PROCEEDINGS

THE INFORMATION TECHNOLOGY PROFESSION AND ITS DEVELOPMENT IN KENYA

*Kenya College of Communications Technology (KCCT)
Mbagathi, Nairobi, Kenya*

March, 1998

MASSA is a professional
body of students of the
Faculty of Commerce,
University of Nairobi.

ERRATUM

We kindly apologise for printing incorrectly the name of the Kenya's Assistant Minister for Industrial Development on pages: iii, ix, 9, 59, 62. The correct name is: Hon. J. Kimkung:

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12–13 March, 1998

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We would also like to thank the following professionals for their support and participation:

Mr Chris Hardisty	Managing Director, DevData Ltd
Mrs Hardisty	
Mr Nitin Bedi	Senior IT Consultant, Deloitte & Touche
Dr Timothy Waema	Director, Institute of Computer Science, University of Nairobi (UoN)
Prof. Francis Kibera	Principal, College of Humanities and Social Sciences, UoN
Mr Harry Hare	Editor-in-Chief, *PC World East Africa Magazine*
Dr Meoli Kashorda	Head, IT Department, USIU-A
Mr Patrick Malungu	Sales and Marketing Consultant, Africa Online
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Dr Isaac Mbeche	Chairman, Department of Management Science, Faculty of Commerce
Mr Njihia	Lecturer, Department of Management Science, Faculty of Commerce, UoN
Mr Gatune	Lecturer, Institute of Computer Science, UoN

EXECUTIVE SUMMARY

Opening Speeches

In his introductory speech, Prof. Francis Kibera highlighted the importance of information technology (IT) in education, business and the industrialisation process. He encouraged the participants to discuss the control of the quality of IT professionals through certification by professional bodies, and the development of a framework for publications and information dissemination. He also pointed out the need to discuss the cooperation between the industry and the university, and the government's contribution to the development of the IT profession in Kenya.

Hon. Dr F. Y. O. Masakhalia stressed that Kenya cannot ignore the importance of technology in developing the economy, including the efforts in becoming a newly industrialised country by the year 2020. IT will play a major role in supporting the re-engineering of business processes. He pointed out the advantages of IT in banking, making information accessible through the internet, and improving speeds and reducing costs of communication. The Honourable Minister highlighted government support in IT training through low tariffs on computers and development of appropriate curricula. He suggested that the seminar considers the need for a professional examination body to regulate IT education and professionalism, as well as controls to ensure information system security. He pointed out that more seminars such as this one need to be held to enlighten organisations and business people alike on the use of IT.

KEYNOTE ADDRESS
The Information Technology Profession and its Development in Kenya by Mr Chris Hardisty—Managing Director, DevData Ltd.

The goal for Kenya is to become a newly industrialised nation by the year 2020. To meet this goal, Kenya must be incorporated into, and play an active role in the global marketplace. This means development of transport infrastructures (e.g., shipping, roads, railways and canals) in order to facilitate the cost effective relocation of manufacturing. In addition to this, development of communication and information

technology infrastructures will lead to economies of scale and internationalisation.

The role of the IT professional is to provide IT infrastructure (e.g., communication and network links) at affordable costs, and overcoming barriers such as perceived low quality of local Kenyan skills and economic development. The quality of local skills should meet internationally accepted standards. Commerce should accept and use local skills that meet these standards. IT professionals must adhere to and maintain standards. We should also encourage donors to use and invest in the development of local skills.

We need government support in developing communications infrastructure and increasing service bandwidths. Cost reductions are required to bring local IT users in line with those in industrialised nations. The biggest barrier to economic investment in the IT industry is software piracy which leads to lost revenues to the government and IT software suppliers, and lack of proper training and support for products.

Our responsibilities are to adhere to international standards and disciplines, use local international accredited training institutions, sensitise commerce, donors and government to locally available skills, and to maintain professional ethics.

FIRST PRESENTATION
Required qualifications of an IT Professional by Mr Nitin Bedi— Senior IT Consultant, Deloitte & Touche.

The IT professional should be highly skilled, experienced, technically competent, aware of business and technology trends, and willing to learn and adapt. Academic qualification in an IT related field plus hands-on training is essential. He or she must have an appreciation of IT as a business tool, and be aware of local and international markets. This is in addition to having professional business ethics, managerial capabilities and advisory skills.

