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FACTORS AFFECTING MOBILE TELECOMMUNICATION INFRASTRUCTURE SHARING IN KENYA

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ABSTRACT

The main objective of this study was to examine the factors influencing mobile infrastructure sharing among mobile operators in Kenya. The variables which influenced the adoption of infrastructure sharing were competition quality, technology development and regulatory framework. The study was based on theoretical concept of the identified independent and dependent variables. Respondents were drawn from the three main mobile operators in Kenya. Descriptive statistics and regression analysis were used to analyse the quantitative and qualitative data. The study revealed that competition, technology and regulation influence network infrastructure sharing leading to significant reduction in cost of network infrastructure roll out and capacity expansion. This further led to an improvement in the usage efficiency of infrastructure that also enables telecom operators to have a competitive advantage through new product development and innovations. However, it was found that network infrastructure sharing especially in its active form is low in Kenya. The study recommended that strategies to promote infrastructure sharing should be adopted as a pathway towards growing the digital economy. Such strategies will also transform Kenya into a knowledge and information based economy by enabling access to quality, affordable and reliable ICT broadband access.

Key words: *Mobile infrastructure sharing, mobile operators, regulatory framework, technology innovation, competition*

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INTRODUCTION

Infrastructure deployment for providing access to broadband Internet continues to be a priority for telecommunication services providers and governments in most countries. This is reflected in the continuous growth in the number of mobile and fixed–broadband subscriptions worldwide (International Telecommunication union [ITU], 2014).

Over the next few decades, there will be a need to upgrade and modernize the mobile networks to support the shift to smartphones. The need for fiber broadband networks and the demand by both corporations and the general public for superfast fiber access at national levels have emerged as urgent priorities to keep pace with global developments, and this will require major financial investment. It is anticipated that in the near to medium term, ICT will continue to lead the growth and improvement in infrastructure development (AFDB, 2016). The increased uptake of mobile telecommunication services has necessitated the need for mobile phone service provider companies to invest more in the infrastructure development so as to accommodate increasing demand (Northstream, 2009). The traditional model of single ownership of all the physical network elements and network layers by mobile network operators is beginning to be challenged in their quest to satisfy customers in a cost-effective manner (Booz, 2009).

This has happened as a result of rapid and complex technology migration compounded with rigorous regulatory requirements and increasing capital expenditures against constrained scarce organizational resources (Hussein, 2000). These trends, combined with increasing competition, rapid commoditization of telecommunication equipment and rising separation of network and service provisioning are pushing the operators to adopt multiple strategies, with network infrastructure sharing in the core and radio access networks emerging as a more radical mechanism to substantially and sustainably improve network costs (Hultell, Johansson & Markendahl, 2004). Through infrastructure sharing, developing countries and other emerging economies can harness the technological, market and regulatory developments that have fostered affordable access to mobile and broadband services in developed countries. Similarly, the network operators entering or consolidating in the emerging markets can aim for substantial savings on capital and operating expenses (Northstream, 2009).

Kenya's telecommunications market continues to undergo considerable changes resulting from increased competition, improved international connectivity and rapid developments in the mobile market. Kenya's mobile market has continued to grow steadily, supported by a mobile subscriber base of about 39.8 million by early 2017. (Communications Authority, 2017). While all network operators have invested in mobile technologies and infrastructure upgrades to support mobile data services, competition has nevertheless presented challenges to their profitability, with uneven revenue growth reported in recent years. To encourage the development of Long-Term Evolution (LTE) services the government has pursued an open-access approach, though they continued to invest in infrastructure and technology upgrades using trial licenses. To compete in this new environment, operators are rethinking business models and are turning to explore infrastructure sharing as a way to enhance their competitive positioning. Ownership of network infrastructure is increasingly being viewed as outside their core business. This sharing falls into the active and passive categories, and like the rest of the industry, operates under sector specific guidelines and regulations

Statement of the Problem

According to Ponelis and Holmer (2015), the greatest benefits from a developmental perspective are increased access to ICTs and potentially less costly

