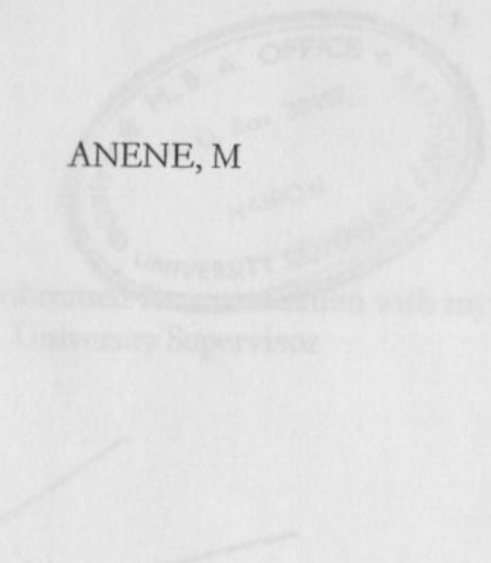


**“THE CONVERGENCE OF THE TELECOMMUNICATIONS,
MEDIA AND INFORMATION TECHNOLOGY, SECTORS
AND THE IMPLICATIONS FOR REGULATION IN KENYA”**

Date 07.10.2002.....
BY

ANENE, M

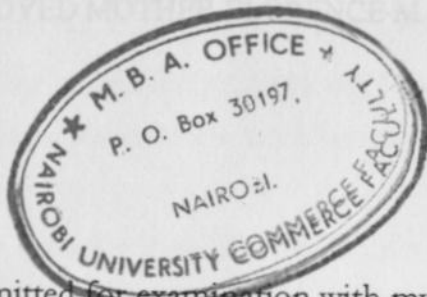


A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF
MASTER OF BUSINESS AND ADMINISTRATION, FACULTY OF
COMMERCE, UNIVERSITY OF NAIROBI

SEPTEMBER 2002

This Project is my original work and has not been submitted for a degree in any other university

Signed..... *A. W. W.* Date..... 07.10.2002.....



This Project has been submitted for examination with my approval as University Supervisor

Signed..... *[Signature]* Date..... 7.10.02.....

ACKNOWLEDGMENTS

Many thanks to my supervisor, Mr Julius Kiragech, of the department of management Science, who indeed has a special place in this project; from the sowing of the "seed" to its conception and the final churning out of the finished the project, for the encouragement, criticism and belief in my capabilities; "Kip" remained a pillar of strength, his unmistakable knowledge of the subject provided a canopy of assurance and reservoir of knowledge. For all that I am indebted to him.

DEDICATION

TO MY DEAREST BELOVED MOTHER FLORENCE M. WENDO

I would like to thank my mother, Florence M. Wendo, for the stimulating times and discussions and to no end; a ravenous interest and appetite for research that they have wrought in me.

Special mention also of my kind and generous friend Naushad N. Meralli; the Chairman Samsar Group of Companies, for always having taken a keen and "curious" interest in my scholarly pursuits.

My good and selfless aunt; Judy Shitiku, a graceful woman who shared some very trying moments with me in the course of the programme. "Aunty we made it", Lillian Inzani, "you are God's special; thank you".

I would like to honour God who, is not only my Lord, but has also given me an opportunity to see my dream come true, has been faithful throughout the same journey, and has continuously given me the strength. Thank you above all, for allowing that which is so special to my heart to be close to yours.

To those who have not been mentioned here, yet in one way or another played a pivotal role in the length of time of the whole programme; take this note as an undying show of gratitude and may the almighty bless you all abundantly, and reward you all so handsomely, in your overall endeavours.

ACKNOWLEDGMENTS

Many thanks to my supervisor, Mr Julius Kipngetich, of the department of management Science, who indeed has a special place in this project; from the sowing of the “seed” to its conception and the final churning out of the finished the project; for the encouragement, criticism and belief in my capabilities; “Kip” remained a pillar of strength, his unmistakable knowledge of the subject provided a canopy of assurance and reservoir of knowledge. For all that I say “thank you sir.”

I would also like to register my appreciation to all my tutors and especially from the department of management science, for the stimulating times and discussions and to no ends; a ravenous interest and appetite for research that they have wrought in me.

Special mention also of my kind and generous friend Naushad N. Merali; the Chairman Sameer Group of Companies, for always having taken a keen and “curious” interest in my scholarly pursuits.

My good and selfless aunt; Judy Shiraku, a graceful woman who shared some very trying moments with me in the course of the programme. “Aunty we made it”. Lillian Inziani, “you are God’s special; thank you”.

I would like to honour God who, is not only my Lord, but has also given me an opportunity to see my dream come true, has been faithful throughout the same journey, and has continually given me the strength. Thank you above all, for allowing that which is so special to my heart to be close to yours.

To those who have not been mentioned here, yet in one way or another played a pivotal role in the length of time of the whole programme; take this note as an undying show of gratitude and may the almighty bless you all abundantly, and reward you all so handsomely, in your overall endeavours.

TABLE OF CONTENTS

ABSTRACT

The primary objective of this study was to investigate the convergence of three sector; telecommunications, IT and Media and the implication of such on regulation, The study was facilitated by a sample study of 15 institutions, which were perceived to be indulging in some form of cross sector investment. The respondents offered information on computer usage, networking of available computers, production and transmission of such, private and public “property “ and desirable regulatory structures. The results showed that most of these organizations had in more ways than one, facilitated an environment conducive for convergence, and as a result specific challenges to existing regulation were clear these were:

- *The challenge to the consistency of regulation*
- *The challenge of globalization*
- *The challenge of abundance to regulation based on scarcity*
- *The challenge to distinctions between public and private activities*
- *The challenge to regulatory structures*

The stakeholder also gave some views on what kind of considerations they thought should be taken into consideration in the future to achieve a more balance all-round regulatory structure, namely;

- *Build on current structures*
- *Developing a separate regulatory model for new activities, to co-exist with telecommunications and broadcasting regulation*
- *Progressively introducing a new regulatory model to cover the whole range of existing and new services.*

This study though, should be interpreted in consideration of the limitations, specifically as regards the novelty of this phenomenon.

TABLE OF CONTENTS

4.1	Average Usage of computerized Production and processing.....	26
4.2	SECTION ONE: INTRODUCTION	Page
1.1	Background of the study.....	1
1.2	Definitions.....	3
1.3	Theme for convergence.....	5
1.4	Statement of the Problem.....	10
1.5	Objectives of the study.....	12
1.6	Importance of the study.....	12
4.7	SECTION TWO: LITERATURE REVIEW	29
2.1	The Global Market Revolution & the WTO Agreement.....	13
2.2	Telecommunications & IT reforms.....	14
2.3	Enabling role of technology.....	17
2.4	Current market developments.....	19
2.5	Existing regulation.....	22
4.12	SECTION THREE: RESEARCH METHODOLOGY	27
3.1	Research design.....	27
3.2	Population.....	27
3.3	Sampling.....	27
3.4	Data collection.....	28
3.5	Data analysis.....	29
4.18	SECTION FOUR: DATA ANALYSIS AND FINDINGS	30
4.0	Data analysis and findings.....	30
4.1	Survey of firms selected and studied.....	30
4.2	Analysis of desirable regulatory practice.....	39
5.21	SECTION FIVE: SUMMARY AND CONCLUSIONS	42
5.0	Summary and Conclusions.....	42
5.1	Conclusions.....	42
5.2	Limitations of study and suggestions for further research.....	47
	REFERENCES.....	48
	APPENDIX	

SECTION ONE
1.0 INTRODUCTION

LIST OF TABLES

		PAGE
4.1	Average Usage of computerized Production and processing.....	26
4.2	Level of Networking Employed and the Kind of Network Technology Employed.....	27
4.3	Range of services carried over the networks.....	28
4.4	Level of Internet connectivity and Application.....	28
4.5	% age of Production constituted by this multimedia.....	29
4.6	Use of Digital Technology in Delivery of Service.....	29
4.7	Age of organization and range of sectors involved.....	29
4.8	Range of employment of digital networking in processing and Delivery.....	30
4.9	Use of digital transmission Technological (ATM, ISDN).....	30
4.10	Network support for compression Techniques (MPEG standards).....	32
4.11	Levels of Internet Connectivity.....	31
4.12.	Use of Internet for content creation and transmission.....	31
4.13	Provision of multimedia broadcasting to clients.....	32
4.14	Age of business and involvement in cross sector invest.....	32
4.15	Employment of Digital Network for delivery of content to market.....	33
4.16	Use of Digital Transmission Technologies (ATM, ISDN & xDSL)	33
4.17	Client Internet Connectivity and Usage.....	34
4.18	Classification of Connectivity into Public and Private.....	34
4.21	Comparison of structures.....	37
5.12	Summary of challenges.....	40
5.21	Summary of options.....	42

SECTION ONE

1.0 INTRODUCTION

1.1 Background of the study

There's widespread agreement that convergence is occurring at the technological level. That's to say that digital technology now allows both traditional and new communications services whether voice, data, sound or pictures to be provided over many different networks.