Some of the personal traits required of an IT professional include being able to work in a team, learn continuously, and have good communication skills. The IT professional must also be patient and analytical.

Kenya has adequately trained personnel. What is now needed is a code of professional conduct for IT professionals. This, together with a national IT policy, will provide direction and advice to top level managers towards organisational computerisation.

SECOND PRESENTATION

The status of IT training in Kenya: issues, problems and challenges by Dr Timothy Waema—Director, Institute of Computer Science, University of Nairobi.

The Sessional Paper No. 2 of 1996 recognises the role of human resource development to Kenya's 2020 industrialisation vision. It however does not deal with human resource development in IT.

IT is taken to encompass computer, communications and electronics technologies. The professions contributing to IT human resource development are computer science, information systems, telecommunications engineering, electronic and electrical engineering, management science and information science.

The number trained at different levels are:

university graduate level	—	350
technician level	—	3,000
craft/artisan level	—	5,000

The issues and problems associated with IT training are disparities in the duration and entry requirements, high cost of training, lack of facilities and training staff, inadequate funding, inappropriate curricula and lack of IT training standards. The challenge for IT training in Kenya is therefore to develop a guiding IT policy, standardise IT training, provide training of trainers at all levels, develop appropriate curricula driven by development objectives and priorities, and to increase participation of the private sector, especially in public sector training.

The way forward is for the government to actively participate in IT training, increasing the participation by IT professionals in charting out the role of IT in Kenya's development, and developing IT training standards, appropriate curricula and programmes.

PANEL DISCUSSION AND GROUP DISCUSSIONS

The panel discussion focused on the state of IT training in Kenya, the current trends in Kenya's IT industry, and how Kenya rates herself against the world in terms of IT.

The group discussions tackled issues on making better use of computers in firms, the need for a regulatory framework for qualifications of IT professionals, publications and textbooks, and IT colleges and schools. Also discussed was the impact of IT on employment, computer training in primary schools, disparities in IT programme durations and the problem of inappropriate curricula.

SEMINAR RESOLUTIONS

The resolutions of the seminar centred on:

1. The need for an IT professional body to monitor and regulate the IT industry and profession.

2. A review of IT training and curricula in the light of standardisation and quality assurance.

3. The development of the local IT industry and recognition of local skills.

4. Government participation in the development of the IT profession.

5. Development of a national IT policy framework.

6. Liberalisation of the telecommunications industry in order to reduce costs of IT infrastructure.

CLOSING REMARKS

Dr Freida Brown pointed out the use of IT by most agencies in gaining and maintaining competitive advantage. She addressed the question of what the industry requires and how adequate the university IT programmes are compared to industry requirements. She also pointed out a difference in what the industrialist and the educator expect from a graduate, when infact all three must operate in harmony.

Dr Brown used USIU-A as a case in describing the role of universities in harmonising with industry to produce graduates for a newly industrialised country by the year 2020: revising the mission, redesigning the curriculum to meet this mission, and acquiring the necessary resources. The major inadequacies included keeping up-to-date with the fast changing technology. She concluded by highlighting how industry can assist universities, and how government can through developments and initiatives lower the cost to IT.

SEMINAR CONCEPT PAPER

The IT Profession and its Development in Kenya

INTRODUCTION

Information Technology is increasingly becoming an integral part of organisational life and an essential tool for business operations and management. The ongoing economic and social liberalisation is compelling business organisations to compete in a global market. Organisations that adopt effective use of IT not only to support their operations and management but also to re-engineer their basic business processes have the potential of gaining a strategic and competitive edge. The IT industry is also very dynamic and it is fair to say that in today's complex business environment there is never a shortage of problems waiting for the right technological solution, and there is never a shortage of technologies waiting for the right problem to solve!

The challenge facing the business community has been in the need for constant review of computer systems. The development of IT and the competitive advantage that comes with it should also be viewed in terms of IT personnel. The dynamism of the IT industry has had an impact on the type of employees required to manage and use these systems. Constant training is therefore required in order to keep abreast with all the changes.

In Kenya, the government has set a very ambitious but achievable target for the country: its industrialisation policy framework—to become a newly industrialised country by the year 2020. This challenge calls upon all Kenyan individuals, groups and organisations to contribute to the realisation of this goal. Here, information and communications technology can play a critical catalytic role through its various integrating applications such as electronic commerce to open new opportunities and markets for Kenyan products. As the technology changes, it is necessary for IT professionals to constantly be retrained in order to keep abreast with all the changes. Some educational institutions have however retained the same curriculum for long periods without adopting to these changes. The question arising from these considerations is *What are we doing as individuals, professionals, business persons, government officials, political and church leaders to support the realisation of our national industrialisation goal?*

The question above summarised the essence and intent of this seminar we organised. We would like to come together to share our experiences, skills, ideas, expectations, hopes and dreams, and to envision and shape the role and contributions that IT should make to strengthen and develop our business organisations and public institutions. You will agree that we all have a role and stake in the development of this nation, as a business community, the IT industry, IT professionals or professional bodies, and as the university community (students and staff).

WHO IS A PROFESSIONAL?

A profession is that kind of occupation in a special area of activity and offering a distinct service which is followed by persons who have undertaken advanced training and education. A professional is a highly skilled, experienced person. Professionals serve as vanguards of almost everything we do. In business, education, law, medicine and government, professionals are treated by peers and colleagues as the keepers of the skills and knowledge necessary to function effectively in our emerging post-industrial era.

Let us pick professional associations as a measure of who a professional is. Professional associations aim at safeguarding high standards of professional conduct, and providing information and study services to keep members abreast. Those who wish to become members of professional associations must undertake progressive stages of instruction and practical experience before being examined for membership. (For example, in Britain the emphasis in experience can be seen in the restriction of membership to those above the age of maturity (23 years) in addition to a few years working experience in an IT environment). These members are expected to accept certain responsibilities towards his or her clients, colleagues and the general public.

There have been complaints from the industry about the quality of graduates the institutions have been producing. This has led to more and more students taking additional courses in order to match up to the employers' expectations. These include IMIS courses for example. Is this really necessary when the university has professionals competent enough to offer the same, at the university, if that is what the industry requires? Or should they simply discontinue their degree programmes and have the same courses done in commercial colleges? There is clearly

a need for the industry and the university to cooperate in the training of professionals who will later be useful to them (the industry) as happen in other developed countries.

OBJECTIVES

During this seminar we would like to focus on professional education in the IT profession and its development in Kenya. The seminar seeks to bring together the IT profession and industry, the business community and business school of the University of Nairobi:

a. To share experiences on the impact of recent advances in information and communications technology and their impact on business in particular and society in general.

b. To examine issues and challenges critical to the development of the IT profession and appropriate training programmes for nurturing this development. This should set the stage for the development of a system that is acceptable and recognised both regionally and internationally.

c. To strengthen the cooperation between the industry and university to ensure mutual and beneficial support to each other essential for a healthy professional and industrial growth.

The subject of *"internationalising"* our professional education can also be introduced. Internationalisation enhances the country's ability to compete in the global markets, and develops the capacity to recognise and respond to international problems. This becomes significant when we consider that global interdependence is irreversible. Curriculum reform will involve updating current developments, at the same time retaining traditional values of the Kenyan society.

ISSUES AND TOPICS

1. Who is a professional? Who is an IT professional?

2. Which are the high demand areas, the available resources in Kenya, constraints of companies in development of IT professionals, practical strategies of developing the IT industry and entrepreneurship?

3. What training does one have to undertake to become an IT professional?

   a. How adequate are the university IT programmes compared to industry requirements?

   b. What can be done to rectify any inadequacy?

4. How does Kenya compare to the international IT professionals?

   a. Are we professionals from the international point of view?

   b. What globalisation measures can be taken?

   c. Which fields have not been explored in Kenya?

TARGET AUDIENCE AND PARTICIPANTS
All the players in the seminar stand to benefit.

- *The Industrial and Business Community*: Industries are the key users of the products of education, and students are trained for the industry. The industry should advise the institutions what needs to be learned. This will improve the quality of staff the industry recruits and in turn cut down the cost and time spent in retraining.

- *The University Community*: The university is essentially an institution of higher learning, where knowledge is generated. As such it must keep up-to-date with current trends in its environment and provide adequate training to its students so as to provide society with the right resources to facilitate growth and advancement.

- *The Student Community*: With the provision of adequate initial training, students will no longer need to undertake extra courses in order to meet the required qualifications of their intended profession. This will greatly reduce the cost of education to the students and their parents. Moreover, the students will become marketable much earlier than is currently the case.

EXPECTATIONS AND OUTCOME

At the conclusion of this seminar we would like to see a situation where professional education is driven by the environment and where the industry and university cooperate to ensure that the education curriculum is geared towards meeting industrial requirements.

The seminar should mark a turning point in the tripartite relationship between the university community, the business community and the IT professional and industrial community marked by cooperation, sharing, supportiveness and above all a determination to contribute to the integral development of this nation. We would like to see proposals and recommendations define the relationships in operational terms together with implementation strategies and plans of action. This will be the greatest outcome of the seminar and is our greatest expectation.

INTRODUCTORY SPEECH

Prof. F. Kibera
PRINCIPAL, COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
UNIVERSITY OF NAIROBI

The Honourable Dr Francis Masakhalia, Distinguished Guests, Ladies and Gentlemen. On behalf of the Vice-Chancellor and the entire University of Nairobi fraternity, I would like to welcome you to this seminar to discuss issues relating to the IT profession and its development in Kenya.

Today is a very important day. We have come together as professionals to discuss IT in Kenya. It would be very absurd for us to talk about industrialisation by the year 2020 and not talk about technology. Information technology and information systems are increasingly becoming more important resources for organisations. They are causing ripples everywhere because they are changing all the time. The users of these technologies also have to change with every technological change. This calls for change in the training content and method. Last week Microsoft Corporation launched Windows 98. There are many people who have not yet used Windows 95 let alone Office 97. This may be attributed to the rate of change and the cost of software. Change is the key word.

The University of Nairobi has also introduced IT courses. These are mainly in the Institute of Computer Science and at the Faculty of Commerce where four years ago a new major was incorporated into the degree course. This is Management Science. It incorporates Information Technology and Operations Research.

Kenya needs a good IT policy or framework. The current situation is one where software piracy is the order of the day. We need a framework for certifying professionals under a legal body. We need a legal framework for ensuring data security and patenting of intellectual property-software.

Honourable Minister, with your permission, kindly allow the participants of this seminar to:

- Discuss critically the quality of the professionals we produce. Quality control is very important. This begins with a policy or legal body to certify professionals and institutions in just the same way that we have Microsoft or Novell certified professionals. They should be well trained in reputable institutions.

- Discuss IT publications, be they magazines or textbooks. I understand that we are honoured to have the Editor-in-Chief of *PC World East Africa Magazine*, Mr Harry Hare who will be here tomorrow for the Panel Discussion. *PC World East Africa Magazine* is one of the most interesting local IT magazines and Mr Hare should be able to help us develop a framework for publications and information dissemination.

- Allow them to also discuss the issue of cooperation. This will increase efficiency and effectiveness, with either party offering the best of its abilities. This seminar has been the result of cooperation between the Management Science Students Association (MASSA) and their lecturers in the Department of Management Science of the Faculty of Commerce. The Faculty of Commerce is eager for cooperation with the industry. The most important issue right now which is also the subject of this seminar is information technology. We need to improve and be more up to date in IT. In this respect I would like to call upon any company which would like to enter into a partnership with us to improve the training to join us. I pick up the offer made by the Microsoft region representative two weeks ago of how Microsoft can help develop IT in educational institutions. The Faculty of Commerce is ready.

- Last but not least, allow them to discuss the legal issues affecting the IT industry. We need to advise the Members of Parliament on which issues need laws. I would begin by suggesting to the Honourable Minister a possibility of forming a Parliamentary IT Commission, similar to the Parliamentary IT Commission (PITCOM) in the UK, which with the help from the IT industry assesses how other countries address issues that arise with regard to competition, liberalisation and regulation. Germany for example has a new multimedia law which covers intellectual property rights, data protection, internet content and digital signatures. This law is a model for the European Union laws on IT. Honourable Minister, I do not see why Kenya

should not develop such legislation which can be used as a model for the Eastern Africa region.

Finally, I want to thank you all for finding time to come to this seminar. I would now like to invite the Honourable Minister, Dr F. Y. O. Masakhalia to officially open the seminar.

OPENING SPEECH

Hon. Dr F. Y. O. Masakhalia
MINISTER FOