THE NETHERLANDS PROGRAMME FOR THE INSTITUTIONAL STRENGTHENING OF POST-SECONDARY EDUCATION AND TRAINING CAPACITY (NPT) ON ‘STRENGTHENING ICT TRAINING AND RESEARCH CAPACITY IN THE FOUR PUBLIC UNIVERSITIES IN UGANDA’

PROCEEDINGS OF THE CONSULTATIVE WORKSHOP ON ICT TRAINING AND RESEARCH PARTNERSHIPS IN UGANDA

HELD AT SERENA HOTEL, KAMPALA

18TH DECEMBER 2007

Organized by:

Faculty of computing and information technology, Makerere University in Collaboration with Mbarara University of Science and Technology, Kyambogo University and Gulu University

Sponsored by:

nuffic
# LIST OF ACRONYMS

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<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CIT</td>
<td>Faculty of Computing and Information Technology</td>
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<td>ICT</td>
<td>Information Communication Technology</td>
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<td>IDI</td>
<td>Infectious Disease Institute</td>
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<td>IBM</td>
<td>Intelligence Business Machine</td>
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<td>JCRC</td>
<td>Joint Clinical Research Centre</td>
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<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>MUST</td>
<td>Mbarara University of Science and Technology</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NARO</td>
<td>National Agricultural Research Organization</td>
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<td>NPA</td>
<td>National Planning Authority</td>
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<td>PHEA</td>
<td>Partnership for Higher Education in Africa</td>
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<td>UNCST</td>
<td>Uganda National Council for Science and Technology</td>
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<td>UIRI</td>
<td>Uganda Industrial Research Institute</td>
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<td>UNIDO</td>
<td>United Nations Industrial Development Organization</td>
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<td>UPF</td>
<td>Uganda Police Force</td>
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<td>UPPET</td>
<td>Universal Post Primary Education Training</td>
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<td>UWEAL</td>
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ACKNOWLEDGEMENT

The Consultative workshop on ICT Training and Research Partnerships was a great success in terms of both attendance and deliberations. This success was made possible by several Individuals and Institutions whose contribution deserve recognition. Special thanks go to Makerere University Faculty of Computing and Information Technology for taking lead in organizing the workshop and preparing these Proceedings and The Netherlands Government (through NPT project on ‘Strengthening ICT Training and Research Capacity in the Four Pubic Universities in Uganda’), for funding the workshop.

Gratitude is also extended to the various institutions that contributed in one way or the other towards the success of the workshop: Ministry of Education and Sports; Ministry of ICT; Ministry of Internal Affairs; Ministry of Local Government; Parliament of Uganda; Uganda Police Force; Uganda Prisons; Uganda National Council for Science and Technology; National Planning Authority; Uganda Investment Authority; Uganda Electoral Commission; State House; Makerere University, Kyambogo University, Gulu University, Mbarara University of Science and Technology, Busitema University; Islamic University in Uganda; Makerere University Business School; Uganda Christian University; Nkumba University; Kampala International University; Ndejje University; US Embassy; IBM- Canada; NEPAD; UNIDO; Partnership for Higher Education in Africa; National Agricultural Research Organization (NARO); Uganda Women Entrepreneurs Association (UWEAL); Simba Telecom Group; Warid Telecom; Uganda Industrial Research Institute (UIRI); Infectious Disease Institute (IDI); Micro Finance Support; International Hospital Kampala; Mayanja Memorial Hospital; The Monitor; The New Vision; The Flames; Kiira FM; and Mega FM.

Appreciation is extended to Minister of State for ICT, Hon Alintuma Nsambu for closing the workshop. Credit goes to the Presenters, the Session Chairs and the Facilitator of the workshop -Mr. Michael Niyitegeka, for the wonderful exposure of knowledge shared with all participants. And to the dear participants, thank you for the amazing and enthusiastic participation that made the workshop worthwhile attending and for providing an action plan for the next step.

Gratitude is also conveyed to Management and Staff of Serena Hotel for their seasoned support that made the participants relaxed and ready to make wonderful deliberations.

The contribution of the Organizing team also deserves accentuation. Special thanks go to Prof. Venansius Baryamureeba, Mr. Narcis T. Rwangoga, Mr. Michael Niyitegeka, Ms. Consolate Komugisha, Ms. Deborah Namirembe and Ms. Peace Buhwamatsiko Tumuheki for the tireless efforts put into the organization of the workshop and ensuring production of these proceedings.
The Consultative Workshop on ICT Training and Research Partnerships was held as part of implementation of the activities of the NPT Project ‘Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda’ i.e. Makerere University (Faculty of Computing and Information Technology), Mbarara University of Science and Technology (Institute of Computer Science), Gulu University (Department of Computer Science) and Kyambogo University (Department of Computer Science). This is a four year project which started on 1st June 2007 and ends on 31st May 2011. The workshop was organised under the auspices of The Netherlands Government through Nuffic.

It has been noted with concern that there are limited partnerships existing between the academic Institutions and the local private and public sectors in Uganda. A lot of research has been undertaken by the universities although it has not been absorbed by the different sectors. With the help of development partners like The Netherlands Government, Rockefeller Foundation and the European Union, public Universities in Uganda are seeking to strengthen existing private-public partnerships and also create new ones in the areas of, but not limited to: \textit{Joint Research; ICT applications development especially software solutions; Producing quality and relevant ICT graduates and thereby reduce training time after graduation; ICT innovations; Mentorship and industrial attachments; and Commercialization of the research/ intellectual outputs from the Universities.} It is on this ground that a consultative workshop was held to seek for views from all the stakeholders on how ICT Training and Research partnerships among the academia, private and public sectors can be enhanced in Uganda.

Participants were from Universities, the Private and Public Sectors in Uganda; and from international organizations. The workshop was largely consultative and therefore discussions involving all the participants were made after the presentation of a paper or two depending on how many were in a session. In total seven presentations were made. The paper on Feedback from the Industry was presented in form of brainstorming by all the participants. The topics that were presented and discussed are: The Status/Developments in ICT Training and Research in Uganda; National ICT Framework in view of the roles of Universities, Private and Public Sectors; ICT Policy in Education; Training for the ICT Industry; Feedback from the Industry; and Partnership Process: Case study of Uganda Police Force and Makerere University Faculty of Computing and IT.

In addition participants were divided into four groups and allocated topics for discussion as follows: ICT in Health; ICT in Education; ICT in Government Service Delivery and ICT in Business. The groups were given terms of reference to guide their discussions as follows; what are the opportunities for ICT in the sector? What contributions can the academic institutions make to exploit the opportunities? and what would you recommend to ensure partnerships in the sector? The aim of the exercise was to allow further understanding of the presentations and sharing of experiences among the participants. The deliberations of the group discussions fed into the action plan that was drawn at the end of the workshop. There were
also 10 projects on display from some of the graduates of the public Universities showing case of what they are capable of doing.

At the end of the workshop, Action areas were identified with consensus on aggressive marketing through open days and consultative workshops; Targeted lobbying to relevant authorities; and Bench marking to get the best practices elsewhere. As a point of immediate action it was agreed that a committee or forum or consultative team be formed to guide and turn the resolutions into a Master Plan for implementation. These proceedings are a record of what transpired at the workshop.

Professor Venansius Baryamureeba
DEAN, FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY, MAKERERE UNIVERSITY
OVERALL COORDINATOR & PROJECT LEADER IN UGANDA
A SNAP SHOT OF THE WORKSHOP PRESENTATIONS

The Consultative Workshop on ICT Training and Research Partnerships was held on 18th December 2007 at Serena Hotel, Kampala. The theme of the workshop was ‘Strengthening Partnerships between the Academia, the Private and Public Sectors’. The workshop was guided by the following objectives in line with ICT training and research:

- Identifying the roles of the Universities, Private and Public Sectors;
- Exploring the opportunities for partnerships;
- Receiving Experiences from the Industry on the quality of ICT Graduates;
- Brain storming on strategies to address and formulate an action plan to mitigate the existing gaps.

At the end of the workshop an action plan was drawn for implementation by all the stakeholders of the workshop. This section presents in abstract format the presentations that were made at the workshop. This is intended to provide the reader a print of what transpired during the workshop as well as arousing interest into further reading.

0.1 Self Introductions

The workshop began with self Introductions by all the participants (details are in appendix 2). 91 participants attended the workshop.

0.2 Prayer and Welcome Remarks

The prayer was made by Mr. Godfrey Kagoro of Makerere University. There after, Professor Venansius Baryamureeba, Dean Faculty of Computing and IT gave welcome remarks.

0.3 Paper Presentations

Seven papers were presented at the workshop of which one was open to the entire workshop participants in form of sharing their experiences about what they know about the Computer Science & IT graduates with the aim of seeking to improve on the delivery and performance of the graduates. These papers were presented in four sessions and each was followed with a discussion based on questions raised from the presentations. Group discussion reports were also presented and an action plan drawn in yet another session. Below are highlights of the presentations of each paper.

0.3.1 The Status/ Developments in ICT Training and Research in Uganda

This paper highlighted the Status of ICT Training and Research in the Public Universities in Uganda focusing on public Universities. The paper provided information on the organizations that having been critical in helping these Universities realize their current ICT status. The paper emphasized that most partnerships being experienced are with international organizations rather than local companies. A point was therefore made that Universities have the talent which the local companies need to exploit and one highlighted was software development.
0.3.2 National ICT Framework in view of the Roles of Universities, Private and Public Sectors
This paper provided a background of the existing National ICT Policy with emphasis that it is due for review and processes to this effect are already ongoing. The paper defined clearly the roles of each of the parties: Universities, Private and Public (government) sectors with emphasis that each of these needs the other in order to be able to effectively play its roles. The government is mainly an enabler for Universities and the private sector in terms of setting proper policies and regulations. The private sector is mainly earmarked for supporting investments of both the academic Institutions and public sector whereas Universities are mainly charged with human capacity, content and applications development.

0.3.3 ICT Policy in Education
The proposed ICT policy for the sector is before cabinet for consideration. This paper highlighted key issues in the proposed Policy for each of the subsectors. Critical success factors were also highlighted. In brief the paper highlighted the role of the Ministry of Education and Sports in providing an environment for ICT policy to enable partnerships on ICT projects.

0.3.4 Training for the ICT Industry
This paper was presented from a University’s perspective, with a petitioning voice to the private sector specifically the ICT Industry in as far as explaining the opportunities and benefits of partnerships for either party are concerned. A whole range of probable areas of partnerships were elaborated. The likely implementation issues to do with legality; evaluation and assessment; and continuity and sustainability of partnerships are explained. In fact the paper demystified the would be worries of either party engaging in partnerships and indeed shows every reason why partnerships should be embraced. Drawing from the Asian and European/American experiences the presenter also shared the traditional practices of Universities and the current practices of Ugandan Universities.

0.3.5 Feedback from the Industry
This paper was presented in a brain storming form by all the participants. In one voice they all agreed that strengthening collaborations between academic institutions and private sectors specifically in the area of ICTs is very important. It creates opportunities and benefits through dialogue, provides practical experiences to students (internships), and research collaboration. However, participants noted with concern that students do not gain practical skills due to the fact that student numbers are too big in comparison with the available facilities such as computers; and that many university students want to be spoon-fed. Several recommendations were made to Universities on how best they can bring on board the private sector, how to improve the quality of their graduates and the benefits thereof.
0.3.6 Partnership Process: Case Study of Uganda Police Force and Makerere University Faculty of Computing and IT
The paper was presented from two perspectives of the two partnering Institutions. It narrated the steps that were taken from the time the idea of partnership with Uganda Police Force was perceived up to the time when the memorandum of understanding was cleared by the Solicitor General ready for signing by the involved parties. The roles of each of the parties were outlined as well as enabling / critical success factors and lessons that can be learnt by any parties tending to partner.

