



NATIONAL INFORMATION TECHNOLOGY AUTHORITY- UGANDA

**IMPACT ASSESSMENT OF THE BAN ON
IMPORTATION OF USED COMPUTERS IN UGANDA**

LOT 1 NITA-U/SRVCS/12-13/00041

FINAL DRAFT REPORT

Submitted By



JUNE 2014

EXECUTIVE SUMMARY

During the reading of the 2009/2010 financial budget, Government of Uganda imposed a ban on importation of used computers with a view of combating the accumulation of electronic waste in the country. Whilst this was for good intention, there was a general outcry that this ban stifled economic activities. As a result traders and other stakeholders vehemently resisted the ban and petitioned against it. There was need to review the ban on used computers because it lacked clear specifications of old, used, new, assembled, and refurbished computers for example, a computer used for only two weeks is considered as used computer hence banned. Based on their petitions and other considerations Cabinet on 2nd November 2011 directed the Ministry of Finance Planning and Economic Development in consultation with the Ministry of ICT to review the importation of used computers in view of the need to spread the use of computers through provision of affordable computers, while taking note of concerns relating to electronic waste management.

The study assessed the impact of the ban on importation of used computers in Uganda and used the outcomes and recommendations of the assignment to form a basis for reviewing and lifting of the ban. The study was conducted in 15 districts under four regions of Uganda (Central, Eastern, Western and Northern). A total of 8 computer importers, 163 institutions, and a representative sample of 638 computer users participated in the study. Data was collected using semi-structured questionnaires, key informant interview guide, desk-based review of documents, case studies, and consultative meetings with key stakeholders. Computer import statistics for FY 2006/7 - FY2013/14 were obtained from Uganda Revenue Authority. Quantitative data using descriptive statistics was generated in STATA 10 and SPSS 17 softwares. Qualitative data was analysed using thematic analysis, content analysis and discourse analysis techniques. Salient issues that arose from qualitative and quantitative analyses were unearthed through triangulations and synthesis of information.

Penetration of Computers and related peripherals before and after the ban: In Uganda, the computer penetration rate stood at 0.3% (3 per 1000 people) in 2000 and increased to 0.5% in year 2004, 0.7% in 2005, 1.5% in 2011. The PC penetration was estimated to be 2-3 computers for every 100 people in Uganda; implying that 2.5% of the people in Uganda have computers.

Trends in value of computer imports: The total value of computers imported after the ban was high (UGX633.783billion) and lower before the ban (UGX 140.61billion). The ban led to the increased number of high value branded new computers being imported into Uganda.

Trends in number of computer peripherals imported: The total number of peripherals imported before the ban was high (877,942 units) valued at UGX 69.87billion. But after then ban, the total number decreased to 200,087units valued at UGX 120.21billion.

Trends in value of computer spare parts imported: The total value of computer spare parts imported before the ban was UGX88.675 billion. But after the ban, the total value was UGX143.125billion.

Benchmarks on best practices adopted at the regional and international levels

Benchmark countries included Rwanda, Nigeria, and Kenya. The three countries are aware and concerned with the dangers e-waste and there is generally a substantial amount of effort to control e-waste. They used tax regimes, pre-import inspection & verification certification, and proof of conformity to safe standards signed by the certified and international companies in line with ISO standards to control importation of used or refurbished computers.

New developments in the ICT sector impacting on the Ban

In the FY2012/13 a total of sixteen (16) International IT Standards from ISO/IEC were reviewed, approved and declared as National IT Standards for adoption by the National Standards Council. The standards were gazetted in April 2013 through the Uganda National Bureau of Standards

- a) ***Legal and policy frameworks:*** A number of legal and policy frameworks have been drafted and put in place, such as: National e-government Policy Framework 2010; National ICT Policy 2012; National e-Waste Management policy 2010; Cyber laws (Computer Misuse Act 2011). Other policies, Laws and regulations are being developed and or reviewed. ICT infrastructure e.g NBI/EGI and DBICs were set up.

- b) **Introduction of ICT in the education curriculum:** The curriculum for subsidiary ICT was developed, for UACE certification in 2011 with the objective of enhancing ICT skills and knowledge. Government efforts through the Rural Communication Development Fund at UCC had established fully equipped modern computer laboratories in over 1,000 government-owned secondary schools across the country.
- c) **Management of E-waste:** The Government set up the e-waste management policy in 2010 so as “*To ensure the safe management of e-waste in Uganda*”. However NEMA has not registered any firm to deal in e-waste management. A multi stakeholder engagement with the E-waste Solution Alliance for Africa is being done with the objective of implementing a practical collection and treatment e-waste management solution in Uganda. NITA-U has also within its mandate drafted the Guidelines for acquisition of IT Hardware and Software for Government Ministries, Departments and Agencies (MDAs) and is currently in the process of developing guidelines for disposal of IT Products in consultation with PPDA.
- d) **National ICT Standards:** Government through NITA-U is working in collaboration with UNBS to review the standards pertaining to the ICT sector. The current standards set by UNBS are generalized for all electronics.

Current Cop-Up Mechanisms for Institutions that were involved in the Importation of Used Computers: Firms affected by the ban, laid off their staff, others set up repair and maintenance workshops and or became agents for new computers as a means of continuing their business. Also Government institutions only buy new computers whereas the NGOs, FBOs and other private sector players resorted to buying brand new computers.

Effectiveness of the different stakeholders in regard to their defined roles and responsibilities in executing the ban

The government created an enabling legal, policy and regulatory environment for implementation of the ban and advancement in ICT sector in line with government ICT priorities in NDP and Vision 2040. NITA-U collaborated with UNBS to review computer standards and specifications while URA and UNBS designated officers to inspect computers at entry points. Other engagements of the different stakeholders included;

- Pre-shipment inspection initiative by UNBS is set to strengthen implementation of the ban.
- Inter-agency technical committee for development of IT standards constituted and facilitated to its work.
- Draft standards for acquisition of computer hardware and software in government were developed by NITA-U. Also draft guidelines for valuation and writing off of aging computers and peripherals were developed
- MoICT- Several legal policy and regulatory frameworks have been formulated
- NEMA- Participated in the formulation of e-waste management policy

User opinions and perceptions on the imposition of the ban

Overall, majority of the institutions (85%) and computer users (64%) were aware of the ban. Most of the computer users (54%) were not affected by the ban. Main negative effect was high cost of acquiring a branded new computer (60.96%), limited access to new computers (18.64%), and increased supply of fake computers in the market through smuggling (11.64%) among others. The main positive effect was that new computers were of good quality (34.75%) and durable (27.12%).

Perceived Impact of the ban on institutions: Majority institutions (78.4%) were not affected by the ban. The negative effect of the ban was mainly in terms of high cost of new computers (61.88%) especially to education institutions (51.85%), and NGOs (18.52%).

Supporting of the Ban: Nearly half of the computer users (49%) and more than half of the institutions (59%) supported the ban. Out of the 8 computer importers who participated in the study, 7 importers (87.5%) were aware and supported the ban.

Reasons for supporting the Ban: Computer user mainly supported the ban because it increased access to durable computers (68%), avoid our country from being a dumping ground (62%), increase access to quality ICT services (52%) and sets standards for use and importation of ICT equipment among others.

In addition, the institutions mainly supported the ban for similar reasons i.e. increased access to durable computers (72%), reduced e-waste (69%) and prevent Uganda from being a dumping ground for e-waste (66%).

Reasons for not supporting the Ban: The main reasons for computer users not supporting the ban were that new computers are expensive (87%), it reduces access to ICT services (49%), and negative economic impact such as unemployment and loss of revenue by businesses (40%).

Key impact dimensions, assumptions, sensitivities and risks involved in lifting of the ban;

- a) **Technology** i.e. inability to advance in ICT when using old computers which do not support the latest softwares like Window8 and Windows7 operating systems.
- b) **Health** (i.e. exposure to hazards materials).
- c) **Economy** (i.e. increased dumping of sub standards goods which are not durable leading to low efficiency, effectiveness and productivity of the users consequently affecting economic growth.
- d) **Environment** (i.e. increased pollution because e-waste contains some very serious contaminants given Uganda lacks of recycling firms dealing in e-waste.
- e) **Politics** (i.e. political interests vis-à-vis national development priorities).
- f) **Human capital development** (i.e. slow development of ICT skills given that Uganda has a largely illiterate consumer mass unaware of its rights, benefits and opportunities) and
- g) **Value for money** (i.e. old & used computers are not durable to give value for money).

Risks involved in lifting the ban: Out of the 163 institutions, over half (53%) did not want the ban lifted. The most likely risks would be; increased e-waste especially given that the country lacks an e-waste recycling plant (50%), increased dumping of old computers in form of donations (36%), continuous circulation of poor quality old computers (22%), and low access to modern ICT services (22%) among others.

Conclusions and Recommendation

The study generated empirical evidence that ban had an impact in terms of reducing importation of old and used computers in Uganda and there was effective collaboration between implementing agencies basing on existing legal, policy and regulatory frameworks in place as well as the increased acceptability of the ban by computer importers, users and institutions which were aware of the ban and supported it. However, given that the government priority objective in the Uganda Vision 2040 identifies ICT among the key infrastructure areas that will spur Uganda's transformation into a modern and prosperous country and in the NDP (2010/11-2014/15) is promoting science, technology, innovation and ICT to enhance competitiveness, then it is advisable that the ban on importation of old and used computers and its peripherals be maintained and enforced in order to promote use of the latest technological advancement so as to achieve the set ICT sector priorities stipulated in the NDP II and Vision 2014. Some of the overall recommendations to Government include;

- a) NITA-U and UNBS should finalize the process of reviewing the computer standards along with setting clear computer specifications in order to inform pre-inspections exercises and the final inspection at URA border points.
- b) Government should review its recent decision to tax computers in the National budget 2014/15. If the tax exemption is reinstated, it will help increase access to branded new computers and strengthen ICT advancement in line government ICT sector priorities.
- c) Government should build the ICT skills of the labour force to use latest IT by starting with assembling new computers then gradually progress to production. This should be enhanced by setting up ICT parks which are in the interest of the Country's Vision 2040
- d) In the short term, establish a countrywide e-waste collection centers through already existing networks of solid waste recycling firms. The collected e-waste can be sorted and sold as exports to countries that have recycling facilities as government through UIA attract investment in recycling e-waste.
- e) Introduction of tax incentives for recyclers in Uganda who can demonstrate that they are recycling electronic goods in a manner that meets local and international standards, including the non-taxation of e-waste destined for recycling within Uganda.
- f) Build on existing policies and legal frameworks to support importation of new computers and best e-waste management practices in the country.

ACRONYM AND ABBREVIATIONS

DBIC	-	District Business Information Centres
DIREE	-	Dealers in Reconditioned Electronic Equipment
DLG	-	District Local Governments
EACR	-	East Africa Compliant Recycling
FBO	-	Faith-Based Organizations
FY		Financial Year
GoU	-	Government of Uganda
ICT	-	Information Communication Technology
IT	-	Information Technology
KACITA-		Kampala City Traders Association
KII	-	Key Informant Interviews
LABE	-	Literacy and Adult Basic Education
M&E	-	Monitoring and Evaluation
MDA	-	Ministries Departments and Agencies of Government
MFPEd	-	Ministry of Finance Planning and Economic development
MoICT	-	Ministry of Information Communication Technology
NBI	-	National Backbone Infrastructure
NDP	-	National Development Plan
NEMA	-	National Environmental Management Authority
NGO	-	Non-Governmental Organization
NITA-U	-	National Information and Technology Authority of Uganda
NPA	-	National Planning Authority
PIT	-	Project Implementation Team
PSFU	-	Private Sector Foundation Uganda
SMART	-	Simple, Measurable, Achievable, Realistic and Time bound
UCC	-	Uganda Communication Commission
UEEE	-	Used Electrical and Electronic Equipment
UETA	-	Uganda Electronics and Technicians Association
UGX		Uganda Shillings
UIA	-	Uganda Investment Authority
UICPA		Uganda ICT Consumer Protection Association
UMA	-	Uganda Manufacturers Association
UNBS	-	Uganda National Bureau of Standards
UNIDO		United Nations Industrial Development Organisation
URA	-	Uganda Revenue Authority
UWMAC		Uganda Waste Management & Administration Confederation
WEEE	-	Waste Electrical and Electronic Equipment

TABLE OF CONTENTS

CONTENTS	PAGES
<i>EXECUTIVE SUMMARY</i>	<i>i</i>
<i>ACRONYM AND ABBREVIATIONS</i>	<i>i</i>
<i>1. INTRODUCTION</i>	<i>1</i>
1.1 Background	1
1.2. Objectives of the study.....	2
1.3 Scope of work.....	2
<i>2. METHODOLOGY</i>	<i>3</i>
2.1. Research design, sampling and sample size selection	3
2.2. Data collection methods.....	4
2.3. Management and Data analysis	4
<i>3. RESULTS AND DISCUSSION</i>	<i>5</i>
3.1. Penetration of Computers and related peripherals before and after the ban	5
3.2. Trend of Import of Computers and peripherals before and after the Imposition of the ban.....	5
3.3. Current stock of aging computers and classification of old and new computers	9
3.4. Benchmarks on best practices adopted at the regional and international levels	10
3.5. New developments in the ICT sector impacting on the Ban	15
3.6. Current Cop-Up Mechanisms for Institutions that were involved in the Importation of Used Computers;.....	20
3.7. Monitoring and Evaluation Framework for the impact assessment on the ban;.....	22
3.8. Effectiveness of the different stakeholders in the execution of the ban and defined roles and responsibilities of the various actors;.....	22
3.9. User opinions and perceptions on the imposition of the ban	26
3.10. Key impact dimensions, assumptions, sensitivities and risks involved in lifting of the ban;.....	31
<i>4. CONCLUSIONS AND RECOMMENDATIONS</i>	<i>35</i>
<i>5. REFERENCES</i>	<i>40</i>
<i>6. APPENDICES</i>	<i>41</i>
Appendix I: List of key institutions selected for the KIIs	41
Appendix II: List of participants in the Consultative meetings	42
Appendix III: Monitoring and Evaluation Framework	43
Appendix IV: Computer, Peripherals and Spare parts import statistics per FY	45
Appendix V: List of Computer Importers	46

LIST OF TABLES AND FIGURES

List of Tables:

Table 1: Allocation of Institutions, computer dealers and users	3
Table 2: Computer penetration rates from various sources	5
Table 3: Current stock of new, old and aging computers	9
Table 4: Number of computers acquired new and old in institutions surveyed	9
Table 5: Technical specifications of used computers which can be allowed as imports in Rwanda	11
Table 6: Sources and types of electronic wastes	18
Table 7: Roles and responsibilities and effectiveness of key stakeholders in executing the ban.....	23
Table 8: Sample characteristics of computer users	26
Table 9: Sample characteristics of institutions.....	26
Table 10: Awareness of the ban amongst computer users and institutions	27
Table 11: Positive Effect of Ban on Computer Users	28
Table 12: Negative effect of ban on Computer Users	28
Table 13: Negative effects of the ban on Institution	29
Table 14: Category of Institution and their perception of the ban	30
Table 15: Reasons for supporting the ban	30
Table 16: Reasons for not supporting the ban	31
Table 17: Recommendation by Computer users who support and do not support the ban	35
Table 18: Recommendation by institutions which support and or do not support the ban	36
Table 19: Computer import statistics per Financial Year	45
Table 20: Import statistics of computer peripherals per Financial Year	45
Table 21: Import statistics of computer spare parts per Financial Year.....	45

List of Figures:

Figure 1: Trends in quantity of computers imported per FY	6
Figure 2: Trends in value of computer imports.....	6
Figure 3: Trends in number of computer peripherals imported per FY.....	7
Figure 4: Trends in value of computer peripherals imported per FY	7
Figure 5: Value in Uganda Shillings of Computer spare parts imported.....	8
Figure 6: Net weight in kilograms of Computer spare parts.....	8

1. INTRODUCTION

1.1 Background

During the reading of the 2009/2010 financial budget, Government of Uganda imposed a ban on importation of used computers with a view of combating the accumulation of electronic waste in the country. Whilst this was for good intention, there was a general outcry that this ban stifled economic activities. As a result traders and other stakeholders vehemently resisted the ban and petitioned against it¹. There was need to review the ban on used computers because it lacked clear specifications of old, used, new, assembled, and refurbished computers for example, a computer used for only two weeks is considered as used computer hence banned.

Dealers in Reconditioned Electronic Equipment (DIREE) and Uganda Electronics and Technicians Association (UETA) – petitioned Parliament to rescind the law. DIREE and UETA argued that the ban would hurt Ugandan consumers by depriving them of low-cost, used computers and other electronic equipment. This would result in Uganda’s digital divide widening as most schools and tertiary institutions rely on donations and purchasing the affordable second hand computers. In addition, a 2009 survey carried out by i-Network immediately after the ban found that 65.2 % of respondents wanted government to institute a ban with considerations, 17.4 % no ban with conditions, 13% no ban at all and only 4.3% favored a ban as suggested by government.

