Kenya's Country Code Top Level Domain; Policy Factors In Domain Structure That Hamper Its Uptake And Use Within The Local Internet Community

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Abstract

This study investigated the factors of the country code Top Level Domain (ccTLD) policies, with emphasis on domain structure, which affect the uptake and usage of the .ke ccTLD and set out to establish and present possible solutions with the aim of popularizing it to the local internet community. The population target comprised of forty nine (49) registrars with online ability to offer registrants direct online search and domain registration. Seven interviews were carried out to inform the design and content of the structured questionnaire as well as to carry out a test re-test reliability method whose coefficient was obtained as 0.81. The findings indicated little knowledge of domain policies by registrars responsible for marketing the .ke domain. Based on the findings, it was recommended that Kenya Network Information center should consider opening up direct second level registrations at premium prices in order to capture a niche market which is available.

Key words: Top Level Domain, Domain Name System, Country Code Top-Level Domain, ICT Policy

1. Introduction

The world has seen three waves of property. The first hark back centuries and relate to 'real and personal property' such as land and chattel, also known as immovable and movable property, the second gained recognition around the nineteenth century and relates to propertization of the 'labours of the mind' or 'intellectual property' while the third wave came within a much shorter period and starting to gain recognition and it is what is known as 'virtual property' (Warren**, 2007**). Throughout, policy and legal institutions have had to adapt with new developments across the three areas.

Policy makers and law-makers have therefore had "to surmount not only a steep learning curve but also in some cases a foundation that is wrought with mistakes when it comes to the treatment that should be given to virtual property" (Warren**, 2007**). The Domain Name System (DNS) is the best example of a form of virtual property that has given rise to challenges in law making and administration.

2. Literature: The Domain Name System

2.1 The Concept of Top Level Domains

The domain name concept was developed based on the knowledge that humans tend to remember names more easily than they remember numbers and hence associating the millions of existing IP addresses with given names would make it easier for human beings to remember. For example, it is easier to remember a domain name www.jkuat.ac.ke as opposed to its equivalent IP address, say, 204.23.7.20. Management of most top-level domains is delegated to responsible organizations by the Internet Corporation for Assigned Names and Numbers (ICANN). ICANN operates the Internet Assigned Numbers Authority (IANA) which is in charge of maintaining the Domain Name Service (DNS) root zone (Postel, 1994). IANA currently distinguishes the following groups of top-level domains:

    i. Infrastructure top-level domain: This group consists of one TLD, the Address and Routing Parameter Area (ARPA) which is managed by IANA.

ii. Country-code top-level domains (ccTLD): Used by a country or a dependent territory. There exists 245 ccTLDs in operation today. Examples include .ke for Kenya, .ug for Uganda, .za for south Africa, .uk for United Kingdom, . us for United States e.t.c.
iii. Sponsored top-level domains (sTLD): These domains are proposed and sponsored by private agencies or organizations that establish and enforce rules restricting the eligibility to use the TLD. Often they are also grouped with the generic top-level domains.
iv. Generic top-level domains (gTLD): Generic domains are essentially open for registration to anyone in the world. Examples of these include .com, .net, .org, .edu.
v. Generic-restricted top-level domains: Similar to generic group, except eligibility is supposed to be restricted and ascertained more stringently.

Generic Top-Level Domain (gTLD) is one of the categories of top-level domains (TLDs) maintained by the Internet Assigned Numbers Authority (IANA) for use on the Internet. The core group of generic top-level domains consists of the dot com, dot info, dot net, and dot org domains. With the commercialization and popularization of the Internet in the 1990s, the dot com domain quickly became the most common top-level domain for websites, email and networking. The number of the gTLD domain names keeps on growing faster reaching over 111 million registered domain names in December 2009 (zooknic, 2009).

In the domain world, the gTLDs like the dot com, dot org, dot net domains are among the most sought after domains on the market. In fact, many people consider the dot com domain to be synonymous with the Internet. Recently however, the popularity of Country Code Top-Level Domains (ccTLDs) such as dot cn for China, dot pl for Poland and dot de for Germany have been gaining strength in the domain market. The trend towards localizing online contents for better serving national identity, communities, customers and end users has paved the way for many websites to move to ccTLDs (Warren, 2007). These ccTLDs can provide geo-targeted and exclusive traffic, which is a benefit the dot com doesn't offer. The trend continues to develop even at regional level as seen through dot eu serving entities and individuals within the European Union. Indeed, domain names are virtual property whose acquisition is synonymous with physical property.

