

THE ROAD LESS TRAVELLED: A CRITICAL REFLECTION ON INFRASTRUCTURE DEVELOPMENT IN AFRICA FROM A PERSPECTIVE OF THE NEW ECONOMICS OF INFORMATION

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ABSTRACT

Many developed countries claim today the status of knowledge societies, since they have invested heavily in human capacity building as well as in the development of an efficient information infrastructure that is supported by a physical infrastructure comprising a network of roads, railways, airports and harbours. For many countries on the African continent this has become a highway less travelled, as these countries lack efficient and cost-effective information infrastructure development. This goes (in many cases) hand in hand with an inability to benefit economically from the application of modern information and communication technology (ICT). However, it has become imperative that information infrastructure investment should go hand in hand with aggressive physical infrastructure development. Africa will only bear the economic fruit of investment in information technology if it is supported by the further development of its roads, railways, airports and harbours. Without these there can be very little economic progress.

KEY WORDS

Knowledge society, economics of information, physical infrastructure, ICT infrastructure

1 INTRODUCTION

The twenty-first century is characterised by new opportunities and challenges posed by the introduction of new and revolutionary information technologies. Not only have these new developments led to a new economic paradigm, the so-called “economics of information” (Evans & Wurster 2000), but they have also introduced the notion of information and knowledge societies (Mansell & When 1998). The successful integration of an information infrastructure with a physical infrastructure has provided these countries with an unparalleled competitive advantage that has fostered economic growth and allowed the global expansion of their marketplace. This has become the golden highway to economic success for these knowledge societies.

For many African countries it is, however, a highway still less travelled. There are many reasons for this. There is, for example, a lack of efficient and cost-effective information infrastructure development. This is accompanied by an inability to benefit economically from the application of modern ICT. Most African countries also have underdeveloped and poorly maintained physical infrastructure (OECD 2005/2006).

It is, however, true that the African Union and most African governments have begun to understand the socio-economic benefits of modern ICT and have accordingly given it a higher priority (World Bank 2009b). According to the World Bank (2009b), African governments started focusing on providing affordable ICT services to their citizens in the hope that it would put them on the road to economic growth and equal international participation. There is also a big international push to provide Africa with more reliable and faster access to the Internet. These initiatives are happening at a time when many African countries are still suffering from an underdeveloped (and in many cases poorly maintained) physical infrastructure (OECD 2005/2006). This condition has put a serious impediment on the social and economic development of the continent and is still preventing Africa from fully benefiting from the new information economy.

It is against this background that we decided to write this article. Our main objective is to illustrate the economic interconnectedness between an information infrastructure and a physical infrastructure. We use the new economics of information model, as developed by Evans and Wurster (1997, 2000) in support of our argument. It is illustrated that the mere investment in information infrastructure by African states will not bring about the desired economic growth. What is also needed is physical infrastructure development. We follow predominantly a quantitative approach in analysing the data.

With this objective in mind the article is structured in the following manner: In the first part we discuss the new economics of information as explained by Evans and Wurster (2000). We highlight in particular that the new economic model is not only “weightless”

in terms of the flow of digital information, but it also has a “top heaviness”, which implies a physical infrastructure to transport and deliver many of the products bought online. As the physical infrastructure and information infrastructure are dependent on each other, we firstly focus our attention on the many new information infrastructure initiatives underway in Africa, including the new digital highway running through the continent. The question remains, however, as to whether Africa is committed in the same way to develop her physical infrastructure in support of this new digital highway, or whether this has become the road less travelled along the way. This issue is addressed in the last part of the article.

2 THE ROAD AHEAD: THE NEW ECONOMICS OF INFORMATION

One of the biggest socio-economic challenges and opportunities facing people (in particular businesspeople) living on the African continent is globalisation and the integration of the world’s socio-economic life (Mahajan 2009). The process of globalisation is driven by advanced capitalism, which has migrated from a production-based economy to an information-based economy. This shift was made possible by the development of modern information and communication technologies, which Preston (2003:35) defines as “the cluster or interrelated systems of technological innovations in the fields of microelectronics, computing, electronic communications including broadcasting and the Internet”. These technologies bring about a profound transformation not only in the global economic landscape, but in particular in the products and services offered by African entrepreneurs. This explains why Van Audenhove (2003:48) refers to these as “spectacular technological innovations”.