Based on their petitions and other considerations Cabinet on 2nd November 2011 directed the Ministry of Finance Planning and Economic development (MFPED) in consultation with the Ministry of ICT (MoICT) to review the importation of used computers in view of the need to spread the use of computers through provision of affordable computers, while taking note of concerns relating to electronic waste management. In June 2009 the Financial Bill was passed and prohibited the import of “used refrigerators, freezers, computers and television sets” from October 2009 after concern that Uganda was not dealing properly with the issue of e-waste².

It is estimated that 60-80 percent of all electronic waste and second-hand electric equipment from developed countries winds up in developing countries which lack capacity, policies, safeguards and enforcement tools to manage it safely. The 2009 ban was Uganda’s attempt to get control of this growing problem. Reports indicate that the government intends to set up new standards for importation of used computers after the ban is reviewed. However, MPs sitting on the Parliamentary ICT Committee rejected a proposal by government to remove the ban on importation of used computers citing reasons that the removal of a ban on used computers would encourage dumping of discarded electronics on Uganda market which is hazardous to human health and environment.

In Uganda, computer usage and demand is increasing acutely across all sectors. The most common type of computers available on stock in Uganda today are; the brand new computers, used computers and “clones” (*computers assembled using different hardware parts*). It is easy and cheap to own a computer in Uganda since the government scrapped import duties/ taxes on computers to help promote knowledge of Information Technology thus influencing computer dealers to reduce the prices of both used and new computers.

However, most of the used computers have some issues such as faulty components and may require upgrading not mentioning the fact that some people still cannot identify the specifications of a good computer and therefore end up buying a computer with ill specifications.

¹ For example, according to the Uganda NGO position paper 2009, it was quoted that government’s move to prohibit the importation of “used” computer is for the right reasons however, it does not hold due to the lack of clarity in the definition of used computers.

² The government instituted the ban on used computers in May 2009 ostensibly to protect the environment from electronic waste, given that once disposed of carelessly, electronics release toxins into the soil. But, earlier, government had done away with import duties on computers so as to increase the uptake of ICT, considered crucial in information storage and management especially now that the government is implementing its “E-Government” programme.

The clones in the market are also not durable and usually have hardware failures in most cases since many different hardware parts from different manufacturers are brought together to build a single base unit and repairing them is close to impossible. The brand new computers favored by the government remain very expensive; ranging from UGX 1.2million to UGX 2.5million on average. These are very high specification computers, durable and come with a warranty of up to a year in most cases. However they are only affordable by big organizations and enterprises plus a few individuals and as such delay the process of promoting Information Technology developments in Uganda.

1.2. Objectives of the study

The main objective of the study was to assess the impact of the ban on importation of used computers in Uganda and use the outcomes and recommendations of the assignment to form a basis for reviewing and lifting of the ban. The specific objectives are to;

- i. Assess and evaluate the impact of the imposition of the ban on importation of used computers on different stakeholders;
- ii. Provide information and guide Government decisions in reviewing the Ban;
- iii. Establish the current stock of aging and new computers in the country;
- iv. Synthesize the different opinions and public perceptions on the impact of the ban;
- v. Assess the would be alternatives to imposition of the ban;
- vi. Review the effectiveness in the implementation of the ban; and
- vii. Build consensus among various stakeholders and forge a way forward.

1.3 Scope of work

- (i) *Assess the penetration of computers and related peripherals before and after the imposition of the ban.*
- (ii) *Assess the impact of the ban to computer penetration and usage by the different actors/ stakeholders;*
- (iii) *Assess the trend of import of computers and peripherals before and after the imposition of the ban and make attribution to the ban;*
- (iv) *Assess the current stock of aging computers and clearly classify them as old and new in the country;*
- (v) *Identify and document new developments in the ICT sector impacting on the Ban on importation of Used computers in Uganda;*
- (vi) *Establish and develop an updatable database of players/ agencies involved in the importation of computers (both old and new) before and after the ban;*
- (vii) *Assess the current cop-up mechanisms for institutions that were involved in the importation of second hand/ used computers;*
- (viii) *Design and develop M&E framework for the impact assessment on the ban of importation of used computers;*
- (ix) *Establish and document benchmarks on best practices adopted at the regional and international levels in regard to the importation of used computers and related accessories;*
- (x) *Assess the effectiveness of the different stakeholders in the execution of ban and clearly defining the roles and responsibilities of the various actors;*
- (xi) *Collect and synthesize user opinions and perceptions on the imposition of the ban*
- (xii) *Assess and document key impact dimensions, assumptions, sensitivities and risks involved in lifting of the ban;*
- (xiii) *Facilitate at least two key stakeholders' workshops, at the start and end of the study, to discuss the findings of the impact assessment on the importation of used computers;*
- (xiv) *Design of a programme and process for facilitating the workshop to generate agreed outputs;*
- (xv) *Facilitate the Impact Assessment workshop on the ban of importation of used computers;*
- (xvi) *Document the proceedings and preparation of a workshop report;*
- (xvii) *Present the findings of the impact assessment study on importation of used computers to a wider group of stakeholders;*
- (xviii) *Prepare a final impact assessment report of the study to be distributed to all stakeholders.*

2. METHODOLOGY

2.1. Research design, sampling and sample size selection

A combination of cross-sectional descriptive and analytical survey design was used. The country was divided into four regions (Central, Eastern, Western and Northern) constituted by 15 selected districts having big commercial towns, from which institutions, computer dealers, and users were easily selected to participate in the study (*see Table 1 below*). Traders who do not import computers and members of the general public, who do not use computers, were excluded from the study.

Purposive sampling was used to select the 163 institutions from each category (*i.e. educations institutions, health facilities, Ministries Departments and Agencies of Government (MDAs), Non-Governmental Organizations (NGOs), Faith-Based Organizations (FBOs) and financial institutions*). Computer importers were also selected subjectively. This is a non-probability sampling technique where subjects are selected because of their convenience, accessibility and proximity to the researcher (Hultsch, 2002). The technique is fast, inexpensive, easy and the subjects are readily available. Eight (8) computer importers also participated in the study.

A representative random sample of 638 computer users was determined using Yamane (1967) formular³ using the value of the standard normal distribution given the chosen confidence level of 95% such that $z= 1.96$ at 95% level, probability of success (p) = 50%, and desired level of precision or permissible error (e) =0.0387. Kish (1965) recommends permissible error (e) ≤ 0.1 or 10%. Random sampling gives each sampling unit (*i.e. computer user*), an equally likely chance (probability) of inclusion into the final sample (Cochran 1977; Wandiembe 2009; Moser & Kalton 1977).

Table 1: Allocation of Institutions, computer dealers and users

REGION	DISTRICTS	SAMPLE SIZES		
		No. of Computer Users	No. of Institutions	No. of Computer ⁴ importers
Central	Kampala	115	42	8
	Masaka	47	4	–
	Wakiso	77	5	–
	Mukono	58	9	–
Eastern	Jinja	27	10	–
	Mbale	27	10	–
	Tororo	28	10	–
Western	Mbarara	25	6	–
	Bushenyi	50	11	–
	Kasese	45	8	–
	Kabarole	23	10	–
Northern	Arua	31	7	–
	Gulu	24	14	–
	Lira	41	10	–
	Moroto	20	7	–
TOTAL		638	163	8

³ Yamane (1967) formula assumes a normal distribution. The Yamane formula can therefore be considered suitable for determining an appropriate sample size.

⁴ The authorized computer importers were located mainly in Kampala. Most computer dealers upcountry purchased from some of these importers.

2.2. Data collection methods

The study was conducted largely using quantitative data collection techniques supplemented by some qualitative data. The quantitative data collection involved, semi-structured interviews using questionnaires administered to computer users, importers and institutions. Secondary data, for example, stocks of computers and computer import statistics (FY 2006/7-FY2013/14) were obtained from Uganda Revenue Authority (URA). The qualitative data collection involved use of Key Informant Interview (KII) guide with key stakeholders during consultative meetings (*see list of participants in Appendix II*), case studies⁵ of some institutions/firms and other countries as benchmarks, and desk-based review of documents.

2.3. Management and Data analysis

Quantitative data were entered in EpiData 3.02. Secondary data i.e. computer import statistics were already provided in MS-Excel 2007 spreadsheet by URA.

Data was exported from EpiData to SPSS and STATA for further cleaning using visual and computer aided checks to identify missing cases and outliers based on preliminary summary statistics. Quantitative data were finally analyzed using descriptive statistics for example the mean, frequencies, percentages, and totals generated in STATA 10 and SPSS version 17.

All qualitative data collected from KIIs was transcribed, edited, and entered into Microsoft Word 2007. The analysis focused on content within the texts in relation to the study themes, based on the objectives and deliverables of the assignment. Specifically qualitative data were analysed using thematic analysis, content analysis and discourse analysis techniques. Salient issues that arose from qualitative and quantitative analyses were unearthed through triangulations and synthesis of information.

⁵ *The cases in point were institutions that the ban impacted on highly or directly. The purpose was to understand the extent of the impact of the ban and how the organisation coped, and what their opinion is as regards lifting or not lifting the ban on used computers. It was also intended to document key impact dimensions, assumptions, sensitivities and risks involved in lifting the ban and the alternative for government.*

3. RESULTS AND DISCUSSION

3.1. Penetration of Computers and related peripherals before and after the ban

Computer penetration is the percentage of a country's population that are computer users. In Uganda, the computer penetration rate stood at 0.3% (3 per 1000 people) in 2000 and increased to 0.5% in 2004⁶. The 2005 household based survey on use of ICT pointed out that the national penetration of computers stood at 0.7 % implying that there were only 182,000 computers serving 26 million Ugandans⁷. This rate has greatly increased over the years with the current PC penetration estimated to be 2-3 computers for every 100 people in Uganda; implying that 2.5% of the people in Uganda have computers⁸. Table 2 below indicates an increase in computer penetration in Uganda over the years.

Table 2: Computer penetration rates from various sources

Year	Computer Penetration Rate (%)	Source
2000	0.3	Survey of ICT And Education in Africa: Uganda Country Report June 2007
2004	0.5	Survey of ICT And Education in Africa: Uganda Country Report June 2007
2005	0.7	2005 Household based survey on use of ICT
2010/11	1.5	Uganda National Panel Survey (UNPS, 2010/11)
2012	2.5	National ICT Policy Draft 2012

The increase in the computer penetration rate between 2005 and 2012 was attributed to the fast growing ICT advancements which demand for computer access and usage. Government programmes and policies such as E-government, supply of computers to education institutions and the removal of import taxes on new computers also played a key role in increasing access to new computers.

3.2. Trend of Import of Computers and peripherals before and after the Imposition of the ban

Trends in imports of computers and peripherals were generated from computer import statistics obtained from URA for eight financial years (2006/07-2013/14).

3.2.1. Trends in quantity of computer imports

Over the financial year period 2006/07-2013/14, the total number of computer units imported was 1,243,213 with a total weight of 3,763,696.91kg (See table 19 under Appendix IV). Figure 1 below shows that the total number of computer units imported increased sharply from 64,744 in FY 2006/07 to 156,572 in FY 2007/08 and reached the peak at 435,323 in FY 2008/09 before the ban. This sharp increase was attributed to government's removal of taxes on import of computers whether new or old. The tax policy specifically exempted computer hardware and software from Value Added Tax (VAT) and import tax. However software development, software license fees, maintenance and computer upgrade costs was not VAT-exempted. However, after the ban, the total number of units decreased to 93,546 in FY 2009/10 and then to 80,216 in FY 2010/11 but later slightly picked up and increased gradually to 158,210 units in FY 2013/14 given the new developments in the ICT sector within Uganda.

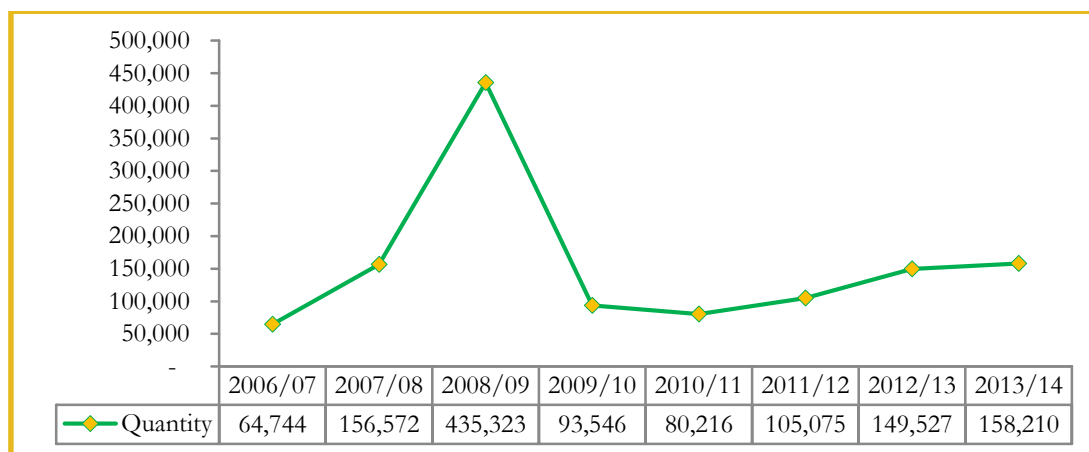
⁶ Glen Farrell: SURVEY OF ICT AND EDUCATION IN AFRICA: Uganda Country Report JUNE 2007

⁷ <http://www.newvision.co.ug/D/9/46/438439>

⁸ National ICT Policy draft 2012

In figure 1 below, the decrease in the number of computers between FY 2008/09 and 2009/10 was in anticipation or speculation of the ban, by computer importers & traders, which was implemented in May 2010. In additions, the proportion of used computers imported was higher than new computers between FY 2008/09 and 2009/10.

Figure 1: Trends in quantity of computers imported per FY

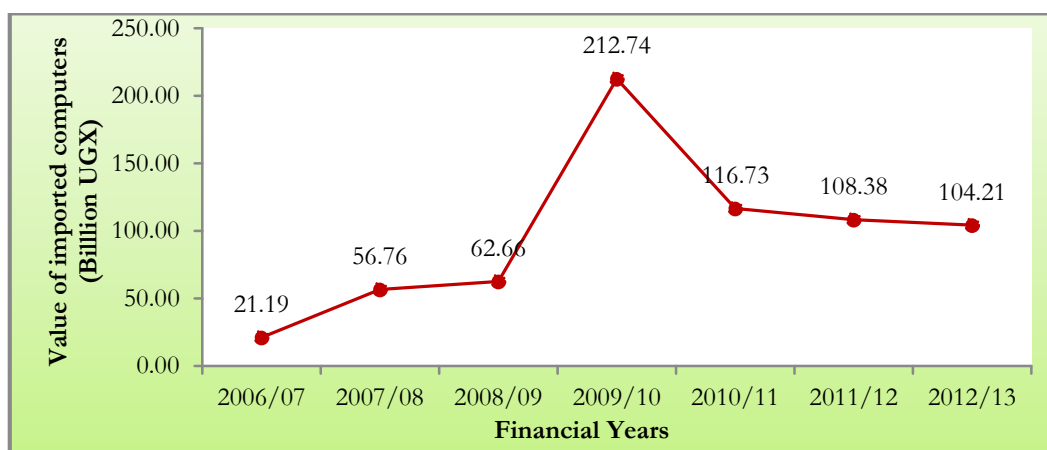


Source: URA Import Statistics 2014

3.2.2. Trends in value of computer imports

Over the financial year period 2006/07-2013/14, the total value of computer imported was UGX 774,393,114,191 (See Table 19 under Appendix IV). Figure 2 shows that the value of computer imports increased from UGX 21.19bn in FY 2006/07 to UGX 212.74bn in FY 2009/10 but after the ban was imposed the value decreased, to UGX 116.73bn in FY 2010/11 and further to UGX 104.21bn in FY 2013/14. However, the overall value of computers imported after the ban (FY 2009/10- 2012/13) still remained higher than before the ban (FY2006/07-2008/09) due to the increased number and higher value of only new computers being imported into Uganda.