CcTLDs (Country Code Top Level Domains) are the two- letter suffixes used by countries to denote their internet addresses. Examples include dot uk (for United Kingdom), dot tv (for Tuvalu) and dot ke (for Kenya). All ccTLD identifiers are two letters long, and all two-letter top-level domains are ccTLDs (Postel, 1994).

Rules for registering ccTLDs differ for each country and may include a local presence requirement. Fees and term lengths also vary between each country and registrar as depends with their goals and expectations (DSTI, 2006). Thus said, the policies and rules governing each ccTLD is completely dependent on the custodian of such a ccTLD as deemed fit for the Internet community of their territory, The models adapted for management of a ccTLD can either be a commercial enterprise, a not for Profit entity, a Public-Private Joint venture, an academic institution, an individual or a hybrid model. The choice of model is dependent on the resources available, existing policy, level of development of the sector and historical antecedents (ITU, 2008).

Over the years, ccTLD registrations have increased as a share of total domain name registrations. Accounting for 30% of registrations in 2000, they accounted for about 40% in 2003 and 35% in 2005 (DSTI, 2006). Differing growth rates between country code registries are largely a result of the goals of the registries which may place more or less restrictions on registrations and prices may vary. It is believed that the huge quantity of the German country code TLD, with over 10 million names registered in dot de is due to a combination of factors. These include policies by the registry that have been largely unrestricted since the early days, a strong level of internet use in Germany and comparatively low prices. Dot de's marked adoption and recognition in Germany is clear in that it has 90% of the total domain name market in Germany and little registrations from outside Germany (DSTI, 2006).

By November 2008, out of 174 million domain names 45% was dot com (down from 50% in 2005), cctld market accounted for 40% and it is constantly increasing where the biggest markets for ccTLDs are dot cn for china and dot de for Germany where each of them had 7% of the domain market. Other ccTLDs like the co.uk (United Kingdom) accounts for 4%, dot nl (Netherlands) accounts for 1.7%. The actual figures of registered ccTLDs by November 2008 for dot cn was over 13 million, dot de 12.4 million, co.uk 7.2 million, dot nl 3.16 million domain names (zooknic, 2009).

2.2 Re-Delegation and Regulation of the Dot Ke Domain

Despite the management of DOT KE ccTLD being carried out by a not-for-profit organization and despite significant decrease in cost of the domain name, a significant number of Kenyans still opt to go for gTLD names. The number of domain name registration for gTLDs in Kenya by July 2009 was estimated to be 17,000 (zooknic, 2009) while those registered under .ke by October 1st 2009 was 11,569. The implication of this is that Kenya's visibility on the internet has been compromised significantly, by approximately 60% of the local internet community opting to register gTLDs. In spite of KENIC's concerted efforts to popularize the domain in Kenya with the aim to increase its uptake, it still remains that some factors have contributed to the failure or limited impact of the initiatives. Consequently a significant part of local content is published through gTLDs and this directly connotes that registration fees go to foreign bodies as opposed to local firms. A significant part of local internet users spend most of their time on the internet engaged in foreign sites as well as local sites registered under various gTLD. Content generated by Kenyan nationals under gTLD have consequently not contributed to the branding Kenya campaign.

Though the cost of registering a domain has decreased over the years from 2003, it still remains comparatively high to other gTLDs as well as disproportional across the various registrars, therefore making gTLDs the more economically favourable option for potential domain name registrants. The cost has been cited by a section of the local internet community as the reason behind domain seekers opting for other domain names instead of the dot ke domain. On average annual costs of registering a .co.ke are Ksh 2,350, .or.ke Ksh 2350, .ac,ke Ksh 580, .ac.ke Ksh 580, .go.ke Ksh 580 while for equivalent gTLDs annual costs amounts to, on average, Ksh 1,000. While the cost may be a major factor, it has also been observed that a significant number of domain seekers opt for other domain names based on other factors and not the cost.

The landing of the fiber optic cable has brought a significant impact in opening up Internet space to many users but can only have much impact in branding Kenya on the internet only when our local domain name is the preferred choice for the expected and growing new wave of internet users, otherwise, the regulatory body will face an uphill task of correcting policies when the damage is already too extensive. Proper policies of handling and managing the Kenyan ccTLD will not only save Kenya foreign exchange but will be a proud statement to the internet community worldwide of the Kenyan presence on the net.

