A New Logic of Reducing the Global Digital Divide in Sub-Saharan Africa: From Obstacles to Opportunities

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The relationship between Information and Communication Technologies (ICTs) and socio-economic development strategies in Sub-Saharan Africa is commonly associated with the goal of reducing the Global Digital Divide (GDD). Even though this is a noble goal, its implementation under what is defined as the Bridge Logic creates an unsustainable environment in which ICT is understood as an end rather than as a means to tackle the real obstacles of the region. This paper proposes a new logic based on selected best practices extracted from the field: performing specific ICT actions in key sectors such as government, local business and education allows nations to achieve a higher socio-economic level while reducing the GDD as a by-product of the whole process. In the first section, the concept of the Bridge Logic is introduced and its weakness is explained. In the second section, some best practices in the region are reviewed to show that a new logic is possible. In the third section, this new logic is formalized. The fourth section concludes the argument.

1 Why the Bridge Logic does not work?

In the developed world, Information and Communication Technologies (ICTs) are ubiquitous in a wide range of sectors such as business, government, healthcare and education. Often, ICTs are one of the major vehicles for the delivery of services and the sharing of information. ICTs have also proven to be an extremely effective tool for capacity building and, thus, are a key component in entrepreneurial activities. In the developing world, the myriad obstacles that have retarded economic growth and human development have made the implementation of ICTs throughout the various sectors rather challenging as many of the preconditions for the effective and sustainable distribution of new technologies are missing or substandard. The discrepancy between developed and developing countries and also within developing countries in the accessibility and quality of ICTs forms the basis of the Global Digital Divide (GDD), a concept that is debated far and wide.

Much of the debate surrounding this topic is in reference to the appropriate approach to bridging the GDD. There are many who argue that in places such as Sub-Saharan Africa (SSA), where poverty, hunger, malnutrition and lack of employment are so pervasive, the implementation of ICTs throughout society would be the equivalent of putting the cart before the horse. The argument continues by claiming that people with limited access to scarce resources need investments in healthcare, basic infrastructure, education, employment training, etc. and not Internet access or cell phone towers. While this is certainly a very accurate and poignant observation, it is the opinion of this paper's authors that presupposing that ICTs have no place in socio-economic strategies aimed at eliminating the aforementioned problems is erroneous and somewhat short-sighted. Closing the GDD is not a development issue that needs to be prioritized over other more fundamental socio-economic challenges such as reducing malnutrition; rather it is a tool to be utilized in programs to reduce malnutrition.[1]

The Bridge Logic, one approach used to overcome the GDD, implies that there is a need to overcome the socio-economic obstacles so as to be prepared to acquire modern ICTs. Under this logic, the expansion of ICT infrastructure, service and use is a goal and the socio-economic problems that plague many nations are obstacles to reaching it. This approach argues that issues such as hunger, low levels of education and lack of access to economic resources will be overcome by bridging the GDD [13].

Figure 1 graphically depicts the dynamics behind the Bridge Logic. It can be seen that while GDD Reduction is the main development objective that drives the transition from one level of ICT to the other ($ICT_1 \rightarrow ICT_2$), in order to do that many GDD programs perceive socio-economic obstacles as a problem that needs to be solved to get to the other side of the bridge. However, if a higher level of ICT service and infrastructure becomes a goal by itself, then it is unlikely that the use of that technology will be sustainable. The reason is that instead of addressing the socio-economic obstacles, the Bridge Logic attempts to jump over them, maintaining the same socio-economic level ($SEL_1 \rightarrow SEL_1$), as its

main objective is to get to the other side of the bridge. In doing so, two mistakes are made: 1) the socio-economic hurdles will not disappear just by jumping over them, making the whole GDD program unsustainable, and 2) success is not found on the opposite shore as the main obstacles that prevent development are ignored and left under the bridge.