0.4 Group Discussions
Participants were divided into 4 (four) groups and each allocated a topic for discussion. The four groups and allocated topics for discussion as follows: ICT in Health; ICT in Education; ICT in Government Service Delivery and ICT in Business. For consistency, the groups were given terms of reference to guide their discussions.

0.5 Drawing an Action Plan
Drawing of the action plan was participant led and this was informed by the presentation from the group discussions. The essence of the action plan was to create the platform on which partnerships could start as well as be strengthened.

0.6 Closing of the Workshop
The workshop was closed by Minister of State for ICT, Hon. Alintuma Nsambu.
SECTION I - OPENING OF THE WORKSHOP

The Workshop started at 09:00 am with a word of prayer led by Mr. Godfrey Kagoro. This was followed with self introductions of all the workshop participants and welcome remarks from Professor Baryamureeba, Dean Faculty of Computing and IT Makerere University.

WELCOME / OPENING REMARKS

Remarks by Prof. Venansius Baryamureeba, Dean CIT, Makerere University

Professor Baryamureeba welcomed participants to the workshop and informed them that unlike other workshops where handouts are provided, this workshop did not have them because it was a consultative workshop and the participants themselves were the handouts. He informed them that Universities were at the workshop to consult them, and vise versa.

He anticipated that the workshop was going to be beneficial given the caliber of the attendees who included among others people from international organizations, the private and public sectors in Uganda.

He looked forward to fruitful deliberations at the workshop and cemented relationships in the near future.
SECTION II- PAPER PRESENTATIONS

Seven papers were presented in four sessions. The presentations were followed by a discussion of the issues (in form of questions, comments and answers) rising from the presentations and or the topics of discussion in general. One of the papers in session two was dedicated to receiving feedback from the Industry in which case it became an open presentation by all the participants.

1. SESSION ONE

Session Chair: Mr. Sylvester Baguma from NARO/Nkumba University.

1.1 THE STATUS/DEVELOPMENTS IN ICT TRAINING AND RESEARCH IN UGANDA

This paper was presented by Professor Venansius Baryamureeba, Dean- Faculty of Computing and IT, Makerere University. He is also the Project Leader and Overall Coordinator of the two Projects on ICT Training and Research Capacity at the four Public Universities in Uganda funded by the Netherlands Government through the Netherlands Organization for International Cooperation (Nuffic).

Prof. Baryamureeba informed participants that his presentation would highlight the developments in the ICT Sector on ICT training with focus on the public Universities in Uganda i.e. Busitema University, Kyambogo University, Gulu University, Mbarara University of Science and Technology and Makerere University; status of research in these Universities; and would also mention the partners that have been supportive in helping the Universities realize their current ICT Status.

ICT Training

He started with Busitema University and informed participants that it is the youngest public University in Uganda having become operational with effect from August 2007. Busitema University has got two programmes in the area of ICT: Bachelor of Computer Engineering (4 years) and Bachelor of Science Education (3 years) in which Computer Studies is offered as a subject together with Mathematics and Physics. Currently it is the only University in Uganda running the Bachelor of Computer Engineering. The scope will soon expand with the launch of the same programme at MUST in 2008.

Gulu University has had a drastic change in three years (from the time the project on Building a sustainable ICT Training in the Public Universities in Uganda started). The Department of Computer Science at Gulu University runs ICT programmes from certificate level up to a Bachelor’s degree. Currently, it has one undergraduate diploma: Diploma in Computer Science (2 years) and two undergraduate programmes: Bachelor of Information Technology (3 years) and Bachelor of Science in Computer Science (3 years). Enrollment to these programmes has greatly improved. The Bachelor of Science in Software Engineering (3 years) programme is scheduled to start in August 2008.
At Kyambogo University the Department of Computer Science is the major department offering ICT programs and training. It has one degree program at the moment (Bachelor of Information Technology and Computing), and expects to start two new programs in 2008: Bachelor of information systems; and Postgraduate Diploma in Computer Science. The Department also offers a Diploma in Computer science (2 years) and Certificate in Computer Science (1 year).

Mbarara University Institute of Computer Science currently runs two undergraduate degree programs: Bachelor of Information Technology (3 years) and Bachelor of Computer Science (3 years). In addition, the Institute runs four short courses: Cisco Certified Network Associate (CCNA); Cisco Certified Network Professional (CCNP); Certificate in Computer Applications (CCA); and International Computer Driving License (ICDL). A Bachelor of Computer Engineering (4 years) Programme is due to start in August 2008.

Makerere University Faculty of Computing and IT offers a wide range of programs ranging from PhD, Masters, Postgraduate Diplomas, Bachelor programs, undergraduate diploma to certificates in computing and ICT related fields. These programmes are offered in four departments: Department of Computer Science with the following academic programmes: PhD by Research in Computer Science (3 years); PhD by Coursework and Research in Computer Science (3 years); Master of Science in Computer Science (2 years); Postgraduate Diploma in Computer Science (1 year); Bachelor of Science in Computer Science (3 years); and Diploma in Computer Science and Information Technology (2 years).

Department of Information Technology: PhD by Research in Information Technology (3 years); PhD by Coursework and Research in Information Technology (3 years); Master of Information Technology (2 years); Postgraduate Diploma in Information Technology (1 year); and Bachelor of Information Technology (3 years).

Department of Networks: PhD by Research in Software Engineering (3 years); PhD by Coursework and Research in Software Engineering (3 years); Master of Science in Data Communications and Software Engineering (2 years); Postgraduate Diploma in Communications and Software Engineering (1 year); Postgraduate Diploma in ICT Policy and Regulation (1 year); Bachelor of Science in Computer Engineering (proposed) (3 years); and Bachelor of Science in Software Engineering (proposed) (4 years).

Department of Information Systems: PhD by Research in Information Systems (3 years); PhD by Coursework and Research in Information Systems (3 years); Master of Science in Information Systems (2 years); Postgraduate Diploma in Information Systems (1 year); and Bachelor of Information Systems (proposed) (3 years).

CIT also provides for the continued demand for computer and IT basic skills through running of several short courses in the area of computing and ICT and other related areas: Certificate in Computer Applications (CCA); International Computer Driving License (ICDL); Oracle Certified Associate (OCA);
Oracle Certified professional (OCP); Cisco Certified Network Professional (CCNP); Cisco Certified Network Associate (CCNA); and IT Essentials I & II. CIT also runs the Midnight University Program mainly to support ICT led socio-economic development through providing Education for All. This program mainly caters for those who may not find time during the day and evening hours and also caters for those financially constrained since its rates are subsidized. CIT provides a wide range of ICT consultancy services through its consulting arm- ICT Consults Ltd.

CIT provides international certification testing. It is an authorized Prometric, Pearson VUE and ICDL Testing Centre. A range of certification exams are delivered including CCNA, CCNP, Microsoft Certified Systems Administrator (MCSA), Microsoft Certified Systems Engineer (MCSE) Microsoft Certified Database Administrator (MCDBA, Microsoft Office User Specialist (MOS) and Microsoft Certified Solutions Developer (MCSD); Oracle Certified Associate Programme (OCA), Oracle Certified Professional (OCP); Graduate Management Admission Test (GMAT) and National Admissions Test for Law (LNAT).

**Status of Research**

The Netherlands Government through Nuffic has funded two projects: Building a Sustainable ICT Training Capacity in the Public Universities in Uganda (2004-2008) and Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda (2007-2011). Both Projects strongly support building capacity of staff and research. The first project focused on MSc training whereas the second one focuses on PhD Training and research capacity strengthening.

Professor Baryamureeba informed participants that the research capacity of the Faculty of Computing and IT has greatly improved. The number of PhD holders has moved from 4 to 15. These are undertaking serious research in collaboration with their counterparts in the collaborating Institutions in the Netherlands. Every year all the partnering Southern Institutions get access to 40 professors from The Netherlands. Under the second project there are deliberate efforts towards strengthening research collaborations now and in the future among the PhD holders (researchers) of the 7 institutions involved in this project. In addition the project has funded in total 30 PhD Students from the four Public Universities in Uganda of whom 10 are to study from Institutions in the Netherlands and 20 at Makerere University. This will be a big boost in as far as building and sustaining research capacity is concerned.

He further informed participants that given the research taking place in the Public Universities, the same will happen in the private Universities. What is important is ensuring that institutions partner so that this research is utilized. Institutions have had research projects especially from the outside organizations such as IBM, World Health Organization, Cisco Systems, but receive very limited opportunities to participate in projects from local companies. The reason behind this could be the tendency to think that Universities have no local talent to do research. However Prof. Baryamureeba assured the participants that within the public Universities there is talent to do research and undertake projects in different areas such as
software development. He informed participants that the Faculty of Computing and IT has a fully fledged software Development and Innovations Department which is already involved in serious research undertakings with International Organizations.

One of the puzzles for which he expected the workshop to provide a solution is how Universities can work with the local sector to boost research projects. He commended the Uganda Police Force for having come on board to work with Makerere University. He emphasized that Universities are ready to deliver and they can deliver!

**Partnering Organizations**

Several Organizations have provided support in one way or the other which support has been crucial in as far as ICT matters in Public Institutions are concerned. These include: NUFFIC, European Commission, IBM, FedEx, Cisco Systems, Google, Microsoft, Rockefeller Foundation, and Norwegian Research Council among others.

The Netherlands Government through NUFFIC has provided support in the area of capacity building to the four public universities in Uganda through two projects. The project on *Building a Sustainable ICT Training Capacity in the Public Universities in Uganda* worth 3.4 million Euros started on 1st July 2004 and will end on 30th June 2008. The project's aim was to address Information and Communication Technology (ICT) capacity building in the Public Universities in Uganda, namely Makerere University Faculty of Computing & IT (Lead Institution in the South), Kyambogo University, Mbarara University of Science and Technology, and Gulu University. The lead institution in the North is the University of Groningen. The other Northern partners in the project are Radboud University Nijmegen and Hanze University of Professional Education. The target group is the staff and students in the above institutions and mid-career ICT professionals. The main activities require expertise from the Netherlands, for support in Curriculum Development and Implementation, in development of research capacity and to advise in the establishment of a Centre of Excellence for ICT Training and Research. Staff of all the four universities was and some are still training at Master's and PhD level in ICT in the Netherlands (NL) and Uganda (UG).

The project on *Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda* worth €5.7 million started on 1st June 2007 and will end on 31st May 2011. The grant was awarded to the organization of the Southern & the Dutch partners. The Southern partners comprise of four Ugandan Public Universities, namely Makerere University (Lead Institution in the South), Mbarara University of Science and Technology, Kyambogo University and Gulu University. The Dutch partners comprise of University of Groningen (Lead Institution in the Netherlands) working with Radboud University Nijmegen and Eindhoven University of Technology. The aim is to strengthen the Capacity of Makerere University Faculty of Computing & IT (CIT), Mbarara University of Science and Technology
(MUST) (Institute of Computer Science), Kyambogo University (Department of Computer Science) and Gulu University (Department of Computer Science) to develop, implement and manage relevant educational and research programmes in the field of ICT. The ultimate goal is to enable the recipient institutions to contribute through ICT towards the national struggle for poverty alleviation as well as rural and economic development in Uganda.