2.3 Theoretical Discussions

The Internet has become a dominant infrastructure for supporting a number of public and private sector activities in various countries (Singh et al. 2007).The e-index, a measure of utilization of the Internet by UN member states, attempts to objectively quantify critical factors and establish a reference point by which a country can measure its progress. The variables examined in the e-index include a country's online presence, telecommunication infrastructure as well as human development capacity. As one of its variables, it incorporates a country's official online presence which is in turn determined by several factors among them being the infrastructural penetration as well as management of its ccTLD. Differing growth rates between country code registries are largely as a result of the goals of the registries which may place more or less restrictions on registrations and set prices at different levels (DSTI, 2006). E-index results reflects a country's economic, social and democratic level of development (United Nations Public Administration Network, 2003).

While these are some of the important policy considerations to be made, there are other factors that play a key role in determining the uptake of any ccTLD within any country. Lawrie (2004) cautionary remarks are that the correct choices for one ccTLD may not be correct for another. It is imperative to understand the local internet community and institute policies tailor made for the environment. In describing the models and policies adopted by various ccTLD registries, the April 2008 policy, business, technical and operations for the management of ccTLD report acknowledge that a registry has to consider the public policy goals or internet usage and that a ccTLD registry should be set up and operated according to these goals. The government of Kenya has recognized that a robust and vibrant telecommunications infrastructure is instrumental in order to facilitate national development (Kagwe, 2005).

2.4 Domain Structure policy

The domain structure policies considered here constitute of pricing policy, discount policies, closed domains, structure level of registration, as well as domain marketing and sensitization.

The April 2008 policy, business, technical and operations for the management of ccTLD acknowledge two commonly used name space structuring models: flat and hierarchical. It is also possible to combine these two models to have a hybrid model, which however is not common. The policy for this structure determines the uptake of the domain (Lawrie, 2004)

In the flat model, names are registered directly under the TLD: mycompany.ccTLD for instance. Apart from any reserved names, there is usually no restriction on which names can be registered or who is allowed to register them. Names get registered on a first-come, first served basis therefore ensuring equal access to everyone. This kind of set-up is simple to understand and administer. The registry only has to implement a single process and policy which everyone has to follow. This model is used by almost all gTLD and a number of ccTLD registries, including dot com, dot nl and dot de. Registrars and end users prefer the simplicity and transparency of the flat model. The registry also only has to employ a single policy and process which every registrant has to follow. However the model does not allow for provision of more unique domain names as provided by the hierarchical structure and is also prone to more disputes. Once administered it is difficult to change in the future.

The hierarchical model uses a number of labels at the second level to address specific communities or interest groups. The ccTLD registries in Kenya, South Africa and Uganda are examples of this approach. The usual convention is to mimic the structure used by the Internet root zone: edu for educational establishments, com for commercial organisations, mil for the military and so on. Some ccTLDs, notably the UK, Kenya and New Zealand, use a different convention – ac for academic community, co for commerce, etc. From a DNS perspective, these differences don't matter.

When the hierarchical model is used, parts of the name space are set aside for specific purposes. The registry has to see that registrations match the appropriate criteria for each part of the name space. Alternatively, the registry might delegate parts of the name space to other organisations who then take responsibility for the registrations that take place there. This usually means more complexity for the registry as different rules apply to different parts of the name space and extra checking may be necessary. For instance the registry may have to check that requests for names under *gov.ccTLD* come from authorised officials in government departments or that registrations in *edu.ccTLD* are only available to academic institutions in the country. Names under *com.ccTLD* could be offered to commercial organisations in the country on a first-come, first-served basis or under some other terms (International Telecommunications Union, 2008*).* The responsibility of the administration of the several second-level domains can be delegated to other entities where each administrator performs both the technical role, that is adding new domains to the domain name system, and a policy role, that is determining. The Kenyan name space structure adopts this hierarchical model with nine second level domains (SLDs):

i.   co.ke for commercial organizations, no restrictions applied
ii.   ne.ke for network devices, no restrictions
iii.   or.ke for non-profit making organisations,
iv.   ac.ke for institutions of higher learning,
v.   go.ke for government entities and
vi.   sc.ke for lower and middle institutes of learning
vii. me.ke for personal names
viii. info.ke for information
ix.   mobi.ke for mobile content

3. Method

The design of this study was a survey carried out on a sample of registrars. The target population was the industry players responsible for offering registration services of the Kenyan ccTLD (registrars) and who offer registration of domains directly from their websites.