Figure 2: Trends in value of computer imports



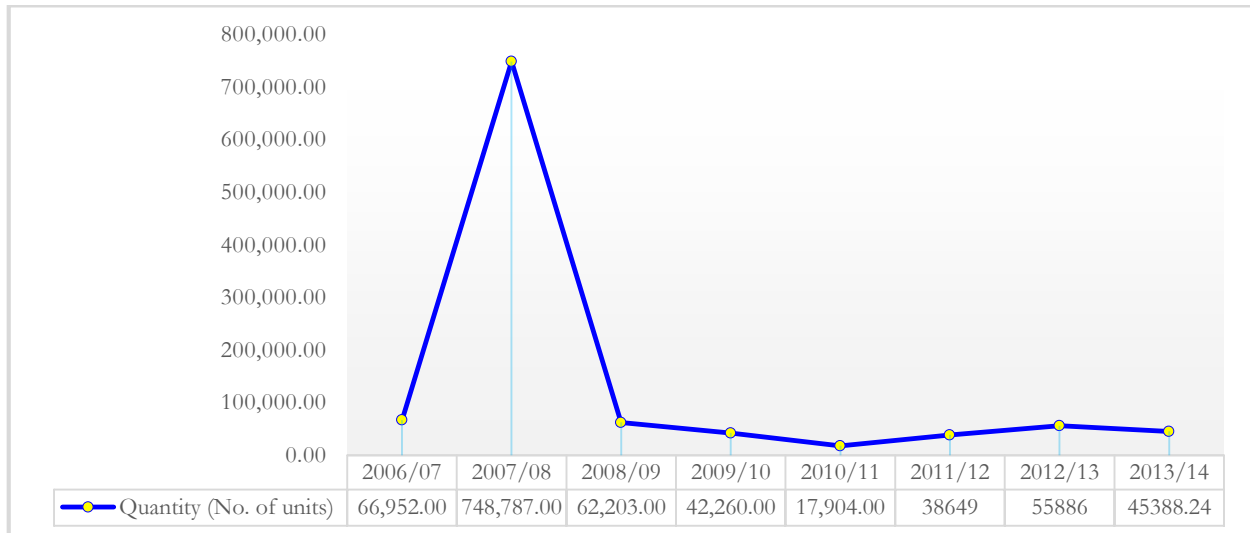
Source: URA Import Statistics 2014

3.2.3. Trends in number of computer peripherals imported per FY

Over the financial year period 2006/07-2013/14, the total number of computer peripherals imported was 1,078,029.24 units with a total weight of 3,763,696.91Kg (See Table 20 under Appendix IV). Figure 3 below shows that the total number of computer peripherals imported increased sharply from 66,952 in FY 2006/07 to 748,787 in FY 2007/08 and then decreased sharply to 42,260 in FY2008/09 and further to 17,904 in FY 2010/11, beyond which it increased at a decreasing rate up to 45,388 in FY 2013/14.

The trend observed was attributed to the number of computers that were being imported in the different FYs given that computer peripherals are complementary to computers.

Figure 3: Trends in number of computer peripherals imported per FY



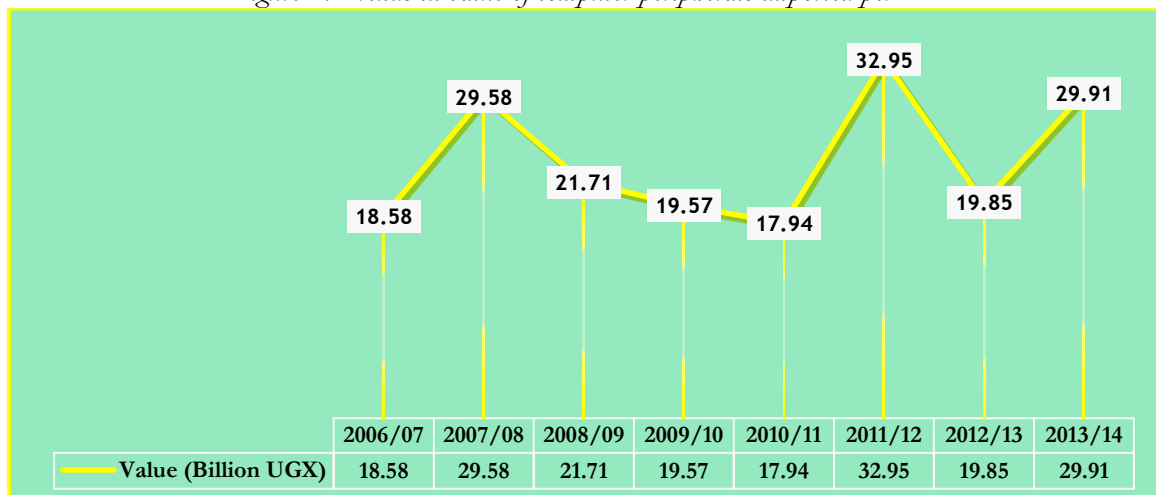
Source: URA Import Statistics 2014

3.2.4. Trends in value of computer peripherals imported per FY

The total value of computer peripherals before the ban (i.e. FY 2006/07- FY2008/09) was UGX 69,87billion but after the ban (i.e. FY2009/10-FY2013/14), the values increased to UGX 120.21 billion yet the total number of units decreased (See Table 20 under Appendix IV). The overall value over the period FY2006/07-Fy2013/14 was 190.08billion.

Figure 4 below indicates that the total value of computer peripherals imported increased sharply from UGX18.58bn in FY 2006/07 to 29.58bn in FY 2007/08 and then decreased sharply to UGX17.94bn in FY 2010/11, beyond which it increased on the overall. The decreases observed between FY 2007/08 and FY 2010/11 were attributed to the anticipation of the ban before May 2010 and the after effects of the implementation of the ban since the peripheral are complementary to computers. Overall, the number of units (quantity) of computer peripherals imported after the ban was less but of very high value which indicated that only new and high quality peripherals were imported to work hand in hand with new computers.

Figure 4: Trends in value of computer peripherals imported per FY



Source: URA Import Statistics 2014

3.2.5. Trends in value of computer spare parts imported per FY

Over the financial year period 2006/07-2013/14, the total value of computer spare parts was UGX 231.8 billion (See Appendix 4.3). Figure 5 shows that the value of computer spare parts imported increased from UGX 21.82bn in FY 2006/07 to UGX39.98billion in FY 2009/10 before the ban.

But after the ban, the value sharply increased peaking at UGX 50.73bn in FY 2010/11 and later plummeted to UGX 22.69bn in FY 2011/12 and continued to decrease to the lowest value UGX14.64bn in FY 2013/14. However, Overall the value of computer spare parts imported after the ban still remained higher while the quantity reduced because of the reduced demand for spare parts since the branded new computers being imported are more durable.

Figure 5: Value in Uganda Shillings of Computer spare parts imported

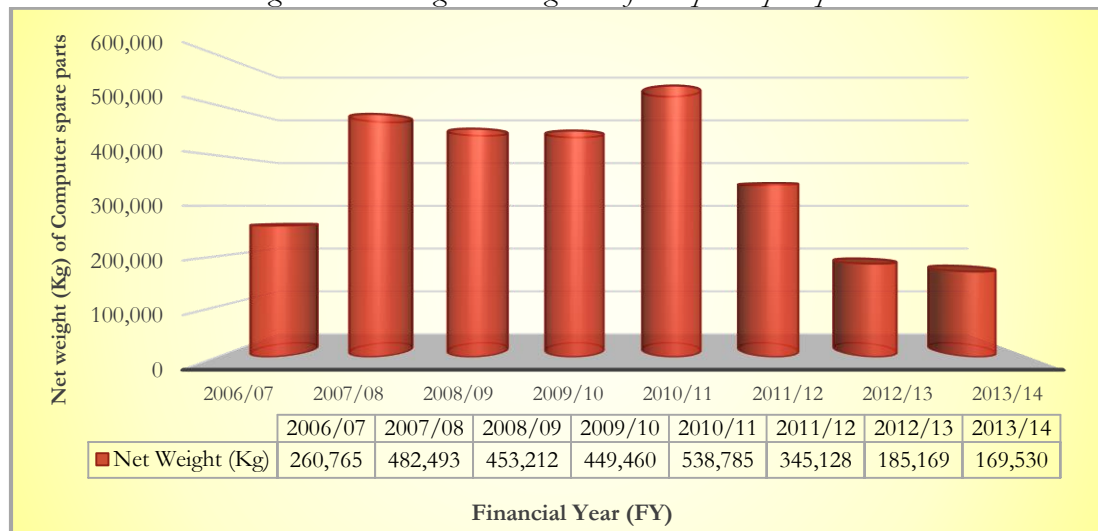


Source: URA Import Statistics 2014

3.2.6. Trends in Net weight of computer spare parts imported per FY

Over the financial year period 2006/2007-2013/2014, the total net weight of computer spare parts imported was 2,884,542 Kg (See Appendix 4.3). Figure 6 below shows that the net weight of computer spare parts imported increased from 260,765Kg in FY 2006/07 to 449,460Kg in FY 2009/10 before the ban. But after the ban, the net weight sharply increased peaking at 538,785Kg in FY 2010/11 and later plummeted to 345,128Kg in FY 2011/12 and continued to decrease to the lowest value of 169,530Kg in FY 2013/14. Overall, the net weight of computer spare parts imported after the ban still remained lower than net weight before the ban.

Figure 6: Net weight in kilograms of Computer spare parts



Source: URA Import Statistics 2014

3.3. Current stock of aging computers and classification of old and new computers

Statistics from NITA-U e-Government survey 2012 indicated that the total number of computers including the damaged ones was 20,689 of which 14,332 computers were in good working condition in Ministries, Departments and Agencies (MDAs) of government (*see Table 3 below*).

On average the 15 DLGs visited had 72 functional computers. This statistic (mean=72 computers) was used to estimate the number of computers in 112 DLGs, the generated estimated total is 8,064 computers in DLGs.

According to the UBOS Census of Business establishments 2010/2011, the total number of business establishments was 458,106 of which only 5% (22,906) were using computers (*see Table 3 below*).

In addition, according to the National ICT Policy 2012, computer penetration in Uganda is 2.5%, hence using an estimated total population of 37.5 million Ugandans in 2013⁹, the total number of individual computer users (i.e. computers in individual hands) was estimated to be 857,000 (*see Table 3*).

Table 3: Current stock of new, old and aging computers

Indicator variable	No. of computers	Assumptions/ Source
No. of working computers in MDAs	16,148	E-Government Survey 2012 by NITA-U
Total No. of computers including damaged in MDAs	20,689	E-Government Survey 2012 by NITA-U
Total No. of computers in good working condition within MDAs.	14,332	E-Government Survey 2012 by NITA-U
Estimated total number of functional computers (old & new) in DLGs in Uganda = (Mean*112 districts) = (72*112)	≈ 8,064	Estimated from Impact Assessment 2014
Business enterprises	22,906	UBOS, 2012
Individual computer users (2.5% of 37.5 million Ugandans own computers)	937,500	State of Uganda Population Report 2013 National ICT Policy Draft 2012
Total No. of New computers imported in FY 2013/14 from URA.	158,210	URA Computer Import Statistics, 2014.

Table 4 below shows that out of the 1558 used computers, 75.1% were functional while out of the 9309 new computers, 90.47% were functional in the 163 institutions which participated in the study.

Table 4: Number of computers acquired new and old in institutions surveyed

Category	Used computers	New computers
No. of computers acquired	1,558	9,309
No. currently functional	1,170	8,422
Percentage Functional	75.1	90.47
% of institutions with computers	33.13	89.57
% of Stock of computers	14.34	85.66

(Source: Survey of Institutions, 2014)

⁹ State of Uganda Population Report 2013

3.4. Benchmarks on best practices adopted at the regional and international levels

Benchmarks on best practices adopted at the regional and international levels in regard to the importation of used computers and related accessories:

In emerging countries, the rapid economic growth has led to a rise in the generation of electrical and electronic waste (e-waste), coming both from local consumers and recycling of second-hand equipment imported for re-use. For most of sub-Saharan African countries, the lack of a sustainable e-waste management infrastructure means that e-waste is collected and recycled in crude methods, causing the release of toxic chemicals to the environment and putting those refurbishing and dismantling e-waste at risk. This is aggravated by the fact these countries usually have little e-waste legislation and no regulations to protect the health of e-waste workers

Not to reinvent the wheel regarding the implementation of the ban, a number of countries that banned importation of old computers were reviewed and their implementation experiences have been included in this report. The countries benchmarked, at the regional and international levels, include Rwanda, Nigeria, and Kenya. Specifically, the review focused on policy & legal frameworks, justifications for the ban, computer hardware and software specifications, ISO standards, and reservations for the ban.

The exercises revealed that the three countries are aware and concerned with the dangers e-waste and there is generally a substantial amount of effort to control e-waste. For example,

i. Rwanda-

- In Rwanda, all computers must be in compliance with EAS390:2005; Information Technology Equipment Safety Requirements.
- No used computer is allowed to enter Rwanda territory for commercial purposes.
- Used computers are only allowed if they are for Education purposes, personal use, church organisations, or orphanages.

Used computers imported for Education Purposes must¹⁰:

- Be less than or equal to two (2) years old if it has been in use and in good working conditions.
- Be less than four (4) years old if never been in use.
- Have a documented proof approved by the ministry of Education justifying the intended use and quantity of computers imported
- Be accompanied by a documented commitment of the donor/supplier that the goods supplied are in good working conditions and meet the requirements of these instructions.

In addition, the ban also emphasizes the following in Rwanda;

- Used computers imported for personal use are limited to two per person and should neither be subjected to approval nor technical requirements contained in these instructions.
- Used computers imported for churches and orphanage centres shall respond to the same criteria as for the school purposes listed above. Here the documented proof of the intended use is approved by the district authorities
- Refurbished computers must be accompanied with a proof of conformity to safe standards signed by the certified and international recognised refurbishing company/supplier in line with the requirements of ISO/IEC 24700.
- Used computer must be accompanied by a third party inspection certificate showing the history of where the computer has been used and for what it has been used previously.

¹⁰ Ministry in the Office of the President in-charge of ICT: *Ministerial guidelines October 2011 related to Importation of used electronic ICT Equipment*

- Used Random Access Memory (RAM), microprocessors and Hard disks are allowed to be imported for commercial purposes provided that the importer intention is not for computer assembling.
- There must be a written agreement between a supplier and the intended user on conditions to comply with before shipment as well as the responsibility to safe disposal of used computers after they have served their purpose.
- Other Electric/ICT equipment must be brand new.

Table 5: Technical specifications of used computers which can be allowed as imports in Rwanda

SN	ITEM	MINIMUM REQUIREMENTS
Desktops with LCD monitors		
1	Microprocessor speed	2GHz
2	RAM	2GB
3	Hard Disk	80GB
4	Optical Device	CD-RW/DVD+/-RW
5	Network	10/100Mbps Network adapter
6	Ports	2 USB Ports, audio in/out
7	Display	Flat Screen with at least 800x600
8	Operating System	Microsoft Windows Vista all versions or Newer versions of Microsoft windows/Equivalent operating system depending on the intended use except the home edition (English Version Only*)
9	Application Software	Microsoft Office 2007 Standard/Professional Edition or higher Version/Equivalent depending on the operating system.
10	Type approval	Type approved genuine products (Hardware and Software)
11	LCD or Monitors	Flat Screens
Laptops		
1	Microprocessor speed	2GHz
2	RAM	2GB
3	Hard Disk	80GB
4	Optical Device	CD-RW/DVD+/-RW
5	Network	WLAN 802.11 b/g/n@2.4GHz 10/100Mbps Network adapter
6	Ports	2 USB Ports, audio in/out
7	Operating System	Microsoft Windows Vista all versions or Newer versions of Microsoft windows/Equivalent operating system depending on the intended use except the home edition (English Version Only*)
8	Application Software	Microsoft Office 2007 Standard/Professional Edition or higher Version/Equivalent depending on the operating system
9	Type approval	Type approved genuine products (Hardware and Software)
10	Battery Life	Two (2) hours
11	Preloaded Software	In case of Preloaded Software, copies of the original CD-ROM for both operating system and application software as well as anti-virus

** Computers intended for schools and orphanages only*

ii. *Kenya*

a) Importation on Used computers

In 2008, Kenya introduced a 25% excise duty on all used computers¹¹ in a bid to reduce computer dumping in the country. The aim was to discourage importation of used computers and encourage local assembly as a means of creating jobs and limiting e-waste, said an official in the MoICT¹². According to the Ministry of Information and Communication, New computers last up to 8 years, compared to second-hand equipment that have a 3 year life span.

There was a significant increase in imported second-hand computers after the government introduced zero-rated duty on these goods in 2006. A study by Eco Ethics International conducted in 2007 revealed that the number of imported second-hand computers doubled following the removal of VAT in the country. UNEP estimated the e-waste generated annually in Kenya at 11,400 tonnes from refrigerators, 2,800 tonnes from TVs, 2,500 tonnes from personal computers, 500 tonnes from printers and 150 tonnes from mobile phones and yet in Kenya and most parts of Africa and Asia, there are no proper regulations to manage disposal of e-waste meaning much of the waste ends up in rubbish pits making recovery and recycling difficult and yet it, can be used as a resource and an economic stimulus (Press Release UNEP, 2010).

In a bid to prevent dumping and reduce e-waste, Kenyan government as a signatory of both Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and the Bamako Convention on the Ban of the Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa; introduced the 25% tax, and Import Declaration Fees of 2025% of cost, (CIF) on all imported used computers in 2008.

b) How e-Waste is being handled in Kenya.