European Commission- has sponsored sponsored ‘Connecting the EU & sub-Saharan Africa for ICT partnerships (EuroAfriCa-ICT)’ project scheduled to start 2008. The new European Strategy for Africa adopted by the EU Council in December 2005 gave a comprehensive policy framework that reflects the priorities of the EU in its relationship with Africa - Towards a deeper and stronger cooperation between Africa & the European Union. The development of EU-Africa Science and Technology cooperation on ICT is of mutual and strategic interest as ICT has been identified as an enabler for a sustainable and long-term development of the African continent. The EuroAfriCa-ICT project objectives therefore are to: Facilitate and support a strengthened EUAfrica dialogue; Identify and develop strategic cooperation projects of common interest and mutual benefit; Strengthen concentration and develop synergies between existing initiatives, programmes and projects; Pursue awareness rising in Africa; Ensure a wider promotion of cooperation opportunities in Europe; Pursue a specific focus on South Africa; and Develop/initiate a specific action towards the Caribbean. Beneficiaries of this project include: Orionis, a Division of Sigma Consultants (France), The Meraka Institute of CSIR (South Africa), The Panos Institute West Africa, PIWA (Senegal), The Academy of Sciences for the developing World, TWAS (Italy), The Africa Unit of The Association of Commonwealth Universities, ACU (UK), Makerere University (Uganda), The Kigali Institute of S&T (Rwanda), The Caribbean Academy of Sciences (Jamaica), and The Agence Universitaire de la Francophonie (Belgium).

IBM has provided unique opportunities for both staff and students in the recent past. The faculty has participated in the IBM Deep Dive Drive which brought together ICT academic fraternity in Africa to discuss possibilities of an ICT-led transformation in Africa. Out of these meetings, it was noted that there was need to mentor ICT graduates in preparation for the Industry. As a result, IBM has put together a program called Makocha Minds Mentorsip Program. CIT is a marquee partner on this programme. IBM is opening regional offices for Eastern Africa in Nairobi. IBM has also donated The Blue Gene/ P Super Computer, the fastest computer on the African Continent to be used by all African Researchers and will be hosted by one African University. A press release from IBM dated 4th December 2007 in New York, states that IBM has made a gift in honor of Prof. Baryamureeba to the United Nations (UN) Foundation in support of ‘Nothing but Nets’, a grassroots campaign to save lives by preventing malaria. The statement further adds that through Nothing but Nets, the UN Foundation and its partners work with the Measles Initiative –one of the most successful vaccination efforts undertaken—to purchase bed nets and distribute them in countries and communities in greatest need.
FedEx and CISCO systems have joined IBM in the mentorship programme. More than 20 students have been nominated and the matching with the mentors is already taking place. IBM is providing its top senior engineers and managers as mentors. This will provide an opportunity to our students and staff to work with some of the top brains in the world. It is through this programme that IBM will be in position to recruit some of the mentees to work in the regional establishments.

Cisco Systems has sponsored CIT staff to undertake training in South Africa the Cisco Academy Training Center of the Middle East and African region and sometimes instructors receive in-house training by the CISCO Technical Area Manager. This has greatly empowered them to be skilled and certified Instructors. As a regional academy, CIT is mandated to oversee the Cisco programmes in the region and ensure that Local Academies operate in line with the CISCO Quality Assurance plan. Cisco Systems has also provided Cisco Lab equipment including CCNA lab bundle, CCNP lab bundle, WLAN bundle Kits (Wireless Access Points, Bridges and their accessories) to support Laboratory Practicals at the academy. CIT received a Video Camera and its accessories to be able to capture and share its success stories and best practices with the rest of the global Networking academy community in Europe, Middle-East and Africa. CIT as a Regional Centre for the Cisco Networking Academy is well prepared for the new curricula in CCNA, CCNP and IT Essentials courses. Cisco Networking Academy has introduced new curricula of CCNA, CCNP and IT essentials for the next generation. The New curricula were designed to address a changing marketplace and respond to New Technologies. These products are the result of Networking Academy’s increased focus on providing the skills students need to pursue IT networking careers in a competitive global marketplace.

Google has also come in a big way. Google Inc has identified CIT as a partner in its programmes for Africa. There are plans to partner with CIT in rolling out Google applications. On March 3rd 2008 Google is set to launch the students challenge dubbed the ‘Build a Google Garget Challenge’ which is targeting students from East Africa. The challenge will have participating universities from Kenya, Tanzania, Rwanda, Uganda, Burundi, and Ethiopia. Google will provide experts who will mentor both students and staff while on the project. The challenge will last four months.

Microsoft has launched a worldwide student’s challenge the ‘Imagine Cup’. Students will be expected to develop solutions using the Microsoft platform. Microsoft Inc is also providing computing facilities for the Microsoft Academy at CIT. These facilities are intended to provide specialized training to students in Microsoft packages. Because of the competence of our students, Microsoft has invited our students to participate in the Imagine Challenge Cup that is competed for by students from all over the world. The 2008 Theme: The Environment. The 2008 World Finals will be held in Paris France from July 3-8, 2008. This provides an opportunity to our students to test their capability and skills against the rest of the world.
Rockefeller Foundation is providing a seed grant for the establishment of the software incubation facility at CIT. The facility will provide Computing graduates from all the universities with hands on skills in software development. The students will be mentored by professionals from the industry [Uganda] and abroad especially from IBM, Cisco and FedEx who will develop problems in form of projects for the students to undertake. The facility will not only provide the students with technical skills, but also with other skills like entrepreneurship, marketing, product branding among others.

In his concluding remarks Prof. Baryamureeba informed participants that Africa has the fastest growing population in the world. Africans have talent which needs to be utilized. We should focus on our local talent so that things happen. He called upon participants to partner and come up with ideas that can improve the existing situation. Both the private and public sectors need to partner so as to improve the quality of our products. The largest computing facility in the region is set at Makerere University. This facility will enable massive training in ICT which is necessary in moving this country to another level though ICT enabled services. This facility is not meant to benefit only Makerere University but all Universities in Uganda.

Norwegian Research Council has provided funds for implementation of OMEVAC (Open Mobile Electronic Vaccine Trials'), an interdisciplinary project to improve quality of vaccine trials in low-resource settings was accepted for funding. The project Primary objective is to develop OMEVAC, a complete secure, mobile and electronic system for data collection and management in vaccine trials, from source to publication, and using and complying to international standards and requirements. OMEVAC is an interdisciplinary action research project that combines health and information technology expertise with field studies in Africa. The partners of this application have already developed several different systems. 1) EpiHandy, a generic electronic open source and free mobile data collection and management system, that is being used for regular studies in low income countries, 2) R, a widely used and renowned open source statistical analysis tool and 3) Nesstar, a research data publishing system. The consortium consists of Norwegian and international organizations, universities, software and hardware development groups and includes TDR/WHO, HandheldsForHealth.org (Linux company in Bangalore India), Makerere University Uganda, INDEPTH Network / Malaria Clinical Trial Alliance, NSD (Norwegian Social Science Data Services), Promise Consortium and 2 faculties at University of Bergen (Centre for International Health and InfoMedia) – Lead Institution. For more information visit: [http://tinyurl.com/243ofl](http://tinyurl.com/243ofl). CIT is responsible for the Software Development component of the project.

1.2 NATIONAL ICT FRAMEWORK IN VIEW OF THE ROLES OF UNIVERSITIES, PRIVATE AND PUBLIC SECTORS

This paper was presented by Mr. Ambrose Ruyooka, Ag. Commissioner Information Technology, Ministry of ICT, Government of Uganda. Mr. Ruyooka informed participants that the formulation process of the National ICT Policy Framework (2003) started in 1998 spearheaded by UNCST and involved consultations
with wide cross-section of stakeholders. The then MoWHC later took over and presented it to Cabinet for approval. It was approved by Cabinet in November 2003. He informed participants that since 2003 a lot has happened for instance all the ICT concerns in the country are under one focal point- Ministry of ICT.

He provided the Policy Statement: The government of the Republic of Uganda recognizes the important role information and ICTs play in national development. Government consequently unreservedly commits itself to champion the development and use of ICT in Uganda; and the Policy Vision: A Uganda where national development, especially human development and good governance, shall be sustainably enhanced, promoted and accelerated by efficient application and use of ICT, including timely access to information.

He further outlined the Policy Objectives as follows: Sensitization and awareness on the role of ICT; Building ICT human resource capacity; Establishing an appropriate infrastructure for ICT development and enable universal access; Promotion of competition and investment in the sector and encourage local participation; Development of Innovative financing of ICTs; Production, storage and dissemination of information; Facilitation of access to public information; Creation of a conducive environment for media pluralism; Promotion of multi-linguism; Promotion of and ensuring gender mainstreaming in ICT development; Establishment of desirable legal framework; Support and encouragement of Research and Development in ICT; Recognition of intellectual assets; and Enhancement of regional and international collaboration.

Mr. Ruyooka went on to elaborate on the roles of Universities, Private and Public Sectors in realizing the framework goals. In explaining these roles he categorized those that are exclusive to either party and those that should be shared by all the three. He informed participants that Universities play the following roles: Human Capacity: Although unemployment rates are very high it is still difficult to find a sufficient supply of skilled ICT personnel to meet the rising demands; Content and Applications: Universities can form a critical mass for a wider participation in the creation and maintenance of content. This can address the problem of lack of relevant and sufficient content; Research and Development: Promotion of Research and Development using Public Private Partnerships, (identify real life problems in the industry and turn them into research issues).

The roles of ensuring Increase of investments in the sector and funding for ICT Innovations are attributed to the private sector. There is need to attract more foreign direct investment in the ICT sector; (locally assemble ICT hardware and network equipment, develop software for export) and also to encourage entrepreneurial approach in training. There is also need to encourage partnerships, mergers and acquisitions so as to enable improved access to global market.

The Public (government sector) provides the Policy and Legislation role as well as Infrastructure development. Favourable trade policies and incentives play a role in the development of the sector e.g. in
the case of Malaysia, the government provides both financial and non-financial incentives to businesses. Financial incentives include zero income tax for a period of 10 years, Research & Development grants, and a 100 percent investment tax allowance on new investment in the ICT sector. Non-financial incentives include unrestricted employment of foreign knowledge workers, no restrictions on global capital, and limited restrictions on ownership. Mr. Ruyooka explained that with proper infrastructure in place Universal access becomes more and more feasible with rapidly declining costs for networking and telecommunication technologies. This allows developing countries to leapfrog ahead through the use of cutting-edge technologies. This would enable among others cost effective Research Education Networking.

He however stressed that there is need for cooperation among the Universities, Private and public sectors if these roles are to be effectively achieved. None can work successfully in isolation of others.

Mr. Ruyooka proposed the Way Forward by informing participants that the national ICT Policy Framework (2003) is due for review. The Ministry of ICT is spearheading the process in view of the convergence, to bring all the ICT sector pillars under one policy Framework. The pillars include: Telecommunications and Posts; Broadcasting Infrastructure; Information Technology; and Information Management.

### 1.3 ICT POLICY IN EDUCATION

This paper was presented by Mr. Humphrey Mukooyo, Senior Information Scientist, Ministry of Education and Sports. He began his presentation by highlighting the need to integrate science and technology in the socio-economic development process as well as getting appropriate technical advice. He also mentioned that Uganda, along with many other countries has identified ICT as a key tool for development and that the education sector plays a key role in the human resource development of ICT, and it is hoped the ICT policy will help achieve this. He informed participants that the Education ICT Policy is before Cabinet for consideration.

Mr. Mukooyo defined Information and Communication Technology (ICT) as ‘electronic means of capturing, processing, storing, communicating information, manufacture and assembly’. ICTs are based on digital information and comprise computer hardware, software and networks. There are other technologies, which deal with information like the ‘intermediate technologies’ based largely on analogue information held on electro-magnetic waves such as radio, television and telephony; ‘literate’ technology based on information held as written word such as books and newspapers and ‘organic’ technology based on human body such as the brain and sound waves. These technologies are now merging rapidly as they join the digital world.

He highlighted the objectives of the Policy as the following: increasing equitable access to ICT; assuring achievement of MDG and EFA goals; enhancing sustainability of UPE; and reducing the high cost of
UPPET. The underlying principles of the policy were also highlighted: Life skills; enhancing employment opportunities and competitiveness; educational objectives; social economic objectives; reduce high cost of education at all levels; increasing equitable access; and development of competencies at the different levels of education.