The sampling technique employed in selecting the questionnaire respondents is stratified sampling to select a sample of respondents from the registrars. Out of the 143 registrars on KENIC website, the study was narrowed to those registrars with online presence as well as capabilities to search and register a domain online which translated at the time to 52 registrars.

In accordance to the resources available and the accuracy needed, a margin of error of 4% was regarded as appropriate for this survey and a confidence level of 95%. The following formula is commonly used to compute sample sizes of studies which are of social science in nature for small populations and was deemed appropriate for this survey to compute the sample size required.

$$n = \frac{Nz^2 pq}{E^2(N-1) + z^2 pq}$$

Where

    i.   n is the required sample size

    ii.   N is the population size

    iii.   p and q are the population proportions. (assumed to be 0.5 each since there are no previous estimates)

    iv.   z specifies the level of confidence in your confidence interval. We used 95%, in which case z is set to 1.96.

    v.   E is the accuracy of the sample proportions. Used accuracy of 0.04.

Therefore, the sample size was determined to be 49. The questionnaires received a response rate of 96% as forty nine respondents were targeted but only forty seven registrars responded. The strata were as follows and the opinion between the two groups was subjected to ANOVA test (one way) to test for difference of opinion between the two groups.

Table 4.4: Classification for ANOVA test

Value added services	Frequency
Internet services plus other services	6
Other services (exempt internet services)	41

Seven interviews were first carried out and the respondents were purposively chosen based on their involvement and experience in the Kenyan domain market dynamics. The interviewees were purposively chosen so that to inform the structured questionnaire and provide any other additional information that the researcher may not have been in possession of. This instrument was then validated by the seven experts in domain policy and the reliability analysis yielded coefficient of 0.81 and therefore the instrument was deemed reliable for the study.

4. Findings and Discussions

### 4.1 Performance level of the current structure of the .ke domain

Table 1 below shows that 68.4% of the **questionnaire** respondents' feel that the current **.ke** structure in defined second-level domains does NOT adequately favour the Kenyan internet community. They were also of the opinion that, though demand for direct second level registration may not be significant, the presence of such an option would work favourably for the .ke uptake. ANOVA test showed no significant difference of opinion between the two groups.

Table 1: performance level of the structure of the .ke domain in the local internet market

Does the current **.ke** structure in defined second-level domains adequately favour the Kenyan internet community	Yes	No
	68.4%	31.6%

Of those respondents who were for the opening up of direct second level registration (86.8%), there were generally two reasons for their response as shown in the figure A below.

Figure A: **Distribution of reasons for opening up direct second level registrations**
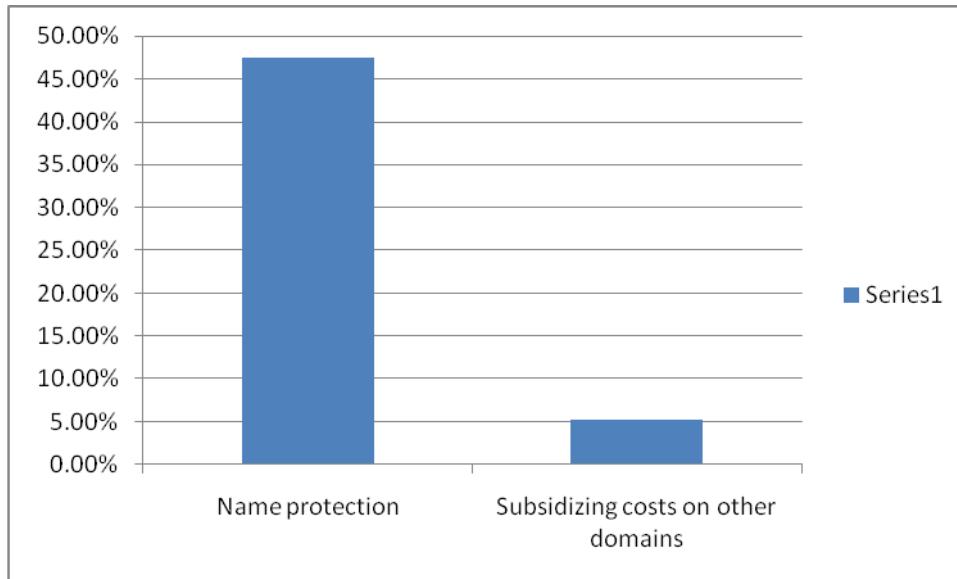
## 4.3 Pricing policy and responsible Organs