Current activities in the market suggest that operators from sectors affected by convergence are acting on the opportunities provided by technological advances to enhance their traditional services and branch into new activities

Telecommunications, media and information technology sectors are seeking cross-platform and cross product development as well as cross-sector share holding. Examples of new products and services being delivered include:

- Home banking and home shopping over the Internet
- Voice over Internet. (VoIP).
- E-mail, data and WWW access over mobile phone networks and use of wireless links to homes and businesses to connect them to fixed telephone networks.
- Data services over digital broadcasting platforms.
- On line services combined with television systems such as web TV, digital satellites and cable modems.
- Web casting of news, sports, concerts and other audiovisual services.

Such development represent concrete examples of an information society in Kenya, they show its potential to touch the lives of every citizen. They also highlight a significant change in the range and diversity of traditional telecommunications and media services.

Until recently, separate networks have supported voice, data, video imaging, with obvious inefficiencies in the use of network resources and personnel. The inefficiencies of duplicate support systems, unnecessary user complexity and general lack of interoperability is clear. This is particularly true in enterprise applications in which private branch exchange (PBX) and voice systems sit side by side with complex LANs designed to support IT applications.

In response to those circumstances, technologies have emerged to combine systems in a way that eliminates duplication while improving services and providing real value to the end-user community. This trend has become known as "convergence". And is the inevitable move towards sharing network resources among previously disparate application and traffic types (Ryan 2001).

Convergence is commonly expressed as; the ability of different network platforms to carry essentially similar kinds of services or, the coming together of consumer devices such as the telephone, television and personal computer.

This latter expression of convergence is one of the most often cited in popular press, it's easily understood by consumers and has the added interest of reflecting a wider struggle between computer, telecommunication and broadcasting industries, for the control of future markets.

Convergence of consumer devices today though, is much less real than network convergence.

Telecommunications operators are already offering audio-visual programming over their networks and are also becoming major players in provision of Internet access as well as backbone infrastructure.

Broadcasters on the other hand have continued to provide data services over their networks and such services will be enhanced due to continued prospect of digital transmission of both radio and television.

Cable operators are providing telecommunication services including telephony and are also starting to deploy cable modems to offer high speed Internet access.

1.2 Definitions.

1.2.1 Information technology

These represent all those hardware, software, telecommunication, database management and other information processing technologies. O'Brien (1993).

According to Roger Carter, information technology must be defined in a way as to embrace TV, computerized record-keeping, computer aided design, printing and much more, simply put, it's the use of technology to generate, process, store and retrieve and communicate information in all its forms (Carter 1987).

Businesses especially large ones have little choice but to become information-based, demographics for one, demand the shift, the centre of gravity in employment is moving fast from manual and clerical workers, to knowledge workers who resist command-and-control model that businesses took from military 100 years ago (Drucker 1987).

At the heart of an enterprise today, is IT. Every aspect of business is automated, or should be automated. Over recent years, we have been deploying systems that improve our operational heartland, like, enterprise resource planning systems, our customers are being managed better with CRM software and through effective networking and internet technologies, we are able to communicate in an instant (Stuart 2001)

1.2.2 Multi media

This blends various tools: touch-sensitive displays, full motion video, still photographic quality images, outstanding quality voice and music audio and, graphics and texts.

Anytime you can use IT in a way that mimics how humans work, you present the organization with a opportunity to improve processes, reduce time to get things done and simplify what workers do. This is the promise of multi media because it tends to rely

more on the natural senses of the users, (touch, image, sound, graphics) creating a more intuitive and spontaneous dialogue with the technology (Cortada 1996).

Multimedia is therefore defined as the technologies that facilitate the integration of two or more types of media, such as text, graphics, sound, voice, full motion video, still voice or animation into a computer-based application (Laudon & Laudon 1996).

1.2.3 Telecommunication.

The movement of information by electronic means usually, over some distance (Laudon & Laudon 1996). This information is normally in any form, (voice, data, text and images).

The term telematics or teleprocessing may also be used since they reflect the integration of telecommunication and computer-based information processing technologies.

However all forms of telecommunications now rely heavily on computer and computerized devices (O'Brien 1993).

Over the years, the topology of computer networks has changed considerably, paralleling changes in the networking equipment and making better use of increasingly powerful platforms, both in centralized information technology and the desktop. Gradually as the computer networks have evolved, they have come to resemble telecommunications networks. For example, the traditional distribution plan for a PBX, system, which includes vertical, raises connecting floor level wiring closets, which in turn connect horizontally routed point to point station connections is now replicated in switched Local Area Networks (LAN) arrangements.

Meanwhile the equipment used in voice networks has grown more computer-like until the point has reached where the difference between an IT platform and a voice platform is fast disappearing.

Where the two models slightly differ, opportunity has now arisen to complete the synthesis, not just because it can be done, but because it would be beneficial to the organization to do so.

In fact, the long sought goal of "convergence" between computing and voice and telecommunication is fast becoming a reality.

1.3 Theme for convergence

In the USA, American Telephone and telegraph, (AT&T), was the largest regulated monopoly providing, virtually all telecommunication services.

After 1994 when the justice department forced AT&T to give up monopoly and allow competing firms to sell telecommunication services and equipment, this ended the monopoly, widening the market for new telecommunications technologies and devices. Laudon, (1993).

Deregulation and marriage of computer and communication has made it possible for telephone companies to expand from the traditional voice communications into new information services such as transmission of news, reports, stock market reports, TV programs and movies.

This is the foundation of the information superhighway (Laudon 1993).

In 1993, a federal appeals court gave the seven regional Bell telephone companies permission to provide such information as stock quotes, sports scores, news reports and periodicals. This ruling followed July 1992, Federal communication commission, (FCC), ruling that baby bells could deliver movies and television to homes in the same way that they now deliver telephone calls (New York times 1993)

1.3.1 Need For Convergence

The integration of video, voice and data on local area network as a concept, has been tossed around for at least a decade, but the arrival of new networking technologies, a generation of powerful multi media PCs and an important new industry standard promises to finally bring about a convergence of information and telecommunication at a cost chief information officers (CIOs), can swallow.

Until recently, video, voice and data each existed in there own separate, well defined spheres, but with organizations increasingly feeling the need to shave costs by eliminating technological redundancies there has been a systematic yet frantic movement toward consolidating all these technologies and bundling them into one single information system umbrella (Zagaeski 1997).

Many an organization have also realised that the information industry is highly volatile and dynamic. To try and stay “stay ahead of the curve”, it’s therefore proving imperative for organizations to provide employees with the latest in multi media tools. This is achievable only by bringing all types of telecommunication services under one information system (IS), umbrella-convergence (Zagaeski 1997).

The increasing decentralized organization structures can easily be supported by convergence. It provides remote users, teleworkers and small offices and retail outlets, with complete access to all of the communication services enjoyed by their colleagues at the headquarters location. Enabling further, remote workers using extended intranets to seamlessly connect to the corporate PBX telephone system and data networks.

Dynamic organizations: The arrival of virtual organizations on the landscape has also encouraged convergence (Laudon & Laudon 1999). These are companies not tied in any

way to an organization physically, yet in partnership with the organization and able to deliver goods and services outside the traditional organizational framework. One company can take advantage of the capabilities of another company without actually being tied to it.

1.3.2 Elements Of Convergence

Some current applications supported by computer telephony integration include voice-enabled groupware, long distance phone calls, and the conversion of electronic mail into voice messages for retrieval by mobile users and voice annotation of text documents. But even more advanced applications will arrive once information telecommunication convergence hits its stride (Morency 1997).

“Convergence will open up an array of applications, many of which have yet to be imagined”, Morency continues”, “there will come a time when everything will be integrated into a single unit”.

Providing video services in the LAN makes solid business sense, particularly for organization in industries such as high tech and marketing, in which workers routinely meet with others in order to, develop and share ideas. “Hauling users into a dedicated room for videoconferencing doesn’t do much for user-productivity, creativity and, spontaneity “ (Morency 1997). More CIOs are realizing that LAN based video and audio are becoming key business tools.