The application of modern ICT has changed significantly the different socio-economic processes and has led to the creation of a new network of socio-economic and political relationships (Castells 1996). It has brought about more efficient strategic co-operation between firms. It has allowed the interactive globalisation of communications and has introduced the globalisation and integration of labour, production, services and finance (Evans & Wurster 2000; Friedman 2005). Examples include online banking, different electronic services provided by airlines and the introduction of online retail stores. The creators and distributors of information products and services, as well as the producers of hardware and software for the information sector – based largely in the richest countries – have grown exponentially to become one of the largest economic sectors (Moore 1998; Castells 1996; Chang 2003; Webster 2002; Van Audenhove 2003).

The reasons why the introduction of these modern ICTs have opened up so many new and radical information-based business opportunities and possibilities must be sought in their ability to digitise information and to manipulate information products and services (Anderson 2006, 2009). This has far-reaching consequences for the life cycle of

information, in other words, the creation, duplication, capturing, organising, processing, storage and retrieval of information as it relates to the different economic processes. The digitisation of information allows for the first time the “unbundling”¹ of information from its original physical carriers, such as objects (eg a house), paper and other print material in a different and unique way from previous analogue-based ICT, including writing and painting. From an economic perspective, predigital information technologies did not have the ability to simultaneously reach millions of people and allow synchronic interactivity and the customisation of customers’ needs. Due to modern ICT, digitised information has become interlinked (hypermedia), can “travel by itself” at nearly zero marginal cost, and can reach more people simultaneously in an interactive way. In their book, *Blown to bits: how the new economics of information transforms strategy*, Evans and Wurster explain this unbundling of information and subsequent digital transfer thereof as “a trade-off between richness and reach” (2000:24). By “reach” they refer to the number of people who participate in the transfer of information. “Richness” is a more complex notion and is defined by a number of characteristics of information itself. These include:

- Bandwidth – the amount of information that can be moved between people
- Customisation – the degree to which the information can be customised to the need of a user
- Interactivity – the degree to which interactive dialogue can be achieved
- Reliability – information is reliable when communicated among a small number of people trusting one another, but once it is shared with more people less trusted it becomes less reliable
- Security – managers tend to share sensitive information only with their inner circle and less sensitive information with a larger audience
- Currency – in the investment world (such as on Wall Street) only a few market makers have access to instantaneous quotes, while other financial institutions receive the information later (Evans & Wurster 2000:25).

Evans and Wurster (2000:24) argue, and we paraphrase their thoughts in this paragraph, that in this predigital paradigm the economics of information was governed by a very basic law: One cannot have simultaneous reach and richness. This inverse relationship meant that there was a trade-off between reach and richness. In the predigital era the communication of rich information was limited and required proximity or very specific channels of information communication. The communication of information to larger groups of people (reach) meant that richness had to be compromised. The problem was therefore that predigital information technologies did not allow richness and reach simultaneously. It was a “compromised information economics” model (either reach or richness) and this has shaped the way in which businesses communicate, collaborate, conduct business, define their products and services, and determine user needs. According

to Evans and Wurster (2000), the operational boundaries of organisations were set in the way in which information is exchanged – rich information being communicated through a narrow channel and “thinner” information among a larger group of people. This model sets the premises of business operations and explains why, for example, an airline company in the past had to have brick and mortar offices where potential passengers had to physically meet one on one with a travel agent to be able to select a flight, buy a ticket and book a seat.

The introduction of modern ICT virtually and literally has deconstructed this economic paradigm. It enables “everybody to communicate with everybody else at essential zero cost” and allows reach and richness simultaneously (Evans & Wurster 1997:74). This brings about a sea of change in the way that businesses are run – from the way companies are doing business with one another to the offering of improved services and new products to users. Evans and Wurster (2000) describe this “unbundling” of digital information as a revolutionary proposition because it changes the very nature of doing business. The booking and buying of airline tickets serve as good examples to illustrate how digital information technologies allow reach and richness simultaneously. The digitisation (read: unbundling) of airline information has not only allowed millions of people to simultaneously book and buy airline tickets around the world (reach), but also to customise their needs by means of interactive online seat and meal selections (richness). As a consequence, most airlines (at least in the USA) could afford to close down their brick and mortar offices, to be replaced by only a web presence.

3 GETTING AFRICA CONNECTED: DISCOVERING THE DIGITAL HIGHWAY

This new “economics of information” model has become the default business model for the developed world. Its early adoption and investment in modern ICT, supported by an existing and well-developed economic infrastructure, has given these countries a competitive edge in the global marketplace and has increased the gap between rich and poor nations. To ensure global economic competitiveness it has become imperative for African countries to not only invest in modern ICT, but also to understand the economic applications.

