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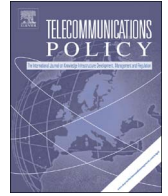
Book Review

Knud Erik Skouby, Idongesit Williams (2014). The African mobile story2014 Aalborg, Denmark: River Publishers296 pages including preface, introduction, list of figures and tables, bibliography, acronyms, index and editor and author details. ISBN 978-87-93102-63-7, hardback, €90

Sub-Saharan Africa has a dispersed Internet infrastructure, even when compared to other areas of the developing world. Evidence about these infrastructural problems can be found in the many studies providing up-to-date metrics on the quality and reliability of Internet access from an end-user perspective – see, for example, Akamai (2016) or ITU (2016). The prices to access the Internet, both in terms of the price per megabyte via mobile access and, critically, in terms of affordability due to pervasiveness of low and unstable incomes sources are often seen as a critical obstacle for internet diffusion. The implications of the resulting patchy connectivity paired with low affordability, are affecting many dimensions of the wellbeing in Sub-Saharan Africa communities creating, in many cases, seemingly insurmountable obstacles and digital divides. While evidence and examples about critical aspects of these digital divides have been explored in many studies, the *African Mobile Story,* edited by Skouby and Williams, provides an interesting collection of studies, from the field, on the effects that improving upon existing poor connectivity and finding appropriate mobile strategies might play in enhancing education, health, transport, governance, agricultural processes, entrepreneurship and overall productivity.

Sub-Saharan Africa has recently experienced fast growth in mobile telecommunications making it crucial to focus on mobile access to assess the overall impact of the Internet on the region's economic and social possibilities. This book depicts the story of the mobile industry in the region starting from early liberalization to the present level of competition, assessing its potential for innovation, whereby mobile ICT acts as a key enabler and catalyst for increased productivity and growth. Interestingly, most of the studies discussed in the book, refer to text-based mobile applications, not the browser-based ones, leaving open a key space to study the future stages of development, once the diffusion of smartphones, affordability of data plan and availability of mobile Internet connectivity will leapfrog to a connectivity centred on wider adoption of web based mobile applications.

Chapter 1, on policy considerations by Gillwald and Calandro, provides a most informative overview of the current state of mobile connectivity in the region, based on the experience and data collected by Research ICT Africa across many Sub-Saharan African countries. The authors explain how price and the quality of service of broadband networks pose key significant policy issues requiring the, often missing, networks' ability to support rapid traffic growth and competitive prices. This chapter is also of particular interest as it identifies both the key obstacles to infrastructure growth and those that, on the contrary, have been losing relevance, such as international wholesale bandwidth which is now priced at a fraction of its previous levels due to the positive impact of the investment in undersea cables. Equally essential is to understand how and why the achieved costs reductions and benefits may not necessarily have been passed on to users. Of particular interest is the discussion focussing on the study by Gupta et al. (2014) on the need to obtain network quality metrics that reflect existing connectivity between ISPs located in Sub-Saharan Africa and the hosting sites for popular content and providing evidence about typical routing detours, via Europe, of the Internet paths that originate and end in Africa. These paradoxes of the upstream internet connectivity in Sub-Saharan Africa, show, for example, how African ISPs tend not to peer at African IXPs while preferring instead to interconnect at European IXPs, and present one of the greatest obstacles to improve the quality of internet connectivity. Gillwald and Calandro's chapter is of great value in shaping the needs for future research on these deficiencies of terrestrial backbones and backhaul networks, while also indicating the necessity of focussing more research efforts on the upstream structure of African Internet connectivity.

The remaining 12 chapters explore specific cases and applications, providing a deeper understanding of the variety and scope of the mobile Internet applications and their potential to affect many different fields of economic, social and political life in Sub-Saharan Africa. Chapter 2, on '*The impact of Liberalization on the Mobile Telephony Market in Africa: the cases of Ghana, Nigeria and Kenya',* by Williams and Kwofie, is useful in providing an overview of recent telecom market reforms in Africa, and similarly Chapter 3, on '*Telecommunications in Africa- Regulation, Technologies and Markets'*, by Frempong and Henten, provides an interesting and knowledgeable discussion of the regulatory developments in the African telephony sector, focussing on the disparity of 3G coverage between cities and rural areas and on its implications for local technological developments..

