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¹ Thanks to Francis Owusu for his insightful comments

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The Information Revolution and Poverty in Africa

The impact of these developments in ICT in Africa, in terms of both ICT development (increased infrastructure and access) and ICT for development (adoption of ICT applications), has been to advance the process of development itself, in terms of ICT for development. The result of this duality of sector transformation has been itself dually vast. On the one hand it has facilitated the delivery of services such as education, health, better governance (on the part of both leadership and governed), enterprise and business development, as well as their overall contribution to socioeconomic well-being (especially poverty reduction), political stability and self-actualization (Okpaku, 2006, p. 153).

While it was once described as a black hole of informational capitalism (Castells, 1998), Africa now has over 350 million mobile phone subscribers (Etzo and Collender, 2010) and it has the fastest growing mobile phone penetration rate in the world. Many claims are made about and for mobile phones and other new information technologies. According to the well-known development economist Jeffrey Sachs “mobile phones are the single most transformative technology for development” (quoted in Etzo and Collender, 2010, p. 661). Some European Union officials claim that they are “time portals” which will bring modernity to the people of the developing world (Graham, 2011). Others argue that these new technologies are enabling “catch up” through technological leapfrogging² (Okpaku, 2006), with the Rwandan President stating that because his country missed the agricultural and industrial revolutions it must take advantage of the information one (Asche and Fleischer, 2011). However, while technological leapfrogging may play a role, differential catch up growth is additionally achieved by leveraging other advantages of late development, based on

¹ Thanks to Francis Owusu for his insightful comments

² Leapfrogging is “bypassing stages in capacity building or investment through which countries were previously required to pass during the process of economic development” Steinmueller, W. E. (2001). “ICTs and the possibilities for leapfrogging by developing countries.” *International Labour Review* 140(2): 193-210.

different cost bases and the nature of social institutions, particularly the state (Wade, 2003; Xibao Guo and Yuanyuan Ma, 2010).

Much of the literature on the impacts of mobile phones on economic development in Africa share the implicit assumption that the main problem is that Africa has been “by-passed” by globalisation (Sachs, 2005). Mobile phones are seen as a potential solution to this by connecting the continent to the outside world and internally. Consequently there is a tendency “to portray the mobile phone as an *end*, rather than a *means* to specific social improvements” (original emphases) (Burrell, 2010, p. 232) and “the concept of universal access carries an implicit theoretical assumption that the key to the successful realization of [an] information society lies in the adequate provision for the widest public ... ‘access’ to information technologies (Park, 1997, p. 191). Connection, in-of-itself, in much of the mainstream literature is thought to be necessarily good, ending what former American Secretary of State Colin Powell has called “digital apartheid” (quoted in Graham, 2011, p. 212). The form which this connection takes in relation to information and communication technologies (ICTs) is meant to be through flows of information. However there are also other forms of connection which associated with these technologies which this paper explores.

In conventional economics one of the main barriers which has been identified to economic development is information asymmetry. Where buyers and sellers have different levels of information, markets are meant to malfunction and “fail” (Stiglitz and Weiss, 1981). Sophisticated quantitative analyses of the impact of mobile phone diffusion have been undertaken to assess the impacts on price dispersion, or differences in prices, across sub-national markets. In “efficient” markets the “law of one price” is meant to prevail –

geography is meant not to matter. One study found that the introduction of mobile phones reduced price dispersion by 10-16% for grain markets in Niger (Aker, 2010), a reflection of changing power dynamics, although it is not conceptualised in these terms.³ Mobile phones can also help potentially promote democracy through the correction of information failures in the polity through delivery of voter education programs for example (Aker, Collier et al., 2011) and are also meant to reduce corruption (Bailard, 2009).