The role of the Ministry of Education and Sports was also highlighted to include: Curriculum development and implementation; raise awareness and mobilize support for ICTs in education; advocate for and mobilize resources for ICTs; promote research, documentation and serve as a depository for ICTs in collaboration with other organizations within and outside the country; Routine monitoring and assessment of the performance of ICT in education sector; implementing and review of ICT policy and developing an action plan with appropriate qualitative and quantitative indicators; initiate and promote coordination, collaboration and networking amongst all the stakeholders; develop ICT related guidelines for educational Institutions; provide information to the private sector on partnership opportunities; harmonize and rationalize the activities of the private and local training institutions; and policy reformulation, monitoring and evaluation.

He informed participants that the introduction of ICT in the sector has got some implications in each of the subsectors is concerned. For the Primary Subsector: All primary schools should be encouraged to use ICT to support teaching, either by producing teaching materials or by use of the technology with students. Guidelines should be produced for schools to show how this can be done; Computer awareness should be introduced into the training of primary teachers on a phased basis, so that newly qualified teachers are equipped to make use of ICT as it becomes available; All students completing this sector should have working knowledge of the computer; All teachers in this sector will be facilitated to undertake special skills training to enable them provide support to the curriculum developed for ICT appreciation for the primary school child. The Government of Uganda will provide ICT infrastructure in each institution to achieve a ratio of 1 workstation for every 25 students over the first five years; and 1 ICT skilled teacher for every 50 students. All students in each institution for which ICT integration program is completed will have an email address and access to ICT curriculum material for each subject in the primary school curriculum; and all primary institutions will ensure that the ICT service delivery and support unit at the institution utilize a significant population of the ICT skilled student population to participate in providing these services.

In the Secondary Subsector: the Secondary School ICT curriculum should focus on higher end computer studies skills including Programming, hardware maintenance and repair; at secondary level the aim is that secondary teachers should be equipped to make use of ICT in their lesson preparation, and to use ICT in their teaching; all teachers in this sector will be facilitated to undertake special skills training to enable them provide support to the curriculum developed for ICT appreciation for the secondary students; students in each institution for which ICT integration program is completed will have an email
address, access to the internet and access to ICT curriculum material for each subject in the secondary school curriculum; the secondary school ICT curriculum presently taught as Computer Studies will be integrated into each secondary school in the short term especially for schools that already have the ICT infrastructure to undertake student study; and all secondary schools will ensure that the ICT service delivery and support unit at the institution utilize a significant population of the ICT skilled student population to participate in providing these services.

In the Business, Technical and Vocational Education and Training Subsector: graduates of the Uganda Advanced Certificate Examinations with credits in Science subjects and Mathematics will be eligible for the computer Technicians training; MoES will encourage and work closely with the private sector to invest in training of students in this production of Computer technicians; MoES will provide ICT infrastructure in each institution in the long term to achieve a 1:1 ratio; teachers in this sub-sector will be facilitated to undertake special skills training to enable them provide support to the theory and practical curriculum developed for computer science as a practical subject, and to ICT appreciation and student personal learning using interactive media for the higher school students; all students in each institution for which ICT integration program is completed will have an email address, access to problem support databases, access to the Internet and access to ICT curriculum material for each subject in the higher school curriculum; all libraries in the schools will have computerized cataloguing systems implemented to enable access and sharing of data; and these courses should be reviewed, both in terms of their quality and the numbers trained.

For Teacher Training and Education the implications of introducing ICT are: to use ICT as a communication tool among teachers and between teachers, administration and management using such collaborative tools as e-mail, chat, discussion forums and net meeting; to use ICT to search for knowledge for further learning via libraries in the school and the internet; to use ICT for Class preparation, exam scheduling, marking and management of students’ results and progress; to have teachers in the education sector in Uganda have their proficiency in ICT used to evaluate their grading; to ensure that the cost saving benefits and efficiencies of ICT technology are sought to address all critical issues involved in optimizing the output from the teacher education institutions. The computerization of all aspects of management of the Teacher training institutions is paramount; the Strategy for teacher training involves having the student teachers trained in ICT appreciation and ICT subject skills to transfer this knowledge to fellow teachers with the aim of the fellow teachers appreciating ICT and learning how to use ICT as a teaching support tool and a learning enhancement tool; teachers will be encouraged to take online courses that increase their understanding of how ICT can assist them in preparation of classes and conducting classes; and Teachers that undergo this program will also be trained to provide first level technical support to the ICT infrastructure at their institutions of learning.
In the Tertiary and Universities Subsector: The fundamental changes in academic instruction and learning using new tools and methods are being evaluated against a different set of standards from those of the past. The emphasis is on outcome. Higher education is judged by what students have learned, not what they have been taught. More and more University students are working adults. These students typically are "place bound". This dictates that the "classroom" should no longer be constrained by time and space. The strategic impact of ICT integration into the student lecturers’ process and e-learning and e-learning services may vary among institutions and, over time; Lecturers need to be encouraged to develop CD based content for Distance education as well as pilot mechanisms of Online E-Learning in Uganda. In addition, modules should be developed for teachers to learn about ICT use in the teaching of their subjects; within an individual institution of higher education, E-learning may be more significant to some subjects within the university than to others. This notion of differing strategic relevance is critical to understanding the wide diversity of potential practices that can be used to integrate e-learning within the university. It emphasizes the relevance of clear and timely high-level decision making on e-learning subjects and the availability of long term (strategic) e-learning development plans; and the substantial increase in student enrolment in the university has to create more flexibility in delivering academic programmes in order to remain competitive. E-learning must focus on the universities general long-term objectives, thereby supporting the University's overall strategic planning.

For the Physical Education and Sports: The Ministry will encourage schools to collaborate with sports academies via the internet to enable them attend International, regional and local meet; The Ministry will develop ICT based tutor and sports coaching programs; The Ministry will carry out coordination and publicity of programs via the internet; Teacher training programs will include component on use of ICT for sports; NCDC content development program will include coach based software and sports student based software; and the Ministry will place all amateur and professional sporting rules on the internet for easy access by schools to enhance on the quality of organization and officiating sports.

Mr. Mukooyo also elaborated on Hardware, Software and Internet Connectivity: The Ministry will negotiate with the Uganda Communications Commission (UCC) to seek to develop a low cost rate of access to the Internet for schools. This model of an e-rate has been successfully used in other countries to facilitate Internet connectivity; The Ministry will authorize schools to allow members of the community to use their computer facilities after school hours. This will provide a service to the wider community, and allow the schools to make some income that can be used to reduce the cost of Internet connectivity. Guidelines and regulations for this activity will be developed by the Ministry; and where schools are located in rural areas and are prepared to make their facilities available to the community, the Ministry will seek to negotiate for funds from the Rural Connectivity Development Fund (RCDF) of the Uganda Communications Commission to provide connectivity at reduced cost.
He informed participants that in as far as Software is concerned; the Ministry has started engaging in negotiations with the manufacturers of software with a view to arranging an educational rate for the main applications to be used in schools. The Ministry has already signed a Memorandum of Understanding with Microsoft in this regard. For the hardware and maintenance: The Ministry will encourage sponsors and donors of equipment to schools to direct their donations to schools that are unlikely to be able to raise funds for equipment of their own. In particular rural schools and girls schools will be targeted; The Ministry will provide limited funding for ICT equipment in a small number of rural-poor schools each year; The Ministry will provide limited funding to equip or upgrade the ICT facilities in some of the BTVE colleges each year; The training in ICT provided to teachers will include a module on first line maintenance, enabling teachers to solve routine problems themselves as and when they occur; The capitation grant to schools will be modified to provide a modest increase in grant to secondary schools that have been targeted for the provision of computers because of their rural-poor status. This will provide some funding for maintenance and upkeep of the equipment.

In drawing his conclusion Mr. Mukooyo highlighted some critical success factors as far as implementation of the proposed ICT Policy in the education sector is concerned: Coordination; Training of trainers; and Curriculum design.

1.4 DISCUSSIONS FOR SESSION ONE

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<tr>
<th>Question/Comment</th>
<th>Responses</th>
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<tr>
<td>1 What can we do, apart from partnering with Universities what have we done and what are we planning to do?</td>
<td>We need to begin by answering a question of what we are doing at grassroots level. We need to have a plan of the Human Resources that we need to train (do needs assessment). We should not only focus on Universities but at all levels. NPA in consultation with all the stakeholders should come up with a plan to guide the human resource training needs of the country. Ministry of ICT could also come up with a roadmap on Human resource needs in the ICT sector. All of us should be involved in what we have to do to get to the local people at the grassroots.</td>
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<tr>
<td>2 The Software Development unit at CIT seems to be relaxed in serving the needs of Uganda and</td>
<td>At CIT a software development unit is in place and has capacity to develop software not only</td>
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<th></th>
<th>more interested in serving international organizations such as IBM and Cisco. What is your comment?</th>
<th>for the local sector but also at international level. The challenge is that the local companies seem not to have interest and trust that Universities can deliver and provide solutions to the Industry’s problems. Need to demystify this belief at this workshop and move.</th>
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<td>3</td>
<td>What is the Ministry of Education doing in as far as reducing the cost of UPPET? Doesn't having more computers imply having more teachers? Are there software systems that are to be introduced to intervene?</td>
<td>The Ministry purchases in bulk rather than each school buying software on its own, the same applies to purchasing of internet connectivity and bandwidth.</td>
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<td>4</td>
<td>As a way of observation I think we need to do policy advocacy to fill up the missing links. Countries which are doing well in the ICT sector such as India, Malaysia and Indonesia, have a home grown policy on ICT. They brand what their needs are and go on to fulfill them right from the lower through middle up to upper levels utilizing all the skills.</td>
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<td>5</td>
<td>When developing curriculum, the Ministry of Education and Sports in Uganda should look at the skills of technicians at all levels. The pyramid must be clear so that we get the manpower we need at all levels. In Tunisia, they know exactly the number of Technicians they need at all levels so that they plan how many to produce per year for each level.</td>
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<td>6</td>
<td>The National Planning Authority is already in the process of carrying out a national human resource survey. The project was launched in September 2007 and the first workshop was held to discuss the demand and supply human resource needs addressing such questions as to what extent should universities train, how many technicians do we need. In brief the Authority is trying and at the end of the day they want to have in place a skills database.</td>
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<td>7</td>
<td>The Ministry of ICT needs to speed up the review process of the National ICT Policy so that it can guide individual sectors in drawing their own guidelines.</td>
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<td>8</td>
<td>India has followed the global market of developing their outsourcing industry. Uganda needs to focus on Human Resource Development for outsourcing. If Uganda cannot export Diamonds, it should export human resource.</td>
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The Bachelor of Computer Applications syllabus covers both the software and hardware components but we need a homegrown policy to get what we want and more proper linkages for the primary, secondary and tertiary subsectors.

2. SESSION TWO

**Session Chair:** Mr. James Lam-Lagoro, Senior Assistant Registrar, Gulu University.

### 2.1 TRAINING FOR THE ICT INDUSTRY

This paper was presented by Ms. Theodore Twongirwe, the Ag Director Institute of Computer Science, Mbarara University of Science and Technology. She started her presentation by sharing an inspiration that any economy depends on three pillars: Academic institutions which produce the skilled human resource; the Government that creates an enabling environment and the Private sector that creates jobs and pays taxes that help in providing social services and running the government.

She quickly highlighted some important background points as follows: Traditionally, the industry has been friendly but somehow aloof when dealing with universities on ICT education; They have been generous in the donation of restricted and unrestricted cash to extra curricula events for example sports events, Fresher balls, entertainers....On the other hand at the undergraduate level, tertiary institutions traditionally have looked to the industry to hire their graduates and provide financial support for their programs. Today, as the lines between each organization, its suppliers, and its customers blur, these institutions must rethink their relationships with the industry and help industries rethink their relationships with universities. The greatest support which the industry can provide tertiary institutions with today is real-life experiences with and advice on how to take advantage of rapid change. High-technology industries are re-engineering and re-inventing themselves at a furious rate. Increasing emphasis is being placed on cross-disciplinary teams, computer and communication technologies, and tighter relationships with customers and suppliers.