Helping to ease CIOs compatibility (due to perceived proprietary technologies) fears is the enterprise wide H.323, a new telecommunication standard that’s quickly winning support from a wide array of vendors, including such industry giants as IBM, Intel and Microsoft. Formally adopted in 1996, H.323 describes equipment and services integrating real time voice, data and video into networked PCs and workstations. H.323 is compatible with current generation LAN, cards, hubs, switches and routers, another big plus with most network mangers and CIOs.

Such standards, apart from calming compatibility fears, are expected by industry observers, to jump start the convergence market by a providing solid foundation upon which vendors can base their application tools.

Also helping boost the practicality of information telecommunication convergence is a new generation of powerful multi-media PCs, “with video and telephony becoming standards features in most newer PCs and with Internet helping to heighten the awareness of these technologies, users are beginning to expect video and telephony capabilities on LANs (Zagaeski 1997). Those trends are expected to accelerate in the years ahead, further promoting the cause of convergence.

1.3.3 Evidence Of Convergence

At the core of proliferation of convergence or “technology for tomorrow”, lie organizations with massive resources and an “eye on the future clock”. These range from print media to electronic, cellular mobile providers and the fixed phone line provider.

Up to a few years ago there was quite a clear distinction between indulging in print media ship and electronic media, but there has been a systematic synthesis of the two to a point where the distinction is virtually wiped out. Leading Print media houses Like the Nation newspaper is now doubling into electronic journalism, like television production, frequency modulation radio productions and both of which at the same time can be accessed on the information superhighway in form of web pages, as real time and on-line readership. The frequency modulation radio production is now in form of streaming radio and one needs only have a multi media desktop computer connected to the Internet to be able to communicate in any way with the newspapers, or tune to the radio. These

developments are not confined to the Nation newspaper but is being replicated by other leading print and electronic media in the country.

The Telecommunication industry is, perhaps, one of the greatest purveyors of the convergence technologies. Initially Telecommunication was synonymous with the monopoly behemoth Kenya Post and Telecommunication Corporation, but as the world broke ranks and liberalization made obsolete monopolistic tendencies, The Kenyan economy made slow painful strides toward liberalization of this highly strategic and profitable industry.

Safaricom, an offspring of Vodafone airtouch (UK), and Telkom (Kenya) was born. This was to be the first cellular mobile provider, five years down the line, a second private cellular provider was born, Kencell Communication. This, on the hand, combined the technology of Vivendi, (France), international and the local giant conglomerate, Sameer group of companies.

With a combined age of less than ten years, these companies have not only galvanised the local telecommunications market, but have dangerously cannibalised the market prior to their existence making obsolete initial technologies such as Pager services.

These providers have within a short time of existence been able to offer their ever increasing and fascinated market with value added services such as conferencing (connecting upto five people at once to a call), infoline, (giving of instant access to constantly updated news), inforsurf, (connecting to the internet and allowing one to send faxes and send and receive e-mails), directory features, these allow one to have directory features at one's palm top.

One provider, Kencell, has even enabled access to streaming radio, where one can access frequency modulation radio station as long as one has a working cellular mobile handset.

1.4 Statement of the problem

The information society is becoming a reality. Its development is fuelled by the rapid technological change, which is transforming information industries, Kenya remains no exception; the nature and speed of this transformation may pose new challenges to policy makers.

One of the most significant developments is, the increasing use of different sectors, notably the telecommunications, media and information technology (IT) sectors, of the same technologies. Evidence of such convergence has been mounting in recent years with the emergence of the Internet and with increasing capability of existing networks to carry both telecommunication and broadcasting services.

The phenomenon of convergence is relatively new and a range of different views exists on what its implications are for the society and for economic activity. There's a broad agreement that development in digital electronics and software are creating the technological potential for a new approach to the delivery and consumption of information services. There's less agreement on how much these developments will change existing practices and over what time-scales. Some consider that convergence will lead to the complete and rapid transformation of existing telecommunications, media and information technology services in such a way that these currently separate groups of services will merge into one another, substantially blurring the previous clear distinctions between them.

Others feel that the specificity of the existing separate sectors will limit the scope for service convergence, and that the media industry has a role as the bearer of social, cultural and ethical values within our society. This would mean that the regulation of

economic conditions and that of the content of information services should be separated to ensure efficiency and quality.

Others believe that if it does occur, it would evolve over an extended period of time.

With such a clear picture of suddenly coming together of a market, previously disparate, and a bundling together of goods and services from players in the past, apart, the fundamental question then arises:

“What are the implications for regulation in Kenya as a result of this bundling together or convergence of telecommunications, media and information technology sectors?”

It's nevertheless clear that whatever implications, of such developments, are likely to have far reaching effects.

The emergence of new services and the developments of existing services are expected to expand the overall information market. This will provide new opportunities for economic growth and employment. At the same time the new communication services environment will also provide opportunities to enhance the quality Kenyan citizens' lives, by increasing consumer choice, facilitating access to the benefits of the information society and promoting cultural diversity.

1.5 Objectives of the study

- ❖ Establish the specific challenges to the regulation as a result of a converging market.
- ❖ Identify possible options for the future regulatory approaches.

1.6 Importance of the study

- ❖ New markets are likely to rapidly develop, which will be essentially global in nature. If the applicable regulatory framework is not appropriate to the development of these, then Kenya may find itself at a competitive disadvantage vis-à-vis its more flexible competitors. This study aims at giving an indication to the way forward on such existing framework.
- ❖ This study also aims at ensuring a competitive basic market structure. All the players caught up in this bundling local market should feel that the ground for competition is fair and not skewed any way so to favour only particular players.
- ❖ This study could prove valuable to academia, serving not only as a good background for further research, but also as a valuable contributor to knowledge.
- ❖ The output of this study could prove an invaluable contributor to the development of a policy paper to guide in the convergence phenomena.

SECTION TWO

2.0 LITERATURE REVIEW

2.1 THE GLOBAL MARKET REVOLUTION AND THE WTO AGREEMENT

REFORMS

We had a fundamentally new world market for telecommunications at the close of the century. These developments marked the closing of a policy circle in which the market has moved full circle from initially competitive circumstances (Muller 1983). Only later did monopolies emerge, and with them came a form of collective amnesia. It seemed as if monopolies had always existed.

It was only in 1984 that USA forced the divestiture of AT&T and thereby therefore created competition in the market for long distance services. The divestiture also liberalized the market for competition in telecommunications equipment.

In October 1986 the World Trade Organization (then the General Agreement on Tariffs and Trade or GATT) launched the Uruguay Round. For the first time, the Uruguay rounds included trade in services on its multilateral agenda (Whalley and Hamilton 1996). It quickly became evident that trade in telecommunications services would be defined only as trade in value added data such as networking.

It is fair to say that many countries were sceptical about or indifferent to the reopening of trade negotiations on telecom services as an extension of the Uruguay Round in 1994. But the success of neo liberal economic reforms in Asia and South America had put even the most politically untouchable forms of monopoly up for re examination in the mid 1990s.

A number of empirical studies have found that investment in telecommunications

infrastructure is a strong predictor of economic (Madden and Savage 1998) this finding suggest that in order to accelerate economic development, countries need to create policy environments conducive to high level of investment in telecommunications sector.

2.2 TELECOMMUNICATIONS (AND INFORMATION TECHNOLOGY) REFORMS

2.21 Impetus For Reforms

Most developing countries nationalized telecommunications services in 1960s.

The late 1980s saw the beginning of reforms stimulated by various factors:

Abysmal performances of the state-owned Telcom providers. Changes in technology, making less tenable, the argument that telecommunications are a natural monopoly and, pressure by the World Bank and other international organizations.

Wellenius, et al (1992) note, “these state telecommunication monopolies generally fell short of meeting needs.

In 1981, Africa boasted an average of only 0.8 telephones per 100 people, Latin America, only 5.5 compared to 83.7 in the United States (Saunders et al 1983).

Vigorous competition existed around the world in the 19th Century (Petrazzini 1996), nonetheless, most countries soon embraced the notion that Telcom was a natural monopoly Noll (1988) notes that, “this belief probably never was accurate but, technology has made it more so, increasingly unlikely.”

Smith (1997) observes that, “telecommunications is clearly a multi-product sector with several alternative service delivery mechanism in service provision:

Some cases of such reforms included:

2.211 Reforms Czech Republic

The most important steps in liberalization were taken with the modification of telecommunications act in 1992. This led to a split of Postal and Telecommunications Company; SPT Praha, into Czech Post and SPT telecom. This 1992 Act though does not provide for an independent Telecommunications regulator. The market benefits from the well-managed regulatory framework of Czech Telcom office (CTO), (Wissman and Tietz 1997).