Reduction of price dispersion is the result of the ability of ICTs to facilitate disintermediation, cutting out intermediaries (“middlemen”) and allowing direct producers to achieve a greater reward from the products of their labour and more efficient arbitrage between different spatial markets. While the former may be true in the case of some fisher people, who are able to effect a strategic coupling between mobile information access and product sale as they are more geographically mobile and able to use their phones to land their catch where they can get the best prices (Jensen, 2007), this is not necessarily the case in other sectors where actors higher up the value chain have more geographic mobility and other sources of power to capture value (See Molony, 2008; Graham, 2010). For example farmers may be locked into forward contracts in order to access inputs, which make them unable to take advantage of higher spot prices (Molony, 2008). Consequently much of the literature on the impacts of mobile phones and other new ICTs (email, internet and computers) on development has tended to be too shallowly “geographical”; focussing on spatial diffusion and connection, rather than on the impacts on socio-economic structures and how use of ICTs is structured by other forms of connection, such as trade and investment flows. Additionally while internet and mobile phone convergence is a recent feature of technological

³ However, Aker notes that reductions in information asymmetries are a necessary, but not sufficient condition for welfare improvements in the context of other market failures, such as poor transportation infrastructure.

development, a new mobile or digital divide may be opening, as the vast majority of phones sold in Africa are “feature” rather than multi-functional “smart” phones, as a result of cost.⁴ Africa has fewer broadband subscribers than Australia, a country of twenty one million people (Smith, 2009).

Much of the literature on closing the “digital divide” shares similarities with work on the “new” economic geography, which argues that Africa suffers from a “proximity gap” or “trap” as it is too far from the rich countries to be able to effectively sell its products to them (Naude, 2009; World Bank, 2009; Wilson, 2011). However this literature ignores the fact that it is partly the adverse forms of interconnection to the international system (Bush, 2007), rather than physical distance *per se*, which produce underdevelopment. Relatedly, “the notion of a digital divide has, in many ways, been unhelpful. It has given too much emphasis to the technology [and draws]... attention away from other divides and inequalities that hamper development (Heeks, 2002, p.7). As Heeks also notes ICTs by themselves do not have any independent causative power. “What do ICTs do? They handle information in digital format. That’s all” (Heeks, 2002, p. 2). In order to understand the impacts of ICT on poverty, it is first necessary to interrogate different conceptualizations of poverty and to think through how the different forms of geographic interconnection that ICTs facilitate influence it.

Conceptualising Poverty and ICT

⁴ Although there are now examples of web-enabled smart phones for under US \$100 selling quickly in Africa. The Chinese company Huawei’s “Android” smart phone in Kenya for example (thenextweb.com. (2011). “Huawei’s \$100 Android phone emerges as Kenya’s best seller.” from <http://thenextweb.com/africa/2011/06/24/huaweis-100-android-phone-emerges-as-kenyas-best-seller/>. One potential user wrote in response “I still can’t believe it, finally us students (*watu* jobless) can get a machine running on android and at least have something to flaunt about in campus grounds” (Daynis. (2010). “Safaricom launches low-cost Huawei VF845 Android Phone. .” from <http://www.moseskemibaro.com/2010/08/10/safaricom-launches-low-cost-huawei-vf845-android-phone/>.

There are three main schools of thought on poverty – the structural, the palliative, and the capability conception. The structural conception of poverty examines how it is that poverty is produced (Lines, 2008). It seeks to interrogate the socio-economic structures that produce inequality, marginalization and exclusion rather than assuming these as extant, and then “mopped up” through remedial public action. In this structural conceptualisation then it is power inequality which produces poverty, as power “holders” are able to shape socio-economic structures to their benefit, to the detriment of others (Oyen, 2004). Taking this perspective, the question in relation to ICTs is then how do they reconfigure the nature of power relationships, broadly conceived, including differences in economic productivity? In this conceptualisation the elimination of poverty depends on structural economic transformation.

An alternative is the palliative conception of poverty, which takes poverty as a given and asks how it can be alleviated or reduced through investment in health and education, for example (Sachs, 2005). Development interventions can have major impacts on poverty reduction (Teklehaimanot, McCord et al., 2007), and there is no necessary contradiction between palliative and more structural approaches to poverty reduction (Green, 2008) – indeed both are needed and synergise together. However much of the literature on the poverty reduction potential of new ICTs fits narrowly within the palliative conception, through the delivery of M-health or education – “M-development”. For example according to Aker and Mbiti (2010, p. 208) “as telecommunication markets mature, mobile phones in Africa are evolving from simple communication tools into service delivery platforms. This has shifted the development paradigm surrounding mobile phones from one that simply reduces communication and coordination costs to one that could transform lives through innovative applications and services”. This palliative “underdevelopment as lack” of knowledge approach (Mercer, 2005)

is problematic because it neglects how it is that poverty is produced, which is important if it is to be overcome.