The Bridge Logic, then, is incorrect in its conception of the relationship between ICTs and development strategies. Instead of being a goal, this paper argues that ICTs should be conceived of as a tool for development and an integral part of poverty alleviation and capacity building programs. ICTs are an extremely important component in development strategies serving as a vehicle for achieving the alleviation of poverty and dislodging stagnated economic growth. However, as with any tool, one needs to know how to use it and, more importantly, in which sectors it would have the greatest impact.
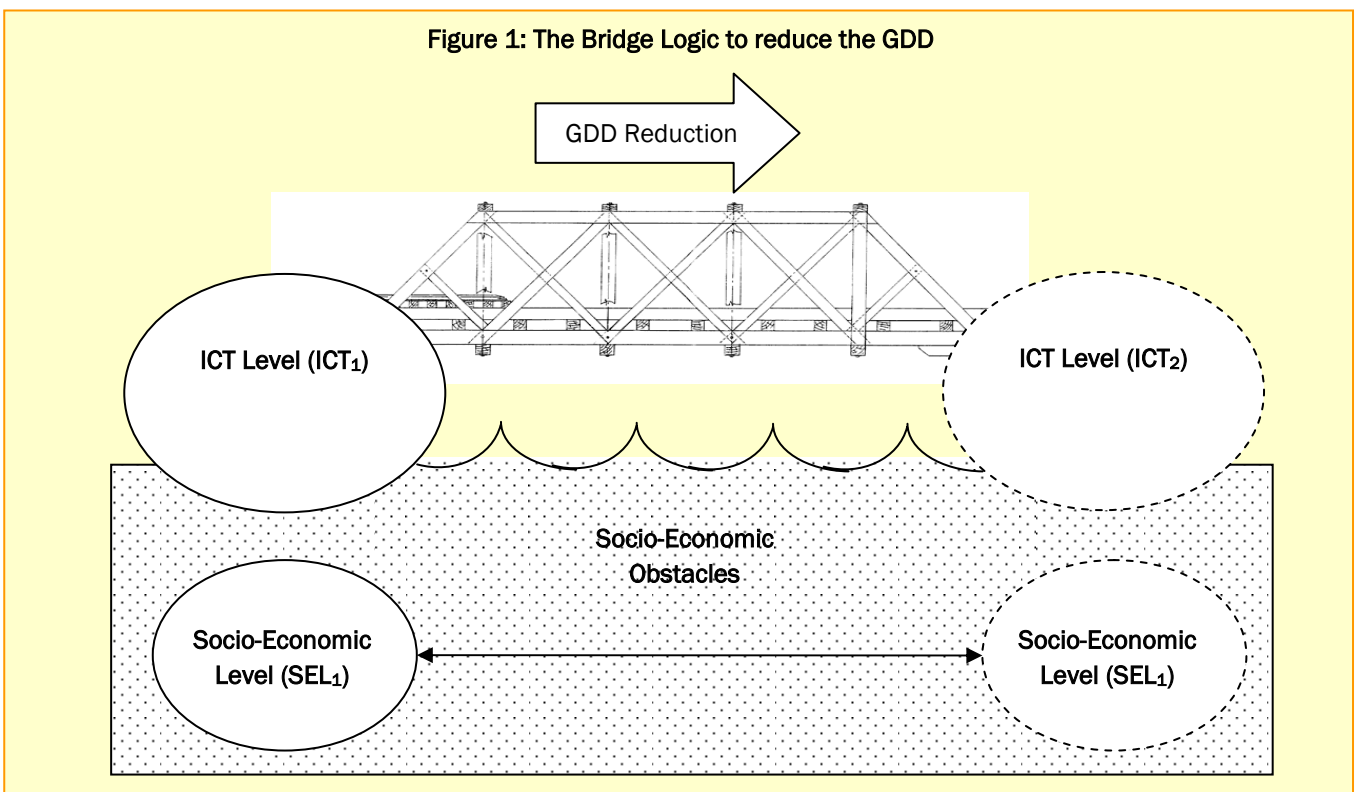
2 Envisioning a new logic through best practices

