TANZANIA COMMUNICATIONS REGULATORY AUTHORITY

(TCRA)

ASSESSMENT REPORT ON MIGRATION FROM ANALOGUE TO DIGITAL BROADCASTING AND ANALOGUE SWITCH-OFF PROCESSES IN TANZANIA

Presented by:

Director General
Tanzania Communications Regulatory Authority
P.O. Box 474
DAR ES SALAAM.

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The study took us about six months from July to December, 2013 and could have not been possible if we did not get necessary assistance and conducive working environment and cooperation from the Authority, Content Service Providers, Multiplex Operators and interviewed consumers.

We wish to acknowledge the assistance of Mr. N. Habbi Gunze – TCRA Director of Broadcasting Affairs and his team for providing us with documents and needed information in regards to migration from analogue to digital broadcasting in the country and its associated digital migration roadmap. His willingness to give his time so generously has been very much appreciated.

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Finally it is our hope that the Authority and the stakeholders will find the study findings worthwhile and be used as tool to soldier on with successful implementation of digital migration in Tanzania.

Prof. N. H. Mvungi .....

Dr. Francis Sichona .....

Mr. F. M. Ishengoma .....

Dar Es Salaam
January 23, 2014

Executive Summary

This study is mainly characterized by assessing the following areas:

- Digital terrestrial television (DTT) performance which include services provision and network rollout;
- Extent of preparedness of the Authority towards migration process;
- Consumer Uptake of digital broadcasting services; and
- DTT and Analogue Switch Off (ASO) processes.

In due course of assessing the above mentioned areas, the study considered the following concerns:

- There were no sufficient decoders in the country;
- Very few people had managed to buy decoders and hence were being denied of the basic right of access to information;
- Broadcasters revenue were decreasing because viewers have decreased since they did not have decoders;
- There was no sufficient consultation with stakeholders;
- No sufficient awareness campaign done;
- Decoder's price was very high for ordinary people to afford; and
- Poor reception and performance of decoders concern from consumers.

The following methodology and approach were used for assessment:

- Design of questionnaires which were used to collect relevant information for assessment purpose. The designed questionnaires were for Content Service Providers (CSPs), Multiplex Operators (MUXO) and Consumers;
- Conducted consumers' survey in all towns/cities where ASO was implemented in phase I using sampling technics. Used pilot survey to test the questionnaire and the survey process itself;
- Conducted CSPs survey of all CSPs involved in analogue TV Broadcasting through interview by a team guided by the prepared questionnaire;
- Conducted MUXO survey of all MUXO through interview by a team guided by the prepared questionnaire; and
- Studied the Authority on migration process and ASO preparedness by interviewing the Authority staff and consulting documents.

In assessing the DTT performance, data were collected from users of DTT services and it was observed that 91% of all households that were using their TVs before ASO had decoders. 89% of the households in the phase I ASO areas were using their TVs after ASO. The reasons for the 11% not using their TVs were as follows: 5.5% had not bought decoders, 0.1% claimed that decoders were not available, 3.2% felt that decoder prices were high, 0.2% their decoders were out of order, 0.3% experienced poor Signal reception, 0.9% their TVs were out of order and 0.7% did not have electricity.

In relation to the extent of preparedness by the Authority towards migration and ASO processes, the findings indicates that the Authority was well prepared addressing important issues as guided by International Telecommunication Union (ITU) as follows:

- Established National Technical Committee on Digital Migration (NTC-DB);
- Established Digital Migration Roadmap;
- Ensured existence of Legal instruments for Digital migration;
- Engaged TV broadcasting stakeholders on the entire process of digital migration and ASO through consultation; and
- Established criteria for ASO.

The uptake of digital broadcasting was assessed through examining the process of licensing MUXO, having in place conducive environment for CSPs to connect to DTT network and availability of decoders in the market. The followings were observed:

- Licensing framework for digital migration was in place;
- Three MUXO were licensed through open tender in 2010;
- Template of Service Level Agreement (SLA) was in place to enable CSPs to connect to DTT network through commercial agreement with the MUXO; and
- Established monthly transmission fee CAP charged by MUXO for carriage of TV channel.

In relation to availability of decoders, it was established that 35.4% of the surveyed Households (HHs) acquired decoders before ASO campaign, 29.5% acquired decoders after campaign but before ASO and 35.1% acquired decoders after ASO. The survey indicates that only 0.1% HHs claimed not to have decoders because of the availability. Similarly, the survey established that before ASO of any particular service area, the Authority ensured sufficient availability of decoders. The data related to decoder availabilities for each service area is included in this report.

In relation to ASO, the team learned that ASO was implemented in phases spanned over four months. This approach provided sufficient time to overcome any challenges and problems which might had arose during the switch off process. Further, it was noted that the switch-off of transmitters was done by respective analogue TV stations which is a good sign of collaboration between the Authority and the CSPs in the entire process.

The study established that at least 65% of all CSPs were connected to the digital platform at the time of ASO which included all major TV broadcasters that were operating during analogue broadcasting. Most of the remaining joined the platform shortly afterwards after fulfilling the necessary conditions. The delays can be attributed to the fact that some of the CSPs did not believe that ASO was imminent.

The Study Team is that convinced from the information gathered that:

- Consumers were not denied access to TV broadcasting by ASO; it was more a problem of mindset change than reality;
- The rush to acquire decoders in the last minute is a typical human behavior not to invest unless obliged to do so;

- The stakeholders including consumers were sufficiently informed (90% of consumers) on ASO;
- Measures were taken to ensure sufficient decoders were available in respective service areas before ASO implementation in any service area;
- DTT enables CSPs to concentrate their resources in their core business of generating quality and appealing contents to the benefits of consumers and their business;
- DTT provided significant improvement in quality of picture, sound and in the number of channels to consumers;
- DTT provided equal visibility of all CSPs to consumers;
- DTT created environment for added value services in same platform like mobile TV and video-on-demand to the benefit of consumers and the CSPs; and
- The migration from DVB-T to DVB-T2 should be market driven to follow the best practices in business.

The study team has established beyond reasonable doubt that the government can continue with the second phase of ASO since DTT potential have been demonstrated and that the Authority managed very well DTT and ASO processes and had taken fully into consideration the interests of all DTT stakeholders. Furthermore, it is being recommended to the government to consider as an incentive for fast digital take-up to remove taxes on decoders.

1 INTRODUCTION

1.1 Background

Tanzania has a population of 43 million. At least 74 per cent live in rural areas. The density is 50 people per square kilometre (49.72) and the per capita GDP is US $ 1,400. However, it need be understood that broadcasting is not a Union Government matter, therefore issues in this report will focus in the Mainland Tanzania.

TV broadcasting in Tanzania Mainland started in 1994 with 4 TV stations (ITV, CTN, DTV, and Abood) using analogue terrestrial broadcasting networks that continued until 2010 when the digital broadcasting was introduced. The introduction of digital terrestrial TV broadcasting follows ITU agreement to do away with analogue TV broadcasting transmitters worldwide by the 17th June 2015. However, East African countries agreed to switch off earlier on the 31st December, 2012 to minimize dual illumination costs and to develop enough experience to manage its challenges before the worldwide switch-off deadline.

Tanzania's efforts to embrace digital terrestrial broadcasting started in 2005 after conclusion of the first preparatory Regional Radio communication Conference held in Geneva, Switzerland in 2004. Tanzania chose the migration process to be policy driven rather than the market forces based approach after careful consideration of all possible options and the associated pros and cons.

Digital terrestrial broadcasting value chain introduced Multiplex Operator services because the technology enables carrying and transmitting multiple TV programmes in a single frequency channel. Three (Multiplex) MUX operators were licensed to aggregate and transmit TV programmes from the different Content Service Providers (CSPs).

One of the licensed Multiplex operators had the highest rolled out digital infrastructure in seven towns and these services areas had the highest number of terrestrial TV viewers under analogue TV broadcasting. Therefore, it was possible to consider implementation of the agreed East African Communication Association (EACO) Analogue Switch Off (ASO) plan.

All the areas that were involved in phase I ASO had digital presence well before ASO, hence dual illumination was operational between 2010 to the date when ASO was implemented in the service area for those CSPs that availed their signals to the operational MUX in the respective service areas. This was in accordance with the Electronic, and Postal Communications Act (EPOCA) of 2010 and the Electronic and Postal Communications (Digital and Other Broadcasting Networks) Regulations of 2011. However, MUX operator enabled freeview for the public broadcaster TV channel TBC1. The Authority intervened to ensure that five national TV channels could be received without payment Hence, the created conducive environment allowed ASO to be implemented since reception of national TV channels was assured.

To implement ASO in Tanzania, phased approach was used for all terrestrial TV broadcasting service areas with Digital Terrestrial Television (DTT) digital signal presence. Phase I that involved all cities/towns that had digital presence was itself done in phases. The Government through the Ministry of Communication Science and Technology endorsed and announced the phased plan of switching off the analogue TV Transmitters in phases in September 2012. The service areas involved were Dar Es Salaam, Tanga, Mwanza, Dodoma, Mbeya, Arusha and Moshi. The phases were as follows: Phase IA 31st December 2012 ASO was done in Dar es Salaam, phase IB 31st January 2013 was done Dodoma and Tanga, phase IC 28th February 2013 was done in Mwanza, phase ID 31st March 2013 was done in Arusha and Moshi and finally phase IE 30th April 2013 was done in Mbeya.

The completion of phase I ASO showed that there are challenges and experiences from the process itself and from consumers, CSPs MUX operators and other key stakeholders. Therefore, it was necessary to make a study to make a reflection on achievements and challenges and plan on how to move forward with digitizing digital broadcasting in Tanzania. Hence, the government and the Authority decided to do study on phase I of ASO before embarking on phase II.

1.2 ASO Study Rationale

The rationale for this study rests on five footings: the Authority migration process strategic plan that planned for monitoring and evaluation of the process, the consumers reaction to starting of phase I ASO implemented in Dar es Salaam, the concerns of Media Owners Association of Tanzania (MOAT) following ASO implementation in Dar es Salaam, the directive of the Parliamentary Committee on Infrastructure Development on MOAT concerns, and the Government directive on the same.

MOAT demands were mainly based on the following allegations:-
There were no sufficient decoders in the Country, very few people had managed to buy decoders and hence were being denied of the basic right of access to information, broadcasters revenue were decreasing because viewers have decreased since they did not have decoders, and the decoder's price was very high for ordinary people to afford. Also, TCRA received complaints on poor reception and performance of the decoders from consumers.

Therefore, study considered to look at the following issues in evaluating stakeholders concerns:-
If there were no sufficient decoders in the Country; whether very few people had managed to buy decoders and hence were being denied of the basic right of access to information; did broadcasters revenue decrease because viewers had decreased for not having decoders; was there no sufficient consultation with stake holders; was sufficient ASO awareness campaign sufficiently done; did decoder's price inhibit ordinary people its acquisition; and was reception and performance of decoders very poor in service areas.

1.2.1 The Authority

The Authority as part of its plans in the implementation strategy of transition from analogue to digital terrestrial television broadcasting it had decided with approval of government to use phased ASO approach. At the end of each phase, a study was planned to help the Authority to make reflection of the process and plan appropriately next cause of action taking into consideration lessons learned in the preceding ASO phase. Hence, having completed ASO phase I, study was to be done.

1.2.2 Public Reaction to ASO Phase I

When ASO was implemented starting in Dar es Salaam on the 31st December 2012, as expected, there was observed rush to acquire decoders, CSPs to hook-up with MUX operator, and public reaction since mind-set shift to adopt to changes takes time. The complaints received by the Authority from consumers were mainly on poor reception and performance of the decoders. Some complained that they were unable to access FTA channels.

1.2.3 Media Owners Association of Tanzania

Media Owners Association of Tanzania (MOAT) through the media requested halting of the ASO exercise appealing to the government and public that the public was being denied their right for access to information. MOAT urged the Government to prolong the simulcast period until June 2015, the date which was announced by ITU.

1.2.4 Parliamentary Committee on Infrastructure Development

The Parliamentary Committee on Infrastructure Development also received same complaints from MOAT and requested that an assessment be made on the claim by MOAT and report be presented to the committee.

1.2.5 The Government

The government directed the Authority to make an evaluation of the ASO phase I before embarking on the second phase. However, the Authority had also planned to implement monitoring and evaluation of the exercise upon completion of ASO phase I and report to the Government.

1.3 Objective

The specific objective of this study was to evaluate/ assess the entire migration process in area where analogue television systems have been switched off.

The evaluation process is divided into TWO areas:-

- The preparedness of the Authority towards migration from analogue to digital broadcast in relations to CSPs, MUXO and Consumers; and
- DTT performance in terms of services provision to consumers and network roll out plan.

1.4 Methodology

(a) TCRA commissioned a study team composed of three experts from University of Dar es Salaam very conversant and seasoned in conducting surveys, data compilation and analysis and digital broadcasting issues.

(b) The study team was composed and its membership was as follows:

(i) Prof. Nerey Mvungi NTC-DB, University of Dar es Salaam - Team Leader;
(ii) Dr. Francis Sichona University of Dar es Salaam; and
(iii) Mr. Frederick Ishengoma University of Dar es Salaam.

(c) Conduct a consumers' survey in all towns/cities that were involved in ASO phase I using appropriate sampling techniques and sample size. Find details in section 2.2.1.

- Design appropriate survey tool, test it using pilot survey;
- Use credible interviewers consisting of university students or graduates preferably; and
- Supervise closely the interview process.

(d) Conduct CSPs survey for all of them that were providing terrestrial TV broadcasting services during the analogue era through interview using appropriately developed survey tool using a team rather than an individual.

(e) Conduct MUX operators' survey for the three licenced MUX operators through interview using appropriately developed survey tool by a team.

(f) Study in the Authority by accessing documents to establish the extent to which the Authority had prepared the digital migration process and ASO to facilitate smooth transition and ASO.

(g) Study the feedback from survey and make recommendations on way forward on the analogue to digital broadcasting migration process in Tanzania.

1.5 The Study Profile

The Digital Terrestrial Television broadcasting value chain has four principle players/stakeholders:

- The Authority that provide and monitor operating environment in the interest of all stakeholders;
- The Content Service Providers (CSPs) / TV stations licenced to prepare and provide contents to consumers (viewers);
- The Multiplex operators (MUXO) licenced to distribute and transmit at a fee the content and services from the CSPs; and
- The consumer / viewer who receive the contents and services hence influenced by all players in the value chain.

Study was made along the same line since each had different role and hence the presentation in this report is organised along the same line.

2 The Studies and Findings

2.1 The Study on the Authority and its Findings

The main objective of the study made on the Authority was to establish the extent to which the Authority was prepared for ASO and the engagement of key stakeholders. The study of the Authority was primarily done through consultation of various documents and through consultation of staff whenever need arose to provide clarification and information.

2.1.1 Consultation with Stakeholders

2.1.1.1 Public Consultation Document

It was observed that the Authority (TCRA) engaged stakeholders early during the migration process by issuing two Public Consultation Documents (PCD) on Analogue to Digital Terrestrial TV broadcasting Switchover (Migration from Analogue to Digital Broadcasting) in Tanzania in 2005 and 2006. Multiplex operator was included in the terrestrial digital broadcasting value chain. The first PCD was in 2005 highlighting DTT and its benefits followed by the second in 2006 establishing licensing framework for DTT that separated content and transmission functions in the TV broadcasting value chain.

2.1.1.2 Annual Broadcasting Conference

The Authority organized annual broadcasting conferences all CSPs were invited every December from 2006 to 2010 that brought together all key stakeholders in the broadcasting value chain to discuss pertinent issues on migration from analogue to digital broadcasting, challenges, constraints and way forward. Even PCD was discussed in one of such conferences. Future plans and experience were discussed and decisions made in a participatory manner.

After 2010, MUX operators were also invited.

2.1.1.3 Engaging CSPs and MUX on the Digital Migration Process

The following activities were seen to have been done by the Authority to ensure that the key stakeholders were involved in the migration process as summarised in fig. 2.1.1:

(i) The Authority first engaged CSPs on DTT in 2005 with the first PCD.
(ii) The Authority organized annual broadcasting conferences since 2005.
(iii) The Authority arranged at least four meetings a year for open discussion involving MUX, CSPs and NTC-DB where all issues related to DTT were discussed to provide information and get feedback from the key DDT players. Challenges and opportunities were also discussed. This gave opportunities for the parties involved to share experiences, fears, and challenges.
(iv) The Authority requested MUX operators and CSPs to meet and iron out issues that were of interest to them; particularly that of MUX services costs, CSP signal distribution during simulcast period, service level agreement, infrastructure sharing/re-use, etc and where necessary Authority facilitated such meetings. The two entities had problem to organise a joint meeting which made the Authority to intervene and facilitate their

meetings because the Authority considered such meeting crucial for smooth digital take-up.

(v) The Authority prepared and posted on its website a service level agreement template between CSPs and MUX operators.

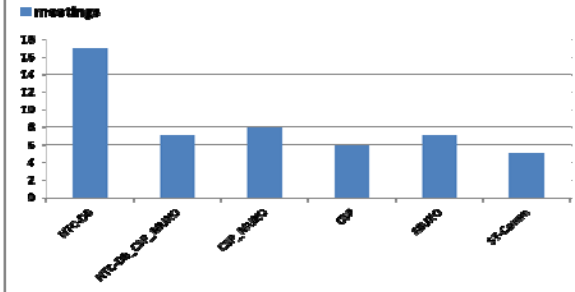

Fig. 2.1.1: Consultations with stakeholders

2.1.2 Regulatory Legal Frame work

The following were found to be in place to facilitate and guide the Authority in the migration process from analogue to digital terrestrial TV broadcasting.

(i) Cabinet approved in 2008 the digital migration policy and road map.

(ii) Enacting of the Electronic & Postal Communications Act, 2010 (EPOCA) by the Parliament of Tanzania;

(iii) EPOCA (Digital and other Broadcasting Networks) Regulations, 2011 which provide for Analogue Switch Off (ASO) on 31st December, 2012;

(iv) The government through the national steering Committee approved in July 2011 the communication strategy for a national wide public awareness campaign on digital migration; and

(v) The Government through the National Steering Committee approved a phased ASO in all simulcast service areas beginning with Dar es Salaam (31/12/2012), Dodoma and Tanga (31/1/2013), Mwanza (28/2/2013), Arusha and Moshi (31/3/2013), and Mbeya (30/4/2013).

2.1.3 Licensing of MUX Operators

It was observed that separation of transmission and content Regulatory Framework was discussed in 2007. In that consultative discussion only two players in the digital terrestrial TV broadcasting value chain were agreed upon. These were the CSPs, and MUX Operators (to provide network services) as an economical solution. The MUX Operator was granted Spectrum User licence & Network Facility (NF) licence. Furthermore, the agreement in consultation process was to have three MUX operators who were licenced in 2010 following an open tender in 2009.

2.1.4 Publicity Campaign for Migration and ASO Processes

It was observed that TCRA formulated in 2010 a Communications Strategy (CS) approved by the Government which used print, newspapers, TV/radio, web services, roadshows, talk

shows, meetings/seminars to publicize the transition from analogue to digital terrestrial TV broadcasting and the ASO process. In fact, the President of the United Republic of Tanzania launched the Public Awareness Campaign and the digital logo on 24th August, 2011. The campaign continued all throughout ASO phase I. There were demonstrations of digital platform performance to members of parliament (MPs) in Dodoma and meetings with MPs.