84.2% of the questionnaire respondents indicated that the pricing policies by the administrator of the **.ke** domain have been a problem while 15.8% felt they were not (table 2 below). The general consensus is that if the cost for the domains was revised downwards to counter other gTLDs it would attract more registrants and hence generate more revenue. The fact that most of the small scale enterprises are just after web presence makes it easier for them to look only at cost issues while choosing their domain names. Hence, they are not really interested with the significance of a .ke domain to their business. This has also lead to a fall in domain renewals for the .ke once the registrants discover other gTLDs that are more cost friendly than the .ke.

Table 2: performance level of the structure of the .ke domain

Have the pricing policies by the administrator of the **.ke** domain been a problem contributing to slow uptake of the domain?	Yes	No
	84.2%	15.8%

On delegation of making policies to appropriate administrators, like .ac.ke delegated to Kenya Education Network (KENET), .or.ke to Government Information Technology Services (GITS), the responses were as captured in Figure B below.

Figure B: Should delegation of sub-domains be done to appropriate entities?
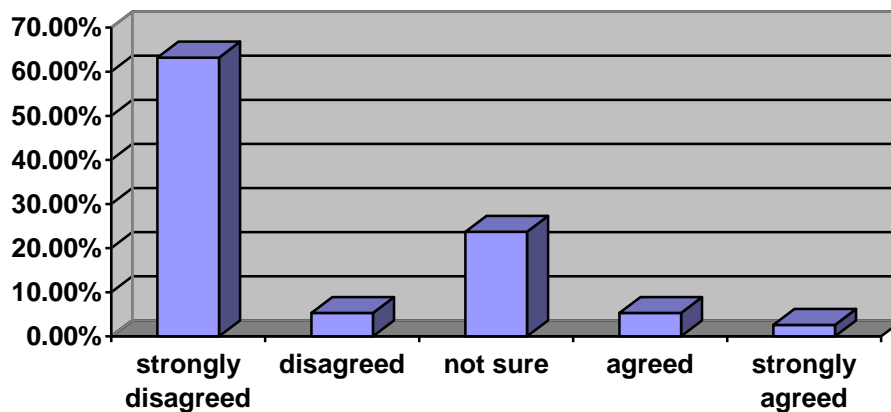
Out of those who strongly disagreed 2.6% indicated that doing so would increase bureaucracy; 20.8% that it would complicate the process while 7.9% felt that the current system was doing fine (*Table 3 below*). All those who disagreed felt that delegation would complicate the process. The respondents who supported the delegation were because they felt the appropriate administrators had a better understanding of the target registrants and therefore would implement policies that were effective on the ground.

Table 3: Cross Tabulation between policy delegation and reason for policy delegation

	Reason given against policy delegation (%)			Total (%)
	It would complicate the process	Current system is doing fine	The respective bodies understand them better	
Strongly disagree	23.0	7.9	0	**30.9**
Disagree	5.2	0	0	**5.2**
Not sure	2.6	0	0	**2.6**
Agree	0	0	5.2	**5.2**
Strongly agree	2.6	0	0	**2.6**
Total	33.4	7.9	5.2	**46.5**

It should be noted that only 46.5% of the respondent indicated their reason(s) for policy delegation. It was also observed that the ANOVA tests showed no significant difference in opinion of registrars. The emerging trend here is that the Kenyan domain registration process, though not yet running optimally, is still running under the best possible structure where all the policy making and database (registry) management is done centrally. This is in contrast to the South African model where different sub domains are administered in a distributed manner. While South Africa may be boasting of far more domain names registrations than Kenya, other factors may have contributed to their domain uptake than the distributed model of domain management. The registrants who responded to the questionnaire felt that they still had much confidence on the KENIC private public partnership (PPP) model. While the general consensus was that having some domains as closed and others as open to any entity to register is a positive development, it is to be noted that 57.9% of the respondents have had a problem in registering .go.ke which has not been the case for .ac.ke which is also a closed domain. Reasons given, as captured in table 4 below, for difficulties in registering .go.ke are slow processing of necessary documents at GITS and bureaucracy in getting necessary documentations from the government.