2.212 Reforms in Argentina

The struggle to introduce privatisation and competition in Argentina was contentious and, presidential decree was needed to do so in 1988 (Petrazzini 1996). The communications commission of Argentina, CNC, agreed to gradual liberalization, which led to two basic cellular mobile providers (Schneider 1995). Argentina further, prepared for the liberalization of the basic service market through the passage of the General Interconnection Regulation in January 1987 and the basic Telephone services decree I March of 1988.

2.213 Reforms in Mexico

Mexico was one of the early reformers of the Telecommunications Markets, in South America, in early 1990.

A start to competition in long distance market was the crowning success of the Government reform policy.

2.22 Reforms, Predictions and existing evidence

Advisors typically recommend three components of telecommunications reform initiatives; privatising the state-owned monopoly provider, introducing competition and creating a independent regulatory administration.

In general, there's a broad agreement that competition is likely to be the most effective method of promoting improvement in the Telcom sector.

Wellenius (1992), observes, "A single monopoly operating enterprise, whether state-owned or private, is increasingly unable to meet equally well, the large varied and rapidly changing demands of three types of users.

Most agree also that; while privatisation can bring about great improvements, it must be combined with effective regulation, Ambrose, et al (1990), note "simply moving a monopoly from the public to the private sphere will not result in competitive behaviour." Indeed "private investors wary of highly politicised processes have long demanded independent regulators, removed from Government influence," (Petrazzini 1996).

Petrazzini and Clark (1996) studying the effect of competition in Latin America and Asia find that cellular and mainline penetration in competitive markets is higher than in non-competitive markets.

Galal, et al (1995), adopt a hybrid competitive approach to study the effect of regulator reforms. Reforms. Comparing the performance of the Telcom sectors in several countries before and after regulatory reforms, they find that one country in their sample (Chile), that resolved all issues of regulatory objectives (commitment, information asymmetry and pricing issues), achieved the greatest improvements while the one country (the Philippines) that did not, experienced the least growth.

2.3 CONVERGENCE: *THE ENABLING ROLE OF TECHNOLOGY*

Though this study is not primarily concerned with technology, an understanding of the nature of the developments of these can lead to an appreciation of the potential for change

2.3.1 Digital Technologies Underpin Convergence

The underlying trend is the common adoption of digital technologies by the relevant sectors.

Digital technologies cover a range of disciplines generally associated with the computer and telecommunications industries-digital micro- electronics, software and digital transmission. Applied piecemeal within each of the relevant sectors, these technologies have already demonstrated their efficiency, flexibility and cost-effectiveness, and have shown how they can enhance creative potential and promote innovation.

Computer technology now plays a key role in content creation and production in both cinema and broadcasting worlds. The ways in which audio-visual material is produced, delivered and consumed are evolving. Content is becoming “scalable” so that it can be used in different environments and delivered in different networks infrastructures. The basic building block is the MPEG family of standards for the digital encoding of moving images. [Motion picture expert group]. Once encoded in this format, images may be modified, manipulated, or transmitted in the same way as any other digital information. The systems and networks handling such information are of course indifferent to the nature and source material, be it image, sound or text. Digital source encoding thus forms the basis of technological convergence.

2.3.2 Network technologies for convergence

As alternative telecommunications infrastructure becomes more widespread, high-speed networks based on optical fibers will soon be capable, in combination with modern server technology, of operating cost-effectively in a virtual broadcast mode. The high data rates and spectral efficiency achievable through digital transmission open up the possibility of delivering high-quality audio and video signals over a variety of different network infrastructures. Transmission technologies such as narrow-band integrated digital services network (ISDN), xDSL, and asynchronous transmission mode (ATM) will ensure that both existing and new infrastructures can play a role in carrying the new services. The capabilities of existing networks are also enhanced by the compression techniques implicit in the MPEG standards, allowing networks of limited transmission capacity to carry services previously considered possible only on sophisticated and pricier wide-band infrastructures.

ATM is of considerable interest as a multi media transport technology. It is a high-speed cell-relay technology, capable of transporting telecommunications traffic of different characteristic

(Voice, data, video) over the same network, and has been designated by the ITU as the basis for broadband ISDN, the successor generation of its narrow-band counterpart.

2.3.3 Internet technology is leading to platform of independence

The most relevant example of such platform independence is the Internet Protocol (IP). IP has developed into the *de facto* network protocol for the Internet able to route and transport all elements of a multimedia service (text, image, motion and sound). IP is also used in Intranet products, providing an infrastructure for multimedia applications within a company or other close user group.

The Internet can best be described as a network of networks interconnected on an open basis using IP, usually running over transmission links leased from telecommunications

operators (Tos). It has evolved rapidly over the past decade from a largely academic-and Sponsored-sponsored network with a backbone capacity of 56kbit/s in 1986, increased to 45mbit/s in 1993, and to 155mbit/s in 1996. This huge change in capacity of the Internet's infrastructure has been in response to the remarkable growth in the number of people using the Internet and the range of applications and software tools developed for it.

2.4 CONVERGENCE: *CURRENT MARKET DEVELOPMENTS*

Significant changes are now being realized through the application of new technology to the individual sectors.

Indeed such changes are in themselves no evidence of convergence, but as can be suggested, the commonality of technology applied could provide a basis for the convergence to develop.

2.4.1 Digital television and digital audio broadcasting services and the audiovisual landscape

In the early 1990s it was discovered that digital technology could be effectively used for delivering television and audio signals. Of particular interest was the possibility of delivering many more channels over the same existing infrastructure (cable TV, satellite transponders, and terrestrial spectrum) by using digital compression rather than the existing analogue transmission (TV without frontiers 1995)

Although it is early days in the development of this market, a number of interesting phenomena-which are either new to TV or significant development of past practice-are appearing as digital compression is cost-effectively reducing capacity constraints:

Programmed bouquets and thematic channels-broadcasting companies are marketing their services in form of “bouquets” of programme channels. The “bouquets” complements “generalist” TV channels with thematic channels concentrating on news, sports, movies etc. offering viewers greater choice and coverage of areas of specific interest to them.

Near Video-on-demand-The availability of substantial transmission capacity at reasonable prices will soon make “near Video-on-demand (NVOD) services possible.

Example: with 60 satellite channels, ten 90-minute films could be broadcast simultaneously, each one starting at 15-minute intervals.

Pay-per-View-Similarly, it is possible to market specific events or movie-showings on an individual subscription basis. Such pay-per-view services have been provided using analogue channels.

These phenomena, which constitute a significant departure from classic schedule-based broadcasting, have potential to improve consumer choice. In addition, and because the “digital” channel is inherently more flexible than an analogue channel, it can deliver other services in form of data, graphics, moving pictures or combination of these.

The arrival of digital radio offer exciting possibilities for the combination of radio and images and links to Internet sites marketing CDs or tickets for band being broadcast.

(Financial Times 1997).

(Broadcasters such as CNN and BBC are starting to make parts of their broadcasts content available on the Internet extending their normal geographical reach, whilst a new breed of web casters is emerging to broadcast particular live events such as sports coverage, concerts, major events, etc.

2.4.2 Telecommunications liberalization is widening choice and lowering prices

In less than five years, the Kenyan market just like the European telecommunication sector, has experienced a radical transformation from one characterized by rigid and inefficient monopoly to a sector facing full and vigorous competition, with the aim being to totally liberate service and infrastructure. This transformation owes its beginning in part to an earlier phase of convergence of telecommunication and information technology. Technological convergence rapidly gave rise to market convergence and to value added.

The regulatory traditions of telecommunications sector contrasted sharply with the free market environment in which the computing industry had developed, and their coming together meant that some rationalization of these regulatory philosophies would be needed if the new services were to flourish (Green paper, 14 1987)

The mobile communications industry is particularly dynamic. (COM, 97, 217: COM 97, 513)

Example: In less than two years, more than 750,000 people in Kenya got connected to the two mobile service providers, whereas in Scandinavia, one in three people have a mobile phone and Europe boasts more than 45 mobile phone owners.

2.4.3 The Internet is bringing new services to business and public at large.

It is however, in the third sector, the Internet, that changes have been the most radical.