Three main sectors were identified for the focus of ICT action: government, local business and education. By concentrating ICT development in these sectors, developing countries will be able to take a modern approach to resolving age old socio-economic problems. Since ICTs can improve the efficiency and effectiveness of a wide range of services, it is logical that they are a key component in strategies aimed at increasing economic growth and human development. The proper implementation of ICTs within the larger context of development strategies can result in capacity building for both individuals and institutions. This will ultimately lead to an environment that is more conducive to twenty-first century ideas and technologies and one that will encourage entrepreneurial activities that stimulate growth and development.

Through the review of best practices, the approach of this paper is to look at the key role ICTs play in overcoming development challenges in each of these three sectors. This will be discussed below. Section 3 discusses how these sectors are linked to a number of real obstacles countries in SSA face and formalizes the proposed new logic.

2.1 Government

The integration of ICTs into the government sector has, in many cases, caused a revolution in the provision of services. E-governance, as it has been termed, is being used to improve the delivery of services and the dissemination of information in a way that is intended to improve citizens' access to their govern-

Figure 1: The Bridge Logic to reduce the GDD

GDD Reduction

ICT Level (ICT$_1$)

ICT Level (ICT$_2$)

Socio-Economic Obstacles

Socio-Economic Level (SEL$_1$)

Socio-Economic Level (SEL$_1$)

ment counterpart. Services are being provided to the public via the Internet, telephone, public access centers, wireless devices and other communications and information systems. This new format for services and information is helping to expedite the processes that slow down many governments in the developing world that are understaffed and/or are functioning on antiquated systems. By digitizing applications for permits, tax forms, zoning information, etc. governments can save valuable time and resources that can then be utilized for a broad range of social programs and services.

This improved access, in turn, will serve to encourage citizen participation in the decision-making process. UNESCO has been working quite extensively in encouraging the growth and inclusion of e-governance and is promoting it as a way to develop new concepts of citizenship in terms of the needs and responsibilities of citizens. The objective of e-governance, according to UNESCO, is to engage, enable and empower the citizen.[2]

As citizens become more engaged in the decision-making process and are empowered through capacity building programs, a likely by-product will be the growth of entrepreneurial activities. Without access to information and other services, individuals are limited in their ability to develop the small and medium enterprises (SMEs) that are becoming the backbone of economic development in regions such as SSA. In a nation where e-governance is pervasive and not only concentrated in large urban areas, SMEs will be a logical offshoot of the government's efforts to build local capacities and encourage the entrepreneurial spirit.

Government policies and initiatives are necessary support mechanisms for any growth within the ICT sector that will lead to the expansion of SMEs, especially in the rural areas where the lack of basic infrastructure signifies a failure of local governance. In Kenya, government ministries have been promoting ICT programs that focus on particular sectors within the economy. Much of the government's efforts are concentrated on infrastructure development and website content development. For example, a small grant from the World Bank helped create the Kenya Country Business Incubator (KEKOBI) project. This is aimed at supporting small and micro-enterprises by making the government both the adopter and purchaser of ICT products. By expanding the demand for technological products, the government is helping to encourage the growth of small

software firms through its expressed need for products that target government ministries such as an e-water portal for the water ministry, a billing system, an accountancy and finance system, an operation and maintenance system as well as a monitoring and evaluation system [2].