2.1.5 Authority's Responsiveness to Consumer Issues

2.1.5.1 Digital Migration Costs

The Authority took steps to ensure that the costs involved in the migration process remain under control to minimize costs to consumers, CSPs and MUX operators particularly that of rolling out digital infrastructure. Approved the Public Private Partnership (PPP) for the public signal distributor since the government did not have the resource to do it alone. Also, Private Investments in a form of joint venture between local and foreign investors (shareholding) were approved for the two additional signal distributors.

2.1.5.2 Determination of MUX Tariffs to CSPs

Following licensing of three Multiplex Operators namely; Star Media (T) Limited, Agape Associates Limited (AAL) and Basic Transmissions Limited (BTL) to provide Digital Terrestrial Television (DTT) multiplexing, signal distribution and transmission services, MUX were given phased-out roll-out plans and opportunity to negotiate with Content Service Providers (CSP) the transmission fees to be charged by MUX during simulcast period and beyond. However, the fees offered by MUX were irregular and prohibitive and therefore hindered fast entry to digital platform by CSPs. In view of that and pursuant to powers conferred to it, the Authority established a Cost Based Fees framework for transmission fees to be charged by MUX to CSPs and on 29th November 2012, presented a Public Consultation Document (PCD) to stakeholders for comments. The PCD recommended the following:

(i) The maximum (ceiling) transmission fee for MUX chargeable to CSPs as a cost of carriage of one digital television programme (content channel) per service area per month be USD 3,800.00;

(ii) The recommended transmission fee be subject to review on annual basis to take into account change in factors such as inflation, technological change, multiplicity of content channels and value added services;

(iii) The recommended transmission fee be mandatory to FTA services during the simulcast period and beyond to ensure smooth entry to digital network by CSPs;

The stakeholders responded positively to PCD and there were no objection from the stakeholders with regard to the methodology and approaches used to estimate the DTT transmission fees payable to MUX by CSPs. Following conclusion of the consultation process, the following were adopted for way forward in regards to transmission fees:-

(a) A maximum (ceiling) transmission fee for MUX chargeable to CSPs as a cost of carriage of one digital television programme (content channel) per service area per month for the year 2013 is USD 3,800.00;

(b) The fee should be reviewed annually taking into account the multiplicity of content channels, technology change, infrastructure sharing and value added services, etc.

2.1.5.3 Set-Top-Boxes and Availability

The Authority had taken measures to ensure convenient availability of Set-Top-Boxes (STBs) to consumers through MUX operators. It established that there were over 1000 distribution centres for STBs at the time of ASO. The Authority worked with government to exempt import duty to make STBs affordable. STBs specifications were provided by the Authority.

Table 2.1.1: Decoders sold to consumers in various service areas just before ASO in the area

S/No	Service Area	Number of Set Top Box Sold as per ASO date		
		Star Media	Agape Associates Ltd	Basic Transmission LTD
1	Dar es salaam	300,000	10,000	None
2	Dodoma Town	20,000	100	None
3	Tanga City	12,000	70	None
4	Mwanza City	35,000	150	None
5	Moshi Town	14391	40	None
6	Arusha City	45,000	100	None
7	Mbeya City	14,000	40	None
	Total	***440,391***	***10,500***	***None***

2.1.5.4 Consumer Support Services

To support consumers, the Authority demanded:

(a) The set-top-box distributors to provide appropriate customer care and technical support; and

(b) Advocated for active consumer feedback mobilisation system;

Table 2.1.2: Set top boxes sold during the ASO dates (i.e. Set-top-boxes that were available to consumers for purchase)

Service Area	**Number of Set Top Box Sold as per ASO date**		
	Star Media	**Agape Associates**	**Basic Transmission**
Dar es Salaam	300,000	10,000	None
Dodoma Town	20,000	100	None
Tanga City	12,000	70	None
Mwanza City	35,000	150	None
Moshi Town	14391	40	None
Arusha City	45,000	100	None
Mbeya City	14,000	40	None

The Authority also:

(a) Worked with TCRA-Consumer Consultative Council;

(b) Had instruments to Type Approve, check Quality of Service (QoS) and Quality of Experience (QoE) assurance; and
(c) Set criteria for ASO (decoders, DTT signal and public awareness campaign).

2.1.5.5 Assessment of Signal coverage

One of the criteria for ASO was the availability of digital signal which match the analogue signal coverage. Measurements were conducted in all ASO service areas namely Dar Es Salaam, Arusha, Mbeya, Mwanza, Tanga, Moshi and Dodoma before commencement of the switch off exercise. In all areas the digital signal was superior compared to analogue signal; see appendix A4.4.

2.2 Consumers Survey and its Findings

2.2.1 Survey Objectives and Methodology

2.2.1.1 Objectives

The Main Objective was to measure the impact of ASO of Analogue Terrestrial Television to the Broadcasting industry.

The specific objectives were:

- To establish the performance of Multiplex Operators and challenges
- To measure the impact of public awareness campaigns to the consumers
- To establish regulatory gaps for the implementation of DTT
- To establish concerns raised by stakeholders on various issues of ASO

2.2.1.2 Methodology

2.2.1.2.1 Scope and Coverage

The survey was conducted in city and municipal centres where there were digital television transmission signals. These included Dar es Salaam (Ilala, Kinondoni and Temeke Municipals), Moshi, Arusha, Tanga, Mbeya, Dodoma and Mwanza (Ilemela and Nyamagana). The survey focused on Awareness of DTT, Quality of Service (QoS), Quality of Experience (QoE) and challenges met from the services of Multiplex Operators, MUXO's decoders distributers and Broadcasters.

There were about 6.7 million people and 1.7 million households in cities and municipals where the DTT was already in place. Sampling principle for households was done to obtain representative number of digital broadcasting services consumers from whom data were collected on awareness on DTT, DTT services and QoE.

2.2.1.2.2 Survey Design

2.2.1.2.2.1 Sample Size

The formula (1) was used to determine an optimum number of households (HHs) to be visited.

$$n = \frac{Nz^2\sigma^2}{d^2(N-1) + z^2\sigma^2} \qquad (1)$$

where n is the optimal household sample size, N is the total number of households in the survey area, σ is sample standard deviation and z can be obtained from probability tables for which 95% confidence level gives z = 1.96. The sampling error was assumed to be 0.02.

The main objective was to ensure that the precision of the estimates, or the margin of error was as small as possible. Given N_h = 1,655,372[1] households in the survey area thus, if z =

[1] The number was obtained from the 2012 population census figures

1.96, a sampling error e = 0.02 provided an optimal sample size of 2,400 HHs from which two persons were selected randomly to make a total of 4,800 persons (consumers) interviewed.

Table 2.2.1. Sampling Plan, Distribution and Response Rate

Place	*No. of HHs*	*HHs Sample Planned*	*HHs Sample Realized*	*Response Rate*
Dar es Salaam	1,109,147	1,608	1,557	97%
Arusha	104,111	151	151	100%
Dodoma	93,399	135	134	99%
Mbeya	91,733	133	126	95%
Moshi	46,073	67	85	127%
Tanga	62,121	90	91	101%
Mwanza	148,789	216	216	100%
Total	**1,655,373**	**2,400**	**2,360**	98%

2.2.1.2.2.2 Sampling Design

The sampling was done only for consumers of digital television broadcasting services. There were two stages of sampling. In the first stage, households were selected randomly by taking into account representation of the income levels in different locations in a particular city or municipal. The selection of the 2,400 HHs was obtained from a sampling frame (list of all households in each city or municipal).

The second stage of sampling was on individuals in the households. Two persons, a head of the household and any other adult were selected randomly. Therefore, a total of 4,800 adults were selected for face to face interview in all seven cities or municipals. Table 2.2.1 summarizes the planned and realized sample.

Table 2.2.3: Number of HHs with TVs before and after ASO

	No. of HHs	HHs with TV	Before ASO	After ASO	Total
Dar es Salaam	1,557	1,503 (97%)	1,461(97%)	42	1,503
Arusha	151	150 (99%)	147(98%)	3	150
Tanga	91	79 (87%)	77(97%)	2	79
Dodoma	134	134 (100%)	124(93%)	10	134
Mbeya	126	126 (100%)	117(93%)	9	126
Moshi	85	85 (100%)	85(100%)	0	85
Mwanza	216	216 (100%)	203(94%)	13	216
TOTAL	2,360	2,293 (97%)	2,214(97%)	79	2,293

Note that a 98% response rate was very good

2.2.1.2.3 Pilot Survey

A few households that were not to be included in the survey area were selected for carrying out a pilot survey to test the survey methodology and the survey data collection instruments. The results of the pilot were used to refine further the survey instruments. The pilot survey involved 56 HHs from Kinondoni municipality.

2.2.2 SURVEY FINDINGS

Table 2.2.2. Characteristics of the surveyed Population

Age		
	Number	Percentage
18 - 35	2,267	48.5%
36 - 60	2,029	43.4%
60+	382	8.1%
Total	**4,678**	**100%**
Sex		
Male	2,363	50.5%
Female	2,318	49.5%
Total	**4,681**	**100%**
Marital Status		
Single	1,268	27%
Married	3,063	65%
Widow	272	6%
Divorced	74	2%
Total	**4,677**	**100%**
Occupation		
Student	506	10.8%
Business	639	13.6%
Entrepreneur	1,216	26.0%
Public Servant	503	10.7%
Private Servant	490	10.5%
Not Employed	291	6.2%
House Wife	590	12.6%
Retired	266	5.7%
Peasant/Farmer	182	3.9%
Total	**4,683**	**100%**
Education Status		
No Education	79	1.7%
Adult Education	38	0.8%
Primary	1,859	39.8%
Secondary	1,680	35.9%
Tertiary	1,018	21.8%
Total	**4,674**	**100%**

2.2.2.1 Characteristics of the Surveyed Population

The Characteristics of the survey population is given in table 2.2.2.

2.2.2.2 TV Ownership and Usage Before and After ASO

In order to know the status of TV ownership and usage before and after ASO, head of households were interviewed whether they owned and used TV set. The responses are summarized in table 2.2.3.

Table 2.2.3: Number of HHs with TVs before and after ASO

	No. of HHs	HHs with TV	Before ASO	After ASO	Total
Dar es Salaam	1,557	1,503 (97%)	1,461(97%)	42	1,503
Arusha	151	150 (99%)	147(98%)	3	150
Tanga	91	79 (87%)	77(97%)	2	79
Dodoma	134	134 (100%)	124(93%)	10	134
Mbeya	126	126 (100%)	117(93%)	9	126
Moshi	85	85 (100%)	85(100%)	0	85
Mwanza	216	216 (100%)	203(94%)	13	216
TOTAL	2,360	2,293 (97%)	2,214(97%)	79	2,293

It is seen from table 2.2.3, that the 2,360 HHs in seven towns/cities interviewed, 97% of them owned a TV; out of whom 97% were acquired before ASO. Moshi Municipality had 100% ownership before ASO compared with other cities and municipals in the ASO area.

Table 2.2.4: Number of HHs with TVs in use

	HHs with TV	HHs with TV in use	Percentage of TV in use
Dar es Salaam	1,503	1,306	87%
Arusha	150	140	93%
Tanga	79	56	71%
Dodoma	134	126	94%
Mbeya	126	121	96%
Moshi	85	84	99%
Mwanza	216	212	98%
Total	2,293	2045	89%

Tanga had the least percentage on ownership of TV because the service area had only TBC and Tanga Municipal Council TV, and that TV reception was poor. The two TV stations could not attract more HHs to buy TV sets unlike other services where there are more than five terrestrial TV stations.

Table 2.2.4 provides the responses on TV usage after ASO.

The percentage of HHs with TVs in use after ASO was 89%. Of the remaining 11% of HHs with TVs, 5.5% were not using their TVs because they had not bought decoders yet, 0.3% HHs with TVs was due to poor signal reception, 0.9% were out of order, 0.7% had no electricity, 0.1% were due to none availability of decoders and 3.2% HHs claimed that the prices of decoders were prohibitively high as shown in table 2.2.4 and figure 2.2.1.

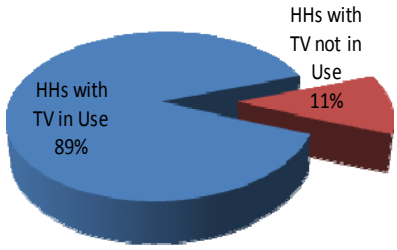

Fig 2.2.1: Percentage of HHs with TV in Use and Reasons for not using TV

5.5% *Haven't bought Decoder*

0.1% *Decoders are not available*

3.2% *High price of Decoders*

0.2% *Decoders not in order*

0.3% *Poor Signal reception by the decoder*

0.9% *TV not in order*

0.7% *No electricity*

10.8% ***Total***

As it is shown in figure 2.2.1 the concern of insufficient or/and unavailability of decoders was not a significant factor hindering uptake of digital broadcasting services. It counted only for 0.1% of HHs that claimed that they were not using the services because decoders were not available. Furthermore, only 3.2% were not receiving DTT because they stated that the prices of decoders were high and therefore out of reach.

2.2.2.3 Estimates of Number of HHs with TV in use in the surveyed area (Appendix; Table A1.1)

Data in Appendix table A1.1 shows that estimated number of HHs with TVs in use in the surveyed area is 1.4 million while the total number of HHs with TVs is 1.6 million. Further 172,000 HHs had TVs which were not being used while 45,000 HHs did not have TVs.

2.2.2.4 Decoder Usage Before and After ASO

Heads of HHs response on the type TV reception modes they possess in their HHs, is as tabulated in table 2.2.5.

From the table, the majority of HHs (62%) were using decoders with rooftop antennas followed by decoders with indoor antenna (21%). Reception through cable and Integrated Digital TV (iDTV) were the least used modes with 2% and 1% of HHs respectively.

To know the number of decoders in ASO area, heads of HHs provided the information as given in appendix table A1.2. Out of HHs with TVs in the ASO area, 78% had decoders. It is estimated that the total number of decoders owned in the ASO area was 1.5 million including those for satellite and cable in 1.3 million HHs. This represents 81% of HHs with

TVs. It was observed that 12% of the HHs had more than one decoder. DTT reception constituted 87% of TVs in use.

Table 2.2.5: Number of HHs with Decoders and Total number of Decoders in the ASO area

	One	Two	Three	> Three	Total HHs	% HHs Dec	No. of Dec
Dar es Salaam	1,032	124	18	4	1,178	90%	1,350
Arusha	106	16	1	0	123	88%	141
Tanga	42	4	0	0	46	82%	50
Dodoma	100	19	1	0	120	95%	141
Mbeya	92	13	1	1	107	88%	125
Moshi	80	4	0	0	84	100%	88
Mwanza	186	16	2	1	205	97%	228
Total	1,638	196	23	6	1,863	91%	2,123

The number of decoders bought before and after public awareness and ASO are shown in table 2.2.6.

Table 2.2.6: Number of HHs who bought decoders before and after Campaign and ASO

	Before Campaign	After Campaign but Before ASO	After ASO	Total
Dar es Salaam	399	319	446	1,164
Arusha	44	37	42	123
Tanga	14	11	19	44
Dodoma	46	31	43	120
Mbeya	46	41	20	107
Moshi	40	33	10	83
Mwanza	64	73	68	205
Total	653 (35.4%)	545(29.5%)	648 (35.1%)	1,846

As shown in table 2.2.6, HHs that acquired decoders prior to ASO campaign were 35.4% of HHs with TVs in use. Further 29.5% acquired decoders as a result of ASO campaign before switch-off. The remaining 35.1% of HHs bought decoders after ASO. Significantly 64% of all HHs had decoders by switch-off date. This in an indication that majority of people were aware and ready for the switch off and they were using digital broadcasting services already before ASO.

2.2.2.5 HHs Feeling perception on decoder prices

Heads of HHs were asked to express their perception on the prices of decoders widely used; their responses are summarized in table 2.2.7.

From the table it can be deduced that more than half (57%) of the HHs in the ASO area stated that the prices of decoders are high. This is in contrast with the fact that 34% of HHs were

comfortable with prices and only 1% of HHs stated that prices are low. This indicates that the price of decoders was not high to inhibit HHs to buy decoders despite concerns that many people could not afford purchase of decoders.

Table 2.2.7: HHs perception on Decoder Prices

	High	Average	Affordable	Low	Don't know
Dar es Salaam	59%	31%	9%	1%	1%
Arusha	61%	36%	2%	0%	1%
Tanga	43%	55%	2%	0%	0%
Dodoma	58%	33%	8%	1%	1%
Mbeya	50%	32%	16%	1%	1%
Moshi	43%	38%	12%	2%	5%
Mwanza	53%	43%	3%	0%	0%
Total	57%	34%	8%	1%	1%

Consumers responses to their satisfaction on the prices of decoders are as depicted in Figure 2.2.2. As shown in the figure, 41% of consumers were satisfied with the price of decoders. Mbeya had the highest percentage (56%) of satisfied consumers while Dar es Salaam (39%)

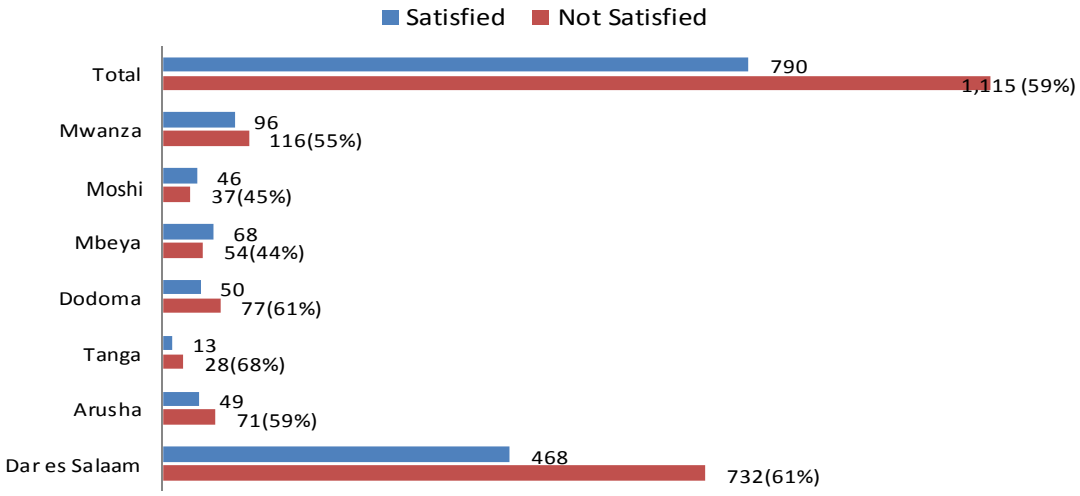

Fig 2.2.2: HHs Satisfaction on Prices of Decoders

and Tanga (32%) had the least satisfied consumers.

2.2.2.6 Estimates of Number of HHs with Decoders and Decoders in the surveyed Area (Appendix Table A1.2)

The data in Appendix table A1.2 show that estimated number of HHs with decoders in use in the surveyed area is 1.3 million with the total number of decoders estimated at 1.5 million.