- The Kenya Bureau of Standards runs the pre-export verification of conformity programme that aims to minimise the national risk of unsafe and substandard goods entering into the country. The Bureau conducts inspections of second-hand computers entering the country to ensure that they are utilisable.
- The Kenya ICT policy (2006) contains a clause on e-waste, which makes the appropriate recycling and disposal facilities for e-waste part of the requirements for renewal of communications licences and the Communications Commission of Kenya (CCK) has incorporated this requirement into current legislation.
- It has also been proposed that the responsibility of handling e-waste and costs related to e-waste should be left to manufacturers, as is the case in European countries, the “producer pays” principle of the Waste Electrical and Electronic Equipment (WEEE) Directive compels producers of electrical equipment to fund the end-of-life recycling of equipment.
- Developed e-waste management guidelines 2011.
- HP is providing funding along with expertise to manage performance, reporting and e-waste support to ensure proper standards, specifications and the processing of materials is upheld.

¹¹ Deloitte:2008 East Africa Budget Insight

¹² <http://www.networkworld.com/news/2008/081908-kenya-introduces-25-percent-tax.html>

c) Recycling plants in Kenya

Described below are some of the plants supporting management of e-waste in Kenya by providing green jobs, an alternative to unsafe recycling practices and a path to a cleaner environment.

(i) The East Africa Compliant Recycling

EACR is operating Kenya's first e-waste recycling facility, operating to international health, safety and environmental standards and establishing a local, sustainable e-waste recycling industry.¹³. Due to the presence and services of the EACR centre, HP expanded its free hardware recycling service for commercial and enterprise customers to Kenya by designing and establishing *The East Africa Compliant Recycling* in Mombasa in October 2011 as a pilot project with funding from HP as a scalable model for e-waste recycling. It was the first facility of its kind in East Africa to test a practical approach to e-waste recycling with the objectives of; Analysing and measuring volumes of e-waste returned; establishing the process to safely separate the products into parts; and Identifying facilities and markets to process all the resulting dismantled materials; and still remains the only recycling facility in Kenya that accepts, dismantles and separates all e-waste components as in large part. The project will commence with an initial pilot of four collection points each working with a network of registered informal sector workers

The HP Planet Partners Program that is available in 57 countries and territories around the world has resulted in HP reaching a milestone of responsibly recycling 2 billion pounds of electronic products and supplies since 1987 to date.

In April 2012 HP announced that this facility would expand under new ownership and with a broader mandate. The renamed East African Compliant Recycling facility is currently at a transition phase, and its running has been taken over by a UK-based professional recycler named Reclaimed Appliances Ltd., which plans to open a Nairobi facility in the near future which specializes in separation and dismantling of e-waste including domestic appliances, ICT electronics and mobile phones. The project will commence with an initial pilot of four collection points each working with a network of registered informal sector workers

(ii) Safaricom supports an e-Waste management initiative by Computer for Schools Kenya (CFSK):

CFSK has established e-waste management initiatives to handle electronic recycling needs. The project dismantles and separates electronic waste, with reusable parts like plastics and aluminium being sold to the informal market. There is no specialised equipment available to deal with the rest of the hazardous toxic material, so CFSK is currently exporting this to countries with appropriate facilities, mainly in Europe and Asia.

(iii) Nokia and Sony Ericsson as well as local service providers have introduced policies for “taking back” end-of-life equipment, demonstrating a willingness to contribute to e-waste management

(iv) Other civil society organisations that are involved in waste management include the Kenya National Cleaner Production Centre, Kayole Environmental Management Association (KEMA), Practical Action, and World Vision International whereas organisations like Hewlett-Packard supported KICTANet's e-waste study, which is currently being used to inform policy discussions.

(v) The E-waste Solutions Alliance for Africa, a collaboration between Dell, HP, Nokia, Phillips and the recycler Reclaimed Appliances (UK) Ltd has been working with key stakeholders and the Government of Kenya to develop the principles and processes needed for responsible collection and recycling of e-waste.

¹³ <http://www.thepeople.co.ke/40388/e-waste-management-boost-recycling-plant-set-open-machakos/>

iii. Nigeria

The Nigeria's Federal Executive Council (FEC) banned the import of secondhand computers and other used electronic items otherwise known as *Tokunbo*. The ban is being implemented through a restrictive tariff regime to discourage the importation of such items. The ban on unserviceable electronic items was informed by the need to check the environmental hazards being constituted by such items. The banned items were usually imported into the country, disassembled and sold in parts to service similar products, contained toxic parts which are dumped indiscriminately¹⁴.

A 2011 BBC panorama investigation found that 100,000 tonnes of e-waste is leaked out of the UK every year and 77% of e-waste from England and Wales ends primarily in Ghana and Nigeria.¹⁵ According to Basel Action Network (BAN 2005) study in conjunction with BCC Nigeria, Nigeria imported about 500,000 used computers annually through the Lagos port alone; About 25% of the imports are functional used electronics while the remaining 75% is junk or unserviceable, which is eventually burnt or dumped carelessly. A preliminary survey conducted in Lagos area, after the BAN 2005 study, showed that the volume of imported used electronic equipment reduced drastically as a result of the steps taken to monitor the importation of Used Electrical and Electronic Equipment (UEEE) into Nigeria.

The Nigerian guide for importers of UEEE states the following provisions:

- Every importer of UEEE should register with National Environmental Standards and Regulations Enforcement Agency (NESREA)
- Nigeria allows the importation of new EEE and functional UEEE
- The country banned the importation of Waste EEE and near-end-of-life electrical/electronic equipment
- Any Waste EEE imported into Nigeria will be sent back to the port of origin
- Administrative punitive fee shall be imposed on the carrier of WEEE or UEEE mixed with WEE

The UEEE in Nigeria is considered waste if:

- The product is not complete and some essential parts are missing;
- Functionality or safety is impaired;
- The appearance is generally worn or damaged;
- The packaging is insufficient;
- The item has among its constituent part(s) anything that is required to be discarded including refrigerators or air conditioners containing Ozone Depleting Substances (ODS);
- It is destined for disposal or recycling instead of re-use; and
- It is old or outdated destined to be cannibalized to gain spare parts.

National Laws and Regulations Relating to E-Waste Control¹⁶

- Environmental Impact Assessment Act Cap E12: The objective is to ensure that environmental factors are considered in the decision making process while likely adverse/hazardous environmental impacts are identified and minimized.
- Harmful Waste (Special Criminal Provisions) Act Cap HI, 1988 and updated in 2004;
- The National Environmental (Sanitation and Waste Control) Regulation 2009;
- Guide for Importers of Used Electrical and Electronic Equipment (UEEE);
- The National Environmental (Electrical Electronic Sector) Regulations 2011

¹⁴ <http://www.balancingact-africa.com/news/en/issue-no-391/computing/federal-government-b/en>

¹⁵ Source: <http://ejatlas.org/conflict/e-waste-in-agbogbloshie-ghana>.

¹⁶ Update on e-waste management in Nigeria: A Presentation made at the 3rd Annual Meeting of the Global E-Waste Management Network (GEM3). NESREA, July 2013

3.5. New developments in the ICT sector impacting on the Ban

According to NITA-U (2011/12) annual report, A Memorandum of Understanding (MoU) with the Uganda National Bureau of Standards (being the national umbrella body for development of standards) was signed towards collaboration in the development of standards. To supplement the MoU, an inter-agency technical committee for development of IT standards constituted and facilitated to its work.

In the FY2012/13 a total of sixteen (16) International IT Standards from ISO/IEC were reviewed, approved and declared as National IT Standards for adoption by the National Standards Council (NSC). The standards cover the areas of Information Technology IT Security Management, Information Technology Cyber Security, Information Technology Security Incident Management, Information and Communications Technology (ICT) Disaster Recovery Services, IT Security Risk Management , Audit and Certification of IT Security Management Systems, IT Network Security, IT Corporate Governance and Software Acquisition. The standards were gazetted in April 2013 through the Uganda National Bureau of Standards

3.5.1. Legal and Regulatory frameworks

A number of legal and policy frameworks have been drafted and put in place, such as;

- National e-government Policy Framework 2010.
- Country Code Top Level Domain (CCTLD) policy
- National ICT Policy 2012.
- Analogue to Digital Migration Policy
- National e-waste Management policy 2010
- Cyber laws (Computer Misuse Act 2011, e-Signature Act & e-Transactions Act)

The Cyber Laws were based on international standards and norms as set-out in the:

- United Nations Commission on International Trade Law (UNCITRAL) Model law on electronic Commerce
- World Intellectual Property Organization (WIPO) Copyright Treaty (WCT)
- WTO Basic Telecommunications Agreement.

Other policies, Laws and regulations being developed/reviewed include¹⁷;

- a) *National IMS Policy*
- b) *National Telecommunications Policy*
- c) *National Broadband Strategy and Policy*
- d) *National Data Protection and Privacy Bill*
- e) *National Information Security Framework*
- f) *National Postcode & Addressing Bill*
- g) *National Broadcasting Policy*

Other regulatory issues addressed in these laws include;

- Intellectual Property for software development, etc
- Privacy and Integrity laws
- Policy issues for usage of Internet resources
- Regulation and standards of Computer hardware equipment and accessories
- Capacity building and
- Software standards

¹⁷ MoICT (2013): Presentation at the Global South-South Development Expo Mini Partnership Forum on Enhancing ICT Development and Connectivity for LLDCs. 1st October 2013. Nairobi, Kenya.

Therefore NITA-U has set up or prepared a firm ground to enable the continuing roll out of infrastructure to support IT applications in different sectors; and to deliver e-government and e-governance services to improve government processes and facilitate improved service delivery.

3.5.2. ICT infrastructure in place

- a) Establishment of the National Backbone Infrastructure/Electronic Government Infrastructure (NBI/EGI) project.
- b) Setting up of District Business Information Centers (DBICS);

3.5.3. Introduction of ICT in the education curriculum

Under the NDP 2010/11 -2014/15, GoU set out the objective of *improving effectiveness and efficiency under the secondary education* through the review of the secondary education curriculums to prioritize ICT and supporting construction of the laboratories for ICT. In regard to achieving this objective, the Ministry of Education and Sports (MoES) in Uganda, took the initiative to improve the ICT skills given to secondary school students before they join the universities, by partnering with the National Curriculum Development Centre (NCDC) which was assigned to come up with a curriculum for subsidiary ICT, for UACE certification in 2011. Introducing subsidiary ICT will enable students develop and consolidate their knowledge of ICT and be aware of new and emerging technologies as well as develop ICT skills to enhance their work in a variety of subject areas¹⁸. In so doing factors like low levels of ICT literacy in the country, high demand for ICT skills as a major requirement for employment, unequal access to basic ICT training and the need to reduce the digital divide are being addressed.

Enrolments were made in 2012 with a good number of the students offering subsidiary ICT however there was a challenge of inadequate ICT infrastructure in secondary schools. The UCC 2012 study, titled ***“A Survey on the Status of Computers in Secondary Schools of Uganda: Opportunities and Challenges,”*** showed that of the 664 schools surveyed, only 448 had computers, meaning 180 schools had none. Also, amongst the surveyed schools, only 395 had at least a room for computer studies, while 121 had no such rooms. Only 21.4% or 142 had internet connection, while 23.3% or 156 schools had no internet connection. Thus implying students did not have sufficient access to computers and many of the schools lacked funds to pay for internet access and facilitate students’ online research. Over 36% of the schools surveyed received their computers through UCC under the Rural Communications Development Fund and the rest being through parents’ contributions, donor agencies and schools’ initiative.

By September 2013, Government efforts through the Rural Communication Development Fund at UCC had established fully equipped modern computer laboratories in over 1,000 government-owned secondary schools across the country. According to UCC, the process started with supplying computers to six universities each receiving 80 computers, while the private one received 40 computers each. Out of the 1000 computer labs in government-owned secondary schools, 600 have already been connected to the internet while the rest will acquire internet within the next one year. Other than being used as a fountain of knowledge by the schools, the computer labs are also been used to impart ICT skills in residents. The residents who live close to the secondary schools make use of the computer labs during evening hours and on holidays when not in use by the students. Each of these laboratories set up carries at least 40 custom made computers built to suit conditions in Uganda’s secondary schools. The remaining 50 government owned schools are set to get computers this year. The question however remains on whether computers can be easily accessed by the students for practice and learning in both the private and government secondary schools (computer student ratio is very low) as well as the ability of schools to afford new computers especially given that now subsidiary ICT is part of the UACE curriculum.

¹⁸ MOES, NCDC 2013: *Uganda Advanced Certificate of Education :Subsidiary Mathematics, Subsidiary Information and Communication Technology* , VOL 10

3.5.4. Management of E-waste

E-Waste for short - or Waste Electrical and Electronic Equipment (WEEE)-is the term used to describe old, end-of-life or discarded appliances using electricity. It includes computers, consumer electronics, fridges etc which have been disposed off by their original users. It is estimated that 75% of electronic items are stored due to uncertainty on how to manage them.

This electronic junk lies unattended in houses, offices, warehouses etc. and is normally mixed with household waste, which is finally disposed off at landfills. This necessitates implementable management measures.

An assessment of e-waste in Uganda was carried out by United Nations Industrial Development Organization (UNIDO) on use of personal computers and partly on associated CRT and LCD monitors, and the research. The study indicated that Government owned the highest number of ICT equipment in the country followed by Non-Governmental Organizations (NGOs) at 75%, large enterprises at 20%, private households, Small and Medium Enterprises (SMEs) and others at 5%.

The E-Government Survey 2012 conducted by NITA-U showed that out of the 93 government institutions (MDAs having a total 21,907 computers, only 70% were found to be working and 30% not working (6,572 computers). This is one of the indications of the accumulating e-waste in the country which would not be disposed off in a well-planned and managed manner. The pictures (1 & 2) below indicate accumulation of e-waste in government institutions.

Picture 1: Obsolete Monitors



Picture 2: Obsolete CPUs



(Source: Nakawa Vocational Training Institute, 2014)

It is for this reason that the Government set up the e-waste management policy in 2010 so as “*To ensure the safe management of e-waste in Uganda*” and by doing so the policy contributes towards achieving the 8th objective of the NDP-1, which advocates for promoting sustainable population and use of environment and natural resources.

The e-waste management policy supports the creation of an enabling environment for private investors to address the e-waste management challenge. However at the moment NEMA has not registered any firm to deal in e-waste management. There is only one incinerator plant owned by government and operated by UPDF in Nakasongola. MoICT attributed their failure to attract investors to set up e-waste management plants to the fact that the country does not have enough e-waste to justify setting up a major plant, which is a huge investment. In addition, there has not been a comprehensive study to determine the amount of e-waste generated and generation rates per type of e-waste to inform and sustain investment in the e-waste plant. Based on the documents reviewed, the main sources of E- wastes are shown in Table 6 below.

Table 6: Sources and types of electronic wastes

Main source/categories	Type of e-waste.
Large Household Appliances	Washing machines, Dryers, Refrigerators, Air-conditioners, etc.
Small Household Appliances	Vacuum cleaners, Coffee Machines, Irons, Toasters, etc
Office, Information & Communication Equipment	PCs, Latops, Mobiles, Telephones, Fax Machines, Copiers, Printers etc. (see picture 1 & 2 below)
Entertainment & Consumer Electronics.	Televisions, VCR/DVD/CD players, Hi-Fi sets, Radios, etc
Lighting Equipment	Fluorescent tubes, sodium lamps etc. (Except: Bulbs, Halogen Bulbs)
Electric and Electronic Tools	Drills, Electric saws, Sewing Machines, Lawn Mowers etc. (Except: large stationary tools/machines)
Toys, Leisure, Sports and Recreational Equipment	Electric train sets, coin slot machines, treadmills etc.

Other initiatives being done by Government through MoICT and NITA-U include;

a) A multi stakeholder engagement with the E-waste Solution Alliance for Africa

The overall objective of the engagement is to implement a practical collection and treatment e-waste management solution in Uganda. The Alliance comprises of Dell, Nokia and Toshiba among others and Reclaimed Appliances as one of the e-waste recycler with a recycling plant in Nairobi-Kenya. Through this initiative, it is envisaged that e-waste collection centres and a treatment facility shall be established in the Country. The Alliance held a multi-stakeholder consultation with the Ministry of ICT, NITA-U, KCCA, NEMA, Ministry of Water and Environment and UCC through which a Concept Paper and Pilot Project Plan were developed and are being reviewed by the stakeholders for onward approval through the Government structures. Some of the key activities that shall be accomplished through the initiatives include:

- a) *Establishment of the Governance Structure for the initiative*
- b) *Harmonization of East African legislation including Standards on E-waste Management*
- c) *Alignment of the Project with other Government initiative such as KCCA Waste Management Project.*
- d) *Identification of e-waste Collections Sites and establishment of requisite infrastructure*
- e) *Creation of Public awareness on the initiative.*

b) Development of guidelines for acquisition and disposal of IT products

NITA-U has within its mandate drafted the Guidelines for acquisition of IT Hardware and Software for Government Ministries, Departments and Agencies (MDAs). The guidelines were shared with PPDA as well as Government Institutions under the strategy for Rationalization of IT Services in Government. The guidelines are intended to be incorporated within the Procurement chain for the acquisition of IT Products (Hardware and Software). Furthermore, NITA-U is currently in the process of developing guidelines for disposal of IT Products (IT Hardware and Software) in consultation with PPDA. This will complement the PPDA guidelines on disposal but will specifically focus on the disposal of IT equipment as well as software across Government Institutions. In addition, NITA-U developed and shared with the PPDA the guidelines for Valuation of Computers and Accessories for disposal. The Valuation guidelines are intended to guide MDAs to determine/arrive at depreciations of computers and accessories for disposal.