Over the past two decades many African countries have indeed woken up to the call. There has been exponential growth in the development of Africa’s ICT infrastructure and connectivity to the internet. This is mainly due to huge financial support from, among others, the World Bank, the Group of Eight countries as well as the United Nations. Up to 1995 only six countries in Africa were connected to the internet. In the year 2002 nearly all the countries on the continent were connected in some or another way to the internet (Ya’u 2002:8). One of the most notable progressions in Africa is the expansion and planned expansion of broadband connectivity by means of submarine

communication cables, for example, the SEACOM, EASSy, TEAMS, SAT-2, SAT-3/WASC and Main One cable projects. The GLO-1 submarine communication cable is a cable system along the west coast of Africa between Nigeria and the UK and is 9 800 km in length. This system as well as the EASSy cable system became operational in 2010 (BiztechAfrica 2010).

Africa has also leapfrogged into cell phone technology. It was the first continent where the use of cell phones outnumbered the use of landlines, and the population coverage has increased between 50 per cent and 100 per cent over the last 15 years (African Union 2009:36; Sullivan 2006; Butler 2005). The continent has furthermore emerged as a leader in the economic application of cell phone technology. It has radically changed not only the way in which people communicate but also how they do their work in Africa. It has made life easier, safer and, to a certain extent, more prosperous (Sullivan 2006; *Economist* 2009).

Under the strategic leadership of the Africa Union the continent has also developed new ICT policies and frameworks to manage these new initiatives. We list a number of these initiatives:

- *Development of National Information and Communication Infrastructures (NICI)*: The development of NICI was spearheaded in 1996 by the African Information Society Initiative (AISI), which was established under the leadership of the Economic Commission for Africa (ECA). The main aims are to ensure that Africa is connected to the internet and to explore the possible application of ICT for socio-economic and political development on the continent. As such the AISI encourages African countries to develop their own NICIs to ensure that sound ICT policies are in place. Up to 2004 more than 30 countries in Africa had initiated such NICIs (Barka 2004). According to the *Global Information Society Watch* (2009), countries such as Namibia, Cameroon, Egypt, South Africa, Tunisia and Uganda made significant progress towards the implementation of national information policies. Even the poorest and least developed countries (such as Niger and Rwanda) made impressive progress with their ICT infrastructure development. In 2005, Niger finalised and presented its reformed ICT development plans to its national assembly. Niger's NICI plan reveals six main strategic components, which include the development of information infrastructure, the application of ICT to reduce poverty, the development of local content for the Web, and the implementation of e-government. With regards to information infrastructure development, Niger invested more than FCFA 25 billion naira (approximately US\$50 million) in telecom infrastructure in 2006 to establish digital international telephone and automatic telex connectivity with the rest of the world (*Réglementation de la Voip cas du Niger* 2006). In 2006, Rwanda approved its NICI plan, focusing on the enhancement of ICT infrastructure in the public sector, improvement of

electrical power quality, approved increase in spending on ICT infrastructure development, and the development of an ICT park and incubator.

- *NEPAD ICT survey and ICT master plan.* One of the main priorities of NEPAD, which is an acronym for the New Partnership for Africa's Development, is "building and improving infrastructure including ICT". As a direct outcome of this priority NEPAD launched a survey in 2004 on the status of ICT use and policies in Africa. An alarming (but not surprising) finding then was that enabling laws to drive e-strategies in Africa are nearly non-existent – even though there were a number of NICI initiatives. Mauritius is mentioned in the report as an exception. The study also concludes that in those countries where projects such as e-learning, e-health and e-commerce have started, it is mostly done without a policy framework. NEPAD has adopted a recommendation of a broad and comprehensive continental ICT survey. Such a survey will help to identify current technical and regulatory obstacles that can jeopardise the development of a coherent ICT plan and infrastructure in Africa. An envisioned outcome of this initiative will be the development of a comprehensive database on ICT in Africa that will form the backbone of an ICT master plan for Africa (Baradu 2005). The findings of this survey are unfortunately not available.
- *Establishment of a policy and regulatory framework.* In 2006 a number of African countries signed a policy and regulatory framework protocol for a number of ICT infrastructure development projects, including the Eastern Africa Submarine System (EASSy) cable (Fin24.com 2006). This was followed by the *Connect Africa Summit*, which took place in 2007 in Kigali, Rwanda. A number of important goals regarding ICT connectivity in Africa were agreed upon. These include the following: to connect African villages to broadband services by 2015; to adapt regulatory measures that will promote affordable and widespread access to the internet; to support capacity building that will enable people to use the internet more effectively; and the development of a cyber security framework for African countries by 2015 (<http://www.oecd.org/dataoecd/27/32/44326734.pdf>) (African Union 2009).
- *Programme on Infrastructure Development in Africa (PIDA).* A key component of the AU/NEPAD Africa Action Plan 2010–2015 is the creation of a comprehensive scientific study on the development of ICT infrastructure in Africa. The aim will be to guide future ICT development on the continent. The following priorities for PIDA have been identified: establishment of harmonised policy, legal and regulatory frameworks; acceleration of the development of an integrated information infrastructure; active promotion of e-applications and services including e-health and e-education; increased global competitiveness of Africa. <http://www.oecd.org/dataoecd/27/32/44326734.pdf> (African Union 2009:27).