This constitutes 78% of HHs had decoders in the surveyed area. Furthermore, Moshi had the highest percentage (99%) of decoders per households while Tanga had the least percentage (51%).

Table 2.2.8: Number of persons heard about ASO Awareness campaign

	Yes	No	Total
Dar es Salaam	2,737(89%)	352	3,089
Arusha	286(95%)	15	301
Tanga	141(77%)	41	182
Dodoma	240(91%)	24	264
Mbeya	229(97%)	7	236
Moshi	170(100%)	0	170
Mwanza	410(95%)	22	432
Total	4,213(90%)	461	4,674

2.2.2.7 Outcome of ASO Awareness Campaign

Out of the 4,674 respondents 90% were aware of the ASO, while 461(10%) respondents were not aware. All respondents in Moshi were aware of ASO. However, in Tanga it was 77% of the respondents which was the lowest.

Table 2.2.9 gives the type media through which public received information on ASO campaign. TV was the most effective media (91% of cases) followed by radio (66% of cases). The least effective media were road shows (9% of cases) and websites (6% of cases). Note that the number of respondents was 4,213.

Table2.2.9: Media used to receive ASO public awareness campaign information

Type of Media	No. of Responses	% of cases
TV	3,792	91%
Radio	2,750	66%
Newspapers	1,503	36%
Friend/Neighbours	922	22%
Road Shows	358	9%
Websites	239	6%

2.2.2.8 Customer Satisfaction on Digital Broadcasting Services

One of the aims of the survey was to measure the level of satisfaction on digital terrestrial broadcasting services after ASO. The factors of interest included quality of picture and sounds, affordability of decoders and pay TV services, customer care and quality of programmes being offered.

2.2.2.8.1 Overall Customer Satisfaction

As shown in table 2.2.10, the customer satisfaction on digital broadcasting services indicated that the viewers were satisfied on the average. However, they would wish to see an improvement in the areas of customer services, the number of channels and availability of channels. The factors that are more tied to quality of broadcasting services were rated 2.6 which is more than average while those associated with acquisition of decoders' monthly payment bills were rated as being unsatisfactory.

Considering factors associated with quality of broadcasting services only, Arusha and Mbeya were the most satisfied compared to the rest. Dar es Salaam and Tanga were given the least rating.

Figure 2.2.3 provides a summary of consumer satisfaction of digital terrestrial broadcasting services in percent.

As depicted in the figure, more than two thirds of consumers were satisfied with digital terrestrial broadcasting services. Although broadcasting services were rated highest in Arusha and Mbeya, the number of consumers satisfied was highest in Moshi.

Table 2.2.10: Overall satisfaction Rating (Scale: 1 = Very Satisfied …… 5= Not Satisfied at all)

	Dar es Salaam	Arusha	Tanga	Dodoma	Mbeya	Moshi	Mwanza	Total
Decoder Price	4	4	4	4	4	4	4	4
Decoder usage Bills	4	4	4	4	4	4	4	4
Bill payments System	3	1	2	3	2	2	3	2
Availability of Channels	3	3	3	3	3	3	3	3
Audio and Visual Quality	3	2	2	2	2	2	2	2
Customer Services	3	2	3	2	2	3	3	3
Number of Channels	3	3	3	3	3	3	3	3
Quality of Programmes	2	2	2	2	2	2	2	2
Average	3	3	3	3	3	3	3	3

2.2.2.8.2 Customer Expectations

Table 2.2.11 shows overall consumer expectation on digital terrestrial broadcasting services

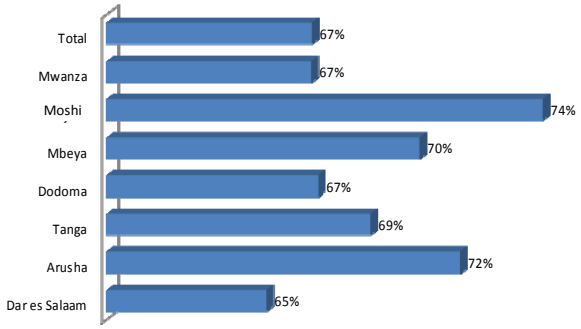

Fig. 2.2.3: Percentage of Customers Satisfied with Digital Broadcasting

ratings. Factors considered were decoder price, subscription services and quality of experience. Overall rating indicates that consumers' views were as expected. Arusha and Dar es Salaam had the highest expectations while Mwanza had the lowest expectations.

Table A1.6 (in appendix) provides overall percentage of consumers' expectation on digital terrestrial broadcasting services ratings. Arusha had the highest consumer expectation (81%) while Dodoma had the lowest (66%). The overall consumer expectation rating was 73% for the ASO service area. This indicates that consumers' expectation on DTT services were within acceptable levels.

Table 2.2.11: Overall Expectation Rating (Scale: 1 = Very Good ……. 5= Very Poor)

	Dar es Salaam	*Arusha*	*Tanga*	*Dodoma*	*Mbeya*	*Moshi*	*Mwanza*	*Total*
Decoder Price	3	3	4	4	4	4	4	3
Decoder usage Bills	3	3	4	4	4	4	4	3
Number of Channels	3	2	3	3	3	3	3	3
Bill payments System	2	2	2	3	2	2	3	2
Availability of Channels	2	2	3	3	3	2	3	2
Audio and Visual Quality	2	2	2	2	2	2	2	2
Customer Services	2	2	3	2	3	3	3	2
Quality of Programmes	2	2	2	2	2	2	2	2
Average	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**

Figure 2.2.5 provides the overall percentage of consumers expectation on digital terrestrial broadcasting services ratings.

Consumer perception on quality of programmes was rated very highly while those of billing system, availability of channels, audio and visual quality and customer services were rated as

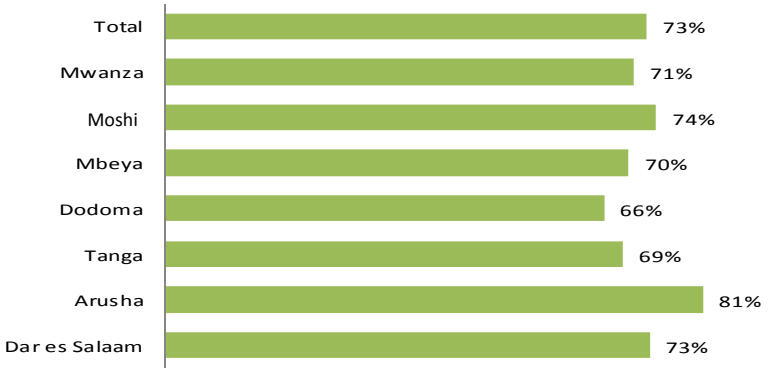

Fig. 2.2.5: Percentage of Customers whose Expectations on Digital Broadcasting were met

being average. More than half of the consumers expressed that services were close to the required standard.

2.2.2.8.3 Customer Perceptions

Table 2.2.12 shows overall perception rating on DTT services. Consumer perception on quality of programmes was rated very highly while those of billing system, availability of

Table 2.2.12: Overall Consumer Perceptions Rating (Scale: 1 = Very Near…….5= Very Far)

	Dar es Salaam	Arusha	Tanga	Dodoma	Mbeya	Moshi	Mwanza	Total
Bill payments System	3	2	2	2	2	2	3	3
Availability of Channels	3	3	3	3	3	2	3	3
Audio and Visual Quality	3	3	2	2	2	2	2	3
Customer Services	3	2	3	2	3	3	3	3
Quality of Programmes	3	3	2	2	2	2	2	2
Average	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**3**

channels, audio and visual quality and customer services were rated average. More than half of the consumers expressed that services were close to the required standard. Moshi and Dodoma had the best perception while Dar es Salaam was the lowest.

Figure 2.2.6 shows overall percentage of consumers on perception of DTT services. More than half of consumers (57%) perceived DTT services as near to the required standards. Moshi had nearly three quarters of consumers while Mbeya had the lowest (50%). The outcome of the study shows that consumers perceived DTT services appropriately.

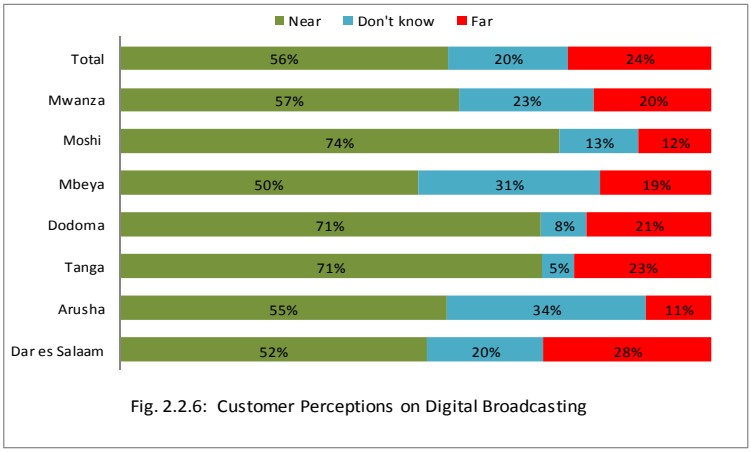

Fig. 2.2.6: Customer Perceptions on Digital Broadcasting

2.2.2.8.4 Consumer Satisfaction Index (CSI)

Table 2.2.13 provides measure of degree of satisfaction based on the weighted scores on satisfaction, expectation and perception on services (Consumer Satisfaction Index).

Table 2.2.13: Customer Satisfaction Index (CSI) for Digital Broadcasting Services

	Dar es Salaam	*Arusha*	*Tanga*	*Dodoma*	*Mbeya*	*Moshi*	*Mwanza*	*Total*
Overall Satisfaction with Digital Broadcasting	3	3	3	3	3	3	3	3
Extent to which Digital Broadcasting has met your Expectations	3	4	3	3	3	3	3	3
Extent to which Digital Broadcasting compares with Standard/Ideal	3	4	4	4	3	4	3	3
CSI [%]	**43**	**63**	**55**	**58**	**43**	**55**	**45**	**43**

The overall CSI was calculated to be 43% which means consumers were satisfied with the digital broadcasting services at average level. Arusha had the highest CSI while Dar es Salaam and Mbeya had the lowest. The overall CSI is below average. Decoder prices and monthly subscription were the main contributing factors to low CSI.

2.2.2.9 General Consumers Viewers and Observations

The questionnaire had a number of open questions. Here under is the summary of what was of concern and suggestions made by a significant portion of the respondent, hence considered prudent to be included in this report.

2.2.2.9.1 Challenges

- Freezing of picture and sound and loss of signal in some areas;
- Customer services were not satisfactory; use of inappropriate language to consumers by telephone, instructions given difficult to follow. They requested for easy way to provide their opinion on means to improve services; and
- Some expected to get all local channels when they paid monthly fees.

2.2.2.9.2 Promotional Offers by Decoder Distributers

- Advertisement should be clear on what the consumer gets to remove misconception that they are being robed when asked to pay for antennae; and
- Distributors of decoders should respect their promotional offers as per advertisement.

2.2.2.9.3 Suggestions

- Recommended adoption of the payment mode similar to mobile phones to allow those with low income to view TV for shorter period so that they can afford;

- Requested for local programmes and inland tourist promotion in pay-TV services;
- They wished to be enabled to access all TV channels they had access to before ASO without paying;
- Requested more flexible choice of pay-TV programmes bundles than at present reducing the cost of lowest bundle and changing what is in the some of the bundles, i.e. have premium bundles even if they cost more; but choice is important;
- The price for decoders should be reduced and be the same for all types;
- Authority to look on how to address the issue of freezing of pictures;
- Sports channel be included in the StarTimes offer;
- Agents for decoder distributors should be trustworthy and responsive to its customers;
- Some of the contents (including music, drama, movies, etc.) are way out of line with Tanzanian culture and they destroy the ethical behaviour of our young generation. Air such programmes at least after 11.00 pm since the children do not go to sleep at 10.00 pm like in developing countries;
- The number of channels advertised for a bundle should be provided in full;
- Dressing habits of some of the TV announcers is very provocative and not in line with Tanzanian culture. Can government intervene on this aspect?
- Increase programmes training or provide information to support farmers, livestock keeping, driving, ethical behaviour, commerce, etc;
- Reduce political programmes since some politicians misuse them by ensuring they appears very frequently in them to promote themselves and seek popularity not necessarily for good course;
- Have the user's guide and installation guide in Swahili and English; and
- Consider increasing educational programmes in various TV channels to assist students in place of excessive music or other entertainment programmes.

2.2.2.9.4 Observations

- The dominant foreign programmes were claimed to be responsible for the erosion of Tanzanian culture, erosion in ethical behaviour in young generation and disregard of heritage;
- The batch of decoders from StarTimes brought after ASO was giving problems to consumers;
- They commended the government for bringing DTT because it has removed the need to acquire dish antennae to get many channels while picture quality is very good;
- The reception in some areas in Makuburi have degraded heavily following installation of the Makongo Star Media transmitter;
- Some are complaining that they cannot get TBC1 broadcast;
- The technical support team charges Tshs 20,000/= but they at times do not solve the problem faced by the consumer;
- Reception in some areas around Kunduchi and Boko are poor (about 50% on and 50% off);
- Pay-TV channel only show foreign programmes they need to show local programmes as well;
- Before ASO consumers reported that they were receiving 3 to 5 TV stations at most;

- There was concern that TBC1 is not currently seen by those receiving TV using satellite;
- The cost of decoders is high for the common man and farmers; and
- Cost of pay-TV bundle is on the high side for common citizens. Hence, reduce the number of channels in a package say to 15 and charge between Tshs 3,000 to 5,000 instead of the current 10,000.

2.3 The Content Service Providers (CSPs) Survey and Findings

Immediately after implementation of the initial ASO of phase one started in Dar es Salaam there was strong negative reaction from CSPs that was expressed through the media by the chairman of their association the Media Owners Association of Tanzania (MOAT). They claimed that ASO has denied access of consumers to broadcasting and they were not accessible as before ASO. They were also concerned with the reduction in revenue from advertisement. It was therefore considered prudent to include CSPs in the study to determine what opportunities if any has the introduction of DTT opened up to CSPs, the challenges and constraints that CSPs experience in the migration process and ASO, their future plans or any other factor that may be of interest to smooth digital take-up.

The study concentrated on those CSPs that were operational during analogue terrestrial TV broadcasting who were sixteen. Since the number was not big there was no need to use sampling, hence all the applicable CSPs were included in the study. It was also useful to get feedback from all of them to enrich the results and to be inclusive.

A specific questionnaire for the CSPs was prepared that was used as a guide for those involved in the survey of the CSPs. The CSPs were visited and interview was conducted and in most cases the respondents for the different CSPs was a management and technical team. The responses of the respondents were recorded by the interviewer and summarized in the report below.

2.3.1 Success

This part looks at achievement in the migration process and ASO from the CSPs perspective.

2.3.1.1 CSPs Connections to MUX and Visibility in Service Areas

It was of interest to know when the CSPs were hooked to MUX to establish if consumers at any time during ASO were denied accessibility to TV broadcasting of stations that were there during analogue. Furthermore, other related issues to gauge if there was increase or decrease in CSPs offering to viewers brought by introduction of DTT. Figure 2.3.1 and table 2.3.1 shows that 54% of the CSPs were already connected to MUX prior to analogue TV broadcasting switchoff while 15% joined immediately after ASO. Figure 2.3.1 and table 2.3.1 comes from table A2.1 in the appendix.

2.3.1.2 CSPs Service Areas During Analogue TV Broadcasting and that Under DTT

Figure 2.3.2 shows the number of towns that the different CSPs were being received before analogue TV broadcasting switch-off through analogue terrestrial broadcasting. The dominant CSPs then are clearly reflected. However, this may change quickly with the introduction of DTT. Table A2.3 in the annex show that 54% of all CSPs were seen in all towns with digital presence during ASO.

Table 1.3.1: Number of CSPs and time taken to start digital broadcasting after ASO (Refer Table A2.1)

Time	No. of CSPs	Percentage
Before ASO	7	54%
Immediately after ASO	2	15%
After 2 month	1	8%
After 4 month	0	0%
More than 6 month	2	15%
Not yet	1	8%

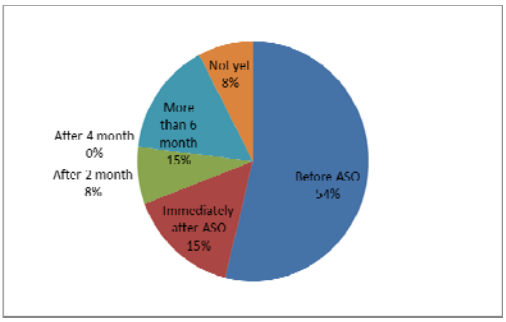

Fig. 2.3.1: The proportion of CSPs connected to MUX at different times in reference to ASO date

2.3.1.3 Ratings of DTT services

The claim that the use of DTT would improve quality of terrestrial TV broadcasting services offering by CSPs was investigated in this survey through interview and completion of questionnaire. Figure 2.3.3 which is obtained from data in table A2.4 in annex 2 clearly shows that on the average most CSPs considered that the introduction of DTT has considerably improved what they are offering to their consumers. Capital TV, Clouds and DTV indicated the highest degree of satisfaction while Mlimani TV was the least satisfied. Figure 2.3.4 shows overall rating by CSPs on the quality of DTT services for different categories in terms of the number of CSPs. The figure also shows that sound

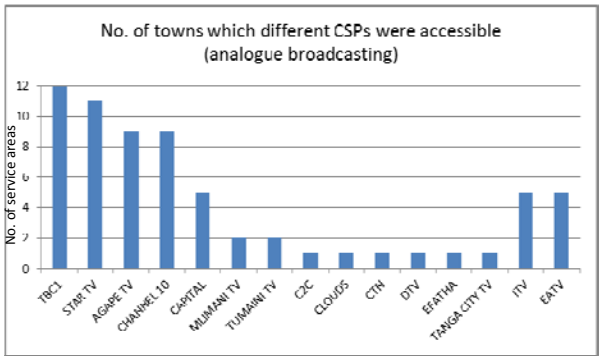

Figure 2.3.2: The number of towns in which CSP was accessible using analogue broadcasting

quality improvement was indicated as being excellent by the largest number of CSPs followed by picture quality. The improvement in the quality of programmes was rated to have lowest improvement relative to others but still reasonable.