These business incubator models are based on initiatives that led to robust economic growth in countries such as China, Pakistan, Malaysia and Singapore. In these programs, the government's support of ICT development through the adoption of policies that favor and protect SME growth and expansion have helped to create viable businesses and develop local capacities and have resulted in creating a much more investor-friendly environment. Prof. Atieno Ndede Amadi, KEKOBIL's chief executive officer, says that Kenya's industrialization must be supported by business incubation programs that leave many SMEs (when they leave the incubator) with fully developed managerial structures and business plans. By working through government ministries, KEKO-BIL has helped to provide a solid platform for entrepreneurs to engage in capacity building activities while simultaneously developing strong local businesses. [2]

2.2 Local Business

As the example of KEKOBIL's program in Kenya shows, local business development is an irreplaceable aspect of economic growth strategies. Not only are ICT products and services being developed by SMEs, but they are increasingly becoming a critical factor in the advancement and growth of SMEs throughout all sectors. ICTs, when implemented in a sustainable, inclusive manner with the support of public and private investments, can be an equalizer by providing access to economic/financial resources to regions, ethnic groups, etc. that were once marginalized. ICT networks, often supported by government investments in infrastructure, can link SMEs with a larger, global market allowing them to complete business transactions from any location.

The UNCTAD Information Economy Report 2006 argues that poverty alleviation programs must include efforts that enhance the capabilities of the poor and marginalized. In rural areas, governments are providing access to market information—including prices and news regarding competitors—that enables farmers and other entrepreneurs to make informed decisions regarding sales, business plans and overall development strategies. Atkinson and McKay say that a digital economy is more than one

that exists on the Internet; it is an economy where hardware, software, applications and telecommunications are pervasive [1].

Businesses are applying ICTs to their strategies in a wide variety of ways. Everything from standalone ICTs, for example PCs used for billing and financial planning, to networked ICTs that link SMEs to larger markets and provide a medium to promote and deliver services. One critical ICT that is often overlooked and underappreciated by those in the developed world due to their ubiquitous presence is the mobile phone. Just as in the developed world, in developing countries mobile phones help to increase the social networks of entrepreneurs thereby expanding the possibilities for business opportunities.

In Rwanda, the expansion of cellular technology in the years since the 1994 genocide has encouraged the growth of many SMEs and helped to link entrepreneurs with clients and suppliers. The number of mobile lines (in thousands) in Rwanda increased from 5 in 1998 to 290 in 2005 [4]. This rapid expansion has opened many doors for entrepreneurial activity in a wide range of sectors. A baker in Kigali uses his mobile phone to receive orders from clients, call suppliers and to keep in touch with his one employee no matter where they are in the city. This same baker estimated that his sales increased by 30 percent due to his mobile phone [4].

The case of the baker in Kigali, Rwanda is a somewhat typical story of SME growth and development due to ICTs. Throughout SSA, mobile phones and other ICTs are helping build local capacity for would-be entrepreneurs that makes investment in this area a sustainable way to overcome certain socio-economic hurdles. To this end, UNCTAD recommends the integration of ICTs into national and sectoral poverty reduction programs so as to provide an "enabling environment" and encourage "the development of pro-poor ICT networks and organizational capacities" [7].

2.3 Education

ICT use in the educational sector is a topic that has received a great deal of attention as they have become a widely accepted tool in both the formal and informal classroom settings: computers in the classroom for word processing, research and increasing literacy; the Internet as a learning tool to disseminate new, up-to-

date information and to create networks of learners; and training for teachers and administrators. These uses, as well as many others, have been shown to increase both teacher and student motivation and to expand the learner's autonomy during the educational process. As a result, socio-economic programs aimed at reducing poverty and increasing access to educational resources necessarily must include ICTs as a vehicle for the attainment of goals and objectives.

Developing human capital serves social as well as economic development goals. A strong knowledge base is critical to improving not only productivity and efficiency and but is also the key ingredient to building capacity among citizens. As such, governments are continually seeking solutions to improve on the educational environment within their borders. When educational programs are implemented in an equitable fashion they are the first step towards an expanded economy. Modern technologies provide the perfect tools for teaching learners how to process information, make more informed decisions and develop the skills necessary for creating SMEs that supply goods and services on both the local and regional levels.