Therefore, Universities must learn about the new attributes which their graduates will need to work in these new environments and adjust their curricula and educational activities. Universities must also learn to respond more rapidly to changes. Conceptually, universities are designed to maintain the status quo. They teach students existing scientific concepts and technological principles. Historically, universities and schools are slow to embrace change. Although, computing research has made enormous contributions to rapid scientific and technological development in different countries they have demonstrated a remarkable inability to change themselves. For these two reasons, universities find it difficult to respond to changes in the workplace in a timely, effective manner. In Developed Countries high technology
companies appear to have learned more quickly and more effectively how to build on the opportunities offered by the changing, global, competitive environment. Universities need to seek out lessons and experiences with which they can begin to fashion a framework for re-inventing themselves. The Industry is a valuable source for these lessons. As universities turn to learn from the Industry they must think about the process of creating partnerships through which the Industry and the Academia can co-evolve: each partner providing lessons and insights which can assist and stimulate the other.

Ms. Twongirwe shared with participants the Asian Perspective using the Case Study of India as follows: China and India are now among the fastest growing economies because they have made efforts to bring about strong relations and collaborations among the higher institutions of learning, the private sector and the government. A case study of the Government of India for example shows that the ICT companies in India are funding most of the research at Universities. Also because of the cross interaction, the Universities are always reviewing curricula to suit industrial demands in this dynamic ICT sector where technology changes every second.

Ms. Twogirwe also shared the European- American Perspective and informed participants that the American and European system of research and advanced education is relying on a partnership between universities, industry, and government which has been highly successful over the past half-century in addressing priorities such as national defense and health care. The central theme of the document was that the nation’s health, economy, and military security required continual deployment of new scientific knowledge; hence the federal government was obligated in the national interest to ensure basic scientific progress and the production of high quality scientists and engineers. Industrial Research & Development activities, including cutting-edge basic research, were strongly supported by corporate leadership and the investment community who recognized the importance of research to long-term product development and profitability. The use of Information and Communications Technologies (ICT) to improve how goods are produced and sold and services are delivered is a feature of everyday life in developed countries.

She went on to elaborate on the Uganda ICT Training Institutions Perspective as follows: Africa and in particular Uganda has the opportunity to accelerate growth using ICT as an engine of economic development. Uganda’s vision of poverty eradication demands urgently for the development of the entire ICT sector; in order to develop its economy, to be able to follow international laws and regulations, to be able to penetrate foreign markets, to collect and share information, to communicate etc. The main constraints were mainly lack of infrastructure and human capacity. It is now a known fact that ICT infrastructure readiness without adequate skilled ICT human capacity cannot lead to economic development. Looking at the Ugandan situation, there is little advice from the Professors at the Universities to the government and policy makers. There is also little interaction and collaborative projects among the public Universities and the private sector. However the issue of Human Capacity has been resolved by the number and Quality of ICT Training Institutions.
She pointed out that the entry point is through consultative workshops and brainstorming sessions so that confidence and trust is built. Thereafter, joint projects should be put in place. In the long term expectations are that interaction will be on a day to day basis. However, funding is needed to kick start the process and sustain the joint activities for about four years. Software development was identified as one strategic area where partnerships can kick start. Microsoft Inc., Google and Yahoo for example are among the richest companies in the world and contribute a lot of taxes to governments around the world. What is interesting is that most of the world’s successful companies like Microsoft Inc., Cisco Systems, IBM, Sun Microsystems, Yahoo and Google trace their roots at education institutions.

Ms. Twongirwe proposed a Partnership Structure for the partnerships. Universities have set out to develop Taught certificate/diploma/degree/postgraduate programs that have a Community Outreach Agenda and it has a big role to play in the Development of our Community. In line with their strategic objectives, universities are now looking into developing and strengthening long-term industry partnerships. Every opportunity to develop and strengthen the existing connections with the ICT industry and to develop new relationships locally, nationally, and worldwide is welcome. A call was made to organizations to be committed in supporting Universities in enhancing their students’ educational experience in a view to share the same dream of community development.

The primary goal of Universities with these collaborations is to form a mutually productive collaborative relationship with the industry partners to enhance the quality of the graduating professionals. This partnership will lead to increased visibility of the organizations in the community and the nation in general, and will also open up other opportunities to develop research relationships with Universities, staff, and students. Universities also value partnership as a means of helping them meet their vision through curriculum review and feedback. It also provides the partnering company with an opportunity especially when introducing major new technology products to the marketplace, an opportunity to understand first-hand the education and training issues the customers will face when using and applying those technologies. A positive response to the call for partnerships will help Universities shape the next generation of ICT and computer engineering professionals, by having access to an exceptional pool of talented ICT professionals and scientific research talent as part of their community outreach programs. Organizations will have plenty of opportunities to interact with University students, make a difference in their university experience, and help them develop into outstanding members of the Ugandan and global computing and information Technology community.

Ms. Twongirwe informed participants that the overall objective of partnerships will be to encourage and develop long-term strategic research alliances between higher education institutions and industry in order to apply advanced knowledge to problems and also provide opportunities to obtain national economic or social benefits. She further highlighted the specific objectives of Partnerships: to dramatically improve the effectiveness and quality of undergraduate ICT education in preparing students for life-long productive
careers; to create an effective combination of an industry's skill needs and the university's goal of providing a solid community-oriented, multi-disciplinary computing education through curriculum review and feedback; to provide industry-oriented and community development oriented research projects to prepare high-calibre undergraduate and postgraduate research students; to foster opportunities for doctoral researchers to pursue internationally competitive research in collaboration with industry, targeting those who have demonstrated a clear commitment to high quality research; to produce a national pool of world-class researchers to meet the needs of Ugandan ICT industry; Partnership funded coalition for Computing education, will develop a strong industry tie with a network of industrial partners; to encourage participation of the girl child in science and technology through support of the gender initiatives and enhanced physical infrastructure for our laboratories through the Computer and Software donations.

Ms. Twongirwe outlined the Benefits of Partnerships to both the Industry and the Universities. To the industry the following points were highlighted: The overall aim of this Linkage Project is to benefit the local industry and hence the rural communities which are in line with the organization's corporate social responsibility missions. This would entrench the company's ongoing social-economic community interventions spread across the nation and consolidate the company's broad and increasingly social responsibility agenda; In participating with universities in undergraduate design projects, the industrial partner not only aids in the production of engineering graduates better suited to adapt quickly to the workplace but also benefits from the talent and work of the student design team. This initiative could trigger a new trend; with the two other big telecoms in Uganda and other vast corporations in business following suit. There is an increasing global focus on the "role of business in society" premised on the fact that businesses can not thrive in communities that are not prospering themselves. This would cement the solidarity between the company and the communities in which it operates. This type of collaboration in which universities are educating a supply of possible employees and a company has a demand for employees with high levels of particular skills, has great potential.

In addition Companies faced with constant corporate restructuring and rapidly changing technologies do not have the luxury of making mistakes when choosing new employees. Hence industry gains cheap labor and access to promising young computing professionals. The fact that industry is willing to come into the university environment and teach material to undergraduates and then work with them on student projects is not surprising. This type of program allows the company to work with prospective employees under conditions similar to the work environment hence reduced training costs. This will boost the growth of both the nation in general and communities through the stimulation of equitable social and economic development which is part of the company's vision and mission of operation in Uganda.

To the Universities, Ms. Twongirwe emphasized the following benefits of Partnerships: The Students will be able to be provided with first hand Systems analysis and design, software development and industry
or work place skills. Industrial Training and employment opportunities for the Students become sort of a sure deal. It will also enable the current staff on Doctoral training to pursue internationally competitive research opportunities in collaboration with industry. It will help the Universities attract other grants leading to other important joint efforts between other funding agencies and companies including; graduate research fellowships, more extensive undergraduate projects focusing on ICT Industries.

As the departments of Software Development within academic institutions are strengthened it will in future be a possible source of income for the Universities as it will be possible to attract ICT Companies. There will be improved relationship with the surrounding communities. Those students and staff who will participate will have a marketable skill that they didn't have before. Currently there are many companies who need people with computing capabilities and these students, if they wish, may pursue employment with those companies once they graduate. Thus, both sides benefit from the venture and companies will be willing to continue participating year after year. The benefit to the university is financial, assistance with the educational endeavor, and stronger ties to the industrial community.

She proposed partnership activities where the industry can collaborate with Universities: Sponsor an Undergraduate final Year Project: Universities believe that industry-sponsored undergraduate projects provide outstanding real-world learning opportunities for students and they are also winning arrangements for the sponsoring organizations. Sponsoring organization must be involved in evaluation and assessment; Provide student internships: A company could choose to participate in the institution’s Evaluated and Assessed “Industrial training Partnership”, which places students in 3-month internships with the organization. If other kinds of internships better suit the company's needs, Universities are also happy to help companies set them up and assist with the intern recruiting efforts; create a department scholarship or fellowship: Such dedicated funding helps Universities attract and retain a talented and diverse student body; make a monetary gift to support ongoing software development programs, or an in-kind donation of equipment, software, or instructional support that help make the students work-ready; Present a seminar or workshop on campus to broaden the students' and University's perspectives on real-world ICT issues, career options, communication skills, challenges of working in international organizations, project teams, and other industry-relevant topics; and or coordinate an onsite presentation/tour to familiarize the students with the company and its facilities.

Further more companies can partner with University Staff on Projects: Ms. Twongirwe informed the industry participants that Universities would like to work with them to establish long-term industry-university research partnerships in specialty areas of interest to their organizations and University staff research lines in areas such as Systems Dynamics, Information Systems, Knowledge management, Security, operational research, GIS, Bioinformatics, e-governance, e-health, and e-commerce. To engage in research that aims at solving the society problems, fostering national development and eventually contributing to the international research developments. University teaching and research staff and
students are enthusiastic and look forward to connecting with you, in sharing their research expertise, and developing industrial partnerships.

Companies could also sponsor annual Open day Events where students will have an opportunity to show case their research at the end of the Year and Industry will also have an opportunity to show case their support to the Institution. On recruitment Fairs, companies could sponsor the Annual Undergraduate Recruitment Fair. In the long term Universities would gladly support the company's recruiting efforts for qualified computing and information technology professionals through student and alumni job postings, student-industry networking events and company publicity and participate in our annual Open day initiatives. Gender Awareness and Promotion of the Girl-Child Initiative is yet another possible area of partnering so as to encourage and broaden the participation of youth in the Science and Technology Sector especially with a Focus on the Girl Child and gender science and technology promotion and awareness initiatives. Alumni Partnerships and Tracer Studies: There is need to carry out a tracer study on the graduates in the Public Universities in Uganda so that this can feed into curricula review and implementation, and collaborations with the private sector and government with the aim of producing better and relevant graduates.

Ms. Twongirwe highlighted the likely Legal Issues during implementation. The major legal issues facing the implementation of collaborative partnerships are intellectual property, patents, publications and confidentiality. She advised that once partnerships are in place each party must uphold these values.