The Internet is both the symbolic and the prime driver of convergence. It is a vehicle for the delivery to users of both existing services (electronic mail, Video, sound, voice telephony, for example) and completely new services (e.g. World-wide Web). It has rapidly evolved from a government/academic network to a powerful communication and trading platform. Characterized by an unprecedented growth rate (doubling its user numbers every year), the Internet has to influence a number of economic sectors, with the emergence of the fast-growing electronic commerce economy (TIME CAST 1997)

2.4.4 Mergers and Alliances are reshaping existing industries

The on-going process of convergence, the opening up of telecommunications sector to full competition both in Europe and globally, and the rapid growth of the internet and on-line services, is leading to creation of new market structures and new roles for market players. In 1996 more than 15% of the total value of worldwide mergers and acquisitions (US\$ 1trillion) was generated by activities that can be broadly termed information and communication industries (Squire, Sanders & Dempsey 1997).

Such venture represent wide-range of transactions, from horizontal alliances which share risk and match complementary skills, to vertical integration as players in one market segment seek to leverage technological convergence, expand into other higher value segment or develop economies of scale.

2.5 EXISTING REGULATION

Over the years, significant progress has been made in the expansion and modernization of the country's postal and telecommunication services. Yet substantial demand for basic service remains unsatisfied and disparity in distribution of communication facilities between rural and urban areas continues to widen. The Government recognizes the importance of undertaking structural reforms to take care of such flaws.

Indeed the country is not alone in considering undertaking of such reform measures. Regulatory changes, new technologies and dynamic markets forces are interacting to reshape the communication sector throughout the world.

2.5.1 Restructuring of KPTC

KPTC, was split into three legal entities, namely Telkom Kenya Limited, Postal corporation of Kenya and communication Commission of Kenya (CCK).

The CCK is the regulatory body for the sector and was established by the Kenya Communication Act of 1998 to discharge duties:

- Issue Licenses
- Price Regulation
- Establish interconnection principles
- Type approve equipment
- Manage the radio frequency spectrum

2.5.2 Establishing of a New Regulatory Framework

The Kenya communication Act 1998, which received Presidential assent on 1st October 1998 set out a new regulatory regime suitable for a multi-operator environment necessary to support the revitalization of the telecommunication and postal sectors.

- Competition

Competition in the telecommunication sector, within a defined market structure, will be fostered with licensing of new players. The aim being to increase customer choice and accelerate investment.

- Universal Service

The Government aims at emphasize the provision of basic postal and telecommunication services to all unserved or under-served areas at affordable rates.

- Equity Participation.

The Government will continue to encourage Kenyans to actively participate in the sector through equity ownership. Consequently, it will be a requirement, initially; that any firm licensed to provide services in the liberalized market segments should at least have 60% of its equity owned by Kenyans.

In reality, the transition from monopoly to effective competition, though far from complete, has required a profound reform of regulation in the telecommunication sector; with rules agreed to set the dates for liberalisation of the sector and to provide a common regulatory framework covering *inter alia*:

- Conditions of market entry (example, common framework for licensing procedures, timetable and conditions which maybe attached.
- Maintenance of public interest (example, a framework guaranteeing the delivery of universal services and specifying consumer rights in relation, for example to the voice telephony service, and rules covering data protection and privacy.
- Interconnection and interoperability of services and networks, and fair allocation resources (example, access to numbers, availability of radio frequency spectrum).

A fundamental consideration has been the need to limit regulation to the minimum required to secure the overall public interest and to enable effective entry and sustainable competition.

The focus of the regulatory framework for telecommunication has been on networks and service provision (including aspects linked to safeguarding the public interest) and not on regulation of content carried over those networks. Three aspects of this focus on an internal market for telecommunication can be highlighted:

- The removal of barriers to investment and innovation within the internal markets.
- Ensuring conditions that support countrywide networks and services.
- Maintaining a defined level of services for users.

Note:

The WTO agreement on basic telecommunication reached on 15th February 1997 is fully in line with the Kenya regulatory framework for the sector. This applies, not only to the dates set for liberalization, but also in regard to the underlying regulatory principles. The deal doesn't cover broadcasting and it only applies to telecommunication (transport) services. Thus it doesn't cover any "content services" which maybe transmitted through telecommunication services.

2.5.3 Publishing and Information Technology

The publishing sector operates within a framework of more limited sector-specific regulation compared to telecommunication and audiovisual/broadcasting sectors, and there are fewer regulatory barriers to entry (in the sense of formal licensing requirements) although there are stringent rules applying to this sector.

At the same time, ranges of controls are applicable to the broadcast media (example those regulating to pluralism, foreign ownership and right of reply) also apply in some form to the publishing sector (and in particular, the press), reflecting public interest objectives common to both sector. However, the implementation of some of those principles of the publishing sector is through self-regulatory bodies, such as press or code of practice, in contrast to stronger powers for regulatory intervention in broadcasting field.

In addition many of the general rules related to public morals, advertising, libel, privacy, intellectual property protection, access to public document, also apply to the publishing sector.

The IT and software industries have less a tradition of sector-specific regulation though once again, horizontal rules relating to issues such as extent controls, electro-magnetic interference; or consumer protection would apply, as would general competition law.

The Internet on the other hand, is more closely associated IT and software industries than with telecommunication whose infrastructure it uses. Whilst the network over which much of the internet traffic flows is subject to detailed regulation. The organization, management and allocation of resources within the Internet has been largely industry and user-led. The community has actively supported the industry led approach in its work on harmful and illegal content on the Internet and more generally on the media.

(COM, 96, 487)

Whilst approaches maybe changing, particularly in key areas such as naming and addressing, there's been little sector specific regulation of the Internet in Kenya.

[NOTE 1].

Note 1: This contrasts with approaches in China Vietnam or Singapore where restrictions have been put in place.

3.3 Sampling

The various stakeholders were separated by strata which is a segregation based on the nature of the industry of the sample.

This was then followed by purposive sampling, (in this case), involved obtaining information from specific targets (i.e. organizations which conformed to the research criteria set by the researcher) (Sekaran 1992)

The strata follows the classification:

- Media industry
- Telecommunications
- Information technology

SECTION THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design.

The study was conducted through elite interviewing of major stakeholders in the IT, Telecommunication and media sectors.

It enabled possible collate of views of various well-informed people within these institutions on the challenges for regulation due to a converging market.

3.2 Population.

The population of interest included all the major stakeholders in the various industries: IT, Telecommunication and the Media.

It's instructive to note that population of study was limited to Nairobi mainly due to the fact that, all the stakeholders in the convergence phenomena have their headquarters in Nairobi and as such, responses were considered as representative of any branches.

3.3 Sampling.

The various stakeholders were separated by strata which is a segregation based on the nature of the industry of the sample.

This was then followed by purposive sampling, (in this case), involved obtaining information from specific targets (i.e. organizations which conformed to the research criterion set by the researcher) (Sekaran 1992)

The stratum follows the classification:

- Media industry
- Telecommunications
- Information technology.

With this stratification, it was possible to obtain a fairly representative sample; sample size of 15 institutions was initially preferred. Of these, two, (CCK & MOT&C), were unique and were to be interviewed as the original bodies charged with overseeing the regulation of an initially segregated market.

A small sample was chosen for various reasons; apart from the cost (of the research), which is an obvious concern, huge supplementary information arose due to the nature of the interviews, but more importantly, these samples easily represented between 80 and 90 % of the convergence phenomena.

This study cut across three seemingly unrelated industries, but which in reality are systematically merging into one big industry.

3.4 Data specification and collection

The study relied upon both primary and secondary data. Primary data was collected through personal interviews, in which the respondent's views and opinions were sought. The researcher was also able to peruse journals and other relevant information sources for secondary data.

Because of the differences in the nature of the institutions, the interview guides were structured differently to try and understand the phenomenon under investigation from the perspective of the particular institutions.

The sequence of questions was random in nature to preclude any guessing of underlying factors that were being sought.

The questions had both a technical and none technical tone. This was necessary to capture the structure and also appreciate the service embraced by these structures.

SECTION FOUR

The guides were tacitly divided into five portions;

The first four portions building up on the challenges and capabilities of the systems in place, the last portion, meanwhile, soliciting the opinions on future regulatory framework.

The interviewees were chief information officers (CIO's), or IT managers or MIS managers or business development managers. Anyone of these was found to be knowledgeable and well versed in the subject matter of the research.

3.5 Data analysis

The analysis followed a tabular format along themes. The first four portions of the guides relied on percentages and proportions; the last portions were directly laid out, based on the strength of recurring themes.

The analysis was also presented using tables and , showing, growth trends of underlying structures, service requirements and service merging.

SECTION FOUR

4.0 DATA ANALYSIS AND FINDINGS

4.1 Survey of firms selected

Data in this study is summarized and presented in percentage representations. These findings deal with the first four portions of the interview. The last portion of the interview meanwhile is derived as a direct layout based on the strength of recurring themes.