The World Links program, a non-for-profit initiative that was created through support from the World Bank, has been working throughout the developing world since 1997 providing capacity building, sustainable, school-based ICT solutions. In response to the rapid growth of Internet usage in Nigeria—a 2400 percent increase since 2000, the majority of which is in the urban areas—the World Links program has been attempting to increase access throughout the often neglected regions of the country [5]. In the Akwa Ibom state, the World Links program offers education, training and information resources to students, youth no longer attending school and adult community members. By running school- and community-based internet learning centers, the World Links project has been playing a role in generating economic and social opportunities for the citizenry. The goal of the program has been to help equip community members with the skills necessary to compete in the workforce and to develop business models for SMEs that ensure continued access to ICTs and other technological services [16].

ICT presence in the educational setting is a key aspect to developing entrepreneurial activities as they help to encourage the growth of twenty-first century ideas. A sustainable program supported by both government and

non-governmental partners helps to develop human capital and prepare individuals with the skills and knowledge necessary to successfully manage SMEs and other business ventures. Using ICTs in education creates a model that mirrors the rapidly changing business environment of today thereby preparing students to be productive members of society.

3   From Obstacles to Opportunities

Conceiving ICT as an enabler of socio-economic development, rather than a bridge we are forced to cross over, has many benefits. However, socio-economic development is not going to happen automatically just by stimulating local businesses, reforming the government to facilitate entrepreneurship or improving the educational level of the population, as these success stories shows.

Most SSA countries have real obstacles that are usually ignored in GDD programs that, when acknowledged, can bring about the success of a project. But when they are not identified and included in a strategic plan, those very same obstacles may be magnified and may actually result in a lower level of socio-economic development [13].

Personal Rule: As many other goods in SSA, ICTs are still treated as a private good instead of a public good. Among other things, this implies that it is conceived to be traded, and the government uses it as an economic and power source. Thus the GDD program must be profitable for both the foreign technology partner and the personal ruler. Take the example of *Simputer*, an Indian product intended to be a sub-USD 200 device, which ended up costing around USD 400 in most Sub-Saharan countries. The difference is not just transportation or intermediation cost, but government and private (usually foreign) profit.

Enclave Economies: ICT does not only emerge in urban areas but also in enclave economies all over SSA. The reason is that "Business" follows the pattern of the concept introduced in the previous section. If you want to implement advanced technology, you will do it in places where the infrastructure is ready, know-how can be easily obtained, FDI has proven to be profitable and government support exists. In most SSA countries, these places are the enclaves where most of the successful projects that introduce ICTs into the continent reside. One of the most important examples of this is the government investment in developing the "National

ICT Backbone" in Nigeria in order to provide international access to their growing oil business.