She advised on Continuity and Sustainability Issues as follows: While many partnerships with industry will be developed sustaining them is a serious problem. Efforts must be made to establish a situation in which the students, the companies, and the institution all win. Most University staff do not have industrial work experience and secondly they may receive no benefits under the current reward system. In fact, they are likely to see these programs as drains on their precious time, which could be devoted to publishing and raising research funding. In order to counteract the same issue the project will reward staff for building partnerships with industry, to counteract the problem of tenure incentives. Involving industry in curriculum development is highly desirable but challenging. The work is time-consuming. Funds are needed to cover the time of faculty and industry representatives. From the faculty's standpoint, industry may be seen as intruding in the traditional way of doing things. The Industry must perceive its participation in joint projects as advantageous. On the other hand to keep the industry involved over time would be to include explicit "deliverables" among the objectives. Doing so, however, runs counter to the academic culture, which traditionally considers students to be the only deliverables. The corporate partners' short-term workforce needs must be met, but not at the expense of the versatility that students will need in their careers.
She suggested that Small companies should be a special focus of academic curriculum development efforts. They are the main sources of innovation and growth in the economy, and serving their research and education needs is a potential growth area for engineering schools. Involving alumni, university, and industry to identify good projects is very crucial. It's important to work with the Academic Registrar's office to identify alumni who might be approached (alumni are usually eager to maintain or re-establish a relationship with the university) to participate in such activities as Organization of Research Open Days; Organization of graduate recruitment fairs and industry evenings; Setting up a database of enquiries and contacts; and Universities should actively seek commercial opportunities.

Ms. Twongirwe made a conclusion that these collaborations are seen as an innovative move in the Ugandan curricula and as means of achieving goals and vision to produce ICT graduates; with integrated skills attuned to contemporary industrial problem-solving, comfortable with ill-defined problems, able and eager to work in teams, and cognizant of product realization and commercialization. It is also an innovative initiative that will help Universities in designing, developing several new industry related courses. Universities shall develop innovative teaching and learning modules and quality assurance mechanisms. The proposals will be continually evolving and improving since it will be the beginning of such a project. Because of the company’s direct involvement in the collaboration activities universities will able to quickly judge their curricula effectiveness and work with organizations to make adjustments to the teaching approach and materials. The university system is under pressure; challenges include reduced public funding, larger numbers of students, and competition from abroad and new information technologies. Industry-academia partnerships are common in the IT field because they benefit both parties.

2.2 FEEDBACK FROM THE INDUSTRY

Participants agreed with Ms. Twongirwe that strengthening collaborations between the academia and the private sector specifically in the area of ICTs is very important. It creates opportunities and benefits through dialogue. Besides, some private organizations develop their own systems. Creating a partnership for example between hospitals and universities can promote ICT in health and students on internship would gain practical skills while coming up with practical solutions to address practical scenarios. The participants called upon the private sector and the government institutions with sufficient infrastructure to give internship opportunities to students as the latter would not have anywhere to go for placements.

It was also noted that the industry-university cooperation also provides an opportunity for Joint Research in ICT. Collaborative research is emerging as the principal route to securing substantial research funding. Large-complex projects require financial investments that may exceed the capacity of a single academic unit or company especially for universities in Uganda. Large grant proposals require upfront investments to cover such expenses as travel and meeting costs for planning purposes, grant writing, cutting-edge
equipment, infrastructure and other professional services that may not be available in-house and pilot projects leading to larger collaborations. Such costs could discourage faculty from exploring collaborative projects if assistance is not available. Having academia and companies partnering together can strengthen research collaboration.

It was however noted that there is need to incorporate training in ICT skills in all academic disciplines at the Universities if collaborations are to take off. Most of the Arts and/or Social Sciences courses do not promote training in ICT. Those who manage to get the opportunity of studying ICT skills only gain theoretical knowledge. The student numbers are too big (computers and any other necessary infrastructure is not enough) and many university students want to be spoon-fed. When such students graduate, they don’t know how to use ICTs (computers, internet) thus do not promote use of ICTs or such collaborations. Teaching of practical skills was therefore highly emphasized.

It was also greed that the trend is changing so there is need to strike a balance - dynamically revise the curricula. Most University staff do not have industrial work experience. Therefore, there is need to bring the private sector on board when revising the curricula and also conduct structured training. This will encourage training that suits Ugandan local needs vis-à-vis practices derived from imported curricula.

It was also agreed that such collaborations can take off if people from the private and public sectors such as telecom companies, Government Ministries, etc come out and express their expectations from academic institutions. It was noted that there are a number of local and international organizations willing to sponsor such collaborations but it takes a lot of time to identify companies to collaborate with. For example, Carnegie Corporation of New York was willing to fund such collaboration but looking for corporations took a lot of time, this therefore could not proceed.

It was also noted that Uganda has a big percentage of small and medium enterprises (SMEs). Operators have small budgets and cannot afford to use ICTs in their day-to-day business operations. Some of them do not know the benefits of using ICTs in the long-run. As education institutions, there is need to come out and sensitize SME operators on the value of ICTs in their businesses.

It was noted that Companies’ main goal is to make money. Most of their partnerships must have value-additions. They therefore question that ‘what value are we getting from partnering with the academia?’ This is the very reason companies would prefer to partner with a musician ‘Kanyomozi’, because they are sure to have in turn the value for their money through visibility coverage. On the other hand, most academic institutions train students to pass exams. Participants advised that the Academia should improve their visibility by teaching students leadership skills and guide them to specialize in a particular area so as to improve delivery. Students should also be encouraged to be creative and innovative beyond what they are taught so as to improve quality.
Participants appreciated CIT for integrating specialized skills for example CCNA courses in the curricula. This is a starting point. However there is need to bring the alumni on board. Students should be treated properly so that they remain ambassadors of the institution even after they have graduated. They can act as the starting point of collaborations and or points of contact for collaborations.

**Ms. Twongirwe’s Response to comments from the industry**

1. Students are given practical training.
2. As far as student numbers are concerned, CIT is spearheading e-learning.
3. Yes, SMEs have very small budgets; nevertheless the academia should find ways of approaching them.
4. Universities need to empower departments to carryout proper career guidance to students.

**SESSION THREE**

**Session Chair:** Mr. Abdul Nsubuga, a Projects Manager with Warid Telecom.

**3.1 PARTNERHIP PROCESS: CASE STUDY OF UGANDA POLICE FORCE (UPF) AND MAKERERE UNIVERSITY FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY (CIT)**

**3.1.1 CIT EXPERIENCE IN FORMULATING A MOU WITH UGANDA POLICE FORCE**

A paper titled “CIT Experience in Formulating an MOU with Uganda Police Force (UPF)” was presented by Mr. Narcis T. Rwangoga, an Assistant Lecturer and Assistant Head of Department of Computer Science, Faculty of Computing & IT, Makerere University. The paper highlights the process and steps taken towards final signing of the MOU with UPF. It points out that the process was lengthy, considering that it necessitated clearance by the Solicitor General to have the memorandum signed.

In the first part of the presentation, Mr. Rwangoga highlighted the often negatively perceived role of UPF in society. He cited a Newspaper Article of December 1, 2005 in the International Press under the headline ‘Makerere’s Administration, Students and the Ugandan Police’. The Article was written at a time when students at Makerere University were on strike. The gist of the article was about the methods the UPF used to quell the strike, where some students were killed by live bullets. He also quoted one of the phrases in the article ‘To every action, there is an equal but opposite reaction, so goes Newton’s third law of motion, and the Ugandan police is good at following this. In summary, the background showed how the UPF is portrayed as a brutal force and with a bad background record with Makerere University. The idea of a memorandum of understanding between Makerere University and the UPF was therefore an opportunity to change the bad history between the two institutions. This, according to Rwangoga, will change the relationship between Makerere University and the UPF.
He narrated the process that the development of the MOU with UPF has followed. At first, the idea was conceived through informal interactions between CIT and UPF staff. These interactions revealed:

- That UPF is undertaking many ICT projects;
- That some of the ICT projects in the UPF are challenging and require support; and
- That CIT has the capacity to support ICT projects in UPF.

Based on realization of the above factors, formal discussions started through consultative meetings between CIT and UPF staff at different levels. Rwangoga cited the following landmark dates:

- February 5, 2007: First consultative meeting between UPF and CIT brainstorming on possibilities;
- March 30, 2007: Second consultative meeting at CIT with higher administration;
- Apr 13, 2007: Third consultative meeting at UPF at UPF headquarters;
- May 21, 2007: Fourth consultative meeting with UPF legal team on MOU contents; and
- Dec 10, 2007: Clearance of MOU by Solicitor General Received.

Rwangoga informed participants of the few issues addressed in the MOU. He mentioned the roles and responsibilities for each Party in the MOU and cited the following:

On the side of CIT,

- Provision of suitable staff, equipment and services for effective implementation of ICT projects;
- Co-operation in working on joint projects;
- Working in close co-operation and seeking further collaboration with other concerned local and international bodies;
- Dissemination of progress results of the projects to the local and international communities through academic paper writing and presentation;
- Provision of Assistance in writing of fundable proposals;
- Undertaking research and development activities in the area of ICT;
- Replicating the positive lessons from the various projects to other areas as shall be determined by the Government.

From the UPF side the following is expected:

- Extending any possible administrative assistance to CIT to enable it run activities properly;
- Providing expert supervision in all collaborative projects;
- Extending assistance in areas of research, including offering regular placements for student internships; and
- Sourcing and budgeting for funds to sustain collaborative projects between CIT and UPF;

Mr. Rwangoga shared with the participants some of the factors that will act as enablers in the partnering process between CIT and UPF. These enablers are critical to the success of the partnership.

- Encouraging and motivating young talents;
• Motivated Senior officials;
• Political will inside government;
• Support from top managers of participating institutions; and
• Enthusiasm of UPF and CIT staff.

There were some likely challenges to address if the partnership is to succeed. Rwangoga cited the following:

• Apathy of, and resistance from, individuals with vested interests;
• Red tape;
• Lack of skills;
• Technological factors;
• Legislative delays caused by the need for new legislation and rules to allow for new forms of doing things;

Mr. Rwangoga informed participants that the MOU between CIT and UPF is:

• An opportunity to create an infrastructure for innovation;
• Access to intellectual property;
• Access to talent - students, graduates, full spectrum workforce;
• Research;
• Customized training & career development for employees; and
• Responsive partnership to meet changing needs.

3.1.2 REMARKS BY UGANDA POLICE FORCE

Mr Yusuf Sewanyana gave remarks on behalf of the Uganda Police Force. He first thanked Makerere University for initiating an understanding with UPF. He also thanked the American Embassy which also approached Makerere University to partner with UPF. The embassy draws from the experience they have had between Tanzania Universities and the Tanzania Police force.

He informed participants that UPF established a team of their ICT staff to further the model. Several meetings were held between CIT and UPF on the possible projects that the two can collaborate. The UPF is ready to set up systems that can enable information dissemination up to the grassroots’ level.

He reported that UPF is already collaborating with other government institutions e.g. Ministry of Works, Immigration Department on the National ID project. So Makerere University coming up to join hands with UPF is yet another privilege of not only expanding the UPF’s scope of operation but also taking on a new perspective on board, Makerere being an academic institution.
SECTION III – GROUP REPORTS

Session Chair: Mr. NT Rwangoga, Assistant Lecturer Department of Computer Science, Makerere University. In this session, the four groups presented their reports and discussions followed. From each group’s presentation, key themes were identified to incorporate in an action plan later drawn for follow up.

3.1 PRESENTATIONS FROM GROUPS

The four (4) groups were required to answer the following 3 questions in relation to the field of discussion allocated to the group:

- What are the opportunities for ICT in the sector?
- What contributions can the academic institutions make to exploit the opportunities?
- What would you recommend to ensure partnerships in the sector?

The four fields of discussion allocated were the following:

1) ICT IN GOVERNMENT SERVICE DELIVERY
2) ICT IN HEALTH
3) ICT IN EDUCATION
4) ICT IN BUSINESS

At the end of each group's presentation, participants discussed the presented materials and 3-4 key points were identified for inclusion in the action plan.

3.1.1 GROUP 1- ICT IN GOVERNMENT SERVICE DELIVERY

This presentation was made by Mr. Yusuf Sewanyana on behalf of group one members. The group began with identifying the opportunities of ICT in government service delivery. Contributions by academic institutions were identified and recommendations on ensuring partnership in this sector proposed.