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services. Utilizing common network infrastructure or other critical infrastructure can catalyze socioeconomic inclusion in the information society. Through infrastructure sharing, developing countries and other emerging economies can harness the technological, market and regulatory developments that have fostered affordable access to mobile and broadband services in developed countries. Similarly, the network operators entering or consolidating in the emerging markets can aim for substantial savings on capital and operating expenses (Northstream, 2009). Besides these developmental benefits and as telecommunication demand outpaces the development of infrastructure, mobile operators in Kenya prefer to invest in their own infrastructure despite the availability of underutilized ICT resources from other operators and players (Moturi & Malungu, 2015) Infrastructure sharing is encouraged, by regulators, because it can provide a healthier competitive environment for the telecoms market. It also improves economies of scale, avoiding duplication of networks where unnecessary. The increase of infrastructure sharing in the telecoms business has allowed for a more efficient pace of expansion and innovation, for example, a faster roll-out of next generation networks (NGN), due to consolidating investment efforts into lower numbers of telecom assets. The sharing of towers and equipment also translates into sharing of expertise between telecoms companies, and an overall reduction in CapEx and OpEx costs, which are also spread among operators.

Study Objectives

- To determine the influence of the regulatory framework on telecommunication infrastructure sharing in Kenya
- To establish the influence of competition quality on telecommunication infrastructure sharing in Kenya
- To find out the influence of technology development on telecommunication infrastructure sharing in Kenya
- To determine the influence of cost optimization on telecommunication infrastructure sharing in Kenya

LITERATURE REVIEW

Regulation

Carlo & Yanjan (2009) refer to regulation as the government imposed controls on business activity and that the two universal tasks of regulation is the setting, monitoring and enforcement to ensure minimum tariffs and maximum service standards. The objectives of the regulatory regime set out in the Framework Directive is to promote competition in the provision of electronic communications services and associated facilities and service facilities. The existing regulatory framework in Kenya is consistent with the EC framework (Stéphane, Philip & Kerron, 2017)

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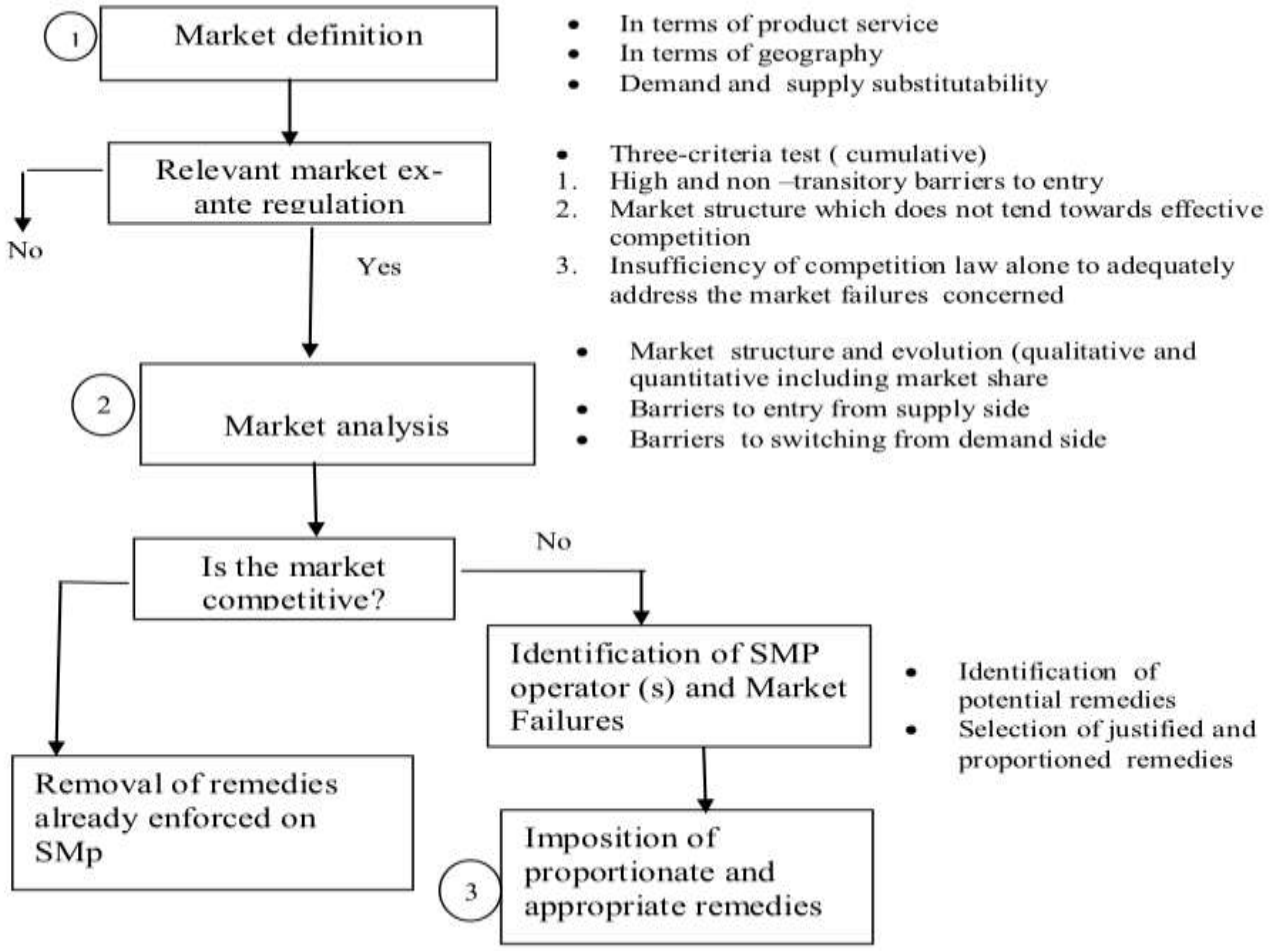

Figure 1:Regulatory Framawork Ecosystem
Souce : Analysis amason (2017)

Generally, regulation in the telecommunication industry can affect these innovative activities via two different channels (Laffont & Tirole, 2014). First, price regulations (the regulation of interconnection charges and retail prices) alter industry profits, hence the incentives to innovate. Secondly, both price or entry regulations change the terms of entry, and hence innovation decisions regarding new entry. Sector specific regulation ensures evolution to a self-sustaining pro-competitive market structure in which the firms behave in a competitive manner so that benefits from competition, in terms of low prices, better quality and extended variety of product choice, are attained. Chanab, Darwiche, Hasbani and Maourad (2007) argue that liberalization of a country's telecom industry can enable economic growth across various sectors, but its success depends on regulatory policies that are conducive to the development of competition. One element of such policy would be creation of regulatory and economic incentives that encourage the sharing of infrastructure among telecom companies as a key lever to foster competition and optimize investments. They further claim that successful telecommunication sector development program rely on four regulatory pillars namely transparency, efficiency independence and non-discrimination.

Competition quality

Competition is essential to the development of a modern telecommunications infrastructure. Waverman, Meschi, and Fuss (2005) demonstrated that competition was instrumental for developing mobile telecommunications in both developed and developing countries. Gutiérrez (2003) found that "opening of the market to more competition and the free entry of private investors in basic telecommunications services will propel network expansion and efficiency across the sector" in his study of Latin American telecommunications. Wallsten (2004) found that protecting incumbents from competition resulted in decreased investment in telecommunications networks, fewer payphones, lower mobile telephone penetration, and less international calling. Brown and Lee (2008) found that competition between telecommunications companies and cable television companies was the most effective catalyst for increased broadband penetration in the United States. Lee and Marcu (2007) found that competition had a positive impact on broadband development in both developed and developing countries.

Technology Development

There are a variety of options that may be considered when assessing the viability of infrastructure sharing. Meddour et al (2011), identified a number of technical options that affect infrastructure sharing and divided them into four basic categories: (i) passive sharing, (ii) active sharing (iii) roaming-based sharing and (iv) spectrum sharing. The sharing of infrastructure can be achieved at different levels as shown in figure 2.

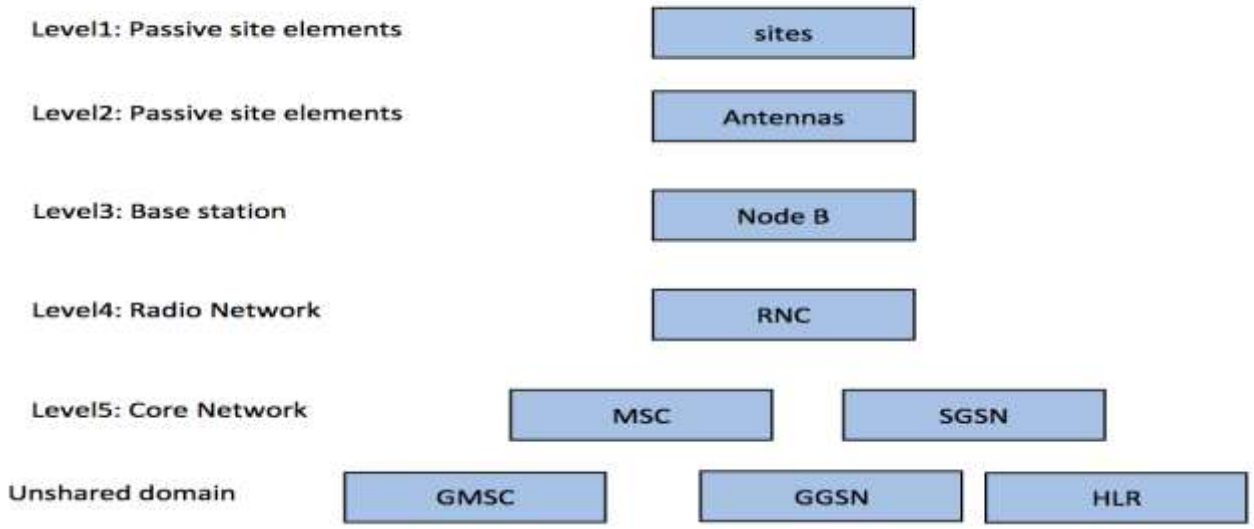

Figure 2: The different levels of infrastructure sharing in mobile networks

METHODOLOGY

The study adopted a descriptive research design using questionnaire to collect data from senior staff of the three mobile operators. Secondary data was obtained from published documents and materials and any other relevant materials like the CA's quarterly reports and annual accounts of the telecommunication companies The study collected both qualitative and quantitative data on different variable namely regulatory framework, competition technology and telecommunication infrastructure

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sharing among mobile firms in Kenya. The data was analysed by use of descriptive statistics, linear regression and factor analysis to represent the response rate and information on the variables under the study. Regression analysis was used to test the hypthesis.

Table 1: sample destribution

MNO	Employee Rank	Target population	Percentage
Safaricom	Senior Management	9	9%
	Departmental Heads	30	30%
Telkom	Senior Management	9	9%
	Departmental Heads	30	30%
Airtel	Senior Management	6	6%
	Departmental Heads	16	16%
Total		**100**	**100%**

Source: Researcher 2018

FINDINGS

There is some level of infrastructure sharing among the mobile operators on different network categories. The level of infrastructure sharing differed in each of the categories. Passive infrastructure is the most shared while there is no evidence of active infrastructure sharing among mobile operators. This realization was key in achieving the objectives of the study.

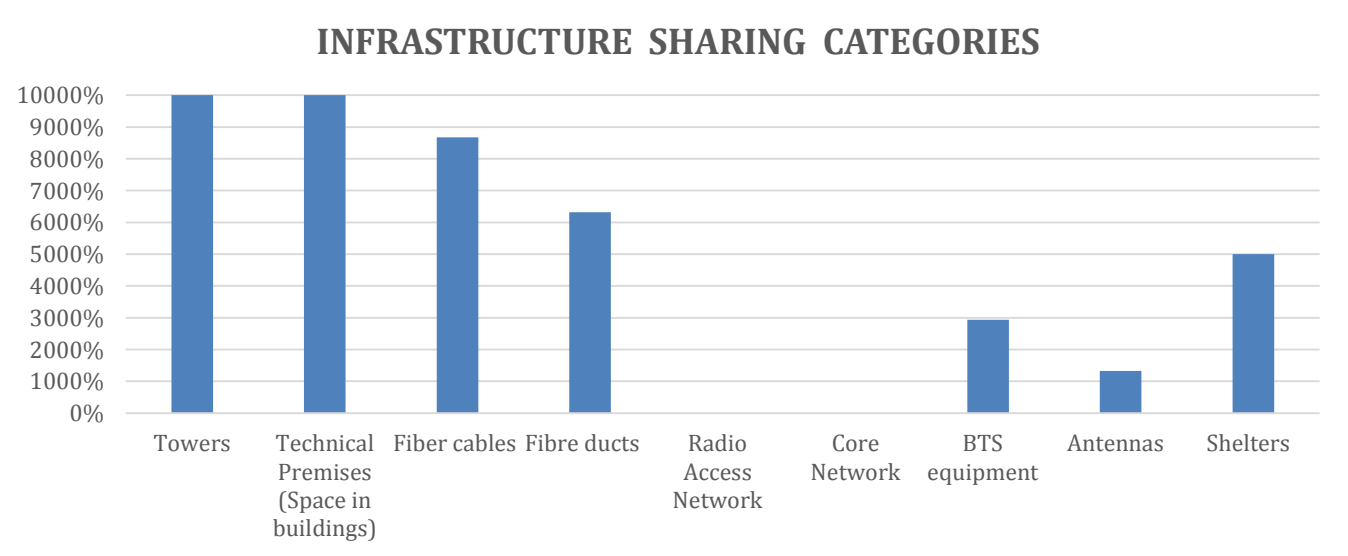

Figure 3: Infrastructure Sharing Categories

The research established that regulation competition quality and technology had significant impact on infrastructures sharing among mobile operators in Kenya. Regulation impact was leading at 56%, followed by completion quality at 53% and technology innovation at 50%.

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Table 2: Regulatory Framework

REGULATORY FRAMEWORK		
variable	**Frequency**	**Percent**
policy Structures	50	73
Price Regulation	40	58
Quality of service	25	36

Table 3: Competition Quality

COMPETITION QUALITY		
variable	**Frequency**	**Percent**
competition policy	55	80
Service Competition	20	29
Infrastructure Competition	34	50

Table 4: Technology

TECHNOLOGY DEVELOPMENT		
variable	**Frequency**	**Percent**
sharing Structures	43	63
Innovation evolution	30	44
Spectrum management	28	41

DISCUSSION

Network infrastructure sharing ushers in a new era of necessary cost saving initiatives of debt-ridden operators, who are finding it hard to compete in an increasingly saturated mobile wireless industry increasing competition, rapid commoditization of telecommunication equipment and rising separation of network and service provisioning. Network sharing allows operators to concentrate on offering better services to consumers as the network can be built sooner.

The research established that the level of infrastructure sharing in Kenyan among the mobile operators was low and driven by new entrants wanting to launch and market their services faster, cost optimization (capex or opex and revenue generation), environmental conservation, operators intention to focus on core business or innovation and increase coverage of ICT services to underserved or un-served areas. The study also determined that passive sharing was the most preferred among mobile service providers

Majority of the respondents indicated that lack of relevant regulatory and policy framework to promote infrastructure sharing among mobile operators had the greatest influence. This has resulted in operators building infrastructure individually for their own use and service expansion. In the absence of a regulatory framework the duplication in infrastructure investment, leased contracts had major impacts on the service expansion and the high cost thus increasing the digital divide between the rural and urban areas, and the poor and wealthy.

CONCLUSION

Infrastructure sharing solutions have proven to be a critical lever contributing to the growth of the telecommunication sector. Infrastructure sharing

levels in Kenya were low hence strategies to promote the same and increase the levels should be explored by the ICT stakeholders. Regulatory framework, competition and technology are reasonably critical to the success of adoption of infrastructure sharing strategy by mobile operators as a means to harness the technological, market and regulatory developments that have fostered affordable access to mobile and broadband services.

The adoption of policies that promote fair competition, interoperability and regulations supporting shared infrastructure framework has benefits to an organization. These benefits include gaining competitive advantage above the competitors, improved efficiency, growth in revenue and innovations. Operators may perceive the economic benefits and adopt a collaborative approach autonomously; however, a clear policy, a commercially friendly price-regulation mechanism, and tailored regulatory safeguards may be necessary to successful infrastructure sharing.

RECOMMENDATION

Shared infrastructure by mobile operators is aimed at improving wider broadband coverage to provide in extended geographical areas in the country to provide the underpinning platform for the growth of the digital economy that support production, distribution and consumption which act as a critical enabler for sustainable development foster economic development. Research has shown that infrastructure sharing levels in Kenya are low and this is influenced by competition, regulatory environment and technology evolution hence the need to explore strategies to promote increased levels through:-

- National governments could initiate framing regulations and policies to facilitate network sharing agreements among ICT providers. One element of such a policy would be the creation of regulatory and economic incentives that encourage the sharing of infrastructure among telecom companies as a key lever to foster competition and optimize investments. This will improve the level of broadband development
- Regulators to play an active role in mitigating the negative competitive of network sharing. It should establish clear reporting and monitoring provisions to evaluate the experience with sharing on an ongoing basis and to take mitigating regulatory or antitrust action
- The government should explore measures such as enforced interoperability, and price adjustments to level the playing field in the telecommunications sector.

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