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Civil Conflicts: ICT penetration, if not properly managed has the potential to increase inequality and tension. GDD has two dimensions: the digital divide between SSA and the rest of the world and the digital divide among SSA countries. However, a third dimension might be added: the digital divide within the country. In a very revealing article, Steve Onyeiwu shows important variations in the way ICT evolved in SSA countries, but in the cases where ICT growth was concentrated in the enclaves (such as the cases of Congo and Nigeria with an above-average ICT index for SSA) it did not help to improve democracy, participation and economic integration as was the intention [9]. In a fragmented country, ICT might have the opposite effect and could potentially widen the gap among the information-haves and the information-have-nots.
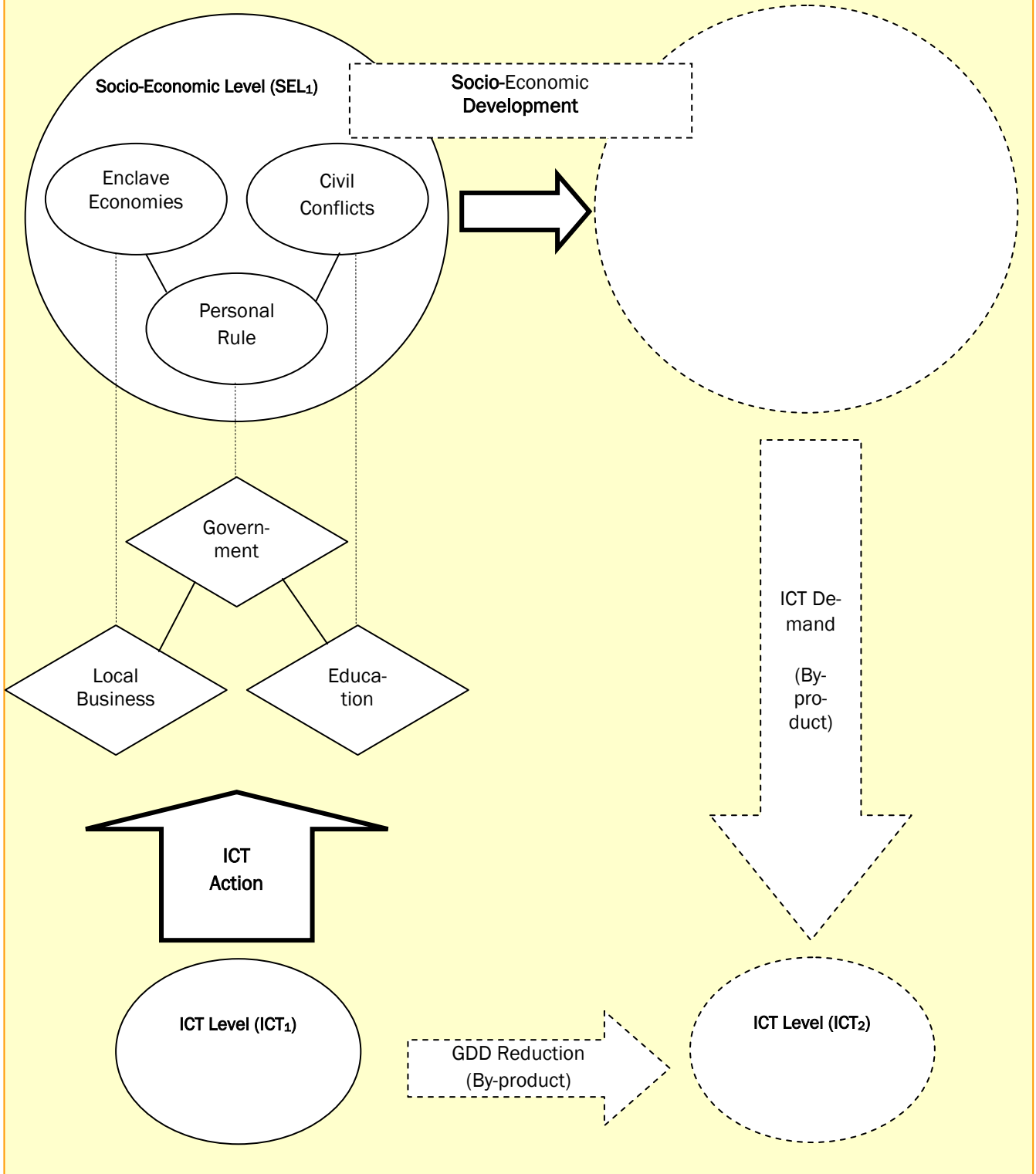
Among others, these three obstacles found in most SSA countries need to be seriously considered when deploying GDD programs, as they often reach deep into the structure of a nation and necessarily must be overcome first in order to minimize other challenges such as urban bias, lack of infrastructure, low levels of education and political instability.

The view proposed in this paper as to how to tackle the GDD explains why certain GDD programs really improve a nation's socio-economic level while others do not. By mapping the three areas of ICT action identified in the previous section (education, local business and government) with these obstacles, one can see the path by which the situation in SSA can be improved by reaching a more efficient socio-economic level.

First, stimulating entrepreneurship and improving local business is a mechanism that debilitates enclave economies. As enclave economies are usually owned by the government or by foreign companies that find very advantageous conditions, the generation of local business under fair rules generates competition and innovation, thus creating an environment totally incompatible with enclave economies.