A third approach to poverty seeks to understand what social structures inhibit or enhance capability development and fulfilment (See Sen, 1999). If this approach is adopted the question might be how it is that ICTs enhance capabilities (what people are capable of doing), and how they may change social structures which influence or inhibit these. At first the capability approach appears to achieve reconciliation between palliative and structural conceptions of poverty, with Sen explicitly stating that his framework draws on both Marx and Adam Smith (Clark, 2006). However the unit of analysis of the capability approach is the individual and consequently it still suffers, from an ethical, if not an ontological individualism (Hill, 2007). This tends to obscure issues of class power, and in particular the class nature of the state (Jessop, 2002) which is charged with implementing policies to overcome poverty. Consequently an approach which interrogates how new ICTs change socio-economic structures enables a more accurate assessment of their poverty reduction and economic developmental potential, and impacts.

Interestingly the palliative and structural conceptualization share some implicit similarities in their emphasis on flows between places as primary drivers of (under)development. In the palliative conception of poverty, which fits with the neoliberal project, interconnection and flow promotion will accelerate development. Liberalisation and unrestricted trade are to be promoted and increased aid flows will “end poverty”. The justification for aid is that while the “free market” is beneficial, aid can accelerate growth and development beyond what would occur under a completely laissez faire regime, particularly when countries are caught

in poverty and other “traps” (Collier, 2007; Sachs, 2008). In contrast structuralists argue for the need to regulate international flows in order to allow for infant industry protection, and endogenous technological development and a reduction of surplus extraction through overseas debt repayments for example. These two approaches are characterised heuristically below.

Palliative conception

Connection (trade, investment, aid, new ICTs) -> contagious diffusion of development-> elimination of poverty.

Structuralist conception

Connection (trade, investment, aid, new ICTs) -> adverse differential incorporation-> (re)production of poverty.

Both of these perspectives have elements of truth to them. The four elements of the neoliberal “connection package” (trade, investment, aid and new ICTs) can be beneficial for development. However, whether poverty reduction or reproduction results depends on the way in which trade and the other elements of the package are structured as a result of (class and state) power relations and the path dependency of previous economic structures. Current global power relations arguably favour structuralist outcomes – the reproduction, rather than reduction of poverty, at least in Africa where foreign investment is heavily concentrated in

natural resource extraction, and the absolute number of people living in poverty continues to rise (Carmody, 2010: United Nations Conference on Trade and Development, 2010).

The ability of ICTs to help change the nature of African economies, and consequently the depth of poverty on the continent, depends on the extent to which they result in market creation, widening and deepening. However they might simply put some (overseas) firms at a competitive advantage relative to others, resulting in a fallacy of composition, where the growth of some firms is the concomitant of the closure of others and poverty levels remain the same or get worse.

Partly the answer depends on the extent to which ICTs put African-based firms at a competitive advantage relative to their overseas competitors. There is no reason to think that this should be the case. Indeed given higher levels of development in other world regions, and consequently more conducive complimentary conditions and factors of production, such as better transport infrastructure, it is likely that if anything new ICTs put firms elsewhere at a relative competitive advantage. “Death of distance” arguments about new ICTs also tend to underplay the continued importance of face-to-face communication for tacit knowledge transfers, for example (Bathelt and Turi, 2011). This mechanism favours more developed regions, with more tacit knowledge.

ICTs and Poverty Production

Much of the literature on ICTD focusses on how ICTs on how they enable connection and thereby, almost axiomatically, reduce poverty. However ICTs may also be implicated in the

production of poverty. Fuchs and Horak (2008, p. 101) note that “unequal patterns of material access, usage capabilities, benefits, and participation concerning ICTs are also due to the asymmetric distribution of economic (money, property), political (power, social relationships), and cultural capital (skills)”. Consequently ICT accessibility and impacts cannot be analysed in isolation from pre-existing socio-economic structures and power relations which they may serve to reinforce, but also subvert.⁵ ICTs then may serve as tools of domination, exploitation, cooperation and popular empowerment. They are embedded in existing social relations of social support, resource extraction and conflict, while also helping to reconfigure and reconstitute them (Carmody, 2010).