PRINT AND ELECTRONIC MEDIA

Table 4.1

Average Usage of computerized Production and processing

Organization	% usage Level
Nation Media Group (NMG)	100
Standard Group (SG)	80
Kenya Broadcasting Corporation (KBC)	50

With a wholly computerized production and processing capability, Nation media Group is the most highly computerized, with 100% computerization, while KBC; represent the least computerized organization in production and processing with 50%.

It can therefore be deduced that these organizations are applying digital Technologies over a range of disciplines ranging from content creation to production and transmission activities.

Table 4.2

Level of Networking Employed and the Kind of Network Technology Employed

Organization	Level (%age)	Technology used
NMG	100	Broadcast & Terrestrial wired & wireless
SG	100	Broadcast & Terrestrial wired & wireless
KBC	50-100	Broadcast

Networking is wholly employed by all organizations sampled at processing and communication/training levels. The Nation Group is perched at the top sharing with the standard Group, both with 100 % level of networking and embracing broadcast and terrestrial wired and wireless network technologies. KBC on the other hand has networked upto 50 % and has yet to embrace the terrestrial wired and wireless network technologies.

Table 4.3

Range of services carried over the networks

Organization \ Service	NMG	SG	KBC
Full multimedia	100	100	
Data and graphics only			100

The Nation Group and the standard have full range of multimedia; this implies that their networks are capable of transmitting in voice, data, text and images. Such networks are fully digitalised in nature. The KBC has only 50 % capability (or 100 % data and graphics only). Such a network is incapable of full multimedia transmission.

Table 4.4

Level of Internet connectivity and Application

Organization	% Connectivity	Main Application
NMG	100	Content Delivery
SG	90	Content Delivery
KBC	50-60	Program Streaming

There is generally a high level Internet connectivity; The Nation Media Group has 100%, whereas KBC has the least with between 50-60%. The implication of this high level connectivity and usage is that; these organizations have recognized and are exploiting the open non-proprietary approach of the Internet in improving production and transmission of service delivery. Especially as concern the multimedia service.

Table 4.5

% age of Production constituted by this multimedia

Organization	%Multimedia Production
NMG	50-60
SG	50-60
KBC	30-50

All the organizations are slowly converting their production to be wholly multimedia. The NMG shares with the SG at 50-60 % multimedia production, KBC is still struggling with upto 40% production constituting multimedia.

Table 4.6

Range of Use of Digital Technology in Delivery of Service Delivery

Organization	% Digital delivery
NMG	100
SG	60
KBC	10

The NMG with 100% digital delivery represents an organization that is using digital technologies in both processing and transmission within a complete networked environment, and is hugely multimedia in its content. KBC with 10 % may seem way down, but it represents a big leap from a near whole manual productivity, to up to 40% multimedia within a 50 % networked environment in less than five years.

Table 4.9

Use of digital transmission Technological (ATM, ISDN)

Organization	Frequency (%)
TELECOMMUNICATIONS SECTOR	
Safaricom 100	
Table 4.7	
Age of organization and range of sectors involved	
Organization	Age (YRS)
Kencell communications	3
Safaricom	>5YRS
Telkom	>20YRS
KCCT	>40YRS

There is a huge age variation in telecommunications sector, of organizations embracing convergence.

Age does not seem to be a critical factor though younger companies are faced with a bigger task of embracing this phenomenon due to the costs involved.

Table 4.8
Range of employment of digital networking in processing and Delivery

Organization	% Processing	% Delivery
Kencell communication	100	100
Safaricom	100	100
KCCT	50	100

There is a heavy reliance of digital networks for both processing and delivery of services. Kencell and Safaricom at 100% processing and delivery represent the highest level of technological advancement whereas KCCT processes at only 50 % and delivery using network 100% of the time.

Table 4.9
Use of digital transmission Technological (ATM, ISDN)

Organization	Frequency (%)
Kencell	100
Safaricom	100
KCCT	50

These are technologies allowing networks of limited transmission capacity to carry services previously considered possible only on sophisticated, more costly wide band infrastructure.

Kencell and Safaricom have employed such technology wholly whereas KCCT has up to 50% of its network digitalised.

The deduction thus, all these organisations are transmitting very high capacities on all manner of services.

Table 4.10
Network support for compression Techniques (MPEG standards)

Organization	Frequency (%)
Kencell	100
Safaricom	100
KCCT	50

Again the cellular providers, Kencell and Safaricom have embraced wholly compression techniques within their networks with 100% support, whereas KCCT has yet to wholly embrace this at network level. It can be deduced thus; these organizations are doing a lot of multimedia production and processing. Compression techniques are used where multimedia capabilities are utilizable.

Table 4.11
Levels of Internet Connectivity

Organization	Frequency (%)
Kencell	100
Safaricom	100
KCCT	100

Internet connectivity is a symbol of Globalization or global network. Hence, with full levels of Internet connectivity all these organization are at the centre of global interconnectivity. Represented at 100 percent internetworking for both, Kencell and Safaricom, KCCT also connects to the net with 100% frequency.

Table 4.12
Use of Internet for content creation and transmission

Organization	Frequency (%)
Kencell	100
Safaricom	100
KCCT	40-50

These organizations are all enjoying the use of non-proprietary approach to standards, embraced by the Internet, combined with the rapid development capabilities of the World Wide Web (www). These organizations can therefore create and transmit content to any part of the world and/or with any other partner.

Nairobi Net	100
Swift Global	80-90
	80

Table 4.13

Provision of multimedia broadcasting to clients

Organization	% Frequency
Kencell	100
Safaricom	100
KCCT	40-50

Multimedia broadcasting allows organisations employing it, to transmit digitally leading to expansion of capacity and hence effectively removing the perceived scarcity, which has dogged the sectors since their inceptions.

Kencell and Safaricom are the leaders within organisations employing multimedia broadcasting.

Table 4.16
Use of Digital Transmission Technologies (ATM, ISDN & xDSL)
INFORMATION TECHNOLOGY

Table 4.14

Age of business and involvement in cross sector investment

Organization	Age (yrs)
Africaonline	<10
Nairobi Net	<10
Swift Global	<10

All the businesses under study in the IT sector have less than 10 years of existence. It can be surmised that Convergence does not necessarily embrace long-standing organizations. It indeed seems as if younger organizations have taken the risk to converge much more quickly than their older counterparts.

Table 4.15
Employment of Digital Network for delivery of content to market

Organization	Frequency (%)
AfricaOnline	100
Nairobi Net	60-80
Swift Global	80

There is an increasing installation and usage of digital network. The implication of this is that the organizations involved are able to transmit faster and more reliably, bigger contents than was previously possible. Clients are able to acquire information and other services much faster and with the same bandwidth as previously hence cheapening the costs.

AfricaOnline is ahead of the other organizations with huge investments in digital networks. Nairobi Net and swift Global are the other organizations surveyed that are making big strides into this expensive yet viable venture.

Table 4.16
Use of Digital Transmission Technologies (ATM, ISDN & xDSL)

Organization	Frequency (%)
Africaonline	100
Nairobi Net	100
Swift Global	100

Not only does support digital encoding (compression and delivery of images using MPEG standards) but allows capacity of networks of limited transmission capacities to carry service previously considered possible only on sophisticated and more costly wide-band structure.

Table 4.17
Client Internet Connectivity and Usage

Organization	%of connectivity +usage
AfricaOnline	100
Nairobi Net	90-100
Swift Global	90-100

The very high connectivity denotes growth and usage of Internet facilities on part of clients of these organizations especially in the last 4 years. AfricaOnline has the highest connectivity and usage on part of their clients.

Table 4.18
Classification of Connectivity into Public and Private

Organization	Frequency (%)
Africaonline	30
Nairobi net	20
Swift Global	20

This consideration of classifying networks or services as either private or public is on the decrease. The separating line has become barely recognizable. Transmission is becoming accessible to all people and content delivery is increasingly becoming interactive. This would explain why Internet service providers are in the forefront of disposing this notion of public vs. private

4.2 ANALYSIS ON DESIRABLE REGULATORY PRACTICE (FUTURE REGULATORY PRACTICES)

All the players within the converging sectors were asked on *desirable regulatory practice*: there was varied responses but some statements that had a strong recurring theme were noted; these were statements that were either verbally quoted from the respondents or when put across to them, they wholly agreed. Selections of these are:

1. With regard to the role of regulation, affirmation of the continuing need to meet a range of public interest objectives whilst recognizing the need to promote investments, in particular in new services.
2. Separation of transport and content regulation, with recognition of the links between them for possible competition problems. (a more horizontal approach to regulation?) With:
 - a). Homogeneous treatment of all transport network infrastructure and associated services, irrespective of the services carried;
 - b). A need to ensure that content regulation is in accordance with the public policy objectives associated with those services;
 - c). A need to ensure that content regulation addresses the specificity of the audiovisual sector, in particular through vertical approach, where necessary building on current structures;
 - d). Application of an appropriate regulatory regime to new services, recognizing uncertainties of the market place and the need for large initial investments involved in their launch while at the same time maintaining adequate consumer safeguard.

e). A balanced solution as to how public broadcasting can be best integrated into the new environment, which should.