Second, to make this environment possible and enforce fair rules, the government needs to be involved. But first,

Figure 2: A New Logic for Reducing the GDD

Socio-Economic Level (SEL$_1$)

Enclave Economies

Civil Conflicts

Personal Rule

Socio-Economic Development

Govern-ment

Local Business

Educa-tion

ICT Action

ICT Level (ICT$_1$)

ICT Demand (By-product)

GDD Reduction (By-product)

ICT Level (ICT$_2$)

it needs to be exposed. Creating a more transparent government is a way of exposing its activities to citizens, making personal rule difficult to sustain in political terms. The government is probably the only actor capable of fully understanding the proper rhythm of ICT introduction within its borders and it is also the one institution that can balance the profit-seeking impulse of internal and external actors within the very aggressive Information Technology and Communication industry [13]. Therefore, as discussed in the previous section, the government is essential as a facilitator of the socio-economic development process.

Third, education is a very important stimulator and component for capacity building. This is true not only in the sense that local entrepreneurs need to have ICT skills in order to do business, but also in the sense that effective educational practices supported by transparent and accessible public institutions increase citizen participation and develop a sense of shared responsibility within the community. In a society where these values become accepted, the dissolution of personal rule behavior reduces the benefits of trying to get to power no matter the cost, thus diminishing the likelihood of civil conflict.

Figure 2 illustrates how to implement ICT actions in specific areas (following the best practices covered before) in order to achieve a higher socio-economic level. From the model in Figure 2, one can see that socio-economic development does not happen solely as a result of ICT presence, as is implied in the Bridge Logic. It will only happen by performing specific actions in certain areas that are connected to the "real" obstacles of Sub-Saharan Africa. Additionally, as explained in the previous section, the new ICT Level (ICT_2) is not the main objective as it is in the Bridge Logic. Rather, it is to reach an improved socio-economic level (i.e. reduce child mortality, improve access to economic resources, etc.). ICT_2 is reached as a by-product of the new socio-economic level ($SEL_1 \rightarrow SEL_2$) through an increase in the demand of new technologies and infrastructure. In this way, the Global Digital Divide issue can be solved without realizing it.

Conclusion

The increasing use of ICTs in Sub-Saharan Africa to reduce the GDD created an approach that was identified as the Bridge Logic. This vision considers reducing the digital divide as a stand-alone objective of development programs, understanding the reduction of that bridge as a goal in itself. Within that logic, overcoming different socio-economic obstacles are considered a means to that end. It was found that there is a problem with this logic, as socio-economic levels often remain the same, thus creating an unsustainable environment for new ICT levels as a result of not addressing the real obstacles of the region.

A new approach is suggested by reviewing three different sectors that are currently the target of many ICT actions: government, local business and education. In this new logic for reducing the GDD, it was found that best practices on these sectors can actually be linked to three main obstacles of most nations in Sub-Saharan Africa: enclave economies, personal rule and civil conflicts. Within this new vision, transforming these obstacles into opportunities implies focusing development projects on reaching higher socio-economic levels while leaving both the increase of the demand of ICT and the reduction of the GDD as by-products of the whole process.

Further research is needed to empirically demonstrate the linkages between the sectors presented in this paper (as well as other sectors) and the real development obstacles that SSA countries have. It is not under discussion the tremendous role that ICT has in improving these sectors, even though the underlying socio-economic effects of successful "ICT for Development" initiatives have yet to be fully discovered. The new logic presented here will provide a framework within which future research on the dynamic relationship between ICTs and development may be conducted.

About the Authors

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Notes

1. See the online article "Using technology in rural areas" for an example of how smartcard biometric technology is being used in a food security program in Lesotho. http://www.developmentgateway.org/ict/rc/filedownload.do?itemId=1080866

2. See the UNESCO Portal at www.unesco.com for an extensive discussion of the uses of e-governance and its capacity building potential.

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