There is an extensive literature on ICT4D, e.g. how ICT can be used for development interventions (Unwin, 2009). While many of the benefits of mobile phones on poverty reduction have been noted in other literature, the ways in which they may contribute to poverty production have been largely ignored. According to Tim Berners-Lee, the inventor of the World Wide Web, mobile phones can be like a “drug” in the developing world, as people feel they have to spend income they sometimes cannot afford to have them.⁶ This is partly because they are “positional goods”, showing social status, but they also make people feel included rather than excluded from processes of globalization (Hahn and Kibora, 2008). There are also instrumental reasons for their usage – the maintenance and nurturing of survival networks. There are instances in Africa, in the Millennium Villages for example, where people have chosen to spend money on mobile phone credit rather than school fees for their children (Puri, Mecheal et al., 2010). Consequently they may, at times, be implicated

⁵ According to Fuchs, C. (2010). "Labor in Informational Capitalism and on the Internet." Information Society 26(3): 179-196., p. “informational capitalism is an antagonistic system that by transnationalization and informatization produces at the same time new potentials of class domination and class struggle. According to him it may create a cybertariate, such as those engaged in microwork in Kenya for example.

⁶ Keynote address at ICTD Conference, Royal Holloway, University of London, 14th of December, 2010.

directly in the production of poverty. In Ethiopia the poorest 75% of the population who use mobile phones spend 27% of their income on them (Gillwald and Stork, 2008) and one study in Uganda quotes a respondent that “mobile phones bring poverty” (Diga, 2007). Mobile phones and other new ICTs may also (re)produce poverty other ways. The following list is indicative, rather than exhaustive.

- Perpetuation of technological dependence and underdevelopment, as new ICTs and associated infrastructure are developed and imported from elsewhere.
- Capital leakage for infrastructure, such as base transceiver stations, phones and mobile credit. For example if the average cost of the importing mobile phones was \$15 per handset, three hundred and fifty million new handsets would represent a capital loss of US \$5 billion per handset turnover time.⁷ Imports of office and telecommunication equipment for the thirty two countries in Africa for which data is available was US \$18bn in 2009 (Calculated from World Trade Organization, 2011).
- Direct income depletion - “In Niger, the cost of a one minute call off-network is US \$0.38 per minute, representing 40 percent of a household’s daily income” (Aker and Mbiti 2010, p. 227). Research amongst university students in Tanzania found they were spending five times more on mobile phone connectivity than they were on food (Kleine and Unwin, 2009).
- Sourcing of coltan, necessary to make the electrical capacitors in new ICTs, is implicated in conflict in the Democratic Republic of Congo, leading to poverty (Nest, Grignon et al. 2006; Nest 2011).
- Disintermediation may lead to poverty amongst traders.

⁷ Some handsets are of course more expensive and others cheaper than this and a small number of mobile phones are also assembled in Africa.

- ICT-enabled firms may capture business from those that are not ICT enabled, contributing to poverty for their owners, managers and workers. While this may mean that more technically efficient firms grow, raising economic growth, this also has implications for poverty by potentially raising inequality and thereby making markets narrower. The poverty elasticity of economic growth may then be reduced.
- New ICTs facilitate increased import penetration into African economies, subjecting domestic manufacturers in particular to competitive displacement pressures (Meagher, 2007).

Multi-country studies across Africa have shown that mobile phones are used primarily to maintain social networks, although they are also used to maintain “weak links” to business associates (Miller, Skuse *et al.* 2005; Souter, Scott *et al.* 2005; Molony 2007). According to Slater and Kwami (2005) mobiles are primarily used to manage local embedded reciprocities. Rather than being used to connect to the “global economy,” the majority of calls in Ghana, for example, are “used to maintain family relations” (Slater and Kwami, 2005 cited in Hahn and Kibora, 2008), and in that way may be regarded as socially articulating,⁸ but not economically articulating to global production networks.