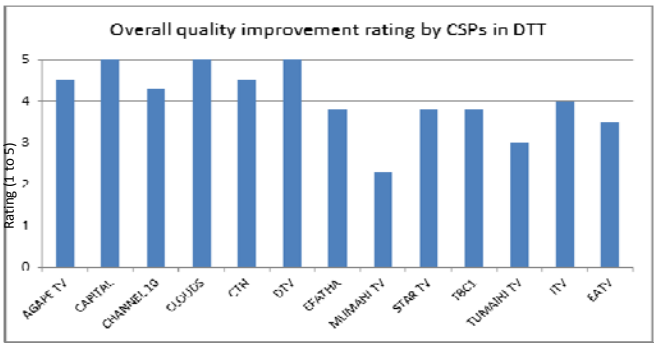

Fig. 2.3.3: Improvement rating of broadcasting quality under DTT

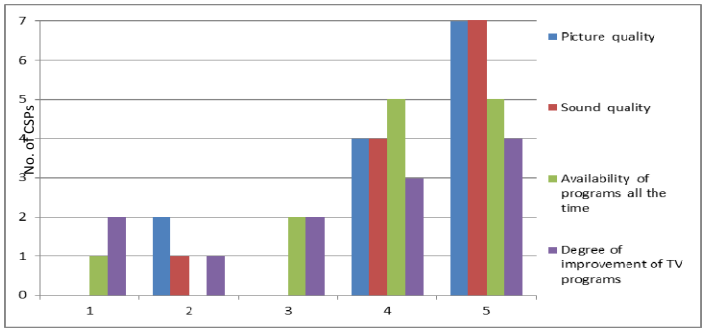

Fig. 2.3.4: The number of CSPs for different rating categories on improvement of TV broadcast by DTT

2.3.1.4 Connection of CSPs to MUX Operators

The survey determined to which MUX operator the different CSPs were getting services from. It was observed that dominant CSPs shown in figure 2.3.2 were served by all MUX operators. Of the three MUX operators, see figure 2.3.5, Star Media (T) Ltd was serving the largest number of CSPs while Agape Associates Ltd had the lowest. Figure 2.3.6 shows that

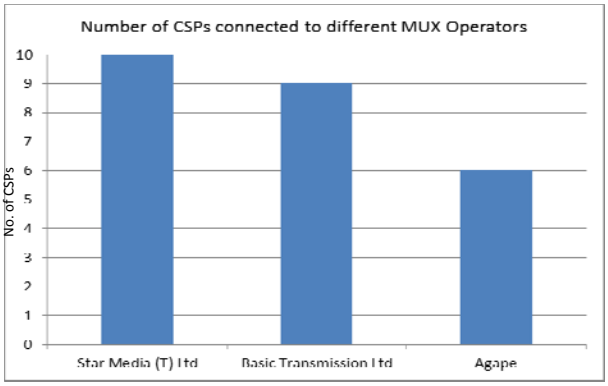

Fig. 2.3.5: Number of CSPs connected to different MUX operators

of those CSPs that were not covering all towns with digital presence, Agape TV reached the largest number of towns followed by Capital TV. The rest were only providing services to one service area.

The MUX operators and the CSPs that they are carrying their signals are required to enter into a Service Level Agreement (SLA). It was observed from the survey that of the 16 CSPs only 9 (56%) had SLA. These are: ITV, EATV, AGAPE TV, CAPITAL, CHANNEL 10, CLOUDS, CTN,

DTV and MLIMANI TV. Table 2.3.2 provides reasons given by some of the CSPs for not having SLA. The most common reasons were conditions set by MUX operators in the SLA and the

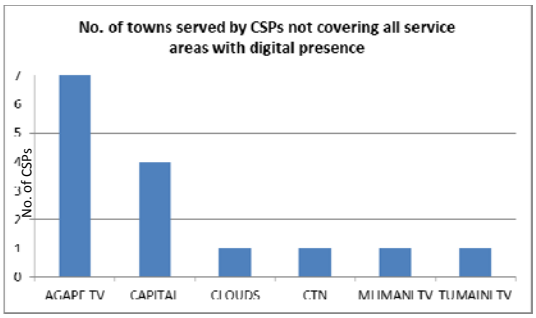

Fig. 2.3.6: The number of towns served by CSPs not in all towns with digital presence

monthly connection fees. Note that some of the CSPs are subscribed to more than one MUX operator.

Table 2.3.2: Reasons as to why CSPs have not entered SLA with MUX Operators

CSP	Reasons
STAR TV	• Regulation of MUX must carry my signal – implies SLA • We don't see the reason, TCRA forced signal to be entered into MUX • Other MUX they over-compress our signal • Connection cost high • Unacceptable SLA conditions
EFATHA	• It is too costly • Unacceptable SLA conditions
TBC1	• High connection costs • Must carry obligation • Unacceptable SLA conditions • No copyright issues since they are licensed in Tanzania
TUMAINI TV	• Monthly costs • Unacceptable SLA conditions • They demanded to be paid for three years

2.3.1.5 DTT Impact on Operational Costs

Under DTT, a number of TV channels are carried by a single frequency channel and CSPs are no longer involved in transmission of TV signals. Hence, CSPs are sharing MUX services. It was envisaged therefore that this may reduce operational costs. The survey showed that it was indeed the case as table 2.3.3 indicates. Electrical power savings was indicated by 93% of the respondents while the smallest was on signal distribution which was 20%. Generally as shown in table 2.3.4 CSPs considered that the introduction of DTT has reduced their operational costs though in varying degree. However, two of the CSPs considered that DTT

has increased their operational costs because of the amount connection fees currently being charged by MUXO. It was said that when coverage of the country increases, then the economies of scale should enable MUXO to reduce fees. On the other hand CSPs were worried that they may fail to service expanded coverage by MUXO if connection fees remain at the same level.

Table 2.3.3: Area type and corresponding number of CSPs (From table A2.6 in appendix)

Area	Number of CSPs	Percentage of total CSPs (15)
Electrical power	14	93%
Other running costs	10	67%
Administrative costs	9	60%
Number of employees at the CSP	3	20%
Signal distribution	3	20%
Did not have effect since the company was already broadcasting using digital	0	0%

Table 2.3.4: Percentage for which DTT has reduced operational costs for CSPs

CSPs	% reduction of operating costs
AGAPE TV	33
CAPITAL	50
CHANNEL 10	**-250**
CTN	75
DTV	75
EFATHA	2
MLIMANI TV	10
STAR TV	35
TBC1	**-100**

Note: Negative values means operational costs have increased

2.3.2 Expectations

The consultative meetings, seminars and workshops and publicity campaign for migration from analogue to digital terrestrial TV broadcasting had made the content service providers to expect different attribute in their business and delivery value chain. The study therefore wanted to establish if their expectations for going digital and the degree to which they were met. Furthermore, to assist the Authority in its planning process for DTT it was of interest to know the future plans of different CSPs. Their responses in these regard are presented.

2.3.2.1 Increasing number of TV channels by CSPs

The surveyed CSPs were asked if they had plans to increase the number of TV channels and the type of services to be provided. Most of the respondents either did not respond to this question or were reluctant to do so. Of the five that indicated interest to expand TV channels, Star TV planned to have the largest increase of 10 TV channels as shown in figure 2.3.7. The others that plan to have extra channels are: AGAPE TV, CLOUDS, ITV and EATV. The type of

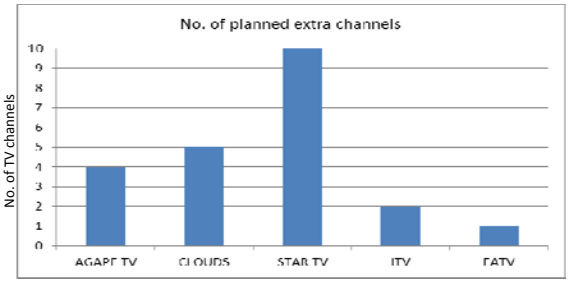

Fig. 2.3.7: The number of extra TV channels planned by CSPs

services to be provided in the extra channels is given in table 2.3.5 that will be a mixture of FTA and pay-TV with exception of ITV that will be pay-TV only.

Table 2.3.5: Comments if all channels will be FTA

CSP	Comments
AGAPE TV	• 3 channels FTA • 1 channel Pay TV
STAR TV	• 50% - FTA (e.g. education programs and BBC) • 50% will be paid channels (like movies, sports
ITV	• 2 pay TV
EATV	• Undecided (i.e. Pay TV or FTA!!)
CLOUDS	• Mixed (ratio to be determined)

The CSPs who indicated that they had no plans to increase the number of TV channels gave reasons for that. Figure 2.3.8 summaries those reasons. The main constraint factor was the

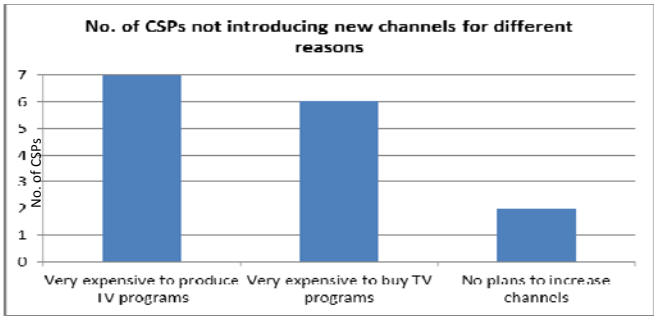

Fig. 2.3.8: Number of CSPs for different reasons for not introducing additional TV

cost of production of TV programmes followed by that of purchasing the same.

2.3.2.2 Support of Local Content Production by CSPs

The different methods that the CSPs are/will be supporting local content production are as listed below:

- Broadcast local contents;
- Partnership with local producers (for commercial purpose);
- In-house TV shows;
- Buying local content from local producers;

- Produce local contents in their studios;
- Produce religious local contents;
- Advocate establishment of training centre for local contents production, although there is funding problem and hence needs some support from other stakeholders. If this is successful, it will create jobs for young people;
- Provide technical support to local producers in terms of access to equipment, production procedures, providing allowances, editing at ITV studio;
- Contract with local cultural groups to enter into partnership like Bongo search, Tikisa, etc to nature talents;
- Contract with local film producers; and
- Build a big studio for local content production which will reduce the production costs.

However, it is worthwhile noting that one CSP thought that it is difficult to promote local content production due to:

- High cost to produce local contents;
- Most local partners dishonour contractual agreements with CSPs; and
- Popular artists prefer CSPs with wide viewership to increase chance for securing lucrative advertisement contracts.

2.3.2.3 Added Value Services Provision by CSPs

AGAPE TV, CAPITAL, ITV, EATV, CLOUDS, STAR TV and TBC CSPs have indicated that they are planning to provide added value services like VoD, pay-per-view, Home shopping, mobile TV and weather forecast. However, some of those not planning to do so claimed that:

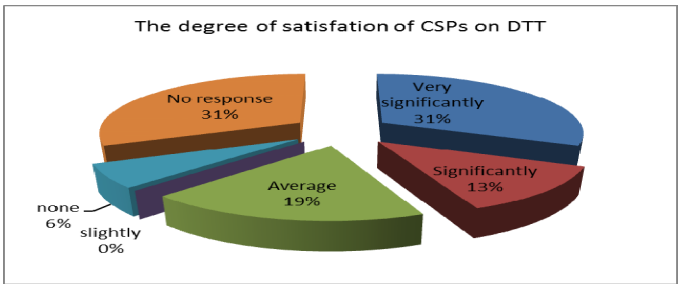

Figure 2.3.9: The degree of satisfaction of different CSPs by DTT

- Digital system itself is not yet stable;
- Have not seen those opportunities;
- They are planning to first improve the existing services before embarking on introducing added value services; and
- They are still studying the options available.

2.3.2.4 Perceived Satisfaction of Expectation on DTT by CSPs

When promoting the introduction of DTT in Tanzania, there were a number of benefits to CSPs that were being advocated. Hence, CSPs when going digital they had certain expectations. It was therefore essential to establish the extent to which such expectations were met. It can be observed from figure 2.3.9 that 31% of the CSPs consider that their expectations when

changing to digital terrestrial broadcasting were very well met and in general 63% of them are satisfied. However, 31% chose not to respond to this question although when considering other indicators to which they responded earlier on it is clear that they all realized benefits by switching to DTT. 6% of the respondents claimed DTT has not made any difference to them.

On satisfaction of DTT some of the CSPs claimed that:

- They were not well prepared to go digital
- They realized that they needed to invest heavily on content
- The number of TV viewers has decreased by about 50% probably had not bought decoders and there was not enough education on moving from analogue to digital terrestrial TV broadcasting.

2.3.2.5 Views of CSPs on MUX Services

CSPs had the following comments regarding MUX services:

- MUX should increase the transmitters power;
- It was improper to give CSP a MUX license;
- There should be a universal decoder used by all MUX operator so that consumers use a single decoder;
- Cost of decoders is too high for a significant number of potential consumers which reduced viewers;
- MUX should attend customer complaints promptly and be in all regions;
- Improve the quality of signal by addressing over-compression issues;
- Improve the signal strength at receiver side for better picture reception;
- Hold discussions with local content producers to determine how to reduce their content costs;
- Improve infrastructure for joint production of local content;
- Increase visibility (reception) where it matters commercially;
- All MUXs are commercial and are driven by quick returns on their investment hence there is need to establish PMUX in order to reach areas with no business case;
- MUX connection fees are too high, should negotiate with CSPs. For example one claimed to use about 2 million Tshs/month while another 2.8 million during analogue broadcasting to run a single site which is about a third of what is being charged by MUX;
- It was a good thing to have removed transmission role from CSPs;
- There are should be different rates charged to commercial CSPs and non-commercial CSPs; and
- Having many MUXs is counterproductive and a burden to CSPs due to duplication of efforts.

2.3.2.6 Views of CSPs for TCRA and Government

Comments to the government and TCRA regarding ASO were as follows:

- It was a wise decision to have digital broadcasting since it has improved the quality of many CSPs offerings, their visibility and number of channels;

- Time for ASO was too short;
- There should be one decoder for all MUX using a smartcard similar to phones since need for many decoders per consumer to access different MUX is nuisance to them;
- Give more education to people regarding digital broadcasting;
- Content producers should be supported by say removing or reducing taxes on content equipment;
- Facilitate meetings between broadcasters to enable them give the same message to consumers;
- Have head-end in every region;
- TCRA revisit the way they issue licenses; and
- TCRA and government should have a policy to enable people to have TV services all the time.

2.3.2.7 Comments on other expectations by CSPs

CSPs additional comments on digital terrestrial TV broadcasting were as follows:

- There has been under estimation on the work needed to preparing for entry to digital broadcasting;
- DTT has enabled huge gain in picture quality and being in same platform;
- Competition for consumers has increased;
- DTT has opened up more business opportunities;
- Local content producers need to improve standard of their products to extend its market;
- Use fibre optic to distribute signal to MUX instead of microwave;
- There is need for mindset change to maximize the digital potential in business; and
- TCRA should monitor to ensure that MUXs follow the agreed rollout plans.

2.3.3 Challenges

Whenever new systems are introduced challenges are expected. It is for this reason that East African Communication Association (EACO) decided to move forward the ASO date to 31st December 2012 so that it is possible to learn from challenges arising from ASO and develop means to address them well before the ITU deadline of the 15th June 2015. This study

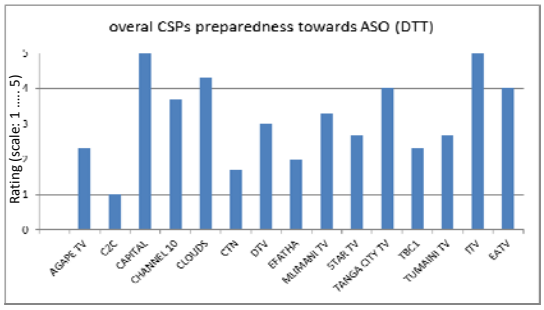

Fig. 2.3.10: The degrees to which CSPs were prepared to enter into digital

therefore looked at the challenges that CSPs claimed to be facing during and after ASO and the whole process of migration from analogue to digital terrestrial TV broadcasting.

2.3.3.1 CSPs Preparedness Towards Entering DTT

CSPs had been complaining of hardship after ASO. Hence, it was prudent to see the extent to which they had prepared themselves for entry into DTT. Fig 2.3.10 shows that there were very big disparities in terms of preparedness of the different CSPs to switch over from analogue to digital terrestrial TV broadcasting. It is clear from the figure that Capital TV and ITV were the most prepared while C2C was the least prepared. The average for all CSPs considering all three categories of investment, technical and operational expenses aspects was relatively weak. Only 53% of the CSPs rated their preparedness at or above average. Figure 2.3.11 shows that investment was the main challenge since 60% of them were not prepared and only 20% were very well prepared.

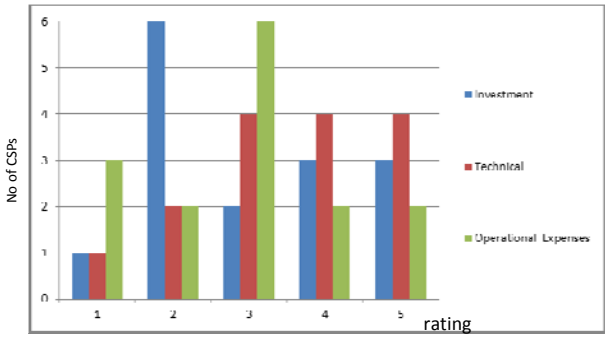

Fig. 2.3.11: Number of CSPs ratings for degree of preparedness for different

2.3.3.2 Reasons that Made CSPs Fail or Delay to Join MUX

It was observed that a large number of CSPs did not join MUX prior to ASO as indicated in figure 2.3.1. Hence, it was of interest to find out the principal reasons behind the observed delays. Those CSPs that responded attributed the delay primarily to technical reasons followed by the tough conditions including costs imposed to them by MUX operators as shown in table 2.3.6.

Table 2.3.6: Reasons why CSP did not join MUX immediately after ASO

CSP	Reasons				
	Cost for joining were high	I didn't know what to do	I did not make any effort	MUX had tough terms	Technical reasons
C2C					√
CAPITAL					√
CLOUDS				√	√
EFATHA	√			√	
MLIMANI TV				√	
TBC1					√

Comments given by CSPs regarding conditions given by MUX delayed CSP to join them are given below:

- Transmission fee only being too high;
- Requested by MUX to switch off analogue before the deadline set by TCRA;

- Public broadcaster should not pay and was not ready to pay since was to be carried by all platforms including MUX operator while it costs the broadcaster to produce content for

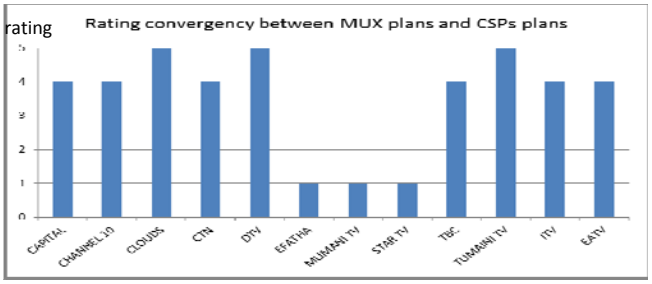

Fig. 2.3.12: Rating of convergence between MUX Operator rollout of digital infrastructure plans and the CSPs plans to expand their

which is not paid for by users (i.e. carriers). Hence, it is MUX who should pay this PSB particularly for pay services offerings;

- Public broadcasters have obligation to provide services everywhere many of which have no business case;
- MUX require pre-payment before CSPs generate income;
- MUX prohibiting its customers using services of another MUX;
- MUX demanded arbitration to be done in London;
- MUX demanded a set of advertisement to be broadcasted freely; and
- Required to send signal to two places.