Chapter 4 on '*The prepaid Mobile Market in Africa'* by Layton focuses on the relevance of the prepaid contracts as they account

for 90% of African subscriptions. This contribution is particularly interesting when capturing the substitution between voice/SMS and OTT services as the nature of this relationship could be crucial in understanding the time frames of the diffusion of different generations of smartphones in Africa. The chapter also highlights the problems associated with the high level of competitiveness and low profitability of the prepaid market and its implications for the lack of private incentives in investing into network expansion. Differently from the previous chapters, Layton provides a business perspective focussing on the problems of generating the incentives for network investment and on the problems faced by operators with a small spectrum footprint in achieving the necessary scale economies required to produce adequate revenues, and the financing difficulties due to the obstacles in obtaining volume discount for purchasing next generation network equipment. An interesting, but also concerning point made, is about the possibility of business convenience for cooperation among competitors in sharing infrastructure and equipment, masts, backbones backhauls.

Chapter 5, by Isah, on *'Mobile Devices Vulnerabilities: Challenges to Mobile Development in Africa'* should be of interest to a more technical audience, while also raising problems about the potential obstacles towards the sustainable usage of mobile phones: their vulnerability to hackers. This chapter also addresses the economic and social consequences that reduced trust, due to lack of security in mobile phones may generate. Chapter 6, by Crentsil, on *'Achieving Scale and sustainability in M-health Solutions for HIV/AIDS in Africa'* discusses how mobile phones were used to provide greater access to healthcare, in HIV treatment and in prevention initiatives. The problem identified is in the ability of such projects to scale up and achieve sustainability when moving from the pilot to the mass services implementation. Also of particular interest are the highlighted policy inadequacies when coordinating and supporting such programmes to make them sustainable across Africa. The chapter assess them by adopting an ethnographic approach to study the scaling up and sustainability of m-health promotion programs, showing how mobile phones allow confidential communication about HIV/AIDS issues that are otherwise carrying a stigma, so eliminating a potential barrier to access to patient monitoring, true self reporting and adherence. Of interest are also the identified barriers to success for these programmes, showing that women in Sub Saharan Africa are 23% less likely to own a mobile phone than men and that the inability to read SMS messages, due to illiteracy, also poses a relevant constraint. Also highlighted are the financial/ technological obstacles constraining m-health interventions, especially in remote or rural areas, because of the non-universal nature of the underlying infrastructure due to network coverage, service fluctuations, bandwidth limitations, and otherwise unreliable connectivity.

Chapter 7, by Annan, Ofori-Dwumfou and Kwofie on '*Mobile ICT and Education Delivery'*, focuses on m-learning in Ghana, showing that this has the highest growth rate in Africa as it provides to many people their primary, and often only, learning technology. Some very interesting case studies are discussed in this chapter - for example, the Ghanaian 'Impact on Reading of E-readers and Digital content' pilot project that gives access to e-reading technology proving that this media leads to improved access to resources, student performance while reducing the costs of production and distribution of reading material. Chapter 8, by Gyaase and Owusu on '*Dissemination of Climatic information and Market driven Extension services to Smallholder farmers in Africa using Mobile technology: The case of Esoko Ghana Commodity Index'* considers the relevance of smallholder agriculture for the Ghanaian economy and its dependency on rain water patterns, and discusses the role of mobile ICTs for agricultural extension services, and for dealing with the consequence of disrupted weather patterns due to climate change. The chapter studies in detail *the Esoko Ghana Commodity Index*, a mobile application that provides a platform to improve agricultural marketing in Ghana. This chapter provides an example of a mobile-enabled *transaction ecosystem* offering small holders farmers the potential of marketing their products based on a much more detailed price information. The ecosystem nature is important as the project is based on a partnership with MNOs, international organizations, businesses, NGOs and research institutions. This application provides price information for relevant agricultural products to both farmers and traders and its reputation and the accuracy of the exchanged information is crucial and supported by a clearly disseminated monitoring structure of agents' feed-backing information.

Chapter 9 by Joseph, Gapsiso and Usman on '*Harnessing ICT for Local Government Administration in Africa: A Look at the Push-ICT approach in Nigeria'* focuses on the role of ICTs in improving governance and citizens' engagement into policy making, reinforcing trust between citizens and governments. This chapter discusses different projects aimed at extending, improving, and facilitating the adoption and usage of ICTs for Nigeria's local government administrations. The chapter also discusses different initiatives supporting the extension of the telecommunications networks to rural and remote areas and the Push-ICT policy and deployment adopted by the Nigerian government, perceived by the authors as being somehow coercive in pushing the Nigerians to adopt ICTs and in overcoming resistance to change practices entrenched in many sectors. Chapter 10, by Lopez and Kratzberg, on '*Using Mobile Phones for Environmental Protection in Africa: The Equatorial Africa Deposition Network case Study'*, focusses on how mobile phones can be used for environmental protection by presenting an interesting case study on the African Great Lakes. After a clear description of the lakes ecosystems and of its challenges, the chapter introduces the EADN and its objective to identify the main sources of atmospheric nutrients produced in Africa. When discussing the role of mobile phones as a component of the ICT4D wider strategy, the authors stress the specific infrastructural challenges posed by coverage and by unstable power sources, because of the priority given to urban areas' mobile infrastructures. The mobile phones in this project are used as the last mile communication channel in a data network and, clearly, this last mile is itself mobile as it follows the human/users mobility patterns. Also, given the often shared use of mobile phones in the rural areas (Gillwald, 2005), these become a focus of interaction facilitating cooperation in the relevant communities. After a detailed analysis of the projects, the authors conclude suggesting using big data sources, such as Call Detail Records (CDR), to map human mobility and correlate these data with the data obtained at the EADN telemetry stations on nutrients pathways. Chapter 11, by Tsivor, on '*Sustainable Energy Generation for ICT Developments in sub-Saharan Africa'* focuses on the challenges posed by the lack of reliable energy supply and on their impact on ICTs sustainable growth. This chapter is of interest as it provides a cost simulation of alternative ways of providing energy to a mobile GSM station disconnected from the grid, showing the viability of this type of solutions. Finally, Chapter 12, by Adjin, on '*The role of Mobile Telephony to the development of intelligent transport systems in Africa'* reviews attempts made to develop intelligent transport

systems across the continent. The case study, which is based in Ghana, is of the pre/post intervention type, comparing the situation in the transport sector case analysed.

In summary, the book as a whole provides an essential overview of many different elements that, while seemingly disconnected, all explore a different component of an *open innovation ecosystem* that is of key relevance for Sub-Saharan Africa. The core element of this ecosystem is provided by mobile Internet connectivity, the enabler of the different experiences and case studies involving numerous stakeholders, in education, agriculture, health, governance, logistics, security and energy provision. These sectors' stakeholders are all using, or find obstacles in using, mobiles services provided by national mobile operators, that are then connected, when transferring internet data, to upstream, local and international connectivity providers, and are otherwise regulated by policy authorities and regulators, for non-internet data and text services that are still at the foundations of most of the cases studied in this book. The possible transition to mobile Internet access will face numerous obstacles, due to the pace of smartphone penetration, patchy infrastructure, market power and bottlenecks. On the other hand, relevant stakeholders and scholars should be able to identify and suggest strategies to overcome the remaining obstacles for this ecosystem and thus to complete its transition towards mobile Internet services, allowing the many possible benefits these can bring in starting a process of innovation leapfrogging that is required for this ecosystem to thrive. The main contribution of this book is scattered across its different chapters and cases that, while being sometime narrow-focused and of non-uniform quality, still convey the real impact that a functioning mobile Internet ecosystems can bring to the regions analysed.

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