Bodies like DIREE, UETA and UWMAC have proposed the need for Government to opt for short term solutions to e-waste management which involves exporting the e-waste to other countries that have recycling plants. Some parts of the computer such as the mother boards are being sold to countries like Turkey that in turn use them for other purposes.

They also pointed out that collection points for computers where people and institutions can dispose off their computers should be established by Government for easier planning of the existing stock and investment attraction. UETA proposed electronic workshops as a starting point for collection of e-waste. The need for capacity building amongst the stakeholders was also suggested so that informed decisions can best be made to supplement legislation and management of e-waste

Box 1: Case study of a Recycling firm affected by the ban:



Second Life Uganda is one of the companies that was affected by the ban and has attempted to support the country in management of e-waste. Second life was dealing in refurbishment and sale of used computers before the ban, however had to shut down that line of business. In 2010, the company partnered with World Loop international which is a leading company dealing in E-Waste recycling across the EAC countries i.e. Kenya (East African Compliant Recycling (EACR) & WEEE Centre), Rwanda (GLEM) and Tanzania (Viafrica Co.) and other African countries to deal in management of e-waste as a means of solving the problem in regards to the end-of-life computers in our country given that banning importation of used computers is not a permanent fix to this problem. They acquired an operation licence from NEMA to deal in e-waste management prior to commencing operations

Second life collected mainly computers as well as TVs and cartridges and the payment of the old computers bought ranged between UGX 10,000- UGX 25,000 for each depending on whether it contained the RAM and the processor with the most gold needed. The collected computers were then dismantled, loaded onto a container and shipped to World Loop based in Belgium.

After one year of being in operation, the business closed due to failure to meet their average supply of 500 computers on a monthly basis. Second life blamed it on the failure of government to set up collection centres where people can easily bring their used or obsolete computers. The firm believes that market exists especially amongst the government institutions which have the highest proportion of obsolete computers lying to waste in stores. There is need for government to set up a disposal policy & mechanism to manage e-waste so that e-waste can easily be made available to the e-waste dealers in a bid to support them in their operations given that they are assured of the market.

3.4.4. National ICT Standards

One of the objectives of NITA-U is *to set standards & regulations* pertaining to the ICT sector which they are currently working on in collaboration with UNBS. The current standards set by UNBS are generalized for all electronics. Development of the specific standards, regulations and guidelines will provide ample support in facilitating the implementation of policies in the ICT sector. The strategies being aligned include;

- a) *Developing guidelines and setting standards for software and hardware development, through public and private partnerships;*
- b) *Developing and setting standards for ICT equipment importation;*
- c) *Providing technical guidance to both the public and private sector, including standards for software and hardware development and usage; and*
- d) *Enforcing and monitoring compliance to set standards.*

3.4.5. Other developments in the ICT Sector

Under the Skills and human resource development approach to spur industrial transformation in the National Industry Policy 2008, *investing more in science and technology including ICT and digital technologies to increase resources for business, industrial development and improved competitiveness* is one of the strategies being done by the government with the private sector in order to realize the Vision and Objectives of the National industrial Policy. The National Industrial Sector Strategic plan¹⁹ identifies Science, Technology and Innovation as one of the intervention areas to strengthen initiatives for industrial and technology Development including, Strategic alliances, acquiring appropriate technologies, technology upgrading and transfer and building effective linkages within and outside Uganda with a view to ensuring the continuous acquisition and provision of knowledge resources for industrial development and competitiveness. In order to achieve it, some of the activities to be undertaken include establishing a one-stop computer-aided design/Computer aided manufacturing (CAD/CAM) and other manufacturing centres, strengthening the Technology Development Centre as well as forming and operationalizing technology platforms among others. The feasibility study on IT parks is underway²⁰

3.6. Current Cop-Up Mechanisms for Institutions that were involved in the Importation of Used Computers;

Organisations such as DIREE which consists of traders who used to deal in importation of used computers have resorted to laying off their staff, setting up repair workshops and being agents for new computers as a means of continuing their business.

Box 2: Case study of a firm that used to deal in importation of used computers:

BI TECH International Ltd is one of the pioneering ICT companies in Uganda. From 1997 up till 2004, BI TECH was dealing in the importation of used computers that would be resold on the Ugandan market because at that time used computers were much cheaper than branded new computers. BI TECH by 2007 had established links from a few of the developed countries that had more advanced ICT like for example Australia, Netherlands and the USA to mention but a few; and imported their used computers into Uganda for sale so as ensure that ICT is accessible and affordable by at least all Ugandans. However, in FY 2009/10, the ban on importation of used computers forced BI TECH to abandon its business dealings in importation of used computers and look elsewhere.

NB: *The company advocates that ICT software and hardware into the country should be left tax free because an increment in the taxes like in the recent FY 2014/15 budget on ICT items can only discourage the development of the sector in Uganda.*

Publications, for example, RNW Africa (2011) asserted that when the ban was implemented in May 2010, importers of second hand appliances were the first to cry out. The 'E-waste Special Interest Group' estimated that 80% of Uganda's 200 ICT enterprises (i.e 160 ICT enterprises) went out of business or relocated since the ban. Formal computer refurbishers such as Uganda Green Computers and Second Life Uganda who previously imported used computers and refurbished them for resale also closed down.

The NGOs, FBOs and other private sector players resorted to buying branded new computers from authorized dealers. NGOs which participated in this 2014 impact assessment revealed that they no longer receive donations of used computers since the ban came into effect. An example of such an organisation is Camara and i-network (*See Box 3 below*).

¹⁹ National Industrial Sector Strategic Plan 2010/11 – 2014/15

²⁰ *MoICT sector Issues Paper for NDPII, 2014*

Box 3: Case of NGOs that dealt in importation of used computers

Camara Uganda:

Camara Uganda was established in 2009 in Fort Portal, in the West of the country. It is an Ireland-based NGO that sources used computers from Irish and British companies and individuals. It cleans data off the hard drives, and refurbishes and loads them with educational software, before setting them up as learning centres in schools in Africa and Ireland¹. Camara initially partnered with Mountains of the Moon University, who hosted their operations Hub. Camara Uganda supplied ICT in education across the country and received four containers of computers which were delivered to more than 100 schools, helping Ugandan children receive ICT skills. Camara Uganda was fortunate to receive many in country donations since starting in 2009. In FY 2009/2010, the Government of Uganda introduced a complete ban on refurbished computers. As a result of this, Camara was forced to downsize its Hub there to a Maintenance Hub, servicing the existing schools and institutions and providing ongoing training to its teachers. Camara is still hopeful that the ban will be lifted in the future so that it can return to full service delivery of computers in education, training, local software development and maintenance. The current Hub is situated at the Pentacostal University, Fort Portal.

I-Network:

I-Network is an ICT for development (ICT4D) organization which had their pilot project under the three pillars of intervention i.e. formulation & implementation of ICT in various sectors (education, health, governance, & entrepreneurship), capacity development of ICT project implementers, and knowledge sharing experiences and lessons which were affected by the ban. Implementation of their pilot projects was hampered because it based on development of ICT through supplying good second hand ICT equipment to farmer groups and institutions in Kayunga and Mbarara districts. Therefore, it scaled down its operations. However, over time it has also developed expertise in ICT4D within Uganda with the support of its counterparts International Institute for Communication and Development (IICD) in the Hague.

3.7. Monitoring and Evaluation Framework for the impact assessment on the ban;

The Monitoring and Evaluation (M&E) framework describes the proposed result areas along with their proposed indicators which shall be used to measure change overtime as a result of the ban. It also describes how data on the indicators will be collected and from where, who will be responsible and how often reports on the indicators will be written and distributed. The draft M&E framework is indicated in Appendix III and will be used to measure the effectiveness of the ban. The valid and reliable indicators were carefully selected in consideration with the results from this impact assessment study 2014. Consequently, the indicators are “CREAM,” that is,

- Clear (precise and unambiguous);
- Relevant (appropriate to the subject at hand);
- Economic (available at reasonable cost);
- Adequate (able to provide sufficient basis to assess performance); and
- Monitorable (amenable to independent validation).

3.8. Effectiveness of the different stakeholders in the execution of the ban and defined roles and responsibilities of the various actors;

3.8.1. Effectiveness of the different stakeholders in regard to their defined roles and responsibilities in executing the ban

The MoICT consulted only NEMA which provided information to support the Ministry’s decision to impose the ban. Immediate action in terms of implementing the ban was undertaken by UNBS and URA who carried out the inspection of computer imports at entry points. When a consignment enters the country and is found to be a used computer, one of three options are taken;

- ❖ *The consignment is transhipped to another country under the supervision of URA;*
- ❖ *The consignment is re-exported to another country; or*
- ❖ *It’s destroyed at the owners cost with supervision from URA and NEMA*

Given that the ban was set up with no clear specifications/standards set for computers, URA simply considers the packaging of the computers to identify whether it is a new or used computer. The ideology is that used computers come wrapped in polythene bags whereas new computers come wrapped in boxes with Styrofoam. This weak inspection mechanism has led to the infiltration of used or cloned computers in the market in some cases. Other factors such as inadequate staffing, weak collaboration amongst government bodies and continued allowance of used computer spare parts which are assembled and sold have affected effective implementation of the ban.

However, the computer import statistics have shown the ban as being effective since its implementation in 2009/10. There was a drastic 78.51% decrease in the quantity of imported computers from 435,323 computers in 2008/2009 to 93,546 computers in 2009/2010. The quantity of computers has shown the ban as being effective given that there was a significant drop. The pre-shipment inspection initiative by UNBS as the undertaking of developing computer specifications is set to strengthen implementation of the ban. Table 7 below summarizes the different roles and responsibilities and effectiveness of the key stakeholders in implementation of the ban.

Table 7: Roles and responsibilities and effectiveness of key stakeholders in executing the ban

Actor/ Stakeholder	Roles and responsibilities in execution of the ban	Effectiveness and remarks
NITA-U	<p>Standards and Certification: Under the ICT sector (public domain), NITA-U is at the regulatory level. The mandate of the NITA-U is <i>“To coordinate, promote and monitor Information Technology (IT) developments in Uganda within the context of National Social and Economic development.”</i></p> <p>One of NITA-U’s key functions is to set, monitor, regulate and enforce standards for Information Technology Hardware & software planning, acquisition, implementation in Government ministries, departments and agencies.</p>	<ul style="list-style-type: none"> • An MoU signed with the UNBS towards collaboration in the development of standards. • Inter-agency technical committee for development of IT standards constituted and facilitated to its work. • In the FY2012/13 a total of sixteen (16) International IT Standards from ISO/IEC were reviewed, approved and declared as National IT Standards for adoption by the National Standards Council (NSC). • Draft standards for acquisition of computer hardware and software in government were developed. • Draft guidelines for valuation and writing off of aging computers and peripherals were developed
URA	Enforce the ban basing on their mandate and computer specifications provided by NITA-U & UNBS	<ul style="list-style-type: none"> • Collaborates with UNBS to inspect computer imports at entry points • Collection of computer import trade statistics • Stops entry of old/used computers and impounds old computers which do not meet the set standards.
UNBS	<ul style="list-style-type: none"> • Working with NITA-U to review and set standard specifications for new enforcing the computers • Support URA in enforcing the ban within their stipulated mandate 	<ul style="list-style-type: none"> • Effective however understaffing at the border points is a challenge • UNBS put in place the pre-verification for conformity system, through partnership with International compliancy assessment agencies to inspect and verify the quality of imports before they are shipped to Uganda
MoICT	Under the ICT sector (public domain), the MoICT is at the policy level. The mandate of the MoICT is <i>“To provide strategic and technical leadership, overall coordination, support and advocacy on all matters of policy, laws, regulations and strategy for ICT in Uganda”</i>	<ul style="list-style-type: none"> • Effective; i.e. provided overall policy guidance and support during enforcement of the ban and setting of ICT standards. • Several legal policy and regulatory frameworks have been formulated e.g cyber laws.
NEMA	Support the development of E- waste management policies identify and licensing potential e-waste recycling firms NEMA is working with URA handling the customs at the border points to ensure that used computers don’t enter.	<ul style="list-style-type: none"> ▪ Provided background information to inform reviewing of the ban ▪ Participated in the formulation of e-waste management policy.
UCC	<ul style="list-style-type: none"> • UCC was indirectly involved in the implementation of the ban. This was through other government programmes 	Effective, for example, the GoU through the UCC has established fully equipped modern computer laboratories in over 1,000

Actor/ Stakeholder	Roles and responsibilities in execution of the ban	Effectiveness and remarks
	<p>aimed increasing access to ICT services e.g.</p> <ol style="list-style-type: none"> i. <i>Setting up and equipping district business information centres (DBICs)</i> ii. <i>Distribution of new computers to academic institutions and supported the setting up of laboratories and in-service training of IT teachers so as to increase access to use of new computers</i> 	<p>government-owned secondary schools across the country.</p> <p>According to UCC, the process started with supplying computers to six universities each receiving 80 computers, while the private one received 40 computers each.</p> <p>Out of the 1000 computer labs in government-owned secondary schools, 600 have already been connected to the internet while the rest will acquire internet within the next one year²¹. Other than being used as a fountain of knowledge by the schools, the computer labs are also been used to impart ICT skills in residents. The residents who live close to the secondary schools make use of the computer labs during evening hours and on holidays when not in use by the students.</p> <p>According to UCC, the process started with supplying computers to six universities each receiving 80 computers, while the private one received 40 computers each.</p> <p>The project did not cater for Private secondary schools and all primary schools which is unaffordable for government now since there are over 13,000 government owned primary schools in the country.</p>
KCCA	<ul style="list-style-type: none"> • KCCA is mandated to monitor delivery of services within its area of jurisdiction. KCCA registers and licences traders who include computer dealers in Kampala. 	<p>KCCA was not directly involved in the implementation of the ban. Therefore, it has been less effective in implementation of the ban. KCCA should work with UNBS and URA in registration, licencing and monitoring activities of the traders dealing in computers especially given that majority of them are based around the city.</p>

(Source: Primary Survey data, 2014)

3.8.2. Effectiveness of the ban as a result of implementation by the different stakeholders

The Ban was effective in terms of the following;

- i. Reduced importation of the used computers in the country i.e. the sharp decline in the quantity of imported computers i.e. from 435,323 in FY 2008/9 to 93,546 computers in FY 2009/10. Many of the businesses that used to deal in used computers have resorted to dealing in new computers and setting up repair workshops as part of their coping up mechanism.
- ii. Inspection of computer imports is done by a team of officers from URA & UNBS at entry points. UNBS inspects goods under the import inspection and clearance scheme, which requires that all imported products whose standards and specifications were declared compulsory, to be inspected for conformity to the relevant standards before release onto the domestic market.

²¹ New Vision Monday, July 07, 2014 (<http://www.newvision.co.ug/news/647061-1-000-secondary-schools-get-computer-labs.html>)

Inspection is done by inspectors from UNBS at the entry points. UNBS has also gone ahead to put in place the pre-verification for conformity system, whereby UNBS formed partnership with organizations such as Bureau Veritas, SGS and Intertek which are International compliancy assessment agencies to inspect and verify the quality of imports before they are shipped to Uganda.

- iii. It has triggered off a review of the ICT standards specifically for computers which will further ensure effective implementation of the Ban.
- iv. Has streamlined the market (computer supply chain) with registered and authorised dealers of particular brands for example Dell, hp and Toshiba who import and supply to traders as credible sources.

3.8.3 Challenges in implementing the ban

The challenges encountered during implementation of the ban has led to poor quality computers, branded as new as well as used computers, continuing to enter into the country. The challenges include;

a) Unclear specifications in regards to software and hard ware components

According to UNBS and URA the specifications being used are generalized for all electronics. As a result cloned computers have flooded the market. Organisations like UETA have reported an increased entry of cloned computers purchased by computers users unable to tell eventually; they get faulty and difficult to repair in the short run.

b) Failure of traders to reduce pricing despite government efforts to subsidize computers

Despite the government policy of no taxes on new computers, traders have continued to sell the computers at a high price making them expensive for the students and households. This has led to continued market demand for used computers which has encouraged smuggling by some of the traders.

c) Inadequate capacity at border points to inspect computers entering the country

Under staffing at the border points has affected thorough inspection of the computers in terms of ICT specifications contributing to smuggling of used computers. Old computers are brought in as personal items e.g laptops or as spare parts.

d) Importation of spare parts to assemble sub-standard computers for sale.