2.3.3.3 Correlation between MUX Rollout Plan and those of CSPs

Figure 2.3.12 shows the individual CSPs ratings on degree of convergence between different MUX operators rollout plans and that of the CSPs. It clearly shows that 80% of the CSPs are comfortable with the work done by MUX operators so far in rolling out digital terrestrial TV broadcasting in relation to their own plans to reach its consumers. For some DTT has opened

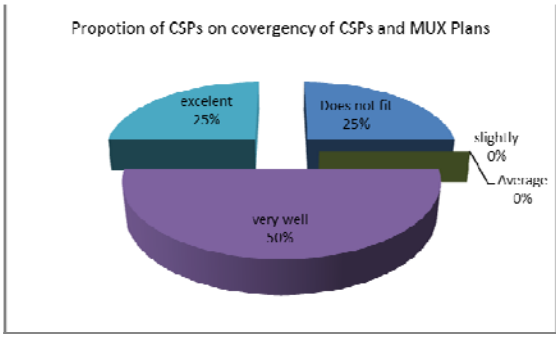

Fig. 2.3.13: Proportion of CSPs regarding the degree of matching their plans to expand service areas in relation to MUX rollout plans

up higher degree of access than it was previously possible with higher degree of clarity in terms of sound and picture. Figure 2.3.13 shows that 50% are highly satisfied which is comforting when compared to the complaints by MOAT at the beginning of ASO.

2.3.3.4 Factors Limiting CSPs Service Areas

The survey wished to establish why some of the CSPs were not in all services areas with digital presence. The CSPs responses are detailed in table 2.3.7. The dominant factor was license limitations followed equally by capital limitations, not being priority areas and none completion of SLA with MUX.

Table 2.3.7: Reasons which prevents CSPs to be available in all towns which have digital presence

CSP	Non- completion of SLA and MUX	Not priority areas	License does not allow	Capital does not allow for the time being
AGAPE TV				√
CC		√		
CLOUDS		√		√
CTN			√	
EFATHA	√		√	
MLIMANI TV	√		√	
TUMAINI TV			√	√

The CSPs claimed that the conditions laid by MUX to them were not acceptable. The connection fees were too high compared to what they were using during the analogue era.

It is worthwhile to note that a number of CSPs are being served by more than one MUX operator, but they have SLA with one of them only. Some expressed that it was a problem to enter into agreement with all MUX operators considering the financial implication. They also wanted assurance of MUX capability to monitor services provided.

The problem of unacceptable clauses has been pointed out as a big hindrance to completion of SLAs with MUX operators besides connection fees; see table A2.11.

2.3.3.5 Problems that CSPs Faced Regarding MUX Services

CSPs claimed that they were facing the following problems in relation to services they received from MUXs Operators:

- Technical failures;
- Lack of uniform coverage (removal of blind spots) in service areas;
- Frequent interruption of TV programs and freezing of picture and sound;
- Reported problems not attended promptly although they were solved in the end;
- Poor communication with MUX when changing their services;
- Instructions by phone only while written instructions are required to initiate action within CSPs;
- MUX use satellite instead of that sent from studio hence degrading signal quality; and
- MUX operators over compress signal.

However, the problems faced by AGAPE TV, ITV, EATV, CAPITAL, CHANNEL 10, CTN and DTV were addressed in their SLA contract with MUX**.**

It was suggested that TCRA should monitor the quality signal transmitted by MUX.

2.3.3.6 Regulatory Issues

Matters related to CSPs knowledge of the regulations governing digital terrestrial TV broadcasting the migration process from analogue broadcasting system was included in the study. The response of respondents showed that 73% of the CSPs had knowledge of the regulations. These were AGAPE TV, CAPITAL, CHANNEL 10, CTN, EFATHA, STAR TV, TANGA CITY TV, EATV, TBC1 and ITV. Some of the CSPs namely CAPITAL, CHANNEL 10, STAR TV, and TBC1 claimed that they observed limitations in the regulations when they started providing digital broadcasting services.

The following additional comments were made by CSPs on regulations to improve the process of migrating from analogue to digital:

- 60% content is considered unrealistic to achieve. It is not easy to get local content in English;
- Reduce regulations to make broadcasting business more liberal;
- Let the market determine the direction of business;
- Existing regulations favour private broadcasters for the contents which endanger the country security. Public broadcaster has to respect regulations;
- Penalty is small for seditious materials that endangers country's security; and
- Connection fees should be affordable depending on the nature of business.

2.3.3.7 Comments by CSPs on How to Improve the Services they Offer

- The infrastructure for producing local content is very weak and TCRA should find means to educate local content producers;
- Review national licenses terms;
- Encourage broadcasters to be seen nationally;
- MUX should implement their roll out plan quickly;
- If AZAM approach is used, it can be a killer for the digital terrestrial TV broadcasting at this crucial stage. It is certain that AZAM will stop the promotion offers when DTT collapses. TCRA need to protect DTT investment until it reaches a competitive stage with other platforms;
- Stakeholders views (CSP) should be taken care;
- TBC does not support the suggestions of level playing ground with commercial broadcasters since their obligations are different;
- Acquisition of frequencies need to be more transparent;

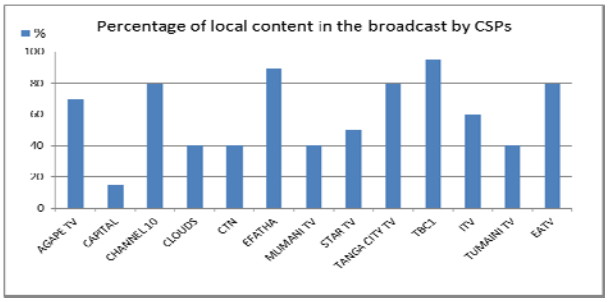

Fig. 2.3.14: Percentage of CSPs local content in their TV

- Reduce decoders prices;
- Reduce the tax of content production equipment;
- Set up an education scheme for content production; and
- Before ASO, make sure people have received the announcements of ASO.

2.3.3.8 Local Content in CSPs Services

Figure 2.3.14 provides claim by different CSPs on local contents in their programmes in terms of percentage. It was however clarified that this percentage was only applicable to prime time since after midnight the stations are either hooked to foreign news channels or to music. This information was seen as being rather subjective to show that CSPs are meeting governing laws, hence there is need to be cautious when using it.

Comments on contributing factors to the failure of CSPs to meet statutory percentage of locally produced contents of 60%:

- The English broadcasting channels claimed that there are no local contents in English;
- The local content costs relatively very high to purchase unless prepared in partnership; e.g. local content costs between Tshs 2.5 -5.0 million for half hour programme compared to Tshs 1.0 million;
- Many raw local content are claimed not to be suitable for television viewing;
- Mlimani TV which is more of a laboratory for students depend on students to prepare local content;
- Local content supply is very low, quality and theme are poor, and price is too high compared to foreign content;
- Producing local content is comparatively very costly (about 4 to 6 times more expensive); and
- Local producers have low technical capabilities.

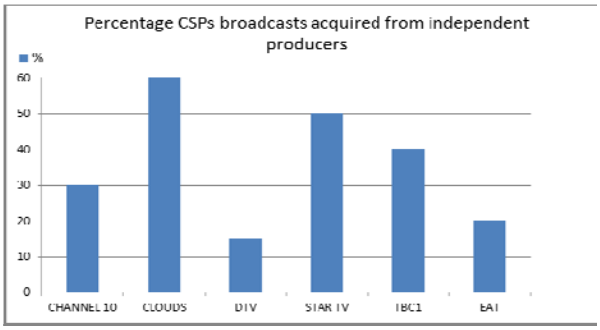

Fig. 2.3.15: Percentage of CSPs local content in their TV

Only 43% of the CSPs purchase programmes from local independent content producers. The CSPs are: CHANNEL 10, CLOUDS. DTV, STAR TV, TBC1 and EATV. Figure 2.3.15 shows the claimed percentages.

2.3.4 General Comments and Observations by CSPs

2.3.4.1 Interoperability and Cost of decoders

- The CSPs interestingly were for single set-top-box. There was a call by CSPs to use of smart card to lock different contents rather than the current practice of using different decoders since they believe it is a cheaper solution. The major reason for advocating single decoder being to increase number of viewers. It was claimed the current decoder prices inhibit the rate digital take-up by low income community, although it is not the only factor. However, none of the CSPs could quantify the 'affordable decoder price'.

2.3.4.2 CSP – MUX SLA and Charges

- The conditions in SLA given by the MUX to CSPs do not satisfy the not discriminatory requirement.
- CSP believe that SLA should be designed by both parties (MUX and CSPs) and not MUX as it is now.
- Most CSPs consider the charge by the MUX operators to be prohibitive. It is claimed that during analogue era CSPs were spending between USD 600 and USD 1,700 per month which is much lower than the set rate of USD 3,800 per month being charged by MUX.
- The monthly transmission charge of USD 3,800 per service area is a hindrance to start-up CSPs.
- Some CSPs think that it would have been better to have a single MUX to reduce the costs for CSPs by sharing the costs (economies of scale).
- Regional CSPs run by municipalities were not conversant with digital broadcasting issues which hindered timely migration to DTT. Also, they claimed that:
    - Their station was non-commercial and had not expected to be charged commercial rates like commercial stations.
    - Their service area is small not justifying the USD 3,800 being charged.
- CSPs considered all MUX operators to be commercial and request if a non-commercial MUX operator could be introduced.

2.3.4.3 Mind – Set Change

- It was argued that mind-set shift is also necessary and negative sentiment publication or broadcast will not help CSPs in rate of increasing viewers.
- The introduction of digital broadcasting was commended by some of the CSPs since it increased reach, improved delivered images and sound, and removed the hustle to run transmitters. However, they desired to see improvement in freezing of picture.
- A CSP acknowledged TCRA efforts and believe that viewership will increase time due to the better reception quality in digital as compared to analogue. The negative response was attributed to human nature of opposing any changes.
- CSPs noted that it was human attitude of opposing any changes whether it is positive or negative change

2.3.4.4 Viewership

- It is claimed that viewership was halved in Dar es Salaam just after ASO but the claim could not be verified with data.
- Most CSPs have claimed to experience sharp decline in their income as a result of reluctance by advertisers to use TV and go for radio and newspapers as a result of fall in the number of viewers.

2.3.4.5 DTT Publicity

- The CSPs considered the promotion of digital migration to be the role of the Authority to the detriment of drop in viewers at the time of switch off of analogue transmitters. This was unfortunate since they are the major stakeholders and beneficiary in the broadcasting business where they could have influenced better the transition.

2.3.4.6 Content

- Most CSPs were coming to terms now that their role is in providing contents and they need to focus more in terms of resources and investment since the one with attractive content shall dominate the business.
- There was little collaboration among CSPs to minimised production costs of local content. It is approximated that local movies and episodes (drama, comedy, etc) is about three to five times more costly than purchase from outside. The same goes for purchase of local movies. It is claimed that most local movies are not suitable for TV broadcast and quality is also a problem.
- Regional CSP observed that although there were many programmes but they were all foreign and would wish to see increased inclusion of local programmes and local movies.
- CSP realized potentials in digital and the need to improve contents quality to make them more attractive content to dominate the business.

2.3.4.7 Other Issues

- CSPs are stack with Absolute Equipment (Analogue Transmitter) and wondered if they could be compensated?
- Must Carry Policy: CSP consider review of must carry policy.

2.4 Multiplex Operators' Survey and Findings

Three MUX operators were licenced by the Authority to provide network facility services (i.e. to aggregate contents from different CSPs and to transmit them in accordance with their licenced service areas. The MUX operators presented convincing rollout plan which made them win the competitive tenders. The MUX operators had therefore obligations and responsibility to CSPs and to consumers while themselves having DTT business expectations. In realising their plans the MUX operators may have faced a number of challenges that could have made them fail to fulfil their obligations. The study therefore wishes to determine to what extent they have met their obligations, the challenges they experienced and opportunities that DTT may have created in their business.

There are only three MUX operators in Tanzania. Therefore, the issue of sampling was not applicable here. Each MUX was interviewed by a panel of interviewers that had telecommunication and broadcasting knowledge. The interviewers had a questionnaire that was used to guide the interview process that they completed to reflect the respondent opinion and position on the different issues. Data on operations and performance were also collected.

The findings provided by the respondents are provided here under.

2.4.1 MUX Operator Achievements on DTT

The respondents self-assessment on the extent to which they have met their target and their obligation to different DTT stakeholders are presented in the sections that follows.

Table 2.4.1: Service Areas that MUX Operator have rolled out Digital Infrastructure and technology used

Town / City	MUX / Technology	Star Media (SM)		Agape Associates Ltd (AAL)		Basic Transmission Ltd (BTL)
		DVB-T	DVB-T2	DVB-T	DVB-T2	DVB-T2
Dar es Salaam		√			√	√
Dodoma		√		√		√
Mwanza		√		√		√
Arusha		√		√		√
Mbeya		√		√		
Tanga		√		√		
Moshi		√				
Morogoro			√			
Musoma			√			
Kigoma				√		

2.4.1.1 Areas with digital Infrastructure and technology used

Star Media, Agape Associates Ltd and Basic Transmission Ltd have rolled out digital infrastructure in 10, 7 and 4 towns respectively as shown in Table 2.4.1. In Dar es Salaam, Dodoma, Mwanza and Arusha all three MUXO have rolled out their Digital Infrastructure.

Figure 2.4.1 shows the number of towns that MUX Operator have rolled out Digital Infrastructure and technology they used (i.e. Digital Video Broadcasting - Terrestrial (DVB-T) or Digital Video Broadcasting - Terrestrial Second Generation (DVB-T2)). It can be seen that Star Media and Agape Associates Ltd have mostly used DVB-T technology while Basic Transmission Ltd used DVB-T2 only. Since the receiver antennae have high directivity to optimise reception gain, the location of transmitter sites against consumer location is significant. Table 2.4.2 shows the location of the different transmission sites for different MUX operators in different

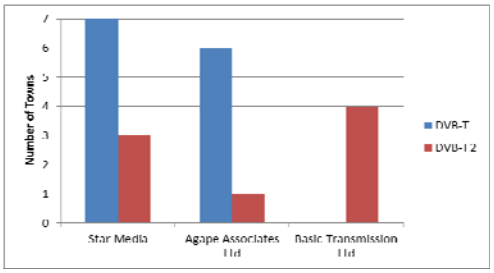

Figure 2.4.1: Number of towns where MUX have rolled out Digital Infrastructure and Technology used

towns/cities.

2.4.1.2 Number of TV channels offerings and categories by different MUX Operators

Table 2.4.3 shows the number of TV channels offerings and categories of services by different

Table 2.4.2: Transmission sites where in different towns for different MUX operators

Town / City	Transmission Sites			
	Star Media		Agape Associates Ltd	Basic Transmission Ltd
Dar es Salaam	kisarawe	Makongo	Kisarawe	Mikocheni
Dodoma	Imagi		Imagi	Imagi
Mwanza	Nyashasha		Kawekawe	Nyashana
Arusha	Themi		Themi	Themi
Mbeya	Kawetere		Kawetere	Kawetere
Tanga	Mkanyageni		Nguvumali	
Moshi	Mabungo hill			Mabungo Hill
Morogoro	Kolla hill			
Musoma	Mkendo hill			
Kigoma			Mlole	

MUX Operators. It can be seen that among of the three MUX operators, it is only Star Media which offers a mixture of Freeview and Pay-TV channels. It is worth to note that Freeview for Agape Associates Ltd and Basic Transmission Ltd will end in December 2013. Hence, the current status is for promotional purposes only. It is expected that they will all follow the Star Times model of operation after December 2013.

Note that interoperability is constrained by:

- Technology incompatibility between DVB-T and DVB-T2 since DVB-T is not upward compatible;

- Antennae directivity (transmitters sites in different locations);
- Operators' willingness to cooperate did not appear to be there (business issues); and
- Encryption technology used; each MUX uses a different technology.

Table 2.4.3: Number of TV channels offerings and service categories by different MUX Operators

MUX Operator	No. Of Channels			Comments
	Any Decoder	Freeview	Pay-TV	
Star Media	0	7	43	
Agape Associates Ltd	40	0	0	FTA compatibility; not in DSM (DVB-T2) and FTA will be until Dec 2013
Basic Transmission Ltd	5	16-DSM, 3-(DOM, MZA, AR)	0	Freeview ends Dec. 2013

The MUX operators complained that there were vendors selling decoders for FTA and they were not supporting the move because they think it can reflect badly on them if the vendors do not provide support services.

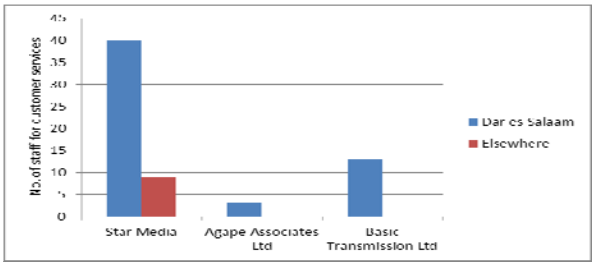

Figure 2.4.2: Number of staff for customer services in DSM and

2.4.1.3 Customer Service and Technical Support Services by MUX

The survey planned to establish the extent to which MUX offered Customer and Technical Support Services to its consumers. The survey found that all three MUX offers these services at different degree.

2.4.1.3.1 Customer Services

Customer service hours for Star Media were 9; while that of Agape Associates Ltd and Basic Transmission Ltd was between 13 hours.

The number of staff for customer services for Dar es Salaam and elsewhere for the three MUX were as shown in Figure 2.4.2. Star Media was leading in this aspect where it employed more than twice the combined total for the other two MUX operators.

2.4.1.3.2 Technical support

For technical support services, Star Media had 150 staff countrywide; Agape Associates Ltd had 7 staff in Dar es Salaam and 6 staff elsewhere; Basic Transmission Ltd services had 7 technical staff and all are in Dar es Salaam.

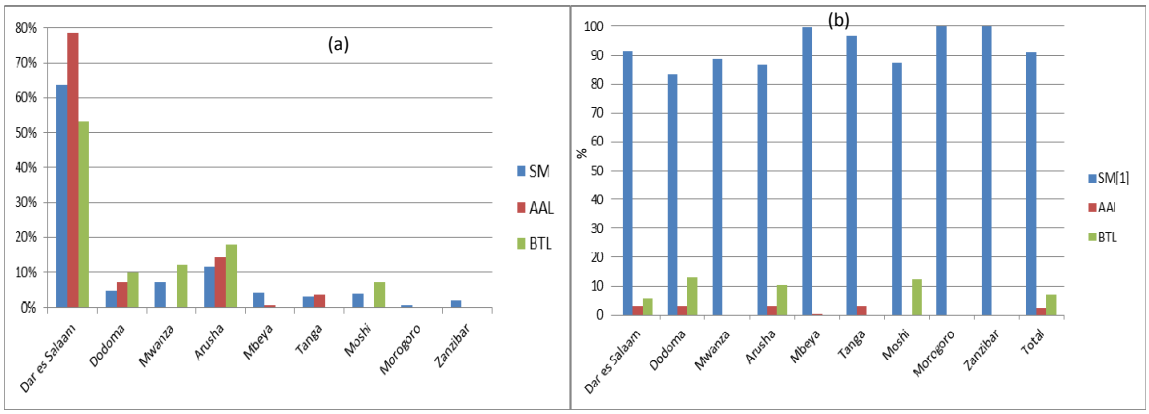

Fig. 2.4.3: Percentage of (a) own total decoders in different Towns (b) total decoders in respective towns for the three MUX Operators

2.4.1.4 Number of decoders connected by MUX

Table 2.4.4 shows the percentage of own MUX operator decoders in different towns for different MUX Operators. All the three MUX operators have most of their decoders installed in Dar es Salaam. Figure 2.4.3 (a) shows comparatively the percentage of MUX operator own

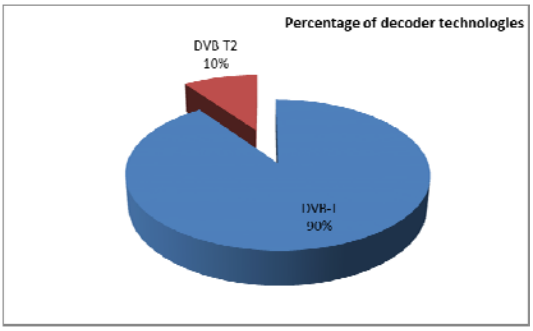

Fig. 2.4.4: The ratio of decoders with consumers for the two technologies DVB-T and DVB-T2

decoder in different towns/cities and figure 2.4.3 (b) that against total number of decoders in the different towns/cities for the different MUX operators. Figure 2.4.3 (b) shows the dominance of Star Media over the other two MUX operators in every town/city and in total which is between 84% and 97% for towns where the three MUX are present and 91% overall. Figure 2.4.4 shows that 90% of all decoders with consumers are of DVB-T type hence strongly dominating in the market. This has strong implications in the migration to DVB-T2.