Opportunities were identified as follows:

- ICT in e-Government – i.e. Government in providing Services; ICT for wider information Delivery beyond mass media e.g. what government does with information;
- ICT for information management and dissemination;
- ICT for planning and optimal allocation of resources;
- ICT for Monitoring Government activities and Services;
- ICT as a databank for current information and future;
• Upcoming Fiber Optic - opportunities in sale of bandwidth, licenses and web standards (web portals), Downstream services, Communication of government policies to civil society, and Online payments (revenue collections);

• Database of all government services;

• Coordination of Government ministries/institutions;

• Pillars of PEAP all have ICT opportunities; ICT as a databank for pre-existing information and future; and

• ICT for Government staff appraisal and assessment/human resource management.

Contributions of Academic Institutions were also identified to include:

• Academic Institutions are think tanks/policy advisory to government; Develop or build capacity to provide services to government e.g. software development, computer repairs and maintenance etc;

• Academic institutions organize themselves as a business because knowledge is a commodity; and

• Consultancy for government in setting up policy and new systems.

The group proposed the following recommendations:

• Identify gatekeepers in government and find out how government works;

• Establish an institution that coordinates government/private sector and academic institution;

• Academics joining government e.g. current Minister of ICT was a Lecturer at Makerere University;

• Organize targeted lobbying i.e. Min of Education and Sports, Parliament etc;

• Changing the mindset within the government [academic institutions are partners, not adversaries]; and

• Harmonization of Government Institutions’ ICT initiatives.

**Points for the Action Plan**

• Targeted Lobbying through establishing a committee that can be connected to government offices.

• Need to harmonize government institutions by identifying those that are involved in ICTs

• An aggressive Marketing strategy that will show that Universities can deliver

**3.1.2 GROUP 2- ICT IN HEALTH**

This presentation was made by Mr. John Kizito, on behalf of group three members. The presentation gives the opportunities of ICT in the health sector, contributions of the academic institutions and the recommendations on how to ensure partnerships in this sector.

The group identified the following opportunities:

• Information System Development;

• Health Research Personnel;
• Technological development (Tele medicine, e-medicine ...) – consultation;
• Monitoring and Evaluation (patients, drugs, ...);
• Disease surveillance;
• Government policies, donor attitude;
• Training Stakeholders and/employees; Service delivery/ health information dissemination;
• Decision support (diagnoses), Knowledge management, ...;
• Health professional data bank; Record keeping (births, deaths, resource usage, ...);
• Drug distribution Vs infection curve (resource allocation);
• Drug Stock Taking; Logistics Systems – timely reporting from different centers;
• Networking – Communication; Data backup;
• Data Collection, ...;
• Sensitize government, donors, ... about existing and feasible technologies;
• explore knowledge exists in communities;
• Supply chain management (Logistics);
• Patient schedule management; Referral System (transfer of patient from one center to another);
• Timely abstract level reporting;
• Mobile applications; and
• Develop portal System to help traditional and modern healers to collaborate.

Contributions of academic institutions were identified as follows:
• Sensitization of Health Personnel on ICTs (Courses, Workshops, ...);
• Propositions on feasible implementations; Collaboration projects and internships (mentorships);
• Design applications that suit our environment; and
• Implementation of Developed and/or designed Systems.

The group came up with a good number of recommendations:
• Interaction between academia and health (private and education sectors?);
• Health to provide necessary information to enhance application development (Internships,...);
• “trust” (and bureaucratic systems between academic and private sectors);
• Involvement in sensitization workshops (open days, ...);
• Repackage for the sake of a win-win situation;
• ICT projects tailored towards Health needs; (ICT) Marketing (Brochures) – proactive marketing;
• Clear memoranda of understanding to take care of legal issues and the like;
• Involvement of National Council of Science and Technology;
• Continuity and Sustainability issues should be addressed; and
• Clear implementation strategies for workshop recommendations.

**Points for the Action Plan**

- Involvement of private sector through collaborative research with academic institutions
- An aggressive Marketing strategy that will show that Universities can deliver

### 3.1.3 GROUP 3- ICT IN EDUCATION

The presentation was made by Ms. Margaret Sevume on behalf of group three members. He informed participants that their presentation was structured as follows: Opportunities in Education (what ICT can do in the education sector); contributions by academic institutions and challenges.

The group outlined opportunities as follows:

- Digitalized curriculum (especially in sciences – animations);
- Human resource development (train, improve supervision);
- Digitalized library (e-resources – periodicals);
- Institution management and administration -Students records, time table, examination; E-learning including mobile learning;
- Social networks and research among institutions;
- Collaborative learning among students and Community outreach where facilities are available;

The group identified the following contributions by academic institutions:

- Developing appropriate software;
- Train users of ICT;
- Identifying and specifying appropriate infrastructure to support opportunities;
- Research – making appropriate recommendations; and
- Encouraging learning innovations.

Group one made the following recommendations:

- Identification of key partners and what they want (should be continuous);
- Establishment of effective partnership - planning, monitoring, evaluation, feedback etc;
- Linking learners to existing opportunities;
- Conducting tracer studies- follow up students’ performance in the field;
- Involvement of partners in curriculum development, preview & review;

30
• Partner with private sector for infrastructure development, R&D, discount, internship and direct support to institutions;

• Influence a reading culture; Emphasize practical sessions;

• Train university lecturers on teaching methods; Develop a partnership strategy with various institutions and stakeholders; and

• The Ministry of ICT should speed up ICT infrastructural development.

**Points for the Action Plan**

• *Identification of key partners and what they want (should be continuous)*;

• *Establishment of effective partnership - planning, monitoring, evaluation, feedback etc*;

• *Linking learners to existing opportunities*;

• *Conducting tracer studies - follow up students’ performance in the field*;

• *Involvement of partners in curriculum development, preview & review*;

• *Partner with private sector for infrastructure development, R&D, discount, internship and direct support to institutions*;

**3.1.4 GROUP 4- ICT IN BUSINESS**

This presentation was made by Annabella Habinka on behalf of group four members. She started by outlining the approach to the question as agreed upon by the group members; opportunities, recommendations and challenges respectively.

The following opportunities were identified:

• Research and Industrial Training e.g in Telecom, banks, microfinance, medical centers etc;

• Maintenance of hardware machines;

• E-commerce websites development;

• Microfinance software development;

• Private sector to dispose off used computers to staff and students in Universities;

• Customer service skills;

• Business Process Out-sourcing e.g call centers;

• IT solutions for Small Manufacturing Enterprises like craft shops, Super markets;

• Out reach program for students to create awareness of ICT benefits;

• Encourage companies recruit from Universities e.g NFT train for others banks, Telecom companies etc Universities take it on;

• To develop soft skills at Universities;

• Identify market needs and include them in the University curriculum from the private sector;
• Develop entrepreneurial and leadership skills on how to form companies and have proper books of accounts - job creators not job seekers; and
• Utilization of good English and light accent.

The group went on to propose the following recommendations:
• Correct the demand vs supply mismatch;
• Think broader to get solution;
• ICT awareness and mind set changing;
• Sponsorship from media depending on the class of people - targeted audience;
• Local language systems to meet the market;
• Support content providers;
• Create mechanism for innovation contest among students annual events;
• Universities to go to CEO’s to enhance targeted lobbying; and Training academic staff in more practical skills so as to pass on these skills to the students.

The following were identified as challenges to usage of ICT in the business sector:
• High Cost of connectivity to the Internet;
• Poor marketing skills amongst students;
• Lack of trust amongst students that are trained to look for greener pastures soon or later; and
• Visibilities of companies to make more money.

She concluded the presentation by informing participants that ICT development is a gradual process and therefore advised that all partners need to follow all stages and to also consider sustainability issues.

**Points for the Action Plan**

- Aggressive Marketing
- Get on Board CEOs
- Bench marking so that best practices are incorporated
- Improve the quality of the products through industrial exposures and pedagogical training.
- Need to harmonize government institutions by identifying those that are involved in ICTs
- An aggressive Marketing strategy that will show that Universities can deliver

**3.2 DRAWING THE ACTION PLAN FOR ALL THE STAKEHOLDERS**

From the discussions after each group's presentation, key areas of focus were identified in each industrial field area discussed. However, it was noted that in addition to the areas of focus identified, there is need to draw an action plan at a later date so that the issues raised can be addressed progressively. However, it was not possible to draw a complete action plan with specific dates of activity. The table below summarizes areas of focus identified:
<table>
<thead>
<tr>
<th>Industrial Field</th>
<th>Key areas of focus</th>
</tr>
</thead>
</table>
| ICT IN GOVERNMENT SERVICE DELIVERY | • Targeted Lobbying through establishing a committee that can be connected to government offices.  
• Need to harmonize government institutions by identifying those that are involved in ICTs  
• An aggressive Marketing strategy that will show that Universities can deliver |
| ICT IN HEALTH                    | • Involvement of private sector through collaborative research with academic institutions  
• An aggressive Marketing strategy that will show that Universities can deliver |
| ICT IN EDUCATION                 | • Identification of key partners and what they want (should be continuous);  
• Establishment of effective partnership - planning, monitoring, evaluation, feedback etc;  
• Linking learners to existing opportunities;  
• Conducting tracer studies- follow up students’ performance in the field;  
• Involvement of partners in curriculum development, preview & review;  
• Partner with private sector for infrastructure development, R&D, discount, internship and direct support to institutions; |
| ICT IN BUSINESS                  | • Aggressive Marketing  
• Get on Board CEOs  
• Bench marking so that best practices are incorporated  
• Improve the quality of the products through industrial exposures and pedagogical training.  
• Need to harmonize government institutions by identifying those that are involved in ICTs  
• An aggressive Marketing strategy that will show that Universities can deliver |

Participants requested the organizers of the workshop to explore ways of arranging a follow up meeting with stakeholders to assess progress in implementation of some of the activities of priority identified.
SECTION IV - CLOSING OF THE WORKSHOP

The Workshop ended at 18:54 pm. The closing remarks were delivered at the Cocktail venue. Before the closing remarks by the Minister of State for ICT, Hon. Alintuma Nsambu, a recap of the day’s workshop proceedings was delivered by Mr. Narcis T. Rwangoga. Also, an overview of the key elements of the NUFFIC Project through which the consultative workshop was held was given by Prof. V. Baryamureeba, the Dean of the Faculty of Computing and IT, Makerere University. Below are the key issues covered at the closing ceremony.

4.1 recap of the workshop by narcis t rwangoga

Mr. Rwangoga delivered the workshop recap, mainly highlighting the objectives of the workshop, the proceedings of the day and the outcomes at the end of the workshop. He started by highlighting the objectives of the workshop, which include:

- Identifying the roles of the Universities, Private and Public Sectors;
- Exploring the opportunities for partnerships;
- Receiving Experiences from the Industry on the quality of ICT Graduates;
- Brainstorming on strategies to address and formulate an action plan to mitigate the existing gaps.

The workshop proceedings were presented as follows: The workshop started with a paper highlighting what is happening in Academic Institutions (public Universities) in as far as ICT Training and research is concerned. This was followed by a paper from the Ministry of ICT on how the ICT framework document defines the roles of Universities, Private and Public Institutions. There was then a paper on ICT Policy in Education presented by the Ministry of Education, which highlighted the role of the Ministry of Education and Sports in providing an environment for ICT policy to enable partnerships on ICT projects.

The two papers gave an overview of the Government’s initiatives in providing an environment for ICT learning and Research. This was followed by a presentation from the Academic sector, with a paper on “Training for the Industry”. The paper attempted to elaborate what the Universities are willing to deliver and indeed can deliver and sought for trust from the Industry to allow for collaborations with them in a number of areas. A brainstorming session on the topic Feedback from the Industry followed with a focus on what products Universities are delivering and how best to improve them. Participants were then put into four groups and given topics of discussion with defined terms of reference.

Mr. Rwangoga emphasized that he believes each individual or institution has picked one or two things to follow up. Action areas were identified with consensus on aggressive marketing through open days and consultative workshops; Targeted lobbying to relevant authorities and Benchmarking to get the best practices elsewhere. As a point of immediate action it was agreed that a committee or forum or consultative team be formed to guide and turn the resolutions into a Master Plan for implementation.
4.2 REMARKS BY PROF. VENANSIUS BARYAMUREEBA

Professor Baryamureeba thanked all the participants of the workshop for their wonderful deliberations and their commitment. He formed participants that the purpose of the workshop was on understanding how Universities can partner better with the private and public sector which in his view was achieved. He realized the importance of coming up with aggressive marketing strategies to show the Press the good things Universities are capable of so that they also get on board.

The education sector is very strong and is spread all over the country which means that every district has access to students and graduates who have been trained in different environments. In this regard he strongly advocated for joint degree programs so that Universities can produce all round graduates that will fit in all types of environments.

Some of the Universities have already built capacity in the area of ICT and can compete with their counterparts in South Africa. The number of PhD Holders in Computing and IT disciplines is growing steadily at Makerere University. Currently there are 15 PhD holders and by the end of 2008 more 20 are expected to join.

As Public Universities in partnership with private Universities we have a role to play using ICT as an enabler to spur Economic growth but we cannot do it alone so we need to partner with the government to put in place an enabling environment so that the private sector can also get on board as an engine of growth in terms of paying taxes and providing employment opportunities to the graduates. These partnerships should not only be with local companies but also with international companies. Makerere University has taken lead and is already partnering with such organizations as IBM, Microsoft, Google, Cisco and FedEx.

He informed participants that he is looking forward to receiving the proceedings of this workshop. He once again thanked the participants and invited the Hon. Minister to give his remarks.

4.3 CLOSING REMARKS BY HON ALINTUMA NSAMBU

State Minister for ICT, Hon Alintuma Nsambu thanked institutions such as Makerere University (Faculty of Computing and IT), without whom the Ministry of ICT would not be there. He informed participants that the Government of Uganda found it necessary to have a Ministry of ICT to coordinate all ICT related activities in the country. The country is operating in the dark without an ICT policy but soon, it will be passed.

The Minister went ahead and challenged participants on how they would feel if their children did not have access to computers in the ICT era. He thanked Prof. V. Baryamureeba, Dean Faculty of Computing and IT, Makerere University for doing a good job of teaching students not only how to operate the computers
but also tap long-term opportunities and benefits. He further advised participants to advocate for children who are more trainable. The job at the University would be easier if children are trained as early as secondary level.

He concluded by pledging the ministry’s commitment to join the academia in training students. The Government of Uganda will provide ICT infrastructure in schools to train students. This way, the students can make money (self-employment).

The Workshop was officially closed at 9.00pm.
SECTION V – APPENDICES

Appendix 1: Programme Consultative Workshop On ICT Training & Research Partnerships in Uganda
Held at Serena Hotel Kampala On Tuesday, 18th December 2007

Appendix 2: List of Participants for the Consultative Workshop on ICT Training and Research
Partnerships in Uganda
## Appendix 1: Programme Consultative Workshop On ICT Training & Research Partnerships in Uganda Held at Serena Hotel Kampala On Tuesday, 18th December 2007

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Resource Person (s)</th>
<th>Session Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:30 am</td>
<td>Registration</td>
<td>Participants</td>
<td>Workshop Secretariat</td>
</tr>
<tr>
<td>8:30-8:35 am</td>
<td>Welcome Remarks</td>
<td>Facilitator</td>
<td>Facilitator</td>
</tr>
<tr>
<td>8:35-8:50 am</td>
<td>Official Opening</td>
<td>Makerere University Vice-Chancellor</td>
<td>Facilitator</td>
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<tr>
<td>8:50 - 9:10 am</td>
<td>The Status/ Developments in ICT Training and Research in Uganda</td>
<td>Dean CIT</td>
<td>Hon. Edward Baliddawa</td>
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<tr>
<td>9:40- 10:00 am</td>
<td>ICT Policy in Education</td>
<td>Ministry of Education</td>
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<tr>
<td>10:00 -10:40 am</td>
<td>Open Discussion</td>
<td>Participants</td>
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<tr>
<td>10:40- 11:00 am</td>
<td><strong>Tea Break</strong></td>
<td><strong>Serena Hotel</strong></td>
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<tr>
<td>11:00-11:15 am</td>
<td>Training for the ICT Industry</td>
<td>MUST</td>
<td>Mr. Patrick Bitature</td>
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<tr>
<td>11:15-12:00 noon</td>
<td>Feedback from the Industry</td>
<td>Participants</td>
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<tr>
<td>12:00- 1:00 pm</td>
<td>Group Deliberations</td>
<td>Groups</td>
<td>Facilitator</td>
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<td>ICT in Health</td>
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<td>ICT in Government Service Delivery</td>
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<td>ICT in Business</td>
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<tr>
<td>1:00- 2:00 pm</td>
<td><strong>Lunch Break</strong></td>
<td><strong>Hotel</strong></td>
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<td>2:00- 3:00 pm</td>
<td>Reports from Group deliberations (15 Minutes each Presenter)</td>
<td>Group Representatives</td>
<td>Mr. NT Rwangoga</td>
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<tr>
<td>3:00- 4:00 pm</td>
<td>Drawing an Action Plan for the stakeholders</td>
<td>Participants</td>
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<td>4:00- 4:15 pm</td>
<td><strong>Tea Break</strong></td>
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<td>4:40-5:00 pm</td>
<td>Open Discussion</td>
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<tr>
<td>6:00-8:00 pm</td>
<td><strong>Cocktail</strong></td>
<td><strong>Serena Hotel</strong></td>
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<td>Wrap up</td>
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<td>Presentation of the Video Clips</td>
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<td>Official Closing</td>
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<td>Mr. NT Rwangoga</td>
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<td>Minister of ICT</td>
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## Appendix 2: List of Participants for the Consultative Workshop on ICT Training and Research Partnerships in Uganda

<table>
<thead>
<tr>
<th>Names</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1 Hon. Alintuma Nsambu</td>
<td>Ministry of ICT</td>
</tr>
<tr>
<td>2 Dr. Peter Ndemere</td>
<td>Uganda National Council for Science &amp; Technology</td>
</tr>
<tr>
<td>3 Mr. Patrick Bitature</td>
<td>Simba Group</td>
</tr>
<tr>
<td>4 Mr. Stephen Bazirake</td>
<td>Mbarara University of Science and Technology</td>
</tr>
<tr>
<td>5 Dr. Martin Bagaya</td>
<td>Makerere University</td>
</tr>
<tr>
<td>6 Mr. Fred Kaggwa</td>
<td>Mbarara University of Science and Technology</td>
</tr>
<tr>
<td>7 Ms. Annabella Habinka</td>
<td>Mbarara University of Science and Technology</td>
</tr>
<tr>
<td>8 Ms. Margaret Sevume</td>
<td>I-NETWORK</td>
</tr>
<tr>
<td>9 Mr. Ishak Mukasa</td>
<td>Makerere University</td>
</tr>
<tr>
<td>10 Mr. D. Lwanga</td>
<td>Partnership for Higher Education in Africa/NTC</td>
</tr>
<tr>
<td>11 Ms. Teddy Namugerwa</td>
<td>Ministry of Internal Affairs</td>
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<tr>
<td>12 Mr. Edward Baliddawa</td>
<td>Parliament of Uganda</td>
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<tr>
<td>13 Mr. Charles Asaba</td>
<td>Uganda Police Force</td>
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<tr>
<td>14 Ms. Sarah Mumbi Bisamunyu</td>
<td>Uganda Industrial Research Institute</td>
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<tr>
<td>15 Mr. Francis Mazinga</td>
<td>National Planning Authority</td>
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<tr>
<td>16 Ms. Jackline Ssanyu</td>
<td>Kyambogo University</td>
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<tr>
<td>17 Mr. Ernest Mwebaze</td>
<td>Makerere University</td>
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<tr>
<td>18 Dr. E.B. Mugerwa</td>
<td>Nkumba University</td>
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<tr>
<td>19 Mr. Stephen Nuwagira</td>
<td>East African Business Week</td>
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<tr>
<td>20 Mr. Joseph. M. Ssemwogerere</td>
<td>Makerere University</td>
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<tr>
<td>21 Dr. Akisofel Kisolo</td>
<td>Busitema University</td>
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<tr>
<td>22 Ms. Carol Natukunda</td>
<td>New Vision</td>
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<tr>
<td>23 Mr. Abdul Nsubuga PMP</td>
<td>Warid Telecom/ Makerere University</td>
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<tr>
<td>24 Mr. Sam Nabwiiso</td>
<td>Kiira FM</td>
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<tr>
<td>25 Dr. Joseph K. Ssewanyana</td>
<td>Makerere University</td>
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<tr>
<td>26 Mr. Andrew Owor</td>
<td>Mbarara University of Science and Technology</td>
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<td>27</td>
<td>Mr. Narcis T. Rwangoga</td>
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<td>28</td>
<td>Dr. John Musajjakawa</td>
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<td>29</td>
<td>Mr. Emojong Osere</td>
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<td>30</td>
<td>Ms. Brenda Nakanjako</td>
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<td>31</td>
<td>Mr. Innocent Kalule</td>
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<td>32</td>
<td>Mr. Geoffrey Tabo-Olok</td>
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<td>33</td>
<td>Mr. Godfrey Mayende</td>
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<td>34</td>
<td>Mr. Chris Mafabi</td>
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<td>35</td>
<td>Dr. Ddembe Williams</td>
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<td>36</td>
<td>Mr. Charles Halonda-Funa</td>
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<td>37</td>
<td>Prof. Venansius Baryamureeba</td>
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<td>38</td>
<td>Mr. Jackson Sabila</td>
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<td>39</td>
<td>Mr. Ibrahim Kin Kaliisa</td>
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<td>Mr. Godfrey Kaliisa</td>
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<td>41</td>
<td>Mr. Pontius Namugera</td>
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<td>42</td>
<td>Mr. Ambrose Ruyooka</td>
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<td>43</td>
<td>Mr. Aaron Wanyama</td>
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<td>44</td>
<td>Mr. Johnson Mwebaze</td>
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<td>45</td>
<td>Ms. Esther Nsubuga</td>
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<td>46</td>
<td>Ms. Aminah Zawedde</td>
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<td>47</td>
<td>Mr. Jackson Muhiwe</td>
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<td>48</td>
<td>Mr. Humphrey Mukooya</td>
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<td>49</td>
<td>Ms. Thodore Twongirwe</td>
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<td>50</td>
<td>Ms. Fiona C. Ssozi</td>
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<td>51</td>
<td>Ms. Deborah Naatujuna</td>
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<td>52</td>
<td>Mr. Sylvester Dickson Baguma</td>
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<td>53</td>
<td>Mr. Henry Matovu</td>
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<td>54</td>
<td>Mr. Joseph Tenywa</td>
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<td>55</td>
<td>Prof. Hippolyte N. Muyingi</td>
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<td>56</td>
<td>Mr. Ahmed Ssenyonjo</td>
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<td>Mr. James Lam-Lagoro</td>
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<td>Ms. Jackie Pimer</td>
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<td>Mr. Richard Mayanja</td>
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<td>Mr. Paul Nasimolo</td>
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<td>Mr. Christopher Ntwatwa</td>
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<td>Mr. Daniel Kaziwa</td>
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<td>Dr. Benon Mugerwa</td>
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<td>Mr. Frank Batungwa Tumusime</td>
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<td>Mr. Robert Mwesigwa</td>
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<td>Ms. Judith Muhairwe</td>
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<td>71</td>
<td>Ms. Ann Akampa</td>
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<td>Mr. Mike Engel</td>
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<td>Dr. Jude Lubega</td>
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<td>75</td>
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<td>Mr. Richard Okello</td>
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