Adoption may then often represent part of a defensive livelihood strategy given widespread poverty and the importance of extended family networks to survival (Rettie, 2008). In common with many other studies, one in Tanzania, which surveyed several thousand households found that while the majority of respondents felt mobile phones had strengthened their social networks, more than half did not think mobile phones had increased their household income (Sife, Kiondo *et al.*, 2010). This suggests that mobile phone adoption is

⁸ Another way to conceptualise this would be as strengthening “bonding” social capital Putnam, R. D. (2000). Bowling alone : the collapse and revival of American community. New York, Simon & Schuster.

partly driven by exclusion, and fear over the possibility of distancing from social networks vital to survival, rather than opportunity. In Botswana “the purpose of calls was recorded as predominantly to friends and family (70%), a proportion of which concerned arranging financial remittances” (Duncombe, 2006, p. 94). We might think of this as “negative adoption,” which can explain the fact that some people have mobile phones, even if they find them very expensive to run. The costs of exclusion from social networks would simply be too great not to have them. ICTs also change and reinforce pre-existing economic structures, which influence poverty to which we now turn.

The Structure of the Information(alized) Economy in Africa

Some have argued that the information economy is itself a new mode of production. For example Benkler (2006, p. 4) argues that “as the material barriers that ultimately drove much of our information environment to be funnelled through the proprietary, market-based strategies is removed these basic nonmarket, non-proprietary, motivations and organizational forms should in principle become even more important to the information production system.”

The networked information economy appears to be relatively weak in Africa, as there is very little research and development of ICT and software applications (Ya'u, 2005), with some notable exceptions such as the Otigba computer hardware cluster in Nigeria (Oyelaran-Oyeyinka, 2007) and the new I-hub in Kenya (African Brains, 2011). There have also been some very innovative applications developed such as m-Pedigree and Simpill in South Africa, which sends a text when a patient opens their pill bottle, and reminds them if they

don't (Radelet, 2010). Outside of applications such as these however, there is very little research and development activity which takes place in the information economy proper in Africa, such as the development of new hard and software, where the much of the value addition takes place. The issue may be partly one of time as new technological development becomes embedded,⁹ although this may be limited by resources as Africa's most innovative economy, South Africa has less than 20% of the number of researchers per thousand people employed as in the Organization for Economic Cooperation and Development countries (OECD, 2009 and ISO, 2009). The continent then continues to be characterised by technological underdevelopment (Timamy, 2007), despite substantial latent innovative potential (Muchie, Gammeltoft et al., 2003). Consequently as has been argued elsewhere current modes of African incorporation into the global informational economy constitute a form of thin integration (thintegration), where Africa is primarily imbricated in global ICT value chains through imports of mobile phones and other technology, with natural resources, primarily, serving as the counter-flow (Carmody, 2010).¹⁰

There are successful indigenous mobile phone companies such as MTN (Mobile Telephone Networks) of South Africa which employs 6,000 people directly worldwide and pays substantial tax revenue. However, according to the Nobel Prize winning economist Joseph Stiglitz (2010) companies such as this are "mining" poorer countries of their income. MTN for example now earns most of its profits in West Africa, rather than Southern Africa, with Nigeria being a particularly important market (MTN, 2009), despite the much lower average incomes in West Africa.

⁹ I am grateful to Chris Benner for this point.

¹⁰ One academic estimates that up to 20 percent of sub-Saharan Africa's phones pass through one housing complex in Hong Kong called Chungking Mansions (Shadbolt, 2009), many of which are retrofitted (fakes).

It is also estimated by the World Bank that the mobile phone industry has created three and half million jobs in Africa, largely in low productivity and profit activities such as selling mobile phone credit (Bhavnani, 2008). As the marginal productivity of labour is very low in these activities, as is the scope for innovation, structural diversification is very limited. Mobile phone credit sellers represent a new hybrid (in)formal economy in Africa, as they work in the “unregulated” or popular economy, but are articulated to the formal economy through purchases of mobile scratch cards. Mo Ibrahim (2011) refers to them as “indirect employees” of his former company Celtel, although without having to pay payroll taxes and social insurance, thereby undermining the possibilities of a tax and accountability bargain between citizens and the state.¹¹ The literature on the diffusion of mobile phones in Africa has concentrated on the demand side almost exclusively, while sometime noting the fact that mobile telephone is an “inverse infrastructure” which are largely self-organizing and do not require huge fixed investments, unlike roads or an electrical grid (Egyed, Mehos et al., 2009). However on the supply side their spread has been facilitated precisely by conditions of informality and state weakness, which must be transcended for there to be development. Mobile phones then have contributed to the growth of the informal sector, through employment creation in selling credit, repairing phones etc, which is beneficial in terms of new livelihoods, but problematic in terms of its longer term development impacts (Meagher, 1995).

While mobile telephony may be helpful to certain informal sector enterprises, the sale of credit to poor populations working in the informal economy could also be regarded as an

¹¹ This is somewhat ironic given the Mo Ibrahim Foundation’s focus on governance.

example where the formal sector is extracting social surplus from the informal sector – adverse articulation between the two “circuits” of the economy (Santos, 1979). Other potentially disadvantageous articulations are also being inscribed, as Celtel was bought out by a Kuwaiti company in 2005, replicating previous patterns of economic extroversion.¹² Income is then flowing up the global social value chain from those in the informal sector in Africa buying mobile phone credit to international stockholders, such as Sunil Mittal who now holds a majority stake in the renamed company, Bharti Airtel, and is the ninth richest person in India (Times of India, 2007).¹³

Perhaps from a developmental perspective the most important question is the indirect impacts of new ICTs on other sectors of the economy, outside of the information economy proper. According to Esselaar, Stork et al., (2007, p. 98) “during the hype of the dot.com bubble in 2000, there was a general perception that the provision of ICTs to SMEs... would have a transformative effect. Clearly the current view is more pragmatic. ICTs are now supported for the catalytic role that they can play within sectors of the economy”.

There are many examples of the informationalized economy in Africa. For example, the Song-Taaba Yalgré women’s organization in Burkina Faso, which exports shea butter and sells over 90% of its output over the internet. Its members use mobile phones and global positioning systems to “track locations, surface area, numbers of trees, and other field data to harvest shea butter more effectively” (Radelet, 2010, p. 109). At the national and global

¹² Although Ibrahim was living in London at the time and had sourced capital for Celtel from international private equity groups such as Emerging Capital Partners

¹³ In a sense the change in ownership may make little developmental difference as both Ibrahim and Mittal are members of the transnational capitalist class Sklair, L. (2001). The transnational capitalist class. Oxford, UK ; Malden, Mass., Blackwell., who are based for the most part, outside of Africa.

scale, ICTs can help boost “invisible” service exports, with eighty thousand people now employed in the South African call-centre industry (Benner, 2006: Maytoo and Payton, 2007).¹⁴ To more fully understand the economic impacts of new ICTs it is helpful to develop a typology.

Typologizing the impacts of ICT in Africa

A variety of typologies have been developed to explain the impacts of new ICTs on development in Africa. Aker and Mbiti (2010, p. 214):

“identify five potential mechanisms through which mobile phones can provide economic benefits to consumers and producers in Sub-Saharan Africa. First, mobile phones can improve access to and use of information, thereby reducing search costs, improving coordination among agents, and increasing market efficiency. Second, this increased communication should improve firms’ productive efficiency by allowing them to better manage their supply chains. Third, mobile phones create new jobs to address demand for mobile-related services, thereby providing income-generating opportunities in rural and urban areas. Fourth, mobile phones can facilitate communication among social networks in response to shocks, thereby reducing households’ exposure to risk. Finally, mobile phone-based applications and development projects – sometimes known as “m-development” – have the potential to facilitate the delivery of financial, agricultural, health and educational services”

Another way to assess the impact of ICTs is the typology developed by Heeks and Jagun (2007) who argue that the impacts of mobile phones fall into three categories 1) incremental (improving the speed and efficiency of what people already do, 2) transformational (creating something new) and 3) those related to production (selling mobile phones and related services). The examples of transformation which are often given relate to the provision of new services such as M-banking or M-health delivery. However as noted earlier economic

¹⁴ Even though the salary of a BPO worker in South Africa is four times that of one in India it is still an attractive base for some companies as the financial regulatory system is the same as the British one (Pejout, 2010). Africa and the 'second new economy'. The political economy of Africa. V. Padayachee. London ; New York, Routledge: 232-244.)

transformation is a much more multi-faceted and complex process than simple service delivery. Consequently an alternative typology, with four components to think through the economic impacts of ICTs is proposed below.

- 1) direct impacts of the production of ICT and in terms of sourcing of raw materials, production, marketing and sales (the ICT hardware value chain),
- 2) business opportunities in the information and virtual economies proper (such as the development of applications, micro-work,¹⁵ business process outsourcing or power levelling¹⁶).
- 3) the impacts of ICT on productivity in other sectors of the economy.
- 4) indirect economic impacts through education, health and other service provision.

The first two of these can be encompassed under the idea of ICT global production networks (Hess and Coe, 2006). In this respect it is useful to draw a distinction between the information economy (which is ICT driven), and the informationalized economy where other economic sectors use new ICTs. Given the weakness of 1 and 2 in Africa, and the limited economic impacts of 4, it is the nature of the informationalized economy which is being created which is most important.

The informationalized economy has differential depth to it depending on the embeddedness, usage and interconnection in the ways in which new ICTs are used. As most of the world's poor work in the small and medium-sized enterprise (SME) sector (Lourenço-Lindell, 2010), including agriculture, perhaps the important question about the impacts of ICT on

¹⁵ http://www.samasource.org/downloads/Samasource_One_Pager_Gen_14Jun2010.pdf

¹⁶ Where gamers are employed to develop characters in on-line games.

development and poverty is how they affect the productivity, business strategies, exports¹⁷ and consequently the growth potential of SMEs. In an African context what is particularly important is the impact on the informal sector, including peasant agriculture.

Some studies imply that the introduction of new ICTs represent positive, rather than zero sum games.

“(Aker, 2008) ... finds that the introduction of mobile phones is associated with increased trader and consumer welfare. The introduction of mobile phones led to a reduction in the intra-annual coefficient of variation, thereby subjecting consumers to less intra-annual price risk. Mobile phones also increased traders’ welfare, primarily by increasing their sales prices, as they were able to take advantage of spatial arbitrage opportunities. The net effect of these changes were an increase in average daily profits, equivalent to a 29 percent increase per year. However, the effects of mobile phones upon farmers’ welfare were not measured” (Aker and Mbiti, 2010, p. 218).

However a reduction in intra-annual price variability is not the same as an overall price reduction and if the majority of the population are primarily farmers, lower food prices may reduce their welfare. In this study the only indisputable beneficiaries were the traders, the obverse of what is meant to be the impact of mobile phones on markets.¹⁸

Do new ICTs fundamentally change the nature of interconnection between more distant people and places and power relations between them, or do they reinforce them? This idea of

¹⁷ Although the international market is limited so the fallacy of composition comes into play. It is not possible for all SMEs to gain international market share.

¹⁸ A survey by a World Bank researcher in Bolivia found that 70% of respondents did not think that internet access had any impact on people’s economic well being Gigler, B.-S. (2011). "Informational Capabilities - The Missing Link for the Impact of ICT on Development." from <http://siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/D4S2P3-BjornGigler.pdf>.

flows and the ways in which people and places are linked can be examined using the concept of articulation detailed below (Park, 1997).

ICTs and Articulation

Writing in the early 1980s the agricultural economist Alain de Janvry (1981) developed his ideas about the political economy of development using the concepts of articulation and disarticulation. His central idea was that economic underdevelopment resulted from social and sectoral disarticulation. Whereas in developed countries there was a developed capital goods sector which provides inputs to and demand for the consumer goods sector (sectoral articulation) and the working class had mass purchasing power to buy the products of industry (social articulation), this was not the case in the underdeveloped world. There he identified two types of economies – export-oriented and import-substituting disarticulated ones. Globalization over the last three decades since his seminal book was written has changed this configuration somewhat, even as the core-periphery structure of the global economy has remained substantially intact (Grasland and Van Hamme, 2010). Partly facilitated by new ICTs and liberal global capital and trade regimes, new global production networks have emerged (Coe, Hess et al., 2004). This in turn has created a new patterns of “network trade” when final products contain components manufactured in many different countries (Broadman and Isik, 2007).

For some these new forms of international interconnection have resulted in the world becoming “flat”, as new ICTs allow information processing and other activities to take place, potentially, virtually anywhere in the world (Friedman, 2005). Regional development tends to

exhibit a long-lived path dependence (Neffke, Henning et al., 2011), however, and others have noted an accentuation of uneven global development (Jomo, Baudot et al., 2007). Sub-Saharan Africa (SSA) continues to receive relatively little inward FDI in manufacturing and services and around three quarters of what the sub-continent exports is unprocessed primary commodities (Bond, 2006). Thus, for the most part, SSA can be characterised as export-oriented disarticulated economies. Are ICTs fundamentally changing this?