Traders often import used spare parts and then assemble the computers which are sold to the people. The level of software compatibility for these assembled computers is substandard given that they do not undertake the quality assurance process done by the authorized manufacturers. Majority of the softwares being run on these assembled computers are pirated and or trial versions which are not durable and are sometimes not fully supported.

3.8.4. Proposed areas of improvements in implementation of the ban

Basing on the challenges encountered by the different stakeholders in enforcing the ban, the following improvements should be done;

- Strengthen the laws and regulations so as to deter traders from smuggling used computers into the country.
- Strengthen operational capacity to inspect and survey the business sector to ensure compliance although UNBS works with other government agencies such as URA, they both don't have technical capacity to effectively implement the ban and monitor its effectiveness.
- Raise public awareness in order to change the attitudes, perception, practises and culture on e-waste management amongst the people living in Uganda.

- Government should lay down a strategy that holds computer manufacturers responsible in line with the standards they uphold globally.
- NITA-U, UNBS, and KCCA should strengthen their working relations in order to effectively register and certify computer importers and computer (hardware & software) dealers in Kampala and Uganda in general.
- The recent tax on computers, as mentioned in the national budget for FY 2014/15, will further stifle access to new computers and the effectiveness of the ban in general.

3.9. User opinions and perceptions on the imposition of the ban

3.9.1. Sample Characteristics of computer users and institutions

Table 8 below indicates that out of the 638 computers users interviewed, majority were males (58%) compared to the females (42%). The average age was 28years with the youngest being 15 years and the oldest being 56 years. Over half of the computer users (73%) attained tertiary education (73%) and nearly 9 in every 100 (90%) had IT related knowledge/skill.

Table 8: Sample characteristics of computer users

Sample Characteristics of Computer Users	Summary Statistics	
Gender	Frequency	Percent
<i>Male</i>	371	58.15
<i>Female</i>	267	41.85
<i>Total</i>	638	100
Mean Age	27.7 years	Min =15, Max =56
Highest Education level	Frequency	Percent
<i>No formal education</i>	3	0.47
<i>Primary</i>	16	2.51
<i>Secondary</i>	156	24.45
<i>Tertiary</i>	463	72.57
<i>Total</i>	638	100
IT related knowledge /skill	Frequency	Percent
<i>Yes</i>	571	89.5
<i>No</i>	67	10.5
<i>Total</i>	638	100

(Source: Primary Survey data, 2014)

Table 9 shows that majority of the 163 institutions interviewed were government owned (49%), followed by NGOs (16%), Private for Profit (15%). In terms of categorization of the institutions, 15% were health facilities, 38% were education institutions and 47% were others which included FBOs, NGOs, MDA, DLG and Financial Institutions.

Table 9: Sample characteristics of institutions

Sample Characteristics of Institutions	Summary Statistics	
Ownership	Frequency	Percent
<i>Government</i>	79	48.47
<i>Private Not for Profit</i>	19	11.66
<i>Private for Profit</i>	24	14.72
<i>NGO</i>	26	15.95
<i>FBO</i>	15	9.2
Total	163	100

Sample Characteristics of Institutions	Summary Statistics	
Category of Institution	Frequency	Percent
Health facility	25	15.34
<i>Hospitals</i>	23	14.11
<i>Health Center</i>	2	1.23
Education institutions	62	38.04
<i>Tertiary</i>	33	20.25
<i>Secondary schools</i>	25	15.34
<i>Primary schools</i>	4	2.45
Others	76	46.63
<i>NGOs</i>	30	18.40
<i>FBOs</i>	12	7.36
<i>MDA, DLG and Financial Institutions</i>	34	20.86
Total	163	100

(Source: Primary Survey data, 2014)

3.9.2 Awareness of the Ban

Table 10 shows that overall, majority of the institutions (85%) and computer users (64%) were aware of the ban. Amongst the regions, there was no significant difference in awareness with Central having more respondents (68%) aware and the northern region had the least (55%) compared to other regions. This implies citizens are well informed in regards to the ban however more sensitization should be done.

Table 10: Awareness of the ban amongst computer users and institutions

REGION	Awareness of the ban	Computer users		Institutions	
		No. of Respondents	%	No. of Institutions	%
Central	Aware	202	68.01	48	80.00
	Not aware	95	31.99	12	20.00
Eastern	Aware	49	59.04	27	90.00
	Not aware	34	40.96	3	10.00
Western	Aware	91	64.08	32	91.43
	Not aware	51	35.92	3	8.57
Northern	Aware	64	55.17	32	84.21
	Not aware	52	44.83	6	15.79
Overall	Aware	406	63.64	139	85.28
	Not aware	232	36.36	24	14.72

(Source: Primary Survey data, 2014)

3.9.3 Impact of the ban on computer users and institutions

a) Positive and negative Impact on Computer users

The impact assessment revealed that most of the computer users (54%) were not affected by the ban as compared to a few (46%) affected. The impact was either positive or negatives, for example, Table 11 shows that the main positive effect was that new computers were of good quality (34.75%) and durable (27.12%) among others.

Table 11: Positive Effect of Ban on Computer Users

Positive Effect of Ban on Computer Users	Percentage (%)
New Computers are of good quality	34.75
New Computers are durable	27.12
Current ICT services are brought in the market	20.34
Reduced supply of fake computers in the country	11.02
New computers are efficient and fast	8.47
Increased labour productivity due to limited breakdowns	7.63
Reduces E- waste	6.78
Reduced computer maintenance cost	5.93
Reduced competition in the market	2.54
Promoted green computing	1.69

(Source: Primary Survey data, 2014)

Table 12 shows that the main negative effect was high cost of acquiring a branded new computer (60.96%), limited access to new computers (18.64%), and increased supply of fake computers in the market through smuggling (11.64%) among others.

Table 12: Negative effect of ban on Computer Users

Negative Effects of Ban on Computer Users	Percentage (%)
High cost of acquiring new computers	60.96
Limited access to new computers	18.49
Increased supply of fake computers in the market through smuggling	11.64
Reduced income levels	6.85
Reduced employment opportunities	5.48
Scarcity of spare parts for new computers	4.79
Increased cost of acquiring IT skills	3.42
Limited access to ICT services	2.74
Consumer exploitation	2.05
High cost of maintenance of new computers	2.05
Has led to decreased labour productivity	1.37
Reduced and collapse of businesses	1.37
Reduced computer donations	0.68
Reduced government revenue	0.68

(Source: Primary Survey data, 2014)

b) Perceived Impact of the ban on institutions

Out of the 163 institutions which participated in the study, majority (78.4%) said that they were not affected by the ban. However, out of the only few 35 institutions (21.6%), which were affected by the ban, the effect was only direct (12.9%), indirect (5.5%), and both ways (3.1%). Out of the 35 institutions which were affected by the ban, the effect was mainly negative (78.8%), positive (15.2%), and or both ways (6.1%).

Table 13 below shows that the negative effects of the ban were mainly in terms of new computers becoming expensive (61.88%) especially to education institutions (51.85%), and NGOs (18.52%). In addition, there was reduced access to computers within institutions (61.25%) with the impact mainly felt by education institutions (29.63%) and NGOs (14.81%) among others shown in Table 13 below.

Table 13: Negative effects of the ban on Institution

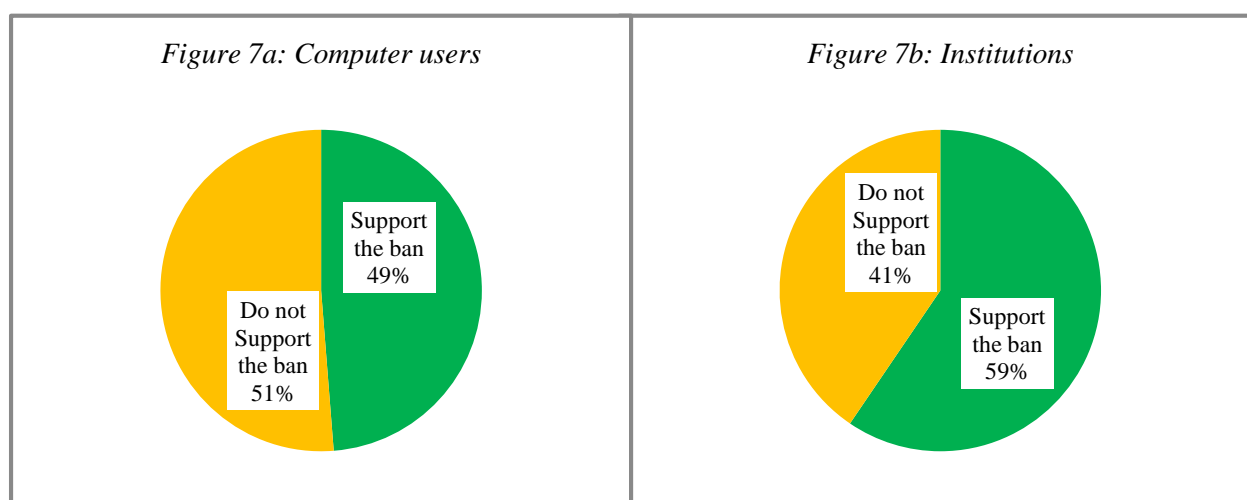
Negative Effects of the ban on Institution	Institutions					Percent (%)
	Health Facility	Education	NGO	FBO	MDA/ DLG and Others	
New computers are expensive to purchase	3.7	51.85	18.52	3.7	3.7	61.88
Reduced access to computers in the institution	0	29.63	14.81	7.41	3.7	61.25
Reduced ICT literacy rate	0	14.81	7.41	7.41	3.7	5.63
Increased manual processes of doing work	0	11.11	7.41	3.7	0	3.75
Reduced donation of used computers	0	7.41	3.7	7.41	0	3.13
Duplicating of new computers	0	3.7	0	0	0	0.63

(Source: Primary Survey data, 2014)

3.9.4 Supporting of the Ban

Figure 7a shows that there was no significant difference amongst the computer users supporting (49%) and those not supporting the ban (51%). However, majority of the institutions supported the ban (59%) as shown in the *figure 7 below (Figure 7b) and Table 14*. The institutions such as MDAs receive branded new computers from government whereas NGOs, FBOs and other private health and academic institutions purchase new computers which are durable and give value for money unlike old and used computers.

Figure 7: Computer users and Institutions for or against the ban



(Source: Primary Survey data, 2014)

Table 14: Category of Institution and their perception of the ban

Category of Institution	Perception	
	<i>Support the Ban (%)</i>	<i>Do Not Support the Ban (%)</i>
<i>Health Facility</i>	72.00	28.00
<i>Education</i>	51.61	48.39
<i>NGOs</i>	50.00	50.00
<i>FBOs</i>	41.67	58.33
<i>MDA/DLGs</i>	79.41	20.59
Overall	59.51	40.49

(Source: Primary Survey data on institutions, 2014)

Computer Importers' Perception of the ban

Out of the 8 computer importers who participated in the study, 7 importers (87.5%) were aware and supported the ban. Most of the importers are registered with the renowned computer manufacturers and are required to only deal in genuine computer products supplied by the authentic manufacturer with whom the authorized distributor signed a partnership. The partnerships may include Gold, Silver and Platinum. For example, in Uganda, Computer Point, NCR and Redington are Gold partners to some of the renowned vendors, for example, DELL, Hp, IBM, Oracles, CISCO, etc.

Reasons for supporting the Ban

Table 15 shows that, according to computer users, the main reasons for supporting the ban were to increase access to durable computers (68%), avoid our country from being a dumping ground (62%), increase access to quality ICT services (52%), set standards for use and importation of ICT equipment (41%), and reduce e-waste (43.4%) among others.

In addition, the institutions, which participated in this study, mainly supported the ban for similar reasons which included increasing access to durable computers (72%), increasing access to quality ICT services (53%), sets standards for use and importation of ICT equipment (44.3%), followed by environmental factors namely; reduces e-waste (69%) and avoids our country from being a dumping ground (66%) as shown in Table 15 below.

Table 15: Reasons for supporting the ban

Category of reasons	Specific reasons	Computer users (%)	Institutions (%)
Economic	Increases labour productivity	32.36	25.77
	New computers are affordable	0.0	4.12
	Low maintenance costs for new computers	2.27	2.06
Technological	Increases access to durable computers	68.28	72.16
	Increases access to quality ICT services	51.46	52.58
	Sets standards for use and importation of ICT equipment	40.45	44.33
	Used computers do not easily adapt to new technology	6.47	-
	New computers use low power	1.3	0.0
Environment	Reduces inflow of used/old computers	0.0	1.03
	Reduces e-waste	43.37	69.07
	Avoids our country from becoming a dumping ground	61.81	65.98
Health	Harmful radiation on human health	1.94	-
Political	It is government policy and decision	13.59	7.22
Others	No warranty on used computers	0.97	0.0
	Consumer protection	0.65	3.09

(Source: Primary Survey data, 2014)

Reasons for not supporting the Ban

Table 16 shows that the main reasons for computer users not supporting the ban were that new computers are expensive (87%), it reduces access to ICT services (49%), and negative economic impact such as unemployment and loss of revenue by businesses (40%) among others. In addition, the institutions did not support the ban for similar reasons which included new computers being expensive (88%), it reduces access to ICT services (69.7%), and that it leads to failure to acquire computers in the form of donations (46%) amongst other reasons. The computer users and institutions which did not support the ban were concerned with affordability of computers and accessibility to ICT services.

Table 16: Reasons for not supporting the ban

Specific reasons for NOT supporting the ban	Computer users (%)	Institutions (%)
New computers are expensive.	87.38	87.88
It reduces access to ICT services.	48.92	69.70
Negative Economic Impact (Unemployment and loss of revenue by businesses)	40.00	24.24
The ban is ambiguous (Un clear specification of what is new, old, used, cloned, or refurbished)	20.92	19.70
Key stakeholders were not consulted when the ban was being put in place.	16.92	24.24
Leads to failure to acquire computers in the form of donations.	38.15	45.45
Promotes unethical conduct (e.g Smuggling and cloning of computers).	27.69	16.67
Used computers are perceived to be of better quality compared to new ones.	33.54	16.67
Scarcity of spare parts.	4.31	1.52
Others	-	4.55

(Source: Primary Survey data, 2014)

To encourage the development of Information and Communications Technology (ICT) services government removed VAT on computers and computer software in 2002/03 and 2003/04 respectively; this move rendered computers to be more affordable²². However, computers remained expensive because the traders attribute it to the volatility of the shilling against the US dollar and operational costs of their businesses, and thus it was market forces that determined prices for computers. High-end original branded computers cost over US\$3000 while low-end original branded new computers cost US\$500-US\$1000 on the Ugandan market.

3.10. Key impact dimensions, assumptions, sensitivities and risks involved in lifting of the ban;

Key impact dimensions of lifting the ban will rest mainly on aspects such as

- h) **Technology** i.e. inability to advance in ICT technology by using old computer which do not support the latest softwares like Window8 and Windows7 operating systems. Starting 8th April 2014, Microsoft stopped supporting Windows XP. Therefore, old computers running on Windows XP will not be supported in terms of software upgrade. The computer requirements enlisted below for Windows 8 to run is not found in old computers;
 - Processor: 1 gigahertz (GHz) or faster with support for PAE, NX, and SSE2 (more info)
 - RAM: 1 gigabyte (GB) (32-bit) or 2 GB (64-bit)
 - Hard disk space: 16 GB (32-bit) or 20 GB (64-bit)
 - Graphics card: Microsoft DirectX 9 graphics device with WDDM driver
- i) **Health** (i.e. exposure to hazards materials e. g radiations from old computers). The extreme amount of lead in electronics alone causes damage in the central and peripheral nervous systems, the blood and the kidneys.

²² AfDB 2010: Domestic Resource Mobilization for Poverty Reduction in East Africa: Uganda Case study

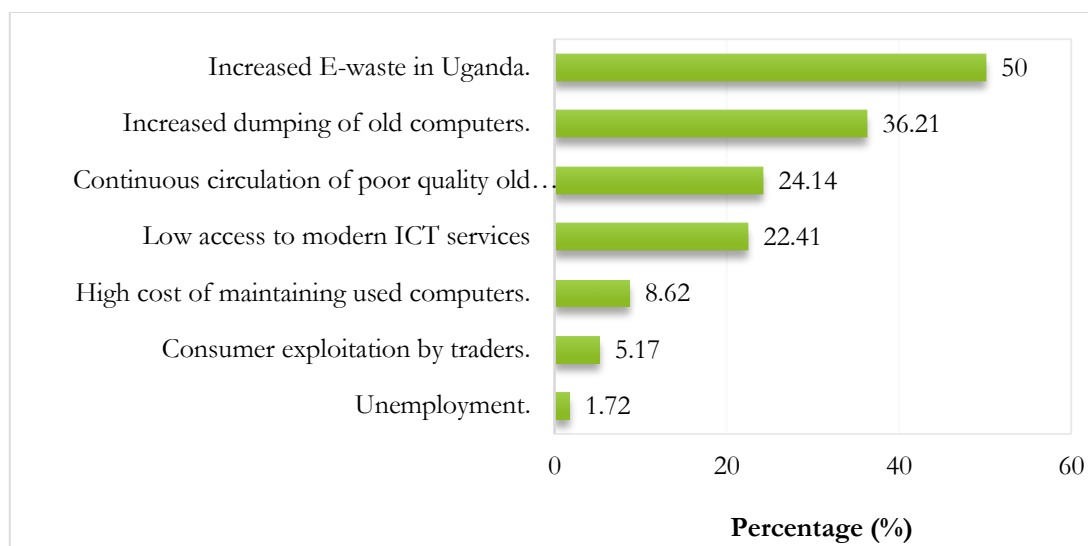
- j) **Economy** (i.e. increased dumping of sub standards goods such as old & used computers) which are not durable leading to low efficiency, effectiveness and productivity of the users consequently affecting economic growth.
- k) **Environment** (i.e. increased pollution due to the fact that electronic equipment especially Waste Electrical and Electronic Equipment (WEEE) contains some very serious contaminants such as lead, cadmium, beryllium and brominated flame retardants, and florescent tubes that produce dangerous radiations and the lack of recycling firms dealing in e-waste management).
- l) **Politics** (i.e. political interests vis-à-vis national development priorities),
- m) **Human capital development** (i.e. slow development of ICT skills given that Uganda has a largely illiterate consumer mass unaware of its rights, benefits and opportunities) and
- n) **Value for money** (i.e. old & used computers are not durable to give value for money).

Computer users, computer traders, institutions, and key stakeholders were asked the key impact dimensions, sensitivities and likely risks of lifting the ban. Their responses are indicated below (See Figure 3; Box 3 and Box 4).

3.10.1 Risks involved in lifting the ban

Figure 8 below shows that out of the 163 institutions, over half (53%) did not want the ban lifted. Most of these institutions were concerned with the likely risks involved in lifting the ban, for example, over 1 in every institutions (>20%) mentioned that the most likely risks would be; increased e-waste especially given that the country does not have an e-waste recycling plant (50%), increased dumping of old computers in form of donations (36%), continuous circulation of poor quality old computers (22%), and low access to modern ICT services (22%) among others(See Figure 8 below).

Figure 8: Likely risks or dangers of lifting the ban



Similar risks involved in lifting the ban were also identified by the stakeholders consulted, with majority calling for the review and making of adjustments to the ban, specifically the computer specifications and standards. They reiterated that government should do the following; i) *set the minimum ICT standards* so as to ensure quality computers whether new or used are allowed to enter into the country and ii) besides the no import tax policy on new computers, *subsidize the prices for new computers* to make them more affordable for the low income earners and learning institutions.

Box 4: Case of an NGO that experienced dumping of used computers

Literacy and Adult Basic Education (LABE) an NGO that advocates for literacy through training groups and teams of community based educators to start and manage classes in the community has experienced dumping of old computers. They are promoting ICT use in school-based setting to improve standards of classroom instruction in local languages through their Digital Education Enhancement Programme that uses ICT in classrooms and community setting by teachers interested in developing their teaching in LABE.

LABE supports the ban because in 2005 they received a donation of 20 computers from their partner in UK but out of 20 computers **only 8** were found to be functional and currently, all of them were disposed off. Since then the organization has resorted to not accepting used computers from partners/donors and only purchasing new computers.

Elsewhere, computer manufacturers say used computers, dumped by the developed countries, are high-energy consumption devices, which cause environmental and social damage besides causing economic loss. Those opposing the ban argue that availability of used/old computers in the market has resulted in high PC penetration as a result of low price. They are cost-saving and a boost for economy for multiple domains, such as internet service providers (ISPs), vendors, fast moving consumer good (FMCGs), advertising, media etc. Clearly computer manufacturers are campaigning for ban on sale of old/used computers to capture their share - instead of investing in country to set up a manufacturing plant, like they did in India.

Box 5: Case of an Education Institution that experienced dumping of used computers:

Lira Town College is a government secondary school located in Lira district. It is another example of an institution that experienced dumping of old computers. In 2005/2006 before the ban, the school received a donation of 25 used computers from Computers for Africa. However these computers received functioned for only 3 months, and yet the school had incurred costs of shipping and inland transport.

Computers 4 Africa collects redundant IT or donated computers, which are then data-wiped and refurbished before being sent out to African schools, colleges, libraries and other community projects to help bridge the digital divide. Therefore the donation of 25 used computers proved that used computers are not durable which attests to the fact that used computers are being dumped in form of donations in Uganda.

Currently Lira Town College uses 40 brand new functional computers supplied by Uganda Communication Commission (UCC) through the government programme of promoting ICT use and access in schools. One teacher underwent in-service training in ICT by UCC.

Environmental concern; Electronic waste (E-waste) in developing countries causes serious health and pollution problems due to the fact that electronic equipment contains some very serious contaminants such as lead, cadmium, beryllium and brominated flame retardants. Even in developed countries recycling and disposal of e-waste involves significant risk. Lifting the ban on importation of used computers will lead to environmental pollution and degradation of biodiversity. For example, some pollutants such as lead and mercury are poisonous to living organisms which are important in the ecosystem.

Durability of computers to give value for money. The lifetime cost of second-hand (used) computers is higher than for branded new computers. Used computers are expensive in the long run because of high maintenance costs and high energy consumption and low processor speed. Therefore, in the short term, it is better to focus on the primary benefits of the lifetime of a computer.

3.10.2 Risks involved in not lifting the ban

- Slow rate of increase in computer penetration in the country given that majority of the people cannot easily afford brand new computers which are considered expensive. Government has upheld the zero tax on computers to make them affordable however for the FY2014/15 they have terminated exemptions under Value Added Tax (VAT) for the supply of new computers, desktop printers, computer parts & accessories and computer software licenses. This tax is borne by the final consumer implicating increased pricing of new computers making them less affordable for majority of the population.
- Computer traders continue to exploit consumers by hiking prices of new computers despite the government's effort to subsidize by imposing zero tax on new computers. However, NITA is in the processing of generating list of computer dealers and certifying them to deal in genuine computer products. NITA-U will collaborate with UNBS and KCCA to vet computer dealers before they are registered and certified.
- Increase in smuggling of used, refurbished and cloned computers. However, UNBS and URA designated officers working together to inspect computer imports at entry points. UNBS has put in place the pre-verification for conformity system, whereby Uganda National Bureau of Standard formed partnership with Organizations such as Bureau Veritas, SGS and Intertek involved in International compliancy assessment agencies which inspect and verify the quality of imports before they are shipped to Uganda.
- Under the education sector, this might frustrate government efforts to improve the ICT skills amongst secondary school students given the limited number of computers in schools because some schools cannot easily afford branded new computers. Therefore, students will not easily access computers for practice and learning in both the private and government secondary schools yet it is essential given that subsidiary ICT is part of the UACE curriculum. The student-Computer ratio remains low. However, UCC is continuously distributing branded new computers to school and tertiary institutions in Uganda. For example, Government through the UCC, has established fully equipped modern computer laboratories in over 1,000 government-owned secondary schools across the country. The project did not cater for Private secondary schools and all primary schools which is unaffordable for government now since there are over 13,000 government owned primary schools in the country.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. CONCLUSIONS

The study has generated empirical evidence clearly showing that the ban has had an impact in terms reducing importation of old and used computers in Uganda. This was attributed to the collaboration between implementing agencies basing on existing legal, policy and regulatory frameworks in place as well as the increased acceptability of the ban by computer importers, users and institutions which were aware of the ban and supported it.

However, given that the government priority objective in the Uganda Vision 2040 identifies ICT among the key infrastructure areas that will spur Uganda's transformation into a modern and prosperous country. The thirty (30) year national aspirations for ICT are encapsulated in the Uganda Vision 2040. In addition, the NDP (2010/11-2014/15) promotes science, technology, innovation and ICT to enhance competitiveness, then it is advisable that government maintains and enforces the ban on importation of old and used computers and its peripherals in order to promote use of the latest technological advancement. Therefore, lifting the ban will stifle development in ICT sector contrary to government ICT sector priorities stipulated in the NDP²³ and Vision 2014.

4.2 RECOMMENDATIONS

4.1.1. Recommendations by COMPUTERS USERS

Table 17 shows that over 3 in every 20 institutions which supported the ban ($\geq 15\%$), the main five recommendation were maintain the ban and enforce it (33%), subsidize new computer to make them affordable (27%), ensure quality control measures by implementing agencies (21%), Strengthen implementation of the ban so that used computers stop entering the country (21%), and government should increase its support of providing new computers to institutions (15%).

In addition, institutions which did not support the ban also gave five main recommendations, namely; lift the ban but with reservations (40%), ensure quality control measures by implementing agencies (27%), sensitization on the ban and dangers of old/used computers (13%), subsidize new computer to make them affordable (12%), and Government should increase its support of providing new computers to institutions (12%) amongst others shown in Table 17 below.

Table 17: Recommendation by Computer users who support and do not support the ban

Supporters of the ban	%	Non-supporters of the ban	%
Maintain the ban and enforce it	48.86	Lift the ban but with reservations	43.86
Quality control by authorized government agencies.	21.97	Review the ban and make the necessary adjustments	17.54
Proper implementation of the ban	20.08	Quality control by authorized government agencies	15.79
Sensitize the public about the ban/dangers of used computers	15.91	Sensitize the public about the ban/dangers of used computers	14.39
Subsidize new computer to make them affordable	14.77	Subsidize new computer to make them affordable	11.93
Review the ban & make the necessary adjustments	12.88	Proper implementation of the ban	11.23
Set specifications on imported computers by government	6.82	Establishing a proper public disposal mechanism for old computers	8.07
Invest in E-waste management and recycling	6.44	Maintained the ban and strengthen enforcement	7.72

²³ The National Development Plan (NDP) 2010/11-2014/15 classifies ICT among the primary growth sectors alongside traditional sectors such as Agriculture, Industry, Energy, Oil and Gas.

<i>Supporters of the ban</i>	<i>%</i>	<i>Non-supporters of the ban</i>	<i>%</i>
Set up computer assembling and production plant	6.06	Involve all stakeholders in enforcing the ban	4.21
Establish a proper public disposal mechanism for old computers	4.55	Set up computer manufacturing factories	4.21
Provide computers to public institutions like schools by government	4.55	Provide enough computers to public institutions like schools by government	4.21
Involve all stakeholders in enforcing the ban	4.17	Set clear specifications on imported computers	3.51
Set up community computer laboratories or one-stop ICT centres	2.65	Invest in E-waste management and recycling	2.81
Allow free donations to schools, CBOs but limit by model and year of manufacture	2.65	Set up community computer laboratories	2.46
Conduct comprehensive survey of all E-waste generated in Uganda	2.27	Allow free donations to schools, CBOs but limit by model and year	2.11
Arresting and prosecuting those culpable	1.89	Supporting ICT laws should be enacted and passed	1.05
Fight corruption in enforcement agencies	1.89	Arrest and prosecute the culprits	0.70
Legislating against old computers	1.52	Fight corruption in enforcement agencies	0.70
New computers should come with complete accessories	1.14	Conduct comprehensive survey of all E-waste generated in the country	0.35
ICT policies and strategies should be developed in unison with technology advancement	1.14	ICT policies and strategies should be developed in line with technology advancement	0.35

4.1.2. Recommendations by INSTITUTIONS & IMPORTERS

Table 18 shows that over 3 in every 20 institutions which supported the ban ($\geq 15\%$), the main five recommendation were maintain the ban and enforce it (33%), subsidize new computer to make them affordable (27%), ensure quality control measures by implementing agencies (21%), Strengthen implementation of the ban so that used computers stop entering the country (21%), and government should increase its support of providing new computers to institutions (15%).

In addition, institutions which did not support the ban also gave five main recommendations, namely; lift the ban but with reservations (40%), ensure quality control measures by implementing agencies (27%), sensitization on the ban and dangers of old/used computers (13%), subsidize new computer to make them affordable (12%), and government should increase its support of providing new computers to institutions (12%) amongst others shown in Table 18 below.

Table 18: Recommendation by institutions which support and or do not support the ban

Institutions which support the ban		Institutions which do not support the ban	
Recommendations	%	Recommendations	%
Maintain the ban and enforce it	32.56	Lift the ban but with reservations	40.00
Subsidize new computer to make them affordable	26.74	Ensure quality control measures by implementing agencies	26.67
Ensure quality control measures by implementing agencies	20.93	Sensitization on the ban and dangers of old/used computers.	13.33
Strengthen implementation of the ban so as to stop entrance of used computers	20.93	Subsidize new computer to make them affordable	11.67
Government should increase its support of providing new computers to institutions	15.12	Government should increase its support of providing new computers to institutions	11.67

Institutions which support the ban		Institutions which do not support the ban	
Sensitization on the ban and dangers of old/used computers.	10.47	Set up proper disposal mechanism for electronic waste	8.33
Set up proper disposal mechanism for electronic waste	4.65	Review the ban and make adjustments	8.33
Set up computer recycling plants	4.65	Set clear specification for used, old, and new computers.	6.67
Review the ban and make the necessary adjustments	4.65	Always consult with all stakeholders in ICT sector	5.00
Impose heavy taxes on & used old computers to discourage importation.	3.49	Establish computer manufacturing	3.33
Set clear specification for used, old, and new computers.	3.49	Set up computer recycling plants	1.67
Establish computer manufacturing plants	2.33	Proper implementation of the ban	1.67
Price legislation for new computers	1.16		

4.1.3 Recommendations by KEY STAKEHOLDERS IN ICT SECTOR

Finalize the review of the standards and specifications of computers

Expedite the process of reviewing computer specifications in regards to new computers given the growing technology world that we live in. The existing specifications used generalize all electronics.

The Government through NITA-U and UNBS should regulate the importation of used computers by clearly defining the components i.e year of manufacture, Pentium and CDR components among others. Consideration should also be taken of the latest technology such as the tablets and laptops. *The set specifications should be subject to review every 2-3years so as to ensure they are in line with vast changing technology world.*

Quality assurance

- Quality should be guaranteed by only doing certain basic tests on the software and hardware.
- It is better to depend on a guarantee certificate from an authentic source e.g DELL, Hp, Toshiba, etc. Computer manufacturers have established an online database in which the buyer can enter a Serial number of the computer/laptop to verify if it is authentically manufactured and branded by manufacturer. If the serial number exists, then it implies that the computer is original.

Control and Management of e-waste

There is need to strengthen acquisition of knowledge and skill amongst policy makers in regards to value and essence of e-waste so that informed decisions can best be made. This can be done through the country's participation in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal so as to learn better approaches towards e-Waste Management. The Basel Convention is mainly focused on devising means to best protect human health and the environment against the adverse effects of hazardous wastes.

In the short-term, a recycling plant for e-waste is very expensive. Therefore government, through UIA should attract investment in recycling e-waste. In the short term, e-waste should be collected, sorted and sold as exports to countries that have recycling facilities, for example, some parts of the computer such as the mother boards are being sold to countries like Turkey that in turn recycles them.

PSFU recommended that government should encourage local business to evolve and recycle e-waste. In addition, government should also provide incentives to attract investment in e-waste management.

KACITA recommended that NITA-U should do a comprehensive feasibility study about the amount and generation rates of each type of e-waste so that the actual volume generated is known and its capacity

to sustain a plant that recycles e-waste in Uganda. The recycling plant needs a continuous supply of raw materials so the ban will stifle supply of this raw material (used & old computers).

Government should set up collection points so that the country can easily plan for the existing stocks of aging computers, peripherals and other electronics accumulating in the country.

Development of local industries; Government should strengthen the development of internal indigenous capacity in ICT sector by encouraging importation of new technologies, or computers which are compatible with latest software. For example, on 9th April 2014, Microsoft stopped giving technical support to Windows XP software compatibility. This implies that all computers imported or operating on Windows XP will not get technical support from Microsoft.

4.1.4 Proposal to Government

- Form a public private partnership including a memorandum of understanding between NEMA and Local Government.
- To put in place a policy detailing new law and regulations on the importation and recycling of electronic items.
- Formation of an audit, monitoring and evaluation team to enforce the regulations on business and report to parliament.
- Establish a countrywide e-waste collection centers through already existing networks.

4.1.5 Best way Government bodies would engage in controlling dumping and accumulation of e-waste;

- Strengthening of the laws and regulations
- Provision of adequate recycling facilities to meet current and anticipated levels of electronic equipment reaching end-of-life in Uganda
- Introduction of tax incentives for recyclers in Uganda who can demonstrate that they are recycling electronic goods in a manner that meets local and international standards, including the non-taxation of e-waste destined for recycling within Uganda.
- Have a levy on electronic goods which include a disposal fee, to meet the cost of collection, end of life recycling and a public awareness campaign.