**Table 4: Distribution of the reasons for difficulty in registering .go.ke**

	Reason for difficulty in registering .go.ke	Frequency (%)
1	Slow processing at GITS	15.8
2	Bureaucracy in getting necessary documents	42.1
	Total	57.9

This may provide a case for delegation of registration of the .go.ke to GITS which may have more knowledge on operations of all the government entities as opposed to the other registrars. However, it is also to be noted that the problem here is not really within the reach of KENIC as the custodian of the domain but as a result of bureaucracy within the government-run GITS and hence delegation may not be the solution. It is also to be noted that there was no significant difference on this matter between the two groups.

4.4 Difficulty levels in domain registration

The Figure C below shows the distribution of the main reasons identified by registrars for registrants choosing gTLDs as opposed to the .ke domain

Figure C: Distribution of registrants' reasons for choosing gTLDs
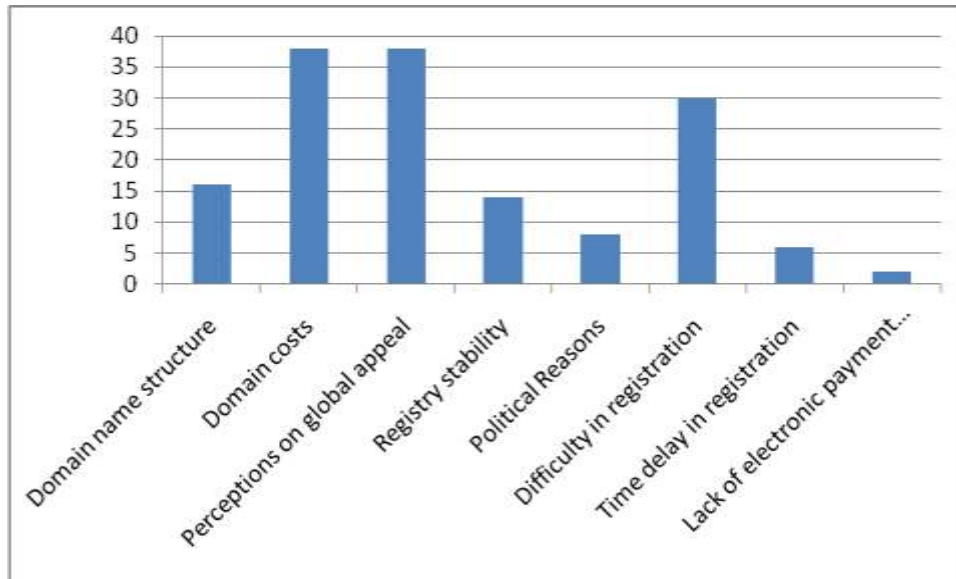
The reasons provided for potential .ke registrants opting for a gTLD showed that among the several reasons provided, domain costs, perceptions on global appeal and difficulty in registration were the prominent factors. For those registrants who have no specific preference on a domain name their choice is informed on the cost and based on the fact that .com is cheaper and appears to have a global appeal as opposed to .ke they end up buying a .com regardless of the fact that the name that they may wish to register for their venture may already have been taken up.

Table 5: Distribution of order of difficulty in registering a domain (%)

	Domain	Easiest	Easy	Difficult	Very Difficult	Total (%)
1	.co.ke	100	0	0	0	**100**
2	.sc.ke	0	21.1	78.9	0	**100**
3	.ac.ke	21.1	78.9	0	0	**100**
4	.or.ke	100	0	0	0	**100**
5	.me.ke	100	0	0	0	**100**
6	.go.ke	0	50	44.7	5.3	**100**
7	.info.ke	100	0	0	0	**100**
8	.mobi.ke	63.2	36.8	0	0	**100**
9	.ne.ke	15.8	78.9	0	0	**94.7**

5.3% and 86.8% of the respondents strongly agree and agree respectively that the difficulty in registering a ccTLD has been a reason for registrants opting for a gTLD. Registration under .go.ke and .sc.ke were noted to be the main domain names in which some form of difficulty in the registration process is encountered.