2.4.2 MUX Operators Expectations on DTT Business

It was of interest to know MUX plans for the coming two years. The responses in this regard which are presented below would assist the Authority in planning DTT issues.

2.4.2.1 Number of Additional Service areas

Number of additional service areas to be provided by Star Media and Agape Associates Ltd are 5 and 6 respectively. These two MUX intends to reach all 26 regional headquarters but considers that many of the towns do not offer business cases. Basic Transmission Ltd did not respond to this question.

2.4.2.2 Employment

All MUX operators plan to create employment opportunities in the coming two years. Table 2.4.5 shows the number of planned employment for each category. It is shown that Star Media plans to have by far much more employees compared to other MUX operators. Star Media was not specific on number of employees in Customer service category as the number expected is to be customer base dependent.

Table 2.4.4: Percentage of MUX own decoders in different cities / towns for different MUX Operators

Town / City	Star Media	Agape Associates Ltd	Basic Transmission Ltd
Dar es Salaam	64%	79%	53%
Dodoma	5%	7%	10%
Mwanza	7%	-	12%
Arusha	11%	14%	18%
Mbeya	4%	1%	-
Tanga	3%	4%	-
Moshi	4%	-	7%
Morogoro	1%	-	-
Zanzibar	2%	-	-
Total	***100%***	***100%***	***100%***

Table 2.4.5: Future plans for employment categories by MUX

MUX	Employment category		
	Technical	Customer service	Others
Star Media	40	Customer base dependent	570
Agape Associates Ltd	50	6	60
Basic Transmission Ltd	21	18	18

2.4.2.3 Number of TV Channels and Service Types

Star Media and Basic Transmission Ltd plans to have a mixture of FTA and PAY-TV channels. For Star Media, 86% will be PAY- TV channels while 14% will be FTA channels. For Basic Transmission Ltd 57% will be PAY- TV channels while 43% will be FTA channels. Agape Associates Ltd did not respond to this question.

2.4.2.4 Added Value Services

All MUX operators plan to have added value services. Basic Transmission Ltd plans to have a bigger number of added value services (VoD, Pay per view, Mobile TV and Radio) while Star Media and Agape Associates Ltd indicated that they will offer VoD only.

2.4.2.5 Number of Decoders to be imported

For the coming two years, Star Media plans to import 1,500,000 decoders while Basic Transmission Ltd 300,000 decoders. Agape Associates Ltd did not respond to this question.

2.4.2.6 Awareness of and Opinion of MUX Operators on Digital Broadcasting Regulations

All MUX operators said they were aware of digital broadcasting regulations. Regarding regulations shortcomings, Star Media and Agape Associates Ltd admitted not to be aware of any regulations shortcomings while Basic Transmission Ltd did not respond to this question.

2.4.2.7 Comments by MUX Operators on Areas that Needs Regulations to Improve the Process of Migration and to Operate in Digital Broadcasting Environment

The following comments were given by MUX operators:

- Consider advocating free-to-view rather than free-to-air.
- Review reservation of 1/3 of MUX capacity for free-to-air.
- MUX Connection fee is too small and cannot cover operational costs.
- Interoperability will be difficult to work because willingness and trust in constructive competition while cooperating are lacking and the different types of encryption in the decoders used by the MUX operators.
- Set network/management fee to be paid by every consumer.

2.4.2.8 Suggestions by MUX Operators to Enable Them Improve the Services They Offer

The following suggestions were given by MUX:

- There is a need for Tax exemption to reduce the cost of decoders to consumers.
- One of the MUX operator considered that there is no need for every MUX to be in all sites but rather to cooperate and share resources.
- TCRA needs to address the issue of promotional offers in different platforms that are meant to create dominance in TV broadcasting business by destroying growth of offering in other platforms since the attractive offers shall stop and costs go up for consumers when the other competing delivery platforms are sufficiently weakened to the detriment of consumers' choices and costs of receiving broadcasting services. Current move by Azam was given as an example.
- Cable service providers provided contents without respecting copyrights (infringing copyright).
- Costs for setting up a DVB-T2 terrestrial site is USD 200,000 when one considers other operational costs the connection fees are low.

2.4.3 Challenges That MUX Operators Face in DTT

It was of interest to know challenges faced by MUX operators during transition from analogue to digital terrestrial broadcasting and operating in digital environment. The findings from the survey are presented below.

2.4.3.1 Duration MUX Took to Start Digital Broadcasting Infrastructure

It was generally observed that MUX operators did not start rollout immediately after receiving licences. Hence the study wished to establish the duration individual MUX operator took to start digital broadcasting infrastructure rollout after getting licence. Star Media took at most three month, Agape Associates Ltd took between three and six month while Basic Transmission Ltd took more than 18 month.

2.4.3.2 Factors that Affected Digital Broadcasting Rollout

It is interesting to note that all three MUX operators conceived that the duration to start rollout was not in line with their rollout plans. The factors that constrained them to meet their rollout obligation and degree their influence in causing delays in rolling out digital broadcasting are shown in table 2.4.6. Environment impact clearance, Tanzania Civil Aviation Authority (TCAA) permit and Tanzania Investment Centre (TIC) Clearance did not have much impact on the delay, but the remaining contributed significantly. It was claimed by one of the service providers that the delays were partly attributed by not getting timely frequency allocation.

For the case of Basic Transmission Ltd, the factors did not have any effect on it because it re-used the sites that were used for analogue TV broadcasting.

MUX operators had following comments:

- One of the operators wondered if it was necessary to always get Environmental Impact Assessment (EIA) reports for re-used since it takes years to get the report.

Table 2.4.6: Factors and degree that they affected digital broadcasting rollout

Factor	Star Media	Agape Associates Ltd	Basic Transmission Ltd	overall
Construction permit	2	4	?	3
Site acquisition	4	4	1	3
Environment impact clearance	1	3	1	2
TCAA permit	?	1	1	1
TIC Clearance	2	1	1	1
Port Clearance	4	4	1	3
Electricity	4	4	1	3
Site access road	4	4	1	3

Note that: 1 = None, 2 = slightly, 3 = Average, 4 = Significantly, and 5 = Very significantly

- Some respondents in the MUX operators' survey requested the report to be discrete with the responses they gave in fear of retributions if the information reaches respective officers.
- Delays pointed out in 2.4.3.1 can be attributed to:
  - Limited efficiencies in every level of some of the government agencies;
  - Weak coordination among different government agencies;
  - Acquisition of site for transmitters; and
  - Supplier's failure to meet agreed delivery time frame.

2.4.3.3 Sharing of Infrastructure for Digital Broadcasting

The study wanted to establish problems perceived by the different MUX operators as grounds constraining sharing of infrastructure for digital broadcasting. Table 2.4.7 shows factors influencing and its degree of sharing of infrastructure for digital broadcasting. While Star Media considered tower and antennae infrastructure only as the ones constraining sharing; the other two considered every aspect as being problematic. This can be interpreted as lack of willingness to share infrastructure.

Table 2.4.7: Areas and degree of sharing of infrastructure for digital broadcasting

Area	Star Media	Agape Associates Ltd	Basic Transmission Ltd	overall
Site sharing	1	4	4	3
Co-location (building sharing)	1	4	4	3
Tower sharing	4	4	4	4
Antennae infrastructure	5	4	4	4
Electrical power supply	1	4	4	3

Note that: 1 = None, 2 = slightly, 3 = Average, 4 = Significantly, and 5 = Very significantly.

MUX operators had following comments regarding sharing of infrastructure:

- Let infrastructure sharing be market driven;
- Feasibility for sharing depends on: owner, implementation of rollout plan, rates charged, and policy;
- The willingness to share digital TV broadcasting infrastructure is claimed to be constrained by business relationship and differing business strategies. Also, it was said that ignorance, fear, unregulated transmission power, and possible jamming effects by adjacent transmitters were other factors.

2.4.3.4 Failure Rates for Transmitters

All the three MUX operators admitted the existence of transmitters' failure on monthly average basis which was at most once a month. The failure monthly rates for Star Media, Agape Associates Ltd and Basic Transmission Ltd were 1/6, 1/3 and 1 respectively.

MUX operators attributed failures to:

- Low electrical voltage power supply level in Mwanza and Frequent power interruptions at Kisarawe.
- It was claimed that there is no instability in transmitted power by transmitters and that if it occurred it was a result of technical failure. However, they said that fading may be observed at reception side because of a number of factors that is not under their. These includes: Reception antennae displacement (angular and/or vertical); and land topology and/or building structures.
- Putting gap fillers was not of interest since it was perceived that there was no strong business case to justify additional investment required.

2.4.4 General Comments and Observations by MUX Operators

2.4.4.1 MUX Operators Business Model

- The MUX business models are a reflection and hangover of the analogue model.
- Each MUX operators has associated CSP with pay TV service provision operational or to start soon since they believe that the FTA stations are not able to pay the transmission charges.
- They claimed that CSPs were not paying transmission fees although some of the CSPs say they were paying while others were doing butter trade.
- MUX were very uncomfortable with the requirement of availing a third of their frequencies channel capacity for FTA. They desire to use it for their associated CSP OFFERINGS. This proves that it would have been difficult to offer FTA service without that requirement in the regulations.

2.4.4.2 MUX Charges to CSPs

- MUX operators believe that the monthly charge to CSPs is not enough to realise Return on Investment (RoI)..
- The MUX do not consider the channels used for pay TV by associated Pay TV companies as being equal source of revenue for running the MUX like that of rented out space to CSPs. E.g. BBC and the like are carried but not paid for directly.

2.4.4.3 MUX Mandatory Charge to all Consumers

- MUX would like to see all users of TV pay something on monthly basis.
  - MUX are concerned on the percentage decrease of those with decoders paying for additional channels compared to the period before switch off of analogue TV. However, this is explainable. This is likely to decrease the infrastructure rollout pace.
- One of the MUX is worried that her business is collapsing since she is receiving nothing from CSP.

2.4.4.4 Decoders

- MUX are not happy with the FTA decoders being sold by independent vendors.
- Two of the three MUX would wish to have shared set-top-box where a smart card is used for the different encryption systems used.
- MUX wish to get tax relief for decoders and equipment to improve chance of faster RoI.
- Some of the MUX operators consider selling of decoders as their business.

2.4.4.5 FTA

- Some MUX consider FTA will kill their business since those FTA channels are KISWAHILI channels which are the only channels needed by majority of Tanzania.
- There was serious concern on reluctant of CSP signing any agreement (SLA) with them while the MUX operators are supposed to transmit all national licence FTA channels for free.
- Some of complain were directed to TCRA arguing that the regulator should facilitate fair business competition to all MUX by assigning fairly and timely transmission frequency.

3 Analysis

The analysis is aimed at assessing the extent to which the different stakeholders in the television terrestrial broadcasting value chain fulfilled its mandate or obligations and its impact, where applicable, to other players in the value chain. It also looks at the facts and compare with claims of different players /key stakeholders.

3.1 The Authority

The Authority had the obligation and mandate on behalf of the government to prepare enabling environment, including level playing ground of different actors, for migration from analogue terrestrial TV broadcasting to digital terrestrial TV (DTT) broadcasting and operation in DTT environment. It was necessary to understand the impact, if any, on what the Authority had done in preparing the different players and in creating enabling environment for the migration process and ASO. The Authority had also the obligation to monitor the progress of the process itself, provide education and information to all the stakeholders. It was of interest to understand if these had any impact.

3.1.1 Involving Stakeholders in the Migration Process#

The study indicated that the stakeholders were reasonably well involved in the process of migration from analogue to digital TV broadcasting from early stages of preparing the environment for the migration process through engagement in the two public discussion documents (PCD) of 2005 and 2006 where the views of different stakeholder which were in the first PCD of 2005 were seriously evaluated and incorporated in the second PCD of 2006. The annual broadcasting conferences since 2005 provided a very solid ground for dissemination of DTT information and an environment for exchanging experiences. Furthermore, the frequent meetings that involved CSPs, MUX operators, National Technical Committee on Digital Broadcasting provided yet another avenue for smooth migration process.

3.1.2 The DTT Legal Framework

The Authority had put in place the necessary legal framework to ensure proper and smooth operation the migration process and operation in DTT environment. These included different policies, applicable law and its regulations. The legal framework addressed reasonably well the migration process and ASO. The smooth operation of ASO and the dual illumination were facilitated by the legal framework that was in place.

There appeared to be a reasonable success in the migration process in Tanzania so far. This can to a large extent attributed to the clear separation of obligations of different players in the DTT value chain in the legal framework.

3.1.3 The CSPs and MUX Operators Interests

The Authority provided enabling environment that brought together the CSPs and MUX operators to discuss and agree on different issues of interest to them and the migration process as a whole. The controversial issues for CSPs were:

- Separation of content preparation and the transmission aspect (hangover of analogue operating environment).

- MUX operators had business model in mind reflecting the analogue model of content provision and transmissions service contrary to the envisaged DTT operation environment that separated the two.

- The Authority conducted a study and had set maximum transmission fees chargeable to CSPs by MUX operators. However, the contention started when its implementation started.

- The Authority provided information to these key players on concept of dual illumination and costs involved. However, it was misconceived and was only understood after ASO that it meant CSPs to meet MUX operator transmission costs and that of running own transmitters.

- During PCD discussions consequence of having three MUX operators were not realised. The complications at a certain extent started to be realised after CSPs stated to connect to MUX operators. The envisaged benefit to consumers of creating competition is not so far apparent.

3.1.4 Consumers Interest

The Authority provided education and information to consumers on DTT and ASO for a reasonable time using different media to ensure the intended message reaches the public.

The Authority facilitated dual illumination for a reasonable time that created conducive environment which expedited digital take-up.

Before implementation of ASO in any of the service areas the Authority ensured that there were in place (a) sufficient decoder (b) reasonable coverage by digital signal where there were analogue signal coverage (c) FTA TV channels continued to be available in the digital environment (d) there was tax exemption on STBs (e) there was sufficient public awareness in the intended service area for ASO.

There is a problem of interoperability of STBs due to different entrance time of the MUX operators in the market which resulted in deployment of different technologies that evolved over time. This also was contributed by the fact that the MUX operators started operating before the regulations were in place.

3.1.5 ASO Awareness Campign

The Authority did put a lot of efforts to ensure that stakeholders were sufficiently informed of ASO before its implementation. However, CSPs did not consider it to be their obligation although they are the principal beneficiary of smooth and efficient transition. They looked for broadcasting contract from the Authority primarily.

3.2 The Consumers

The survey results found that 97% of HH in the surveyed area owned a TV, out of whom 97% were acquired before ASO. Moshi Municipality had 100% ownership before ASO compared with other cities and municipals in the ASO area. However, Tanga had the least percentage on ownership of TV because the service area had only TBC and Tanga Municipal Council TV, and that TV reception was poor. The two TV stations could not attract more HHs to buy TV sets unlike other services where there are more than five terrestrial TV stations.

The percentage of HHs with TVs in use after ASO was 89%. Of the remaining 11% of HHs with TVs, 5.5% were not using their TVs because they had not bought decoders yet, 0.3% HHs with TVs was due to poor signal reception, 0.9% were out of order, 0.7% had no electricity, 0.1% were none availability of decoders. Thus, the concern of insufficient or/and unavailability of decoders was not a significant factor hindering uptake of digital broadcasting services. It counted only for 0.1% of HHs that claimed that they were not using the services because decoders were not available. Furthermore, only 3.2% were not receiving DTT because they stated that the prices of decoders were high and therefore out of reach.

HHs that acquired decoders prior to ASO campaign were 35.4% of HHs with TVs in use. Further 29.5% acquired decoders as a result of ASO campaign before switch-off. The remaining 35.1% of HHs bought decoders after ASO. Significantly 64% of all HHs had decoders by switch-off date. This in an indication that majority of people were aware and ready for the switch off and they were using digital broadcasting services already before ASO.

3.3 The CSPs

3.3.1 Coverage and Quality

The coverage and signal quality by different CSPs under DTT is now uniform and has increased as illustrated in figure 2.3.4. Hence, the visibility of different CSPs has increased significantly to benefit of the consumers providing them wider viewership choice.

3.3.2 Operational Costs

There are a number of CSPs that were not visible in all services areas that were receiving TV broadcast during analogue era. However, some of them like those with national licence can now be visible in all services areas covered by DTT. This has implications in operating costs for the CSPs and may appear to be an increased financial burden relative to what they had been spending during analogue era.

A number of CSPs had both radio and TV broadcasts during analogue era and has maintained the radio transmission sites in digital era which negates the impact on operational cost reduction levels.

3.3.3 Number of MUX Operators vs CSPs

From the point of economies of scale, the number of CSPs that were licenced at the time of entering DTT was not enough to meet the operational investment costs of three MUX operators which made the MUX operators to come with the pay-TV business model. To facilitate reduction in the costs to CSPs by MUX operator, there is a need to increase the number of licenced FTA TV channels and subscription services through MUX operator.

3.3.4 Regional CSPs

During phase I of DTT, there is no original CSP connected to the digital platform. There might be various reasons contributing to these including costs and technical. The cost aspect can be attributed to the lower potential advertisement revenue being lower than that required to meet their studio operational costs and transmission fees.

3.3.5 CSPs Competition for Consumers

The uniformity of visibility of different CSPs has resulted in strong competition and distribution of viewership to a particular CSP at any one time. This may attribute to a misconception that the viewership in digital era has decreased.

3.3.6 MUX Transmission Fees

The revenue potential from different services areas is influenced by the economic potential of such areas. Therefore, it is prudent to consider such factors in determining transmission fees.

3.3.7 Conflict of Interest

Some of the CSPs expressed that there were MUX operators that had strong association with a particular CSP hence it was difficult to ensure fair and non-discriminatory service to the rest of the CSPs or for the subscription services. The association is seen as a strong potential source for conflict of interest.