4.1.6 Overall Recommendations

Uphold the ban and Strengthen enforcement of the ban through Capacity building of the staff and increasing staffing levels amongst the implementing agencies (URA & UNBS) so as to deter traders from smuggling used computers and ensure continued effectiveness of the ban.

- ❖ In the national budget for FY 2014/15, VAT was reinstated on computers. It is recommended that government should reinstate exemptions under VAT for the supply of new computers, desktop printers, computer parts & accessories and computer software licenses so as to ensure new computers can easily be affordable for the people. If the tax exemption is reinstated, it will help increase access to branded new computers and nurture the growth of ICT sector and strengthen ICT advancement in line government ICT sector priorities.
- ❖ Given that ICT is a subsidiary subject at high school in Uganda, Government should set minimum requirements for secondary schools to have at least a computer laboratory and a minimum number of functional new computers (e.g 20-30 computers). UCC should extend its support by providing branded new computers to primary schools and private secondary schools at a subsidized price so as to ensure the national student computer ratio increases. Distributing new computers to government schools only is not enough to increase a student's access to ICT.

- ❖ Build on existing policies and legal frameworks to support importation of new computers and best e-waste management practices in the country. Policies such as “taking back” end-of-life equipment, guidelines for e-waste management and guidelines for importers of computer.
- ❖ NITA-U and UNBS should finalize the process of reviewing the computer standards along with setting clear computer specifications distinguishing new, used, old, refurbished and cloned computers in order to inform pre-inspections exercises and the final inspection at URA border points. The set computer specifications should be subject to review every 2-3years so as to ensure they are in line with vast changing technology world
- ❖ Continued sensitization of the public in regards to the ban, dangers of old/used computers and the need for safe disposal of e-waste in the country.
- ❖ The Government should establish countrywide regional formal e-waste collection centres through already existing networks dealing in recycling waste. This will enable the country to plan better for the existing stocks of aging computers, peripherals and other electronics reaching end-of-life accumulating in the country.
- ❖ NITA-U alongside other key stakeholders should form synergies and strengthen their working relations to allow for information and knowledge sharing, certify computer importers and monitor the effectiveness of the ban. This can be done by agreeing on the what collaboration is necessary and what level, signing an Memorandum of Association and establishing focal persons in each of the key institutions involved.
- ❖ There is need for enhancement of skills among policy makers in regards to value and essence of e-waste so that informed decisions can best be made. This can be done through the country’s participation in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal so as to learn better approaches towards e-Waste Management.
- ❖ Government should build the ICT skills of the labourforce to use latest IT. In the short term, government should start with assembling new computers then gradually progress to production. This should be enhanced by setting up ICT parks which are in the interest of the Country’s Vision 2040.
- ❖ The companies or individuals engaged in assembling of computers from spare parts imported should partner with the established computer manufacturers such as Hp and DELL. This partnership will not only enhance skill development and build capacity of the local people but also ensure that the computers assembled are branded new and run on softwares compatible and fully supported by the authorized manufacturers. Government should also come up with a regulation on assembling computers in Uganda. Firms assembling computers should be registered, certified and regulative by NITA-U. This will help regulate assembling of substandard computers, for example, clones being assembled and sold at high prices in Uganda. This will also create consumer trust of the certified computer assemblers.
- ❖ The Government should provide incentives to encourage investment in establishment of e-waste recycling plants so as to meet current and anticipated levels of electronic equipment reaching end-of-life. Incentives such as tax exemption among others in line with the investment policy of Uganda can be considered. Given that an e-waste recycling plant requires a huge capital investment, in the short term, e-waste should be collected, sorted and sold as exports to countries that have e-waste recycling facilities

5. REFERENCES

- Cochran, W. G. (1977). *Sampling Techniques*. 3rd Edition, New York: John Wiley & Sons, Inc.
- EAC (2005): *Regional e-Government Framework for East African Community (EAC), 2005*. East African Community.
- GoU (2011): *Computer Misuse Act, 2011*. The Uganda Gazette No. 10 Volume CIV dated 14th February 2011. Printed by UPPC, Entebbe, by Order of the Government.
- Government Policy Communications Strategy-Cabinet Secretariat-2009
- Kish, L. (1965). *Survey Sampling*. New York: John Wiley & Sons, Inc.
- Ministry of Tourism, Trade and Industry (MITI) 2008. *National Industry Policy*. Republic of Uganda, January 2008.
- Ministry of Trade, Industry and Cooperatives (MTIC) 2010: *National Industrial Sector Strategic Plan 2010/11 – 2014/15*. Republic of Uganda
- MoICT & NITA-U (2012): *National e-Government Master Plan for Government of Uganda*. October 25th, 2012
- MoICT (2010): *Electronic Waste Management Policy for Uganda*. Ministry of Information and Communications Technology. Final Draft, June 2010.
- MoICT (2010): *National Electronic Government (e-Government) Framework*. Ministry of Information and Communications Technology. Republic of Uganda, June 2010.
- MoICT (2012): *Uganda National ICT Policy, 2012*. Ministry of Information and Communications Technology. Republic of Uganda, June 2012.
- National Environment Act (1995), Cap 153.
- National Environment Management Policy (NEMP) of 1994
- NDP (2010-2015). *National Development Plan 2010/11-2014/15*. Government of Uganda.
- NITA-U (2009): *National Information Technology Authority, Uganda Act, 2009*. The Uganda Gazette No. 36 Volume CII dated 31st July, 2009. Printed by UPPC, Entebbe, by Order of the Government.
- NITA-U (2012): *National e-Government Readiness Assessment Survey 2012*. National Information and Technology Authority of Uganda. Final Report, 06th December 2012.
- NITA-U (2012-2018): *Strategic Plan 2012/13 – 2017/18*. National Information Technology Authority Uganda.
- SPSS-PC+ Statistics (2007). *Statistical Analysis Version 17.0*. Computer Software, Chicago: SPSS Inc.
- StataCorp (1984-2009). *Statistics/Data Analysis*. STATA 10. <http://www.stata.com>
- Uganda Vision 2040
- Wandiembe, S. P (2009). *Sample Survey Theory Introduction*. Department of Statistical Methods, Makerere University, Kampala.
- Yamane, T (1967). *Statistics: An Introductory Analysis*. 2nd Ed., New York: Harper and Row.

6. APPENDICES

Appendix I: List of key institutions selected for the KIIs

Bi-TECH International Limited	
College of Science and Computing, Makerere University	
DIREE	- Dealers in Reconditioned Electronic Equipment
I-Network Uganda	
KACITA	- Kampala City Traders Association
LABE	- Literacy and Adult Basic Education
MFPED	- Ministry of Finance Planning and Economic development
MoICT	- Ministry of Information Communication Technology
NEMA	- National Environmental Management Authority
NGO Forum	- National NGO Forum
NITA-U	- National Information and Technology Authority of Uganda
NPA	- National Planning Authority
PCICT	- Parliamentary Committee on ICT
PSFU	- Private Sector Foundation Uganda
Second Life Uganda Limited	
UCC	- Uganda Communication Commission
UETA	- Uganda Electronics and Technicians Association
UIA	- Uganda Investment Authority
UNBS	- Uganda National Bureau of Standards
UNIDO	- United Nations Industrial Development Organisation
URA	- Uganda Revenue Authority

Appendix II: List of participants in the Consultative meetings

<i>Name</i>	<i>Position</i>	<i>Institution</i>
Dr. Pat Samanya	Permanent Secretary	MoICT
Dr. David Turahi	Director Technical Services	MoICT
Godwin Kahuuta	Senior Information Officer	MoICT
Hon. Bageine Vincent	Chairperson	Parliament Committee of ICT
Dr. F F Tusubiira	Board Chairperson	NITA-U
Prof. Patrick Mangeni	Board Member	NITA-U
Dr. David Turahi	Board Member	NITA-U
Stella Alibateese	Director, Regulations & legal Services	NITA-U
Julius Torach	Director, e-Government Services	NITA-U
Peter Kahiigi	Director, Information Security	NITA-U
Vivian Ddambya	Ag. Director Technical Services	NITA-U
Dr. Fredrick E .Kitoogo	Director, Planning, Research and Development	NITA-U
Phillip Walera	Manager, Architecture, Standards and Certification	NITA-U
John Bosco Kavuma	Manager, Planning	NITA-U
Gerald Kisongoch	Programme Officer	NITA-U
Yvonne Nabasa	Planning Officer	NITA-U
Gloria Kansime Asiimwe	Statistician	NITA-U
Richard Obita	Standards Officer	NITA-U
Kaggwa Ronald	Director Policy, Planning and Information	NEMA
Mr. Waiswa Ayazika	Director Environmental Monitoring and Compliance	NEMA
David Eboku	Manager –Standards Department	UNBS
Mr. Richard Ebong	Engineering Standards Officer	UNBS
Tondo Zainah	Team member	UNBS
Nakiguli Helen Cynthia		UCC
Ogwal Moses Goli	Director Policy & Advocacy	PSFU
Mr. Bruno OTTO	Head of UNIDO	UNIDO
Fred Kakooza	Senior Investment Executive-ICT	UIA
Lubulwa Lawrence	Secretary	DIREE
James Lunghabo	Coordinator	Uganda ICT Consumer Protection Association (UICPA)
Lwasa Umar	Vice Chairman & PRO	UETA
Robert-Van Nieuwport	Managing Director	Second Life Ltd
Moses S. Kasule	CEO	KACITA
Taremwa Sam Rwabwehare	Executive Director	Uganda Waste Management & Administration Confederation
Silver	Managing Director	Uganda Cleaners Production Center
Eunice Musiime	Team Leader, Policy and Advocacy	National NGO Forum
Eng. Elisha Wasukira	Coordinator	I-Network
Representatives District Authorities	Heads of ICT in the 10 district Chief Administrative Officers (CAOs)/ Deputy CAO	15 District Local Governments

Appendix III: Monitoring and Evaluation Framework

Result	Indicator	Collection Method	Data source	Frequency	Baseline value	Baseline year	Targets	Responsible Party
Increased awareness in regards to the Ban	%age aware of the Ban No. of media campaigns conducted No. of stakeholder workshops	Survey	<ul style="list-style-type: none"> ✓ NITA-U survey reports ✓ Stakeholder workshops proceedings 	Annual	0			MoICT and NITA-U
Increased access to computers	Computer penetration rate	Survey and document review	<ul style="list-style-type: none"> ✓ UCC ✓ UBOS ✓ NITA-U 	Annual	2.5%	2012		UCC, MoICT
Increased trade in the Importation of new computers	No. of new computers Imported	Document review	<ul style="list-style-type: none"> ✓ URA reports ✓ UBOS Report 	Annual	158,210	2014		URA
	No. of computers importers	Document review	<ul style="list-style-type: none"> ✓ URA reports 	Annual	8	2014		URA
Legal, Policy and regulatory frameworks passed	No. of policy and legal frameworks developed and passed	Document review	<ul style="list-style-type: none"> ✓ MoICT Policy documents 	Annual	3	2014		Parliamentary ICT committee, MoICT, NITA-U and UNBS
E-waste management	No. of firms licensed and dealing in e-waste management	Document review e.g Investment Reports	<ul style="list-style-type: none"> ✓ NEMA reports ✓ UIA Investment Reports 	Annual	0	2014		MoICT, NEMA and NITA-U
	Volume of e-waste recycled		<ul style="list-style-type: none"> ✓ Industrial performance Statistics 					

Impact assessment of the Ban on Importation of Used Computers in Uganda.

FINAL DRAFT REPORT 2014

Result	Indicator	Collection Method	Data source	Frequency	Baseline value	Baseline year	Targets	Responsible Party
Assembly and production of new computer	<ul style="list-style-type: none"> No. of people trained in assembling new computers 	<ul style="list-style-type: none"> Document review KII 	<ul style="list-style-type: none"> ✓ Industrial production statistics ✓ UIA document ✓ MoIC & NITA-U documents 	Annually	0	2014	<ul style="list-style-type: none"> % of active labour force literate in IT 	UIA UBOS MFPED MoICT, NITA-U & UCC.
Assembly and production of new computer	<ul style="list-style-type: none"> ICT park set up 	<ul style="list-style-type: none"> Document review KII 	<ul style="list-style-type: none"> ✓ MoICT, NITA-U, UCC ✓ UIA ✓ UBOS ✓ MFPED 		0	2014	<ul style="list-style-type: none"> 1 Assembly plant 	Ditto
Assembly and production of new computer	<ul style="list-style-type: none"> Computer production facility set up 	<ul style="list-style-type: none"> Document review KII 	<ul style="list-style-type: none"> ✓ MoICT, NITA-U, UCC ✓ UIA ✓ UBOS ✓ MFPED 		0	2014	<ul style="list-style-type: none"> 1 Production plant 	ditto

Appendix IV: Computer, Peripherals and Spare parts import statistics per FY

Table 19: Computer import statistics per Financial Year

Period	Financial Year	Net Weight (Kg)	Quantity (No. of units)	Value (UGX)
Before the ban	2006/2007	662946.00	64,744	21,187,950,869
	2007/2008	816998.00	156,572	56,761,533,748
	2008/2009	822709.28	435,323	62,660,230,475
	Sub total	2302653.28	656,639	140,609,715,092
After the ban	2009/2010	520710.29	93,546	212,742,503,886
	2010/2011	274646.59	80,216	116,729,483,890
	2011/2012	296694.68	105,075	108,377,971,255
	2012/2013	189428.58	149,527	104,205,201,185
	2013/2014	179563.49	158,210	91,728,238,883
	Sub total	1461043.63	586,574	633,783,399,099
Overall	Grand Total	3763696.91	1,243,213	774,393,114,191

(Source: Analysis from URA database on Import Statistics, 2014)

Table 20: Import statistics of computer peripherals per Financial Year

Period	Financial Year	Net Weight (Kg)	Quantity (No. of units)	Value (UGX)
Before the ban	2006/2007	662,946.00	66,952.00	18,576,369,707
	2007/2008	816,998.00	748,787.00	29,576,370,618
	2008/2009	822,709.28	62,203.00	21,714,823,280
	Sub total	2,302,653.28	877,942	69,867,563,605
After the ban	2009/2010	520,710.29	42,260.00	19,569,186,845
	2010/2011	274,646.59	17,904.00	17,936,807,807
	2011/2012	296,694.68	38,649.00	32,952,093,174
	2012/2013	189,428.58	55,886.00	19,850,728,174
	2013/2014	179,563.49	45,388.24	29,906,121,693
	Sub total	1,461,043.63	200,087	120,214,937,693
Overall	Grand Total	3,763,696.91	1,078,029.24	190,082,501,298

(Source: Analysis from URA database on Import Statistics, 2014)

Table 21: Import statistics of computer spare parts per Financial Year

Period	Financial Year	Net Weight (Kg)	Quantity (No. of units)	Value (UGX)
Before the ban	2006/2007	260,765	260,765	21,815,289,880
	2007/2008	482,493	228,701	34,290,013,264
	2008/2009	453,212	-	32,570,103,378
	Sub total	1,196,470	489,466	88,675,406,522
After the ban	2009/2010	449,460	-	39,982,912,902
	2010/2011	538,785	-	50,730,912,585
	2011/2012	345,128	-	22,686,563,048
	2012/2013	185,169	-	15,087,938,851
	2013/2014	169,530	152,373	14,636,877,852
	Sub total	1,688,072	152,373	143,125,205,238
Overall	Grand Total	2,884,542	641,839	231,800,611,760

(Source: Analysis from URA database on Import Statistics, 2014)

Appendix V: List of Computer Importers

No	Name of Company	Telephone Contact	E-mail Address	Location
1	Computer Point (U) Ltd	0776-543109/ 0312-250400	N/A	Plot 1A Kafu Rd Near Fairway Hotel.
2	Computech System Solutions Ltd	0414-342169/ 0312-371334/ 0701-448487/ 0772-448487	compussl@gmail.com	Plot 47/49, Nkrumah Rd, UCA Building-ground Floor Rm 14
3	Elite Computers (U) Ltd	0312 264255/ 0414 255933	info@elitecomputers.co.ug	Plot. 4A Kampala Rd, Crown Hse 1 st Floor.
4	Mitsumi Computer Garage	0414-347707		Bombo Rd, Plt 12, G.M. Building - Opposite Emka Hse
5	Kazinga Channel Office World Ltd	0414 258968 / 258889 / 254779 / 031 260313 / 0312 260314	sales@kazinga.com workshop@kazinga.com	Ebb Rd. Kampala. Metropole House commercial plaza, 1st Floor
6	Southern Business Solutions (U) Ltd	0772-501669/ 0414-220383	joelsempa@sbs.co.ug	Eseza Hse, UMA Show Grounds.
7	Redington (U) Ltd	0414-342096/ 0718403641/ 0713700333	Sales.uganda@redingtongulf.com	Plot 15 Mulwana Rd,
8	MFI computer solutions			Lumumba Avenue