It is clear that Africa has embarked on the digital highway. It also seems that there is consensus that access to and use of modern ICT is essential and crucial for the long-term socio-economic development of Africa. These efforts, if successfully applied, will not only narrow the digital divide but can also help to reduce the continent's levels of poverty. It is, however, a road not without its potholes and toll gates, and there are still some significant challenges and bottlenecks. For example, Africa still lags behind other regions of the world in internet access (ITU 2009). Access to the internet on the continent is unevenly distributed and the provision of broadband connectivity is relatively slow with a low penetration rate. This is mainly due to high prices combined with limited availability. An appropriate information policy and regulatory framework is also still lacking.

Solid progress has, however, been made in the construction of the digital highway and there is enough reason to be positive and optimistic about Africa's digital future.

4 THE ROAD LESS TRAVELLED: THE PHYSICAL HIGHWAY

The question remains: Is Africa committed in the same way to maintain and further develop its physical infrastructure in support of this new digital highway, or has this become the road less travelled? This question will now be explored. We will start by explaining the interdependent relationship between digital information infrastructure and physical infrastructure. Following from this we will discuss the progress that Africa has made regarding her physical infrastructure development over the last decade.

The airline industry serves as an appropriate example to illustrate this interdependent relationship between a physical and an information infrastructure. Although the process of digitisation allows information to be unbundled from its physical objects, such as airplane seating and meal selection, and can "travel by itself", it is important to realise that the physical airplane needs to take off and "travel by itself", carrying passengers and products that are bought online. To use another example: A medical doctor, working in a rural area in Namibia, may find usable information on the internet about treatment medication of a particular disease, but this information will be of no avail if the transportation infrastructure fails to allow the delivery of the necessary medication in time to the clinic.

To fully embrace and benefit from the new economics of the information model, it is crucial to understand this interdependent relationship between digital information infrastructure and physical infrastructure. Travelling on the digital highway alone will not bring the desired economic benefits. Investment in an information infrastructure alone is simply not enough. The new economics of information cannot operate successfully without the "economics of things". The dematerialised and weightless economy is underpinned and supported by a "materialised" and top-heavy infrastructure. Such an

infrastructure includes operational harbours, safe airports, working railways, accessible roads, warehouses and the physical addresses of people. A well-developed information infrastructure and a corresponding physical infrastructure form the backbone of all socio-economic activities of the information and knowledge society.

Politicians, economists and other policymakers in Africa need to develop a very clear understanding of this interdependent relationship. We argue therefore that African governments and the private sector have an obligation to develop and maintain, alongside the information infrastructure, an affordable physical infrastructure facilitating access to the physical products and services that are made accessible through modern ICT. Only this will allow people effective access to basic services such as health care and education, and will contribute to make African businesspeople globally competitive (OECD 2005:47).

Based on available information it seems that for Africa this is a road less travelled. Until very recently Africa had a poor track record regarding physical infrastructure development and maintenance. Based on reports published by the World Bank (2009a), NEPAD (2004) the OECD (*African Economic Outlook* 2006) as well as the AU/NEPAD *African Action Plan* (African Union 2009) we list a few infrastructural realities that impede the development of Africa to become a competitive economic role player in the era of globalisation. These are:

- One-third of Africans living in rural areas are within two kilometres of an all-season road.
- Of a total of 1.5 million kilometres of roads in sub-Saharan Africa, only 19 per cent is paved in comparison with 27 per cent in Latin America and 43 per cent in Asia.
- Most people in Africa are further away from a road than anywhere else in the world. This is specifically true of Ethiopia. Inaccessibility to infrastructure makes economic interactivity and development nearly impossible.
- One-third of the roads built in sub-Saharan Africa over the last 20 years are not maintained.
- Transportation is unreliable and expensive. Transport costs is one of the main factors that explains variable local economic activities.
- There are a limited number of vehicles on the road in Africa.
- In sub-Saharan Africa only airports in South Africa and Ghana meet the FAA standard of Category 1 for international flights – Africa's share of air traffic in the world is only 4.5 per cent but its share of accidents is 25 per cent. As a result many African airlines are banned from flying to European airports.
- Landlocked countries in Africa face higher insurance and transportation costs than anywhere else in the world – it is estimated that landlocked countries in Africa pay four times more for transport services than developed countries do.

- The railway coverage on the continent is extremely low and the mean density is 2.9 kilometres of railroad per 1 000 square kilometres.
- It is estimated that Africa will need to invest at least six per cent of its gross domestic product per year to not only maintain, but also to further develop the continent's infrastructure.
- There are still operational inefficiencies, and in the words of the OECD report (OECD 2005:47), Africa "remains a continent of stranded mobility".

Niger serves as a good example of this stranded mobility. There are only four motor vehicles per 100 people, ranking Niger 119th of 134 countries with data pertaining to mobility (NationMaster 2007). Due to the landlocked nature of Niger, the country is also forced to rely heavily on air transportation. There are only two international airports in Niger, situated in the capital Niamey and at Agadez (Baxter 2011). These two airports are two of 28 situated throughout Niger. Only nine of these airports have paved runways. This is an extremely low number compared with America's staggering 14 858 airports, and it equates to 2 171 airports per million people. As a result of having so few airports, Niger is ranked 129th out of 231 countries with data (*CIA World Factbook* 2007).

Seventeen of the countries on the African continent have no rail transport. According to UNECA (2007), these countries are Burundi, Cape Verde, Central African Republic, Chad, Comoros, Equatorial Guinea, Gambia, Guinea Bissau, Libya, Mauritius, Rwanda, Sao Tome & Principe, Seychelles, Sierra Leone, Somalia and Niger.

Although there are no railways in Niger, the joint Benin–Niger railway is utilised for travel and export by the country. This railway is reachable by road at Parakou, Benin. From here, OCBN, a joint Benin–Niger railway, operates a service to the Benin port of Coronou (*Encyclopaedia of Nations* 2007).

The statistics about the physical infrastructure of Rwanda are even worse than those of Niger. Rwanda is among the countries in the world with the lowest number of motor vehicles per person. According to NationMaster (2009), Rwanda has only two motor vehicles per 100 people and is ranked 125th out of 133 countries. Rwanda shares this rank with other developing countries in Africa such as Benin and Mozambique. According to the *CIA World Fact Book* (2009), Rwanda had in 2004 a total length of 14 008 km roadways with only 2 662 km of this being paved and 11 346 km unpaved roads. These roads have deteriorated even further due to the 1994 civil war. In 2008 Rwanda only had nine airports, four of which had paved runways.

There is, however, a light at the end of the tunnel – and it is not an oncoming train. There are a number of initiatives underway on the continent with regard to physical infrastructure development. Major stakeholders, both in Africa and internationally, are realising the importance of a strong and well-maintained physical infrastructure in Africa. In the AU/NEPAD *African Action Plan 2010–2015*, it clearly states that "for

African countries to benefit from the increasing global economy, an adequate transport network must be in place to provide essential and efficient physical access. The lack or poor state of transport networks in Africa is among the most serious impediments to the economic and social development of African countries, preventing many countries from becoming competitive in the global markets and slowing/preventing the process of regional integration” (African Union 2009:15). Most of these role players are committed to bringing about change. There is a clear understanding that a well-developed and cost-effective physical infrastructure will create import as well as export opportunities for Africa. This will in turn foster private-sector involvement and hopefully attract international investment. It was not surprising that infrastructure development featured as a major agenda item at the September 2005 “UN Millennium plus 5 Summit”. It was also a central theme of the *Commission for Africa Report* (OECD 2005:47).