A company CEO dealing with websites for schools, and who was interviewed in line of shedding light on this matter, has managed to develop 185 websites for various high schools and primary schools It is to be noted that 85% of these schools are registered under .com instead of the .sc.ke. The CEO of this company was identified and interviewed and he cited the long process of registering under the .sc.ke as the main reason why he opts to register under .com. This is regardless of the fact that .sc.ke is much cheaper than the .com itself. His concern here was based on the fact that KENIC's policies are too rigid to consider his company as one that offers a certain service that could directly favour them and yet has been reluctant to update the policies in view of these developments.

Apart from the difficulty experienced under .go.ke attributed to GITS as discussed earlier, it is to be noted that some registrars had encountered a problem while trying to register a domain under .sc.ke. This was quoted to be especially when dealing with public primary schools which have been in existence for a significant period yet have never received their registration certificate from the government. This certificate may take as long as six months to get from the government and therefore such institutions are advised to just acquire a .com domain.

On provision of free domain for country residents especially in academics in order to increase local ccTLD awareness and popularization, 78.9% and 21.1% of the respondents strongly agreed and agreed respectively. All the respondents (100%) were of the opinion that such a provision would work favorably in marketing the .ke domain to young entrepreneurs and/or students in the country.

4.5 Domain marketing and sensitization

It is to be noted that the introduction of the three new sub-domains (mobi.ke, .me.ke and .info.ke) has not been as well received as anticipated due to what registrars perceived as poor marketing (86.9%) and lack of publicity (18.5%) as captured in table 6 below.

Table 6: cross tabulation of reasons for the low uptake of the three new subdomains

Reasons why the three new sub-domains (mobi.ke, .me.ke and .info.ke) have not been as well received as anticipated	
Poor marketing	**Lack of publicity**
86.9%	18.5%

There is still poor knowledge of the functions and even existence of the .ke domain not only to the internet consumers but also to many information technology administrators in many companies and organizations and hence the choice of domain names by such people in the know is not poised towards .ke domain.

5. *Discussion*

The analyzed data showed that the opinion of the majority of the registrars is that there is no demand for direct second level registration so far. However, they are in agreement that such lack of demand may be occasioned by lack of awareness of such a possibility.

The data also showed that the choice of a domain is mostly influenced by cost, stability of the registry, perceptions on global appeal/presence and the time it takes to register under any of these domains.

The majority of the registrars are of the opinion that the domain name trustee should not adapt domain pricing restriction policy despite evidence of widely varying domain costs from one registrar to another.

The performance of .ke was given a poor rating with regard to marketing and discount policies. On comparison of returns per domain sold, it was noted that some registrars will opt to advice the client to acquire a domain under .com based on the fact that this may result in higher returns for the registrar as opposed to registering under .ke.

The analysis also showed that the only demand for .ke domain is mainly due to securing local identity/presence. The most loyal registrants to the .ke happen to be the local Institutions of higher learning and big multinational companies seeking to gain local presence.

There is a strong case for KENIC to consider popularizing .ke domain by putting it in policy for the provision of perhaps a free domain for upcoming professionals in the universities and colleges. Such a move would serve to ensure that those taking up positions in decision making with regard to domain name acquisition in organizations are well aware of the existence of .ke and its benefits.

5.1. Conclusion

The Internet has evolved from a tool primarily reserved for computer and networking research, to a global medium for commerce, education, and communication since country code Top Level Domains (ccTLD) were first established. CcTLD represent the national/territorial interests of a country and is often viewed as the flagship of a country's internet participation and a strategic asset with symbolic, social-economic and/or internet stability and security implications. Therefor, in order to popularize and increase adoption of the .ke domain within the local internet community

- KENIC should consider opening up direct second level registration at premium prices on a trial basis. This would improve on name brevity and capture those who would be in need of protecting their brand as well as those willing to acquire it at premium prices.
- That KENIC should review the domain prices downwards to rival the competing generic TLDs.

- That policy should explore on ways of enforcing a price cap for domains sold with no value added services attached
- That a free domain should be provided to a certain section of the Internet community in view of publicizing and marketing the .ke brand. My recommendation on this is that .sc.ke should be provided for free to all the high schools and primary schools.
- That a concerted effort be undertaken in creating awareness of the .ke brand especially in the university and college students who influence the policies of the companies and organizations which they are later employed in.

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