversations with the private sector, civil society and citizens about how best to respond to the needs of the poorest and most marginalised, and the policies that should be in place to reduce inequalities through the use of ICTs". This raises questions about the role of the state within society and the respective policy and conceptual issues. As regards policy, many states have sought to promote sustainable development through "a restricted public sphere paradigm which places greater emphasis on the corporate imperative", namely that the state must not jeopardise "the competitiveness of corporate interests in the wider global economy" (French, 2002:41).

However, there are variations in the policy role that the ICT industry would like to see governments play. GeSI (2016:36) has called on governments to play "their part in shaping policy and legal frameworks" by "liberalising some markets, improving the ease of doing business and bearing down on restrictive practices", thereby reducing the regulatory burden on businesses. For French (2002:142), sustainable development raises fundamental questions about the coordination of "public/private-public/corporate" intervention, and he calls for "a more collaborative approach". This highlights the importance for future research in this area, but as Harris (2016) has pointed out, researchers are not generally inclined towards engaging with the users of their research and communicating their findings to a wider audience. Harris also notes that ICT4D researchers are not normally incentivised to adopt these engagement practices.

A liberal pluralist perspective sees the state as a neutral arbiter of social processes, which provides opportunities for all stakeholders to influence state policy and which works for the benefit of society as a whole. This is consistent with the ICT industry's position on the SDGs, and also echoes the UN's call for governments and the private sector to collaborate to address the SDGs.

Connecting the Unconnected

"Connecting the unconnected" (Ericsson, 2016:24) is generally viewed as a realistic contribution that the ICT industry can make in the achievement of the SDGs. This resonates with Heeks' (2014) assertion that "connecting the excluded" was one particular area worthy of further study and analysis, with an example of job advertisements through SMS in a developing world context. Indeed, the GSMA (2016:5) stressed the importance of "extending network coverage to rural areas" but arguably more importantly recognised that while connectivity "is a very important first step" the real prize is about "what this connectivity enables" namely "connecting everyone and everything to a better future". In many ways this is globalisation positively cast, and Sachs (2016:webpage), for example, has described the SDGs as "a new kind of globalization" but as such it might be seen to be in conflict with the underlying spirit of the SDGs in a number of ways.

In particular, the standardisation of products and services and the dominance of a relatively small number of global brands within the ICT industry constitute significant barriers to small local entrepreneurs and producers within less developed countries. There are also risks

that increases in trade, often associated with globalisation, will accelerate the exploitation of non-renewable natural resources, and thereby increase pollution and greenhouse gas emissions and undermine the SDGs. Where local economies increasingly concentrate on the production of a limited range of products and services to meet the demands of global markets, a downturn in these markets can have damaging consequences for local economies. Ultimately, many critics would argue that globalisation does not offer a better future for everyone, rather it produces winners and losers, and that it can exacerbate, rather than reduce, inequalities between developed and less developed economies.

Technology Increases Efficiencies

The development and deployment of new technologies are often considered key contributing factors in the improvement of efficiencies across the sustainability spectrum, and in helping to deliver sustainable growth. Clark and Dickson (2003:8059) suggest that "the need for sustainable development initiatives to mobilize appropriate science and technology has long been recognized". More specifically, Ericsson (2016:12) concluded that "ICTs have the potential to increase the rate of diffusion of a very wide range of technologies across the economy" and "the accelerated uptake of these technologies……constitutes the key to achieving the SDGs by their target date of 2030". Schor similarly noted, "advocates of technological solutions argue that more intelligent design and technological innovation can dramatically reduce or even stop the depletion of ecological resources, as well as eliminate toxic chemicals and ecosystem disruption" (Schor, 2005:310). For example, the applications of digital technology in the mining and minerals extraction industries "include building a more comprehensive understanding of the resource base, optimizing material and equipment flow, improving anticipation of failures, increasing mechanization through automation, and monitoring performance in real time" (Durrant-Whyte et al., 2018:webpage). However, Schor also points out that such approaches "fail to address increases in the scale of production and consumption" (Schor, 2005:310).

On a more positive note, the unprecedented nature and pace of technology development within the ICT industry may provide sustainable solutions to seemingly elusive environmental and social challenges, and thus allow the ICT industry to make a major and lasting contribution to the SDGs. Heeks (2014:2), for example, noted that ICT products and services that are currently to the fore for use in developing countries are "near-ubiquity of mobile, spread of broadband, more big/open/real-time data, use of field sensors/embedded computing, more social media, more crowd-sourcing models, more cloud, more smartphones, and 3D printing", and that the scope, reach and depth of ICTs in developing countries is changing apace. Heeks (2017: webpage) noted, "the relationship between digital ICTs and international development can be divided into three paradigms – pre-digital, ICT4D, and digital development". The digital paradigm is now on the ascent and will overtake the ICT4D paradigm by 2030. Heeks (2016:1) concludes, "we can foresee a 'digital development' paradigm in which ICTs are no longer just tools to enable particular aspects of development, but the platform that mediates development". Continued research on the successive phases of technology development should clarify relative costs and benefits. However, Easterly (2007) argues that large scale scientific programs do nothing to solve the problems of poor contract enforcement, corruption and extortion and the ineffective government services that plague so many aid initiatives in developing countries.

Continued Economic Growth

Ericsson (2016) explicitly links rapid economic growth with SDG success, and, in addressing SDG#7 (Decent Work and Economic Growth), GSMA (2016:165) looked to "sustain per capita economic growth in accordance with national circumstances and, in particular, at least seven per cent gross domestic product growth per annum in the least developed countries". Many critics argue that such growth will make increasing demands on the Earth's finite natural resources, which will ultimately prove unsustainable. Higgins (2013: webpage) maintains, "the economic growth we know today is diametrically opposed to the sustainability of our planet." The counter argument builds upon the notion of "decoupling economic growth from environmental degradation" (GSMA, 2016:20), but this concept remains poorly defined.

It thus appears that the term "sustained economic growth" refers - within the ICT industry - to the perceived importance of securing continuing economic growth, rather than to explaining how such growth is to be achieved within finite environmental limits. At the same time, some critics see decoupling as an elusive goal. Jackson (2009:8) highlighted the distinction between "relative" and "absolute" decoupling. The former refers to the decline of resource impacts relative to growth, and the latter signifies an absolute decline in such impacts. Although some large corporations might claim to support relative decoupling through their commitments to efficiency, they currently show little enthusiasm for absolute decoupling, which Jackson (2009:48) believed "is essential if economic activity is to remain within ecological limits".

Castro (2004) has questioned the very possibility of sustainable development under capitalism and argued that economic growth relies upon the continuing and inevitable exploitation of both natural and social capital; and Mingers (2001) has insisted that future research in this area must adopt a transdisciplinary and multi-methodological approach. Raiti (2006:1) has viewed the need for a multidisciplinary approach as "a piece of the development puzzle", but it is evident that the various disciplines contributing to the field, "such as anthropology, computer science, geography, development studies, and IS" cannot easily "be brought together under one methodological or theoretical umbrella" (Walsham, 2017:34).

Conclusions

The realisation of the wide-ranging global vision for a sustainable future embodied in the SDGs will require commitment from a range of public and private sector entities, not least national governments. The UN has called upon all businesses to play a central role in achieving the SDGs, but monitoring and evaluating the role of the ICT industry in advancing the SDGs seems likely to be a complex and contested process. Current research initiatives in the ICT4D field offer an initial framework for tracking and evaluating the key issues discussed in this chapter, even if the ICT industry and the ICT4D research community often take different philosophical (and at times, political) standpoints. It is to be hoped that ICT4D researchers can play a valuable role in what Unwin (2017:61) has called "a flexible and effective multi-sector partnership (governments, private sector, civil society, and citizens) approach", which is important "for implementing ICT initiatives that contribute to sustainability".

The advent of SDGs constitutes a very significant business opportunity for the ICT industry, which would involve what GSMA (2016:98) describe as the "co-ordination and standardisation of the industry's messages globally" which is "critical to achieve optimal results for all stakeholders". The ICT industry emphasized the vital importance of the role of governments in creating a more liberal market environment and in funding many of the necessary improvements in connectivity, but the role of governments, particularly in less developed economies, in effectively addressing these challenges may prove problematic. The rapid pace of technological development may revolutionise how the SDGs can be achieved;

but for some critics the fundamental problem will be the tension between the SDGs and continuing commitments to production and consumption in advancing economic growth.

Ultimately, it is important to recognise that in some ways the SDGs may be unattainable and that while they can be seen to be laudable and universally agreed upon aspirations, they face testing challenges against a background of continuing world population growth. A number of factors might be seen to contribute to such a pessimistic potential scenario. The SDGs look to build on the UN's arguably less ambitious Millennium Development Goals (MDGs) established in 2001. However, the failure to meet many of the MDGs, perhaps most notably demonstrated by overall increases in carbon dioxide emissions, in water scarcity, and in the uneven progress across the globe, do not provide universal grounds for optimism.

That said, the ICT industry has certainly identified the SDGs as a massive and geographically wide ranging business opportunity, and continuing corporate and government investment will undoubtedly support progress in helping to meet the SDG goals and more specifically in improving access, connectivity and efficiency. Looking to the future, the ICT industry will want to monitor how a range of ICT initiatives is contributing to the SDGs and in publicly reporting on progress, they will help to maintain momentum both within the industry and in the wider business community. At the same time, the academic community also has an important role to play in working with business leaders and in supporting national and international policy makers in addressing the opportunities and the challenges presented by the UN's commitment to the SDGs.

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SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Target: By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing states and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries. *SDG 5. Achieve gender equality and empower all women and girls.* Target: Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women. *SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.* Target: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020. *SDG 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.* Target: Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology.

Table 1. ICT Targets Related to the SDGs
Source: United Nations, (2015).

Figure 1. ICT Industry Perspectives and Related ICT4D Research Themes