The answer to this question would appear to be no, as there is no evidence of structural diversification in Africa's exports. In fact the reverse seems to be happening. For the thirty nine Africa countries for which data is available in the World Trade Organization's statistics database the proportion of exports accounted for by agricultural products, fuel and minerals from the continent actually rose from 69.4% in 2000 to 71.3% in 2009, and there was a roughly corresponding drop in the proportion of total exports accounted for by manufactures (calculated from World Trade Organization, 2011). Some have argued that as a result of increased resource dependence in exports there has actually been a technological downgrading of African economies (Economist Intelligence Unit, 2002), despite the much vaunted "mobile phone revolution".¹⁹ This (neo)colonial trade structure reproduces, rather than substantially reducing poverty (Carmody, 2011).

Conclusion

¹⁹ Increasing resource intensity in the export structure has been driven by both demand for Africa's natural resources and competitive displacement pressures on manufacturing arising from competition with Chinese products in particular Kaplinsky, R. (2008). "What Does the Rise of China Do for Industrialisation in Sub-Saharan Africa?" Review of African Political Economy 35(115): 7-22..

The failure of neoliberalism in Africa led to its reinvention through the use of a variety of concepts such as governance and social capital over the last number of decades (Carmody, 2007). This failure of market reforms was blamed on a lack of social capital or poor governance, while the economic basis of the policies themselves were not questioned, at least by the development institutions implementing them. More recently Africa's physical geography has been used by development institutions, such as the World Bank to "explain" the continent's underdevelopment (Carmody, 2011). The posited solution is to reduce distance from rich parts of the world through the elimination of tariff barriers and investment in infrastructure. As the self-proclaimed "knowledge bank", the World Bank knows what to do.

Much of the literature on the impacts of new ICTs in Africa fits into the modernization paradigm which sees development occurring as a result of processes of contagious diffusion from rich to poorer parts of the world. This technoliberal boosterism, where there is conflation of information technology with markets and democracy, does little to address the fundamental structural problems of African economies. While World Bank researchers argue that Africa is now being propelled into cutting edge transnational production networks (Broadman and Issac 2007), there is little evidence of this happening on a substantial scale from the macro trade statistics or micro level analysis (Carmody and Hampwaye, 2010).

Africa remains characterised by technological dependence across a range of sectors, including ICTs. While these new technologies do have poverty reduction benefits and potentialities, through the unlocking of capabilities, they do little to substantially raise productivity or economic diversification as shown by the trade statistics cited earlier.

According to Amartya Sen (2001, p. 183) “evidence suggests that successful development can best be achieved by involving a ‘wide dissemination of basic economic entitlements (through education and training, through land reform, through availability of credit [and thereby broaden] access to the opportunities offered by the market economy’ (Alampay, 2006, p. 12). “Viewed in this way, it implies that access to ICTs do not necessarily lead to development unless other entitlements are provided” (Alampay, 2006, p. 12). However, entitlements are not costless and a productive economic structure is needed to generate the resources to pay for them. Furthermore economic upgrading and diversification requires more than access to entitlements. It requires an active government strategy to build competitive advantage in the manufacturing and services sector (Rodrik 2008). The reduction of information asymmetries alone cannot substitute for that.

As Graham (1998, p. 172) argues “complex articulations are emerging between interactions in geographical space and place, and the electronic realms accessible through new technologies”. However in much of the literature there is an intellectual disarticulation between the spread of new ICTs and their supposed impacts. Africa is incorporated into the global technological revolution primarily in a dependent manner, as an importer, rather than producer of technology. The main benefit of mobile phones and other new ICTs in Africa is the greater access to information and communication they allow. However to expect them to transform places is to overload their impacts. Other structures of economic production and flows of trade and investment are much more important in achieving that. These are fundamentally structured by power relations. Africa’s development then becomes a fundamentally political, rather than a technical question, although there is no neat division

between the two. Their political usage and impact is potentially the greatest impact that new ICTs can have in Africa. The recent revolutions in the Arab world were organized and aided by the fact that 80% of youth in those countries report using the Internet (Fayad, 2011). The “Arab Spring” is also sometimes referred to as the “Facebook Revolution”, as this is often how protests were organized. However in Africa the internet penetration rate is only 11% (Internet World Stats, 2011), and for Sub-Saharan Africa substantially lower. The rapid growth of the internet through time however may change political configurations on the sub-continent.

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