3. A balanced solution as to how public broadcasting can best be integrated into the new environment, which should:

a). Encourage those organizations vested with the public broadcasting obligations to exploit new technologies and new ways of reaching their audiences;

b). Require such broadcasting to distinguish clearly between public broadcasting activities and activities lying in the competitive domain.

c). Effective application of the competition rules; an increased reliance on those rules, accompanied by gradual phasing-out of sector –specific regulation, as the market becomes more competitive.

4.21 Comparison of structures.

Three main options for the organization of the statutory duties to regulate the electronic communications industries were considered:

- Separate regulators for the infrastructure and services;
- Separate regulators for economic/social issues (involving both infrastructure services) and content issues and
- Single a regulator, covering infrastructure and services, economic/social and cultural content issue.

The perceived cons and pros of the three were also investigated;

	Pros	Cons
<p>Option 1: Separate infrastructure and services regulator</p>	<p>Different issues tend to arise in relation to infrastructure and services</p>	<p>Does not solve problem of regulatory overlap so risk of double jeopardy.</p>
<p>Option 2. Separate economic/social regulator (covering both infrastructure, access and services) and content regulator (covering PSB and negative programming controls)</p>	<p>Can address leveraging of market power from service to infrastructure and vice versa.</p> <p>Different skills and approaches required for effective economic and content regulation.</p> <p>Allows separate voice for each of the different approaches. This might ensure more transparent debate about trade-offs.</p>	<p>Content regulator might not take full account of effect of decisions on economic issues.</p> <p>The boundary may not always be clear and who draws the boundary</p>
<p>Option 3. Single regulator (covering infrastructure access and services, and economic/social and cultural content issues)</p>	<p>Can address leveraging of market power from service to infrastructure and vice versa.</p> <p>Full implications between economic and content issue can be taken into account and appropriate trade-offs made.</p> <p>Avoids (most) problems of defining the regulatory boundaries</p>	<p>Economic issues too different from content issues danger that one aspect might tend to dominate the other.</p> <p>Does not give separate voices to the economic and content aspects.</p> <p>Danger that a single regulator would become too large and bureaucratic.</p>

SECTION FIVE

5.0 SUMMARY AND CONCLUSIONS

This study had set out to establish the specific challenges to regulation as a result of convergence of the telecommunications, Media and IT sectors. As a result of such challenges:

The study was to then identify and explore possible options for the future regulatory approaches,

The Literature covered in the study was highly borrowed from the developed states especially the European Countries of which United Kingdom was at the forefront, and also from the United States of America, which has a highly dynamic and versatile regulatory structure.

This study mirrored the vital and highly acclaimed discussion (of 1997-1998) going by the same title but which was wholly a European continental concern. The vitality of these sectors especially to the Kenyan economy was not lost on me, and indeed the views collected and collated were proof that this is an area that is slowly but surely becoming an axis to which the economy need shift to. Any country disregarding these three sectors Kenya included, would risk becoming an information dwarf and would soon be irrelevant in a world quickly coalescing into a "global village" governed by information.

5.1 Conclusions

These conclusions are based on the findings tabulated in section four of this paper; these findings are discussed in the light of the objectives mentioned in the above paragraph.

5.1.1 Conclusions on survey of Firms Selected and Studied

Several specific challenges to regulation can be deduced from these tabulated results: Increasing computerised production and processing creates the challenge to the *consistency of regulation*: regulating essentially similar services differently particularly, on the basis of the technology used to deliver the service, could represent discriminatory treatment which might hold back competition, investment and the provision of services. Another challenge to regulation can be deduced from the prevalence and pervasive nature on Internet, *the challenge of globalization*; the globalization of services is a feature of the new landscape, while satellite television broadcasting represents one example, it is the Internet, which constitutes the quintessential global network, the Internet's structure and ubiquity potentially allows it to defy attempts to apply existing regulatory objectives at national level.

The challenge of abundance to regulation based on scarcity: Regulatory approaches were based on the perceived scarcity of both radio frequency and content. But the findings of this study belie this perception. Current market technology trends such as the tabulated increases in network capacity; the possibility of content and services to be delivered over a number of platforms; the increase in competing routes to customers and improvements in digital compression suggest that in a fully digital environment, scarcity may over time become a less significant issue, calling for current regulatory approaches to be assessed. The challenge to *distinction between public and private activities*; convergence will not prevent the implementation or regulation based on distinctions between what is "private" and what is "public", but it may shift the boundaries separating the understanding of the two. To the extent that rules have been formulated on the basis that particular networks, services or activities are public rather than private, this could have consequences for the level of regulation applied to a particular service.

A reassessment may be required to determine whether current boundaries between what is public and what is private remain valid in the light of technological developments. Example new means of delivering services, interactively, and the possibility of per

transaction payments makes it harder to draw those lines in the future.

The challenge to regulatory structures: regulatory structures within the converging sectors are fragmented, diverse and complex. The risk of overlapping regulation indeed is ominous or the need to deal with multiple regulators within or between two sectors or even countries may call for rationalisation of current structures in order to avoid unnecessary administration creating barriers.

Table 5.12

Summary of challenges

- *The challenge to the consistency of regulation*
 - *The challenge of globalization*
 - *The challenge of abundance to regulation based on scarcity*
 - *The challenge to distinctions between public and private activities*
 - *The challenge to regulatory structures*
-

5.2 CONCLUSIONS ON OPTIONS FOR FUTURE REGULATORY PRACTICES.

Such practices should be based on certain underlining principles:

Independent and effective regulators will be central to a converging environment. The general trend might be towards lighter regulation, yet increased competition brought about by convergence underlines the need for effective and independent regulators. Indeed, a key priority of any regulatory framework should be to seek to meet the needs of users in terms of more choice, improving levels of service and lower prices, whilst fully guaranteeing consumer rights and the general public interest. This calls for future

regulatory approaches that respond to the needs of the users.

Given the speed, dynamism and power of innovation of the sectors impacted by convergence, Public authorities must not succumb to the lure of over-regulation or regulating as an extension of existing communication rules, the regulators should instead, limit such regulations to what is strictly necessary to achieve clearly identified objectives. Regulators should be guided by a need for clear and predictable framework. Regulators should seek to ensure a clear and predictable framework within which business can invest.

And finally Regulators should be guided by principles that ensure full participation in a converged environment. By building on existing concepts of universal service in telecommunications and the public service mission in broadcasting. By ensuring that everyone is able to participate in the information society.

Based on the above principles, three options for future regulatory practice can be derived:

Build on current structures. This option envisages leaving the current vertical regulatory models in place. This essentially would mean that different rules apply in telecommunications and audiovisual/broadcasting sectors, and to a lesser extent in publishing and IT.

The pace of change would be dictated by the speed of innovation and the effectiveness of competition. This would allow the regulatory framework to adapt to response to market forces and the need for fresh round of deregulation/regulation could be avoided.

The second option envisages *developing a separate regulatory model* for new activities, to co-exist with telecommunications and broadcasting regulation.

This would allow the Government to "curve out" new services and activities, which cross traditional boundaries, placing them under a distinct set of rules, if rules are needed at all.

This would allow a coordinated approach to be developed in relation to many of the high value activities, which characterise the converging market place.

The last option would be to *progressively introduce a new regulatory model to cover the whole range of existing and new services*. This would be the most far reaching, since it would call for fundamental reassessment and reform of today 's existing regulatory environment. This may not necessarily mean a new set of rules but rather looking to see how existing frameworks can be adopted to promote flexibility; remove inconsistencies, avoid discrimination within and across sectors and continue to ensure the achievement of public interest objectives. Instead of applying to just some services (as would in option two above).

Table 5.21

Summary of options

-
- *Build on current structures*
 - *Developing a separate regulatory model for new activities, to co-exist with telecommunications and broadcasting regulation*
 - *Progressively introducing a new regulatory model to cover the whole range of existing and new services.*
-

5.2 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

One major limitation of this study was inability to convince all the proposed interviewees to participate in the research. The study would have been very enriched by the direct participation of the key organization; CCK. .

Resource was another constraint. Those people who otherwise would have benefited this research but were out of reach were never interviewed.

The researcher also realized that this very important area was still not yet very understood and hence a longer period of interaction with the major stakeholders would have suited this study better.

5.21 SUGGESTIONS FOR FURTHER RESSEARCH

This study dealt with three sectors and the bundling together; hence it was very wide giving the researcher little leeway to investigate specific issues with more intensity. Hence if the study is done with specific sectors investigated as a result of convergence, it would allow much more to be discovered and detailed.

The study can also be extended as it stands to investigate convergence within say the East African region. This would enable easier comparison at regional level the way it has been done in some European circles.

References

ARTICLES

- Ambrose, William, Paul Hennemeyer & J. P. Chapon. Privatizing "Telecommunications Systems: Business Opportunities in Developing Countries". IFC Discussion Paper Number 10. 1990.
- Andrews L, Edmund; "Ruling Backs Baby Bells on information services," The New York Times, May 29th 1993.
- Galal, Ahmed and Bharat Nauriyal. "Regulating Telecommunications in Developing Countries" Policy Research Working papers No 1520. October 1995
- Graham Paul; "Convergence of Telecom, Media and IT", IMIS JOURNAL June 1999, P 25.
- Morency John; "Emerging Technologies", "Data Telecommunications and Convergence", CIO Magazine, September 15, 1996.
- Madden, G & S, Savage, "CEE Telecommunications Investment and Economic Growth." Information Economic & Policy 10:173-95, 1988.
- Noll, Roger. "Telecommunications Reforms in Developing Countries". Stanford University Department of Economics Working Paper. 1998.
- Noll, Roger. "The Twisted Paper: Regulation and Competition in Telecommunications." Regulation. No 4/4 pp 15-22. 1987.
- Petrazzini, Ben. "Global Telcom Talks: A trillion Dollar Deal". Institute for international Economics. 1996.
- Petrazzini, Ben. "Costs and Benefits of Telecommunications Liberalization in Developing Countries." Mimeo. 1996.
- Ryan Jerry; "A Solution for Convergence in the Enterprise": VoiceLAN. The applied Technologies Group, Inc. One Apple Hill, Suite 216, Natick, MA.
- Saunders, Robert, Jeremy Warford & Bjorn Wellenius. "Telecommunications and Economic Development". The World Bank. 1983.

- Smith, Peter. "What the Transformation of Telecom Markets Means for Regulation." Public Policy for the Private Sector, Note No. 121 The World Bank, July 1997.
- Squire, Sanders & Dempsey; Study on Adapting the European Union Regulatory Framework to the developing multimedia Environment, December 1997.
- Stuart John; "The name of the game is do or die", IMIS JOURNAL, April 2000, p 23
- Wellenius, Bjorn. "Telecommunications Reforms-How to succeed." Public Policy for the Private Sector, Note No 130. The World Bank, October 1997.
- Wellenius, Bjorn. & Peter Stern, Eds. "Implementing Reforms in the Telecommunications Sector: Lessons from Experience." The World Bank, 1994.
- Wellenius, et al. Telecommunications: "World Bank Experience and Strategy. World Bank Discussion Paper 192. December 1992.
- Whalley, John and Collen Hamilton, The Trading System after the Uruguay Round. . Washington, D.C.; Institute For International Economic, 1996.
- Zagaeski Paul; "The State of The Art, New Products and Staying Ahead of The Curve", CIO magazine, February 15, 1997.
- Zagaeski Paul; "The state of the art, new products, and staying ahead of the curve", Issue of CIO September, 15, 1998.
- "Communication Commission of Kenya", The Kenya Communication Act 1st October 1998.
- Ministry of Transport and Communications. Nairobi, Kenya. Telecommunications and Postal Sector Policy Statement", April 1999.
- Radio with images, Financial Times, 11 November 1997
- Television without frontiers, the Television Standards Directive (95/47/EC), adopted in October 1995

Towards a dynamic European Economy, Green paper on the development of a common market for telecommunications services and equipment, COM (87) 290, Brussels, 30.06.1987

BOOKS.

- Carter Roger; "Information Technology", Cavaye Place, London SW109PG, 1987, p 9
- Cortada W, J.; "TQM for information systems management", International Edition, McGraw-Hill books company, Singapore 1996, p 103.
- Drucker P; "Harvard Business Review on Knowledge Management", Harvard Business Review Press, Library of Congress, 1998, p 4
- French C, S; "Computer Science", 5th Edition, Letts Educational, Aldine Place, London W12, 8AW, 1996, p 40-41.
- Hodson Peter; "Local Area Networks, 3rd Edition, Ashford Color Press, Gosport, Hants. Great Britain, 1998, p150-151.
- Laudon C, & Laudon P.; "Management Information Systems", Fourth edition, 1996, Prentice Hall, Inc. Upper Saddle River, New Jersey, 07458. p 216- 218.
- Laudon C, & Laudon P; "Information System and the Internet", Fourth edition, 1999, Prentice Hall, Inc. Upper Saddle River, New Jersey, p 44-45.
- Lazarsfield P & Barton A; "Qualitative Measurement in the Social Sciences: Classification, Typologies and Indices", Stanford California, Stanford University Press, 1951, p 160
- Nachmias D & Nachmias C; "Research Methods in the Social Sciences", 5th Edition, Oxford University Press, Inc, 1996, p 338
- O'Brien A, James; "Management Information Systems". A Managerial End User Perspective, Second Edition, 1993, Library of congress, p 182-183
- Uma Sekaran; "Research Methods For Business", Skill building approach, 2nd, edition, Library of congress, 1992, p 235

APPENDIX 1

PRINT AND ELECTRONIC MEDIA

1. What kind of industry would you classify your institution to be in?

2. How long has the institution been in existence?

3. Do you use the computer in most of your production and transmission activities?

4. If yes, are the computers on a network?

5. What kind of network technology is employed by your organization?

6. What ranges of services are carried over these network(s)?

7. Does your organization employ the Internet?

8. For what purpose (s) does it do so?

9. What elements of multi media service, (text, image, motion video and sound is routed via the internet)

TELECOMMUNICATIONS SECTOR

10. What percentage of your production does this multi media constitute?

11. Do you use digital technology in the delivery of your services?

12. Please elaborate

13. What other services do you offer, or are planning to offer? (Near video-on-Demand, pay per view, multi media data broad casting)

14. comment on the multiplicity of regulations governing different services on a single network.

15. Is your organization involved in any cross sector investment?

16. If yes please explain

17. In your opinion, how will this affect the existing regulations?

18. Can you give your opinion on a desirable regulatory practice?

TELECOMMUNICATIONS SECTOR

1. What kind of industry would you classify your institution to be in?

2. How long has the institution been in existence?

If yes, what kind?

3. What kind of network(s) do you employ?

What kind of interactive services do you offer?

4. What kind of transmission mode does the network use?

Comment on the multiplicity of regulations governing different services on a

5. Does your network support compression techniques?

6. Comment on the Internet connectivity in your organization.

Is your organization involved in any cross sector investment?

If yes, please explain

7. For what purpose do you employ the Internet?

8. How does your business rely on the Internet?

9. Do you provide multi media broadcasting?

10. If yes, what kind?

11. What kind of interactive services do you offer?

12. Comment on the multiplicity of regulations governing different services on a single network.

13. Is your organization involved in any cross sector investment?

14. If yes please explain

15. In your opinion, how will this affect the existing regulations?

16. Can you give your opinion on a desirable regulatory practice?

INFORMATION TECHNOLOGY

1. What kind of industry would you classify your institution to be in?
2. How long has the institution been in existence?
3. What kind of network do you employ?

4. What transmission technologies does such network use?

5. Do these transmission support digital encoding.

6. If yes, what impact do such digitisation have (capacity-wise)

7. Comment on the internet connectivity for your clients

8. Comment on their usage of the Internet.

9. Comment on the internet growth in the last four years

10. Is connectivity classified into public and private?

11. If yes please explain

12. Comment on the multiplicity of regulations governing different services on a single network.

13. Is your organization involved in any cross sector investment?

14. If yes please explain

15. In your opinion, how will this affect the existing regulations?

16. Can you give your opinion on a desirable regulatory practice?

Appendix Two

Information Technology Sector

Africaonline

UUNET*

Wananchi

Nairobi Net

Swift Global

Media

Nation Newspapers

Standard Newspapers

KTN TV

Nation TV

Kenya Broadcasting Corporation (KBC)

Telecommunication

Telkom

Safaricom

Kencell Communications

Regulators,

- Communication Commission of Kenya (CCK)
- Ministry of Transport and Communication (MOTC)