As an expression of commitment to Africa, a number of global and African-based organisations and countries have provided and pledged monetary support for the development of infrastructure. The most notable contributions and pledges are:

- *The World Bank*. In 2000 the World Bank provided US\$409 million to the eight countries of the West Africa Economic and Monetary Union to improve 1 300 km of cross-country roads in the region (World Bank 2000). During 2005 the World Bank also committed itself to lend another \$1.8 billion a year for infrastructure development in Africa (World Bank 2005).
- *The G8 Countries*. Britain, who chaired the G8 summit in 2005, urged its member states to embrace what is called a new Marshall Plan for Africa. This plan includes a financial contribution of \$25 billion over the next three to five years and plans to write off the debt of most of the poorest countries on the continent. This initiative is part of the G8 Africa Action Plan, which was already agreed upon by the G8 countries in 2002. Information on whether this target was actually met is not available. The current forecast by the OECD is that a little less than half of this promise will actually materialise (*Economist* 20 February 2010).
- *China*. The China National Machinery Import & Export Corporation (CMC) and the Government of Ghana have agreed to construct a railway from Nsawam through Kumasi to Paga on the border with Burkina Faso. It will have a branch running from Tamale to Yendi. It is hoped that this railway will attract investors to both Ghana and Burkina Faso, and improve these economies. This \$6.05 billion contract agreement will be implemented in two phases and will commence on 1 September 2012 and in June 2014 respectively (RailwaysAfrica 2010).

African countries and regions are taking initiatives to develop their infrastructure and these countries are involved in large-scale road construction projects. Several of these projects are funded through commitments obtained by the Infrastructure Consortium for Africa (ICA), which was launched at the G8 Gleneagles Summit in 2005 and strives

to improve investment in infrastructure development in Africa from private and public sources (ICA 2010). These developments are aimed at the transport, power, water and ICT sectors. According to the ICA annual report for 2009, the transport sector has received the largest commitments, namely \$7.5 billion. Road construction projects funded or partly funded from these commitments in 2009 include the CEMAC (the Economic and Monetary Community of Central Africa) Trade Corridor project, the Mombasa-Nairobi-Addis Ababa Road Corridor project and the Botswana Integrated Transport project (ICA 2010).

Another initiative on the African continent to review the links and coherence between infrastructure (in particular transport) and poverty reduction strategies, is the sub-Saharan African Transport Policy Program (SSTP). The SSTP is multi-donor funded and will support the formulation of action plans to ensure poverty reduction by means of transport improvement. The SSTP currently supports 36 countries in Africa (SSTP 2011). The AU/NEPAD *African Action Plan 2010–2015* also outlines an ambitious infrastructure priority plan that includes 14 development initiatives at an estimated cost of more than \$5 billion (African Union 2009:18–24).

5 CONCLUSION AND THE ROAD AHEAD

The information and knowledge society, which is characterised by globalisation and advanced capitalism and driven by ICTs, has led to a new information-based economy. This new economy, as we have argued, not only relies on sophisticated and well-developed information infrastructure, but also requires a well-developed and maintained physical infrastructure comprising roadways, railways, airports and harbours.

Africa is on the right track regarding her economic understanding and subsequent commitment to the development of both the information as well as physical infrastructures. Based on our interpretation of the available data, it is, however, a question as to what extent Africa is actually moving with both wheels (digital and physical) on this “right track”. Many African governments are focusing on and prioritising ICT development. Most of these initiatives are well funded by international role players and it is predicted that Africa will soon have wider access to broadband. The digital wheels are well oiled and there is reason enough to be optimistic about Africa’s digital future. The same does not apply to physical infrastructure developments. The AU admits that the physical “infrastructure is among the main bottlenecks to productivity growth and competitiveness in Africa” (African Union 2009:15). The same resource allocation and financial commitment is not placed on the development of physical infrastructure and it is much more costly to build a road than to roll out broadband connectivity. This has resulted in extremely poorly developed and poorly maintained physical infrastructure in west and central Africa in particular.

Being digitally connected has already contributed significantly to socio-economic development in Africa, and will continue to do so in the future. It is, however, not enough and will not bring the full benefits of the new economics of information. What is also needed is improved physical infrastructure. This will not only link African countries more effectively but will facilitate trade and social exchanges with the rest of the world. Much progress has been made in southern and east Africa, but it is imperative that the AU also succeeds in developing and implementing the strategic objectives in the transportation sector in central and west Africa as the AU/NEPAD *African Action Plan 2010–2015* outlines.

NOTE

- 1 The notion of “unbundled information” is coined by Evans and Wurster to illustrate that information can “exist” separately for its physical carrier. They explain it as follows: “When information is carried by things – by a salesperson or by a piece of direct mail, for example – it goes where the things go and no further. But once information is electronically [carried], information can travel by itself” (1997:73).

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