Affordable Mobile Broadband Services: Models & the Way Forward

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Abstract:

It is becoming more and more apparent that the vast majority of subscribers in developing countries will be receiving wireless broadband information services through mobile terminals. To make the growth in mobile technology and services sustainable, stakeholders of the mobile value chain need to address the cost and reliability issues for mobile services. In this paper three mobile service affordability models are discussed based on a rural/urban social network context, the development of local service providers and radio access network sharing concepts.

1. Introduction:

The explosive growth in mobile subscriptions has indicated recently mobile device capabilities are improving, their use as the only medium to information access in developing countries is becoming evident [2,1]. This fact is complemented by the unavailability of fixed-line communication infrastructure in rural developing regions and the ease of deployment of wireless communications infrastructure in these regions. Innovative mobile web & broadband services, such as M-health, M-Banking/payment, M-Government, M-Education, etc., require next generation mobile broadband technologies and advanced terminals for a successful launch and operation. Affordability and reliability of such services, together with usability of mobile services, become very crucial parameters to understand and solve, for the uptake of web-based mobile services in developing regions. This article will present models for affordability of mobile services in the context of developing countries. The security and reliability of these mobile services will also be mentioned for completeness. The analysis is based upon three models, which in the author's opinion can effectively and sustainably improve affordability of mobile services in developing countries.

The first affordability model is based on the promotion of a local mobile service provider. The recent resurgence of mobile virtual operators is a good example in this category. Furthermore, based on a definition of Innovative mobile broadband services (IMBS)[1], the model regards mobile services as consumer products ready to follow consumer prices of each country. The second model tries to promote the creation of an echo system of rural/urban social networks (RUSNs). By active engagement and support of these social networks, the model emphasizes that social networks become producers of indigenous knowledge databases and local content. The RUSNs in turn can use these local databasesto subsidize the IMBSs. The third model requires both long term planning and regulatory intervention by government and policy makers to consolidate and promote sharing of network resources by competing network operators. Since Broadband Mobile web services require new costly access and core network investment[3], the third model of affordability proposes a network consolidation model, similar to what has become popular in Europe [3,1]. It has been shown that network sharing as proposed in [3] can give substantial reduction in network capital & operational expenses, and reduced power requirement which should be directly translated onto a significant reduction in mobile service costs. The three models combined show a way forward to make mobile broadband and web services [2,5] affordable in Africa and other developing countries. Such a move should be aggressively promoted by all stakeholders of the mobile value chain.

2. Local Mobile Service Providers

The increased internet and web presence in the mobile area motivates the possibility of using mobile subscriber terminals as a tool for delivering mobile broadband services. Many in developing countries are grappling with the idea of using the large penetration in mobile technology and services for the benefit of social and economic growth. A number of mobile projects for health, governance, banking and learning have been identified in the boundary region of mobile and web technologies. One important conclusion that can be deducted and has been highlighted in the W3C workshop and executive summary [2] is that, the current few mobile SMS based services, appearing on the scene are just a proof of concept and announce the beginning of the thousands of mobile data based services that will engulf the mobile economies of developing countries [1,7]. When these numbers of mobile services become available they can also be regarded as consumer products necessary to improve the life of billions of users.

Promoting local mobile service providers therefore becomes very crucial for tapping into this large market. The role of educational institutes in developing countries, in building the capacity for affordable and sustainable mobile technology and service development was discussed in reference [7]. The frame work consists of research, educational and entrepreneurial components. In the final analysis the harnessing and development of a local mobile content and service provider sector is of paramount

importance, in order for developing countries to benefit from the spin-off effects of the explosive growth in mobile technology & services. It has also been argued that local mobile content and service providers can make mobile services more usable, locally relevant and affordable [7,11]. Furthermore, the move can give an opportunity for poor countries to develop their economies and create much needed employment opportunities in the mobile content and service provision sector.

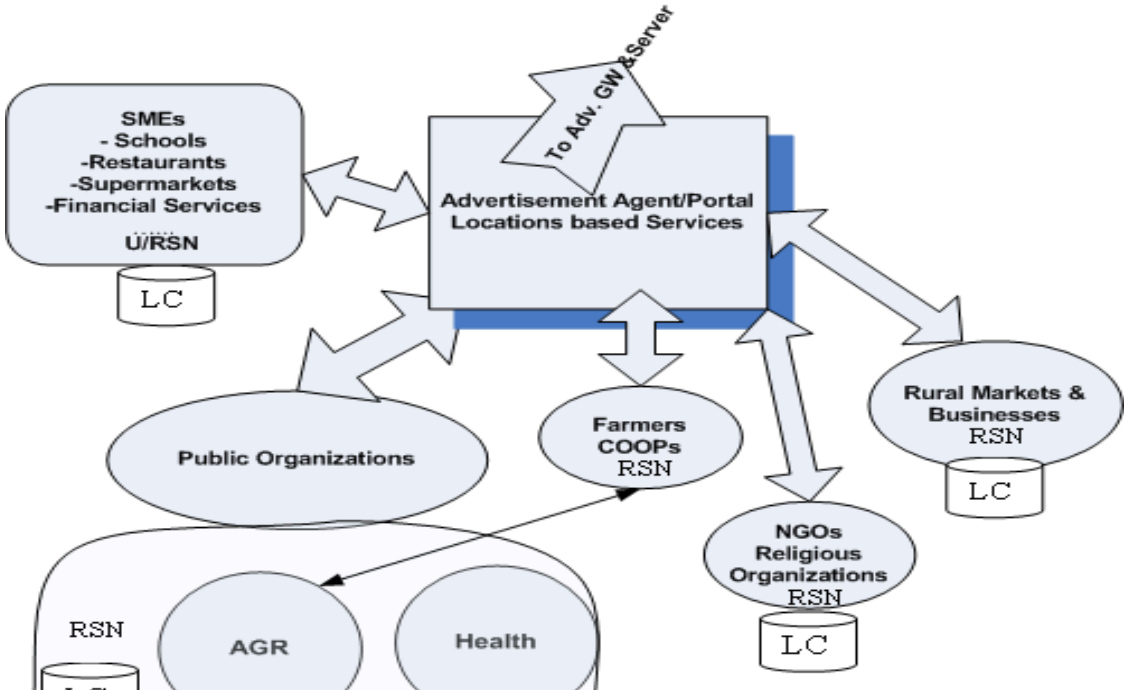

Figure 1, A model for a mobile social network and services.

RSN- Rural Social Networks

LC – Local Content

3. Rural/Urban Social Network & an Echo System

Rural/Urban social networks (RUSN) and associated local databases can provide a way to solve some of the affordability problems associated with mobile web services. Some of the issues that must be addressed to solve the affordability of innovative mobile data services in developing countries are; 1) The placement of a regulatory and policy mechanism to promote a collaborative working relationship between network operators and 3rd party local mobile service & content creators. 2) Regional research initiatives in the area of rural/urban social networks (RUSN) to promote indigenous local mobile content creation. The creation of an echo system of stakeholders to utilize the indigenous database as a source of income is one

aspect of this model. The formal creation of indigenous databases and validation for a general ICT4D intervention in rural communities is well studied in reference [6]. However, in this paper a simple model of an echo system of RUSN based on a mobile local content and mobile advertisement service for improved affordability is presented. The model uses a local rural market scenario to describe the usage of the model by social networks that are created as a natural consequence of the interaction in the RUSN members. Figure 1, above shows an RUSN echo system based on mobile services, involving both rural and urban social networks, with a further public and private organizations contributing to the echo system. Social networks can be public or private organizations, cooperatives (COOPs), associations dealing with services such as health, agriculture(AGR), business, transport (TRAN) or education (EDU). These social network groups can build their own local content data base, share and sell content to services providers, public and private organizations and other RSN groups. These local content databases (LC) contain a wealth of information for timely, relevant and location based M-Adv services. The aggregate of these databases also provide a platform which can be used by the network and service providers to perform customer behavior studies to build next generation intelligent mobile advertising systems. Furthermore, the model promotes a negotiation platform between mobile network & service providers and the social networking groups. The negotiation can result in discounted prices for the RUSN members on basic and mobile value added services. However, this depends on how much the RUSNs invest on developing their local mobile content and the mobile advertising income through the M-adv advertising system.

Therefore, research initiative on development of local and indigenous mobile databases and a way to market it should be a concern for all stakeholders in the mobile value chain. This is especially of paramount importance for the uptake of next generation content based mobile broadband data services. A possible rural community scenario for an RUSN echo system and resulting commercialization of local content and mobile services is described in the following section.

3.1 RUSN Scenario:

Before the Easter festival, owners of several butchery houses in Kampala would like to buy extra cattle from the Mbale town market at the North-western town of Mbale weekly market. Mbale region is well known for its cattle breeding farmers.

1. The Butchery owners, which form an urban social network, USN, through their association call the local Mbale market association to advertise their requirements to the local farming community. The requirements (Type of cattle, numbers and age groups) become a content which the Mbale market RSN store in its local content database.

2. The Mbale market RSN quickly sends an early request for adverts to the mobile service provider about “the coming of cattle buyers from Kampala.”
3. The mobile service provider based on the M-adv request and using its Location based database sends the M-adv together with a broadcast SMS call to local council meeting.
4. The M-advert will result on a messaging spree to and from the Mbale town market owners with Farmers COOPs, Individual cattle breeders and other interested parties.

The SMS messages contain specific requests for Local content (LC), on the type of cattle, number and age group that the butchery owners are interested (local market owners can provide this information for free or can add value for the content). The scenario above shows that mobile advertisement (M-Adv) is a service model that can be used for reducing the cost of access to information and render relevant services to rural communities. This is unlike the main stream mobile industry strategy, where M-Adv is only considered as new revenue streams for improved profit margin of corporations, this scenario showed the use of M-Adv from a rural community perspective to reduce the total cost of ownership (TCO) of mobile services.

4. Network Sharing Model

The traditional universal access funds (USF) used to address the digital divide between rural and urban areas of developing countries is becoming insufficient to bridge the gap between the information haves and those who cannot afford to buy the services[9,3]. This is clearly seen by the fact that mobile service costs become unaffordable for a significant percentage of subscribers, and despite available mobile coverage the number of ***active*** users of both basic and value added services is limited in developing countries[1,2,10]. This is more profound in rural and marginalized communities, and a crucial parameter to be addressed to guarantee the success of future content based mobile broadband web services. Furthermore, if this trend continues, the new mobile internet/data services will have limited footprint and at the same time result in significant number of people being left outside of access to public and relevant information. Therefore to reduce the cost of mobile broadband infrastructure and service provision a new techno-economic model with long term planning is necessary.

Radio access network (RAN) sharing by competing operators, is being promoted as one of the effective tools and long term solution to reduce both cost of infrastructure deployment and power consumption of 3G broadband mobile networks [3]. As shown in figure 2, the main CAPEX load of broadband wireless infrastructure is the cost of the RAN and associated deployment cost [3,12]. The two network operators, NetOp1 & NetOp2 can use the network sharing opportunity to reduce the cost of mobile broadband infrastructure. The savings can be in sharing base station (BS) cell site, BS tower, BS Power, e.t.c.,. A number of European mobile operators are opting to this scheme, to reduce the cost of mobile

broadband services, made possible by network sharing agreements [1,3]. This is motivated by the reduction in deployment, operational and power consumption costs, that is achievable with network sharing. It is for example estimated that the deal by network operators T-Mobile and 3, announced recently could achieve a cost savings of 2 Billion UK Pounds, a 30% reduction of base station sites and a 70% reduction of the power consumption by the network nodes [3].

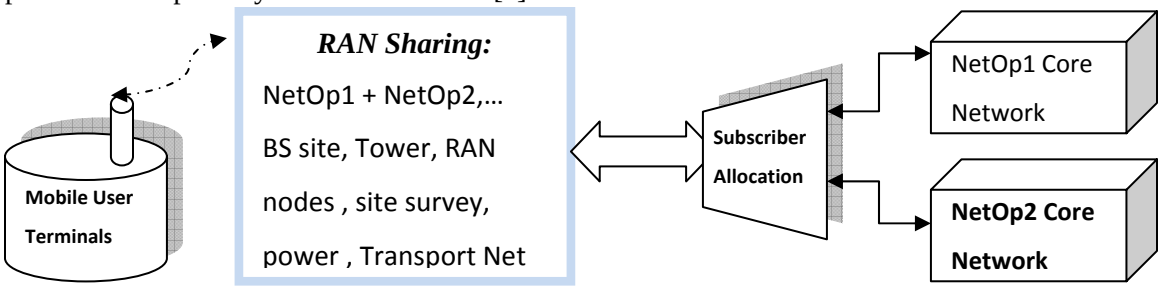

Figure 2. Conceptual RAN Sharing Model.

The issue is whether these savings in CAPEX and OPEX by the network operators is converted into lower mobile broadband service prices promoting the increased utilization of mobile web services ? Resource limited developing countries should support such moves by network operators because, the long term development and provision of mobile broadband web services depends on such schemes. In the author's opinion W3C, ITU and regulatory authorities, should promote a discussion and help enact policies at most to enable such collaborative moves by competing network operators, and stimulate actions towards network sharing by different stakeholders in the mobile value chain. The discussion with RAN sharing is based on the popular mobile technology GSM/UMTS and is crucial to reduce the cost of broadband mobile services to both urban and rural communities [1,3,12]. It is most likely that if RAN sharing is not followed by UMTS operators, new technologies such as WIMAX and DVB-H could be more cost effective and sustainable alternative to provide mobile broadband web services [1,10]. Network sharing in the long term is beneficial in many respects some of these are:

- For the mobile industry, and the collaborating operators, lower mobile web prices can attract more subscribers and the development of more innovative services, which in turn increases the traffic and revenue generated for the concerned companies.
- Network sharing is also environmentally agreeable, this is clearly seen in the above mentioned RAN sharing example of T-Mobile & 3UK operators. The duo could reduce 30 % percent of cell sites (~5000 Base stations) and corresponding power requirement. This is a significant reduction of the CO2 footprint, which should be encouraged. In an African rural community perspective, it is a usual scene to find three nearby operator BS towers, powered by three diesel generators. Such wastage of resource and costly network rollout can be minimized by introducing the concept of radio access network sharing. This in turn could solve the affordability issue.

5. *Conclusion*

A sustainable growth in mobile broadband technology and mobile web services can only be achieved, when stakeholders of the mobile value chain effectively address the affordability issue of mobile services. In this paper some models of affordability have been discussed with the aim to reduce the cost of mobile services in developing countries. The three models consisted: 1) Local Service Provision, 2) Social network based mobile echo systems with indigenous mobile local content, 3) Network sharing by competing operators. As the need for innovative broadband mobile web services to address societal challenges in developing countries increases, new techno-commercial models will appear to solve the affordability issues. The models presented in this paper can be seen as a contribution towards an affordable and sustainable ICT4D Intervention for developing countries.

6. *References:*

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