3.3.8 Mind-Set Change was Needed

The introduction of DTT that culminated with ASO was met with reaction from CSPs and sympathies of CSPs views on migration simply because of the natural behaviour of human beings to resist any changes. As it was correctly stated by some of the CSPs; whether the change may be positive or negative there will always be resistance from some quarters. Therefore, given time the public will continue to realise the potentials of digital broadcasting over analogue and may consider that the process should have come earlier than later.

3.4 MUX Operator

3.4.1 DVB-T vs DVB-T2 Decoders

The ratio of DVB-T and DVB-T2 decoders with consumers is 90:10 respectively. Hence, there must a proper and prudent migration plan from DVB-T to DVB-T2 in the interest of consumers. It is essential that such plan should not burden/disadvantage the consumer.

3.4.2 Number of TV Channels

The number of channels now available to consumers under DTT with uniform visibility has increased significantly from a maximum of 15 during analogue era to more than 50 under DTT. Therefore, DTT has facilitated extensive increase in viewers choice of TV programmes. This even strengthens the competition for viewers and misconception of decrease in the number of viewers per station under DTT. Hence, as realised by some of the CSPs there is a need to produce more attractive contents to retain or even increase viewers of a particular station.

3.4.3 DTT Network Rollout

The envisaged network rollout plan by different MUX operators in phase I was not achieved and is not likely to be achieved in the near future because the large number of service areas do not appear to provide business for the MUX operators. Furthermore, the mix of MUX and CSP functionalities is another factor.

3.4.4 Infrustructure Sharing

The survey has indicated that there is no willingness and trust among MUX operators to share infrastructure which could have reduced investment and operational costs. There is no need for all MUX operators to establish and construct new sites, particularly for services areas with low economical potential that has been rated as presenting no business case but rather consider strongly sharing under business arrangements.

3.4.5 Promotional Offers Under Different Platforms

It was expressed that promotional offers under different delivery platform needs Authority intervention to protect the emerging DTT delivery platform. The promotional offers can be conceived as anti-competitive measure that needs control.

3.4.6 Employment

DTT has created additional employment opportunities in the broadcasting sector since most of the CSPs reported to have retained its employees in the analogue era while the MUX operators has engaged a number of employees.

3.4.7 Customer Service and Technical Support

The survey conducted indicates that Agape Associates Ltd decoder distributer Agape TV and one of the Basic Transmissions Limited decoder distributor namely Continental do not have call centeres to attend customers online while the number technicians in relation to their customer base have no correlation; being too low.

4 Observations

4.1 Reduction of Viewers Claim

From the results of this study findings following ASO the viewers traditional viewing landscape changed drastically because they were suddenly having at least 50 TV channels to choose from in comparison with the traditional 3 to 6 during analogue terrestrial TV broadcasting era. It need be understood that although there were 15 TV stations during analogue era countrywide, hardly any terrestrial TV viewer had access to more than 6 TV stations for various reasons including transmission power, transmitters' location relative to that of viewer, landscape surrounding the receiver, etc. Also, when the consumers purchased decoders in Dar es Salaam during ASO they were given access to full package for at least one month. Some of the decoder distributers did that for a longer period.

The viewers therefore wondered into the unknown world of new TV programmes that had contents that were different from what they were used to drifting them away from their traditional channels. The consequence of the new abundance was that a survey done by TV stations or its agent on viewership of its station gave an impression that TV viewership has decreased sharply overall but the actual decline was for the traditional stations through redistribution of viewers. This observation is supported by the fact that 65% of households in ASO areas had decoders before analogue TV transmitters switch off (ASO). When the above is translated to the HHs with TVs that were in use before ASO it is actually over 72%. This figure rose quickly to 91% after ASO.

Note that even when the initial bundle expired for some of the decoder distributors, the viewers continues to have access to at least five TV stations in Dar es Salam with equal degree of visibility and quality. It is thus the role of the CSPs to make efforts to reach and retain their viewers in this new DTT environment which is a sharp contrast with that during analogue. Furthermore, at the time of ASO 65% of all CSPs were visible in the digital platform which included all major TV stations. Therefore, the introduction of DTT and ASO did not deny the citizens access to TV broadcasts and hence information.

The CSPs need to understand that to hold to their viewers with increasing TV stations visibility and increase in numbers on offering they need to be innovative in contents they offer. The competition for viewers and hence related revenue depending on numbers of viewers possess new challenges to CSPs where innovation in the industry shall be the only solution.

The long queues observed in Dar es Salaam just before ASO and immediately thereafter were typical of human behaviour who made new investment for themselves only when necessary. Furthermore, some were sceptical whether ASO would really take place since it is common to extend deadlines.

4.2 Consultation with Stakeholders

Looking at the number of meetings and its forms since 2010, although consultations started in 2005, there was significant number of meetings that Authority had with stakeholders or facilitated to ensure they took place. They included 17 National Technical Committee on Digital Broadcasting (NTC-DB) meetings, 7 meetings involving CSPs, MUXO and the NTC-DB, 8 meetings involving CSPs and MUXO, 6 meetings involving CSPs alone, 7 meetings involving MUXO alone, 5 Steering

Committee meetings and 5 Annual Broadcasting conferences. These numbers are significant by any standard unless there is a crisis, which was not the case.

It is worthwhile noting that the DTT operating environment and the number of MUXOs were obtained through intensive consultation processes through two public consultation documents. The same applied for the EPOCA Act of 2010 and the July 2011 regulation.

Therefore, consultation with stakeholders was sufficiently done since the key stakeholders in the DTT value chain were involved in any planned action by the Authority in line with established legal framework before its implementation.

4.3 Decoders Availability

It was demonstrated that necessary preclusions were taken to check and get satisfied that there were decoders available with consumers and for sale by distributors in a service area before ASO. Table 2.1.1 and Table 2.1.2 attest to this. The consumers feedback further supports this since only 0.1% claimed not to have bought decoders because they were not available and 91% of all HHs that were using their TVs before ASO had decoders. Therefore, decoders availability was not a constraint for consumers to access TV broadcast after ASO despite complaints that decoders were costly.

4.4 DTT and ASO Awareness Campaign

It was very clear that the Authority did put a lot of efforts in informing the community about DTT and ASO using all available communication platforms and media. The impact was that 90% of the respondents were aware of DTT and ASO. Furthermore, it was observed that in some of the service areas up to about 40% of decoders were bought after campaign before ASO. This demonstrates significant publicity campaign impact. It was also observed that the number of TV ownership increased after ASO which is a good indicator of acceptability of DTT delivery by consumers.

4.5 Price of Decoders

All categories of respondents in the digital terrestrial TV broadcasting value chain were of the opinion that the cost of decoders was on the high side for common person or farmer hence suggested the need to reduce the cost to viewers in the interest of faster digital take-up in Tanzania. However, it is significant to note that although there was a feeling that the price of decoders was high but it was not a hindrance to its acquisition by consumers since up to 91% HHs that were using their TVs before ASO had decoders. The remaining proportion must be lower by now since decoder procurement is has become a continuous process.

4.6 Quality of DTT Signal at Consumer Side

As given in appendix A4.4 the Authority verified the presence and quality of digital signals in all services areas before ASO. Extensive work was done on this in Dar es Salaam and part of Cost Region which is the main terrestrial television service area with most viewers. In general the signal quality was good for a large part of the service area but there were some blind spots here and there particularly behind tall building or hills relative to the transmitter site observed and signal strength also faded in the boundary of the coverage region as expected. Signal cancellation effects from two transmitter sites of Makongo and Kisarawe was experienced at some parts like some areas in Makuburi Ward in Dar es Salaam. Removing the blind spots however was not a priority to MUX operators who are working to rollout digital infrastructure to the remaining service areas.

In general, consumers are satisfied with DTT services which can also be observed across the board with respect to quality of picture and sound and in the number of channels and the introduction of mobile TV.

Some of the consumers face challenges in proper installation of antennae and they were not receiving appropriate support or even timely from customer and technical support teams of the MUXO operator or its decoder distributor. There is need to strongly require all decoder distributors to strengthen their customer and technical support services to its customers.

4.7 Legal Framework and DTT Success

The migration process from analogue terrestrial TV broadcasting in Tanzania and phase I ASO were a success amid lots of challenges that the process faced particularly in developing countries with weak economies like ours. The investment cost required to rollout digital infrastructure countrywide is high and the incumbent dominant analogue TV broadcasters had invested heavily on transmitters that were decommissioned during ASO. They were resentful because of they felt the decommissioning of their transmitters was a waste of their investment which was difficult to come to terms with. Even with that the Authority managed to implement ASO since they had in place legal framework that guided the whole process. Without legal instruments, the whole process would have gone into disarray. The legal instruments included the licencing framework, EPOCA Act of 2010 and the EPOCA regulations of July 2011.

TCRA had also put in place appropriate strategic plan for the migration process and other plans on strategic issues on the process that were approved by the government or by the Digital Migration Process Steering Committee.

The involvement of the stakeholders in preparing such instruments and the DTT operation environment including the decision to separate transmission from content provision were also good catalyst for the migration success so far. The management vision and commitment to see its implementation legally are commendable.

4.8 Content Service Providers Services

Equal visibility of different CSPs in service areas that they are licenced has created real challenge for the analogue era dominant terrestrial TV broadcasters because they then enjoyed higher coverage depending on their transmitters network which small broadcasters could not afford. Hence, coverage and transmitters network is no longer the major factor for dominance but the appeal of its content. This marks a big paradigm shift in the business requiring CSPs to invest more in content and to innovate more and more. The best innovator is the most likely one to dominate the market.

The digital terrestrial broadcasting has opened up businesses opportunities that were not there during analogue error. The CSPs can access a much larger number of consumers for pay-TV over terrestrial network since consumers only need antennae to access them which is cheaper than that for satellite receiving system. Therefore, CSPs can plan to offer a mixture of pay-TV and FTA services to maximise their RoI. Mobile TV is already on offer and other services are planned in the near future. The future for CSP services are bright, creativity in their business models and on the means to deliver them is their challenge.

Consumers quest for appealing local content is real. A significant proposition of respondents wished to see more local contents on offering particularly on pay-TV. This is an indication of large market potential which CSPs could capitalise on. Their reservation on what is being shown is that it is an imitation of other themes, culture and excessive violence. If one looks at violence scenes in developed countries it always ends that it does not pay since the law will catch up with you. This in a way discouraging acts of violence and disobedience.

Programme rating is rear in our TV programmes. While regulation demands it, CSPs are not obliging. This is a strong weakness particularly when desiring to build strong ethical and moral behaviour for the young generation in our society that values its culture, morality and ethics.

4.9 Quality of DTT Services

It was agreed by all DTT platform stakeholders that going digital platform has improved significantly the quality of picture and sound in most parts of the different services areas being served through digital terrestrial TV delivery platform. There are challenges attached to it considering that this is a new operating environment that is still being implemented like blind spots and freezing of picture and sound in some areas. There is need to give MUXO time to address such challenges since they also need to complete rollout in other areas without digital presence.

4.10 Dual Illumination

To ensure that there is continuity for citizens to receive TV terrestrial broadcasting after ASO in different service areas dual illumination concept was introduced as part of migration process. Dual illumination required terrestrial TV broadcasters to be on both analogue and digital platforms during transition period. This appeared to be one of the thorny areas of the migration process largely because it was misconceived by broadcasters. They considered giving content to MUXO as promotion of MUXO business. Records showed that some were not even when MUXO offered to pay them to include their contents in the package they transmitted. Furthermore, CSPs were not ready to pay MUXO to carry their contents which made it difficult for MUXO to meet its operational expenses. This was unfortunate since it was in the interest of broadcasters who depend on number of viewers to maximise advertisement income to actively promote migration to guarantee continuity of their business after ASO. We strongly believe that broadcasters should have done more to promote DTT transition since they were the principle beneficiaries of smooth transition to digital platform and not the Authority.

Prolonging true dual illumination period would have been very expensive for broadcasters (CSPs) who would have been required to meet the costs of running own transmitters and paying MUXO monthly transmission fees to transmit their content on digital platform. The CSPs were saying that the transmission fees were high as they were. It implied that most CSPs would have failed to meet dual illumination operational expenses (own operational expenses and that of MUXO) and would have resorted to running their analogue transmitters only.

Despite all the complexities involving dual illumination operation during digital migration before ASO the Authority managed to ensure that it was operational since 2010 and that before ASO all CSPs holding national broadcasting licences for FTA were seen by viewers on digital platform without payment. Records shows that it was not easy but it did happen. The Authority needs to be commended for making this happen.

5 Conclusions

The study was conducted on different stakeholders in the digital broadcasting value chain. Hence, conclusions are made first on observations made for the different stakeholders and the overall conclusion.

5.1 Conclusion on Individual Stakeholders Responses

5.1.1 The Authority

The team is satisfied that the Authority had:

- satisfactorily engaged all stakeholders on migration process: minutes of NTC-DB, CSP and MUX; ABC conferences proceedings; National Steering Committee
- Customers' interest in its actions during migration and ASO
- Challenges to implement dual illumination
- Challenges to ensure MUX respected their committed rollout plans
- Education and promotion of migration from analogue to digital TV broadcasting done reasonably well
- In place legal framework (applicable law and regulations) that facilitated smooth operation of ASO.
- Success in the migration process and ASO is largely attributed to having legal framework in place.

5.1.2 The Content Service Providers (CSPs)

The team is convinced from CSPs responses their opinions were that:

- DTT introduction has opened opportunities in broadcasting business but there are also challenges
- DTT improved visibility, quality of picture and sound
- DTT has strengthened competition for consumers and advertisement
- CSPs give higher priority of their investment on improvement of content production
- Connection fees are high; consider review
- MUX SLA conditions inhibiting FTA service growth
- Common STB preferred
- At time of ASO the national broadcasting station were on dual illumination and visible which ensured reception continuity
- Most CSPs have saved costs under DTT platform
- There is need to limit number of MUX to decrease costs to CSPs (economies of scale)
- MUX should be discouraged to run CSP(s) to facilitate offering fair and non-discriminatory to all CSPs
- DTT has enabled consumers to have access to a larger number of channels
- CSPs are better informed of dual illumination costs now than before
- There is need to reduce cost of STB to increase number of viewers
- MUX and CSPs needs more interactions
- The outcry by CSPs and public after ASO in Dar es Salaam was more a problem of mind-set change challenge

5.1.3 Multiplex Operators (MUXO)

The team is convinced from MUXO responses their opinions were that:

- When MUXO uses channel for associated CSP for subscription services does not assign same value as for FTA
- MUXO considered transmission fees to CSPs being low
- There were no enough licensed CSPs to meet MUXO running costs
- There was need for decoders be exempted tax to reduce their cost and fasten digital take-up
- Rolling out of digital infrastructure too slow and unlikely to cover all regions soon there being no business case in some of the remaining towns.
- MUX favoured pay-TV offering particularly using associated CSP
- MUX business model was hangover of the analogue one

5.1.4 Consumers Survey

The Team is convinced based on the results of the consumers survey that:

- Contrary to expectation, insufficient/unavailability of decoders was not a significant factor to viewership after ASO.
  - It accounted for 0.1% of HHs that were not using the services because decoders availability and 5.5% had not bought them
  - Of HHs that TVs in the ASO area, 91% had decoder
  - Most consumers in ASO area had access to digital broadcasting services and hence were not denied basic right of access to information that they had before ASO
  - There were sufficient number of decoders in ASO service areas
  - 65% of decoders were sold to consumers before ASO
- Most consumers were aware of ASO since there were DTT services before ASO. 90% heard about ASO.
- The price of decoders did hinder its acquisition although 57% of respondents claimed it was high

5.2 Overall Conclusion

The study established that at least 65% of all CSPs were connected to the digital platform at the time of ASO which included all major TV broadcasters that were operating during analogue broadcasting. Most of the remaining joined the platform shortly afterwards after fulfilling the necessary conditions. The delays can be attributed to the fact that some of the CSPs did not believe that ASO was imminent.

The Study Team is that convinced from the information gathered that:

- Consumers were not denied access to TV broadcasting by ASO; it was more a problem of mindset change than reality.
- The rush to acquire decoders in the last minute is typical human behaviour not to invest unless obliged to do so.
- The stakeholders including consumers were sufficiently informed (90% of consumers) on ASO.

- Measures were taken to ensure sufficient decoders were available in respective service areas before ASO implementation in any service area.
- DTT Enables CSPs to concentrate their resources in their core business of generating quality and appealing contents to the benefits of consumers and their business
- DTT provided significant improvement in quality of picture, sound and in the number of channels to consumers
- DTT provided equal visibility of all CSPs to consumers
- DTT created environment for added value services in same platform like mobile TV and video-on-demand to the benefit of consumers and the CSPs
- The migration from DVB-T to DVB-T2 should be market driven to follow the best practices in business.
- Visibility of number of TV stations for most viewers increased suddenly to 50 plus that resulted in migration from particular traditional stations giving WRONG perception that the number of viewers have decreased sharply

6 Recommendations

6.1 The Authority

- Revisit transmission fees charged by the Multiplex Operators such that the fees caps reflect economic level for each service area and attract CSPs to connect to MUX to allow economy of scale. Include pay-TV services offerings in DTT in costing since the MUX is supposed to support FTA and subscription services
- Expedite licensing process of the TV applications which may increase the number of TV licensee who will hook to digital platform to allow economy of scale
- Enforce infrastructure sharing among the Multiplex Operators based on the existing regulations especially when establishing new sites to reduce investment cost
- Take necessary measures including technical viability to ensure Regional CSPs hook to digital platforms
- Enforce separation of functionalities, office premises, accounts, human resources, ownership and Management between CSPs and Multiplex Operators
- Enforce the fair, non-discriminatory and transparent MUX operators' services offering to CSPs by looking closely at the SLA conditions the MUX operators tend to impose on CSPs
- Provide legal preferential treatment to education institutions by creating conducive environment
- Establish revolving funds for the Public to get loans to buy decoders. The Authority may engage experts to advise modalities of accessing and operationalization of the funds
- Put in place measures that will protect investment of the Multiplex Operators (i.e. terrestrial digital television delivery platform) for at least three years (i.e. until 2016).

6.2 The Content Service Providers

- Establish Research and Development (R&D) units as a means to explore more opportunities services accrued from digital broadcasting, create appealing content relevant to our environment and introduce added value services

- Enhance competition while cooperating in providing content services to consumers to optimise operational costs while improving quality of services e.g. in promoting and enriching local content production
- Make optimal use of digital platform by offering and innovating added value services offerings
- Make more investment in producing quality and interesting content since the future of broadcasting success of a TV station will be determined by appeal of its contents to viewers
- Contact the Authority whenever there is no agreement on SLA terms with MUX operator, but it is essential to enter into agreement

6.3 The Multiplex Operators

- Ensure that any migration plan from DVB-T to DVB-T2 will not burden consumers and at the same time not disadvantage DVB-T viewers
- Strengthen customer services, technical support to consumers by employing more technician, introducing call centres for those who doesn't have, and increasing its capacity for the existing
- The capacity of frequency channel has to be optimised while ensuring quality of picture and sound
- Workout means to provide gap fillers in blackspot.

6.4 Overall Recommendation

The study team has established before reasonable doubt that the government can continue with the second phase of ASO since DTT potential have been demonstrated and that the Authority managed very well DTT and ASO processes and had taken fully into consideration the interests of all DTT stakeholders. Furthermore, it is being recommended to the government to consider as an incentive for fast digital take-up to remove taxes on decoders.

A. APPENDICES

A.1 Consumers Responses Tables

Table A1.1: Estimates of Number of HHs with TV in Use in the surveyed area

	No. of HHs	*HHs with TV in Use*	*HHs with TV not In Use*	*Total*
Dar es Salaam	1,091,135	906,364	136,718	1,043,082
Arusha	104,110	97,160	6,940	104,100
Tanga	62,120	38,864	15,962	54,826
Dodoma	93,400	87,444	5,552	92,996
Mbeya	91,733	83,974	3,470	87,444
Moshi	46,073	45,528	542	46,070
Mwanza	148,789	146,033	2,756	148,789
Total	**1,637,360**	**1,405,367**	**171,490**	**1,577,307**

Table A1.2: Estimates of HHs with Decoders and number of Decoders in the surveyed area

	No. of HHs	*HHs with Decoders*	*No. of Decoders*	*% of HHs with Decoders*
Dar es Salaam	1,091,135	817,532	936,900	75%
Arusha	104,110	85,362	97,854	82%
Tanga	62,120	31,924	34,700	51%
Dodoma	93,400	83,280	97,854	89%
Mbeya	91,733	74,258	86,750	81%
Moshi	46,073	45,530	47,696	99%
Mwanza	148,789	142,270	158,232	96%
Total	**1,637,360**	**1,280,156**	**1,459,986**	78%

The data in Appendix A1.2 show that estimated number of HHs with decoders in use in the surveyed area is 1.3 million with the total number of decoders estimated at 1.5 million. This constitutes 78% of HHs had decoders in the surveyed area. Furthermore, Moshi had the highest percentage of decoders per households.

Table A1.3: Number of HHs with Decoders and Total number of Decoders in the ASO area

	One	Two	Three	> Three	Total HHs	% HHs Dec	No. of Dec
Dar es Salaam	1,032	124	18	4	1,178	90%	1,350
Arusha	106	16	1	0	123	88%	141
Tanga	42	4	0	0	46	82%	50
Dodoma	100	19	1	0	120	95%	141
Mbeya	92	13	1	1	107	88%	125
Kilimanjaro	80	4	0	0	84	100%	88
Mwanza	186	16	2	1	205	97%	228
Total	1,638	196	23	6	1,863	91%	2,123

Table A1.4: Type of Decoders most used in HHs

	Startimes	Digitek	Continental	Ting	Others	Total
Dar es Salaam	91%	6%	2%	2%	0%	100%
Arusha	99%	0%	0%	1%	0%	100%
Tanga	88%	10%	0%	3%	0%	100%
Dodoma	97%	1%	2%	0%	0%	100%
Mbeya	97%	1%	0%	1%	0%	100%
Moshi	100%	0%	0%	0%	0%	100%
Mwanza	95%	2%	3%	0%	0%	100%
Total	93%	4%	2%	1%	0%	100%

Table A1.5: Customer Satisfaction on Digital Broadcasting (Percentage of Customers)

	Very Satisfied	Satisfied	Averagely satisfied	Not Satisfied	Not Satisfied at all
Dar es Salaam	18%	29%	18%	13%	22%
Arusha	30%	23%	19%	15%	14%
Tanga	9%	44%	15%	19%	12%
Dodoma	5%	44%	17%	15%	18%
Mbeya	17%	35%	19%	14%	16%
Moshi	9%	40%	24%	16%	10%
Mwanza	7%	43%	17%	17%	17%
Total	16%	33%	18%	14%	19%

Table A1.6: Consumer Expectations on Digital Broadcasting (Percentage of Consumers)

	Very Good	*Good*	*Average*	*Poor*	*Very Poor*
Dar es Salaam	31%	26%	16%	11%	16%
Arusha	42%	25%	14%	10%	9%
Tanga	10%	44%	15%	19%	11%
Dodoma	7%	42%	17%	13%	21%
Mbeya	12%	37%	20%	14%	16%
Moshi	10%	39%	25%	13%	13%
Mwanza	6%	39%	26%	16%	14%
Total	**25%**	**30%**	**18%**	**12%**	**15%**

Table A1.7: Consumer Perceptions on Digital Broadcasting (Percentage of Customers)

	Very Near	***Near***	***Don't know***	***Far***	***Very far***
Dar es Salaam	16%	36%	20%	17%	12%
Arusha	13%	43%	34%	8%	3%
Tanga	20%	52%	5%	17%	7%
Dodoma	13%	58%	8%	17%	4%
Mbeya	14%	36%	31%	14%	5%
Moshi	14%	60%	13%	10%	2%
Mwanza	10%	47%	23%	16%	4%
Total	**15%**	**41%**	**20%**	**15%**	**9%**

A.2 CSPs Response Tables

Table A2.2: Time taken by CSPs to start digital broadcasting from the time digital broadcasting started

CSP	Before ASO	Immediately after ASO	After 2 month	After 4 month	More than 6 month	Not yet
AGAPE TV	√					
C2C						√
CAPITAL			√			
CHANNEL 10	√					
CLOUDS	√					
CTN					√	
DTV	√					
EFATHA					√	
MLIMANI TV		√				
STAR TV		√				
TBC1	√					
TUMAINI TV	√					
ITV		√				
EATV	√					

Table A2.2: The number of towns in which CSP was accessible using analog broadcasting

CSP	No. of Towns
TBC1	12
STAR TV	11
AGAPE TV	9
CHANNEL 10	9
CAPITAL	5
MLIMANI TV	2
TUMAINI TV	2
C2C	1
CLOUDS	1
CTN	1
DTV	1
EFATHA	1
TANGA CITY TV	1
ITV	5
EATV	5

Table A2.3: Status of CSP broadcasting in all towns/cities with digital Transmission

CSP	Broadcasting in all towns?	
	Yes	No
AGAPE TV		√
C2C		
CAPITAL		√
CHANNEL 10	√	
CLOUDS		√
CTN		√
DTV	√	
EFATHA	√	
MLIMANI TV		√
STAR TV	√	
TANGA CITY TV		
TBC1	√	
TUMAINI TV		√
ITV	√	
EATV	√	
Total CSPs	**7**	**6**
Percentage	**54%**	**46%**

Note:

- No response from C2C and TANGA CITY TV
- 54% of the CSPs are broadcasting in all towns with digital Transmission.

Table A2.4: Rate at which the broadcasting has been improved in all areas where they broadcast digitally (scale : 1: Nothing; 2: much less; 3: average; 4: significantly; 5: very significantly)

CSP	Picture quality	Sound quality	Availability of programs all the time	Degree of improvement of TV programs	Overall improvement rating
AGAPE TV	5	5	4	4	4.5
CAPITAL	5	5	5	5	5.0
CHANNEL 10	4	5	4	4	4.3
CLOUDS	5	5	5	5	5.0
CTN	5	5	4	4	4.5
DTV	5	5	5	5	5.0
EFATHA	4	4	5	2	3.8
MLIMANI TV	2	2	3		2.3
STAR TV	5	5	4	1	3.8
TBC1	4	4	4	3	3.8
TUMAINI TV	2	4	3	3	3.0
ITV	5	5	1	5	4.0
EATV	4	4	5	1	3.5

Table A2.5: CSPs and which MUX they have subscribed to

CSP	MUX		
	Agape Associates	Basic Transmission Ltd	Star Media (T) Ltd
AGAPE TV	√	√	√
CAPITAL		√	
CHANNEL 10			√
CLOUDS		√	√
CTN			√
DTV			√
EFATHA	√	√	
MLIMANI TV		√	
STAR TV	√	√	√
TBC1	√	√	√
TUMAINI TV			√
ITV	√	√	√
EATV	√	√	√

Table A2.6: Areas where the digital broadcasting has reduced running costs

CSP	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
AGAPE TV	√	√	√	√	√	
CAPITAL	√	√	√	√	√	
CHANNEL 10		√	√	√		
CLOUDS		√				
CTN	√	√	√	√		
DTV		√	√	√	√	
EFATHA		√	√	√		
MLIMANI TV		√	√	√		
STAR TV		√				
TBC1		√	√			
TUMAINI TV		√	√	√		
ITV	√	√	√	√		
EATV		√				

Key:

Area 1: Number of employees at the CSP

Area 2: Electrical power

Area 3: Other running costs (transport, vehicles, water, security, towers, etc)

Area 4: Administrative costs

Area 5: Signal distribution

Area 6: Did not have effect since the company was already broadcasting using digital

Table 2.7: CSPs planning to establish extra channels

CSP	Number of channels	After how long (years)
AGAPE TV	4	0
CLOUDS	5	1
STAR TV	10	1
ITV	2	2
EATV	1	2

Table 2.8: Reasons for a CSP not planning to have extra channels

CSP	Very expensive to produce TV programs	Very expensive to buy TV programs	No plans to increase channels	Other reasons
C2C	√	√		
CHANNEL 10	√			
CTN	√	√		
DTV	√	√		
EFATHA	√	√		
MLIMANI TV	√	√		
TANGA CITY TV			√	
TBC1	√	√		
TUMAINI TV			√	

Table A2.9: Ratings at which the CSP expectation in being in digital broadcasting has been fulfilled compared to analog broadcasting

CSPs	None	slightly	Average	Significantly	Very significantly
CAPITAL			√		
CHANNEL 10					√
CTN					√
DTV					√
MLIMANI TV	√				
STAR TV				√	
TBC1			√		
TBC					√
TUMAINI TV					√
ITV				√	
EATV			√		

Table A2.10: (Scale: 1. Nothing 2: Small extent 3: Average 4: Big extent 5: Very big extent)

CSP	Investment	Technical	Operational Expenses	overal
AGAPE TV	2	2	3	2.3
C2C	1	1	1	1
CAPITAL	5	5	5	5
CHANNEL 10	3	5	3	3.7
CLOUDS	5	5	3	4.3
CTN	2	2	1	1.7
DTV	2	4	3	3
EFATHA	2	2	2	2
MLIMANI TV	4	3	3	3.3
STAR TV	2	3	3	2.7
TANGA CITY TV	4	4	4	4
TBC1	3	3	1	2.3
TUMAINI TV	2	4	2	2.7
ITV	5	5	5	5
EATV	4	4	4	4

Table A2.11: Reasons which prevent the completion of SLA and MUX (**Refer Table 26**)

Reason	CSP				
	EFATHA	EATV	STAR TV	TUMAINI TV	ITV
Do not accept SLA conditions		√	√	√	
Cost of service of MUX	√	√		√	√
MUX unwillingness to provide services					
The problem of the connection between CSP and MUX					

Note: Only five CSPs responded to that question

A.3 MUX Operators Response Tables

Table A3.1: Percentage of MUX's decoder in a service area against total decoders in the service area

Town / City	ST	TING	CONT/Digtek
Dar es Salaam	91	3	6
Dodoma	84	3	13
Mwanza	89		
Arusha	87	3	10
Mbeya	100	0	0
Tanga	97	3	0
Moshi	88	0	13
Morogoro	100	0	0
Zanzibar	100	0	0
Total	91	2	7

A.4 Supporting Documents ASO Evaluation

A.4.1 Summary of The DTT TX Fees

A4.1.1 Background

On 29th November, 2012, TCRA presented a Public Consultation Document (PCD) to stakeholders on the framework to cost based transmission fee for Digital Terrestrial Television (DTT) charged by Multiplex Operators (MUX) to Content Services Providers (CSP). The PCD recommended the following:

(i) The maximum (ceiling) transmission fee for MUX chargeable to CSPs as a cost of carriage of one digital television programme (content channel) per transmission site per month be USD 3,800.00;
(ii) The recommended transmission fee be subject to review on annual basis to take into account change in factors such as inflation, technological change, multiplicity of content channels and value added services;
(iii) The recommended transmission fee be mandatory to FTA services during the simulcast period and beyond to ensure smooth entry to digital network by CSPs;
(iv) MUX be encouraged to use National ICT Broadband Backbone (NICTBB) for signal distribution to reduce costs;

Stakeholders were required to submit comments in the form of written representation to the Authority by 10th December, 2012.

A.4.1.2 Conclusion and Recommendations

After expiry of the period allowed for stakeholders to submit their views of the presented MUX charges, the taskforce observed that there was no objection from the stakeholders with regard to

the methodology and approaches used to estimate the DTT transmission fees to be paid by CSPs to MUX.

Based on the above response the following are our recommendations:

(i) Charges indicated in the PCD of USD 3,800.00 be adopted as a maximum (ceiling) transmission fee for MUX chargeable to CSPs as a cost of carriage of one digital television programme (content channel) per transmission site per month for the year 2013

(ii) This fee should be reviewed annually taking into account the multiplicity of content channels, sharing of infrastructure and value added services etc.

(iii) Encourage MUX to increase pace of infrastructure roll-out country-wide.

A.4.2 Confirmation of Licensed TV station in 1994

From the TCRA sources the following TV were licensed in 1994

1. Independent Television (ITV) January,1994
2. Dar Es Salaam Television (DTVMay,1994
3. Abood Television October,1994
4. CTN Television February,1994

A.4.3 Assessment of availability of set top boxes

Table A.4.3.1: Availability of set top Boxes as of 6th December, 2012

Time Frame	Star Media(T) Ltd	Agape Associates Ltd	Basic Transmissions Ltd
Number of decoders imported until 30th November, 2012	330,000	20,000 (DVB-T)	NONE
Number of sold decoders until 30th November, 2012	260,000	10,000 (DVB-T)	NONE
Number of decoders in store	40,000 (DVB-T) 30,000 (DVB-T2)	10,000 (DVB-T)	NONE
Number of expected decoders to be imported from 1st December, 2012 to 31st December, 2012	180,000(DVB-T)	0	35,000(DVB-T2)
Number of expected to be imported for the next quarter (January to March 2013	300,000	300,000	15,000 (DVB-T2)
Number of subscribers/viewers as of 31st November, 2012	260,000	9,000*	NONE

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Table A.4.3.2: Set top boxes sold during the ASO dates

S/No	Service Area	Number of Set Top Box Sold as per ASO date		
		Star Media	Agape Associates	Basic Transmission
1	Dar es salaam	300,000	10,000	None
2	Dodoma Town	20,000	100	None
3	Tanga City	12,000	70	None
4	Mwanza City	35,000	150	None
5	Moshi Town	14391	40	None
6	Arusha City	45,000	100	None
7	Mbeya City	14,000	40	None

A.4.4 DTT Signal coverage measurement before ASO

Measurements of DTT signal were conducted in all seven towns with digital coverage and the results shows that digital signal match the analogue signal. The Authority conducted measurements to ascertain if both signal coverage matches as prerequisite for ASO. Measurements were conducted in Dodoma, Arusha, Mwanza, Tanga, Moshi, Mbeya and Dar Es Salaam

The main objective of the exercise was:-

- To assess whether the digital terrestrial signal coverage match/complements the analogue signal coverage;
- To assess the quality of digital signals.

Both analogue and digital television signals were measured and compared in terms of coverage and quality using the following tools:-

- Spectrum Analyzer;(To measure the signal strength (dBμv/m)
- Argus Software; (To measure the signal strength (dBμv/m)
- DVB-T Decoders;
- Analogue Television sets; (For Picture/ Sound Clarity)
- Measurements were conducted in different points of the broadcasting service area

Summary of the results for each service area is as follows:

A.4.4.1 Dar Es Salaam:

The DVB-T signal coverage is available throughout Dar Es Salaam region, and a good part of the Coast region. At some locations the signal strength levels reach more than 70 dB Microvolts/metre. Excellent reception over Dar Es Salaam service area, with the black spots in the city centre whereby the signal is affected by rising structures. signal reception gets stronger as one moves away from

the city center.

A.4.4.2 Arusha

More than 20 points were measured and all provided good results on the digital television signal coverage and reception in most of measurement points in Arusha. Most of selected tested points provided good signal reception for both indoor and outdoor receptions.

A.4.4.3 Mwanza

Provided good results for digital television signal coverage and reception in most of measurement points (More than 20 points were measured)

A.4.4.4 Tanga

Most areas within Tanga service area provided very good outdoor reception which indicates that the transmitter is located far from the service area.

A.4.4.5 Moshi

Most areas within Moshi service area provided very good outdoor reception which indicates that the transmitter is located far from the service area or configured with lower transmit powers and thus customers are advised to use outdoor antenna

A.4.4.6 Mbeya

More than 20 points were measured and digital signal observed to be good as compared to analogue signal though there some few areas like Simike, Uzunguni and Posta were the signal was not stable due geographical terrain.

A.4.4.7 Dodoma

The selected measuring point showed good signal by Star Media in all areas but Agape Associates need to improve its signal in Bahi, Chamwino, Kibaigwa, Hombolo, Mvumi and Buigiri.

Recommendation made was as follows:

- For area observed to have poor indoor performance MUX operators should look on the way to improve signal strength by introducing gap fillers
- Areas like Tanga and Moshi where transmitters observed to be far from large population MUX operators should put gap fillers in the city centre.
- In terms of coverage, the overall measured service areas gave good results which implies that switch off may be carried on subject to availability of enough set-top-box.

A.4.5 Migration from Analogue to Digital TV Broadcasting Stakeholders Meetings

Table A.4.5.1: The list of consultation meeting on migration to digital broadcasting between TCRA and stakeholders for period of 2010-2013

Year	NTC-DB	CSP and MUX	Steering
2010	• 9th June, 2010 (Joint MUX, NTC-DB meeting) • From 1st to 4th July, 2010 • From 2nd to 3rd August, 2010, • 24th September, 2010	22nd December, 2010 (MUX Only)	None
2011	• 20th January, 2011 • 21st January, 2011 (Joint MUX, NTC-DB and National CSPs meeting) • 25th February, 2011 (Joint MUX, NTC-DB and National CSPs meeting) • 25th March, 2011(Joint MUX, NTC-DB and National CSPs meeting) • 01st August, 2011 • 17th August, 2011 • 11th October, 2011(Joint MUX, NTC-DB meeting) • 6th December, 2011 (NTC-DB meeting with Officials From Zanzibar Revolution Government)	• 12th March, 2011(MUX Only) • 15th March, 2011(CSP Only) • From 20th to 21st APRIL, 2011(MUX Only) • 29th April, 2011	• 19th May, 2011 • 13th October, 2011
2012	• 27th January, 2012 • 30th April, 2012(Joint MUX, NTC-DB meeting) • 29th June, 2012 • 11th December, 2012	• 09 March, 2012 • 08th May, 2012, • 03rd AUGUST, 2012 • 14th August, 2012 (CSP applicants only) • 14th September, 2012 (CSP Only) • 24th September, 2012 (MUX Only) • 09TH October, 2012 (National CSPs Only) • 23rd October, 2012(CSP Only) • 29th October, 2012 • 29th November, 2012 • 24th December, 2012 (MUX Only)	04th September, 2012 17th December, 2012

		• 28th December, 2012 (Dar es salaam service area CSPs Only)	
2013	07 FEBRUARY, 2013	22nd July, 2013(MUX Only) 22nd August, 2013(MUX Only) 20th September, 2013(MUX and National CSPs) 17th October, 2013(MUX and National CSPs)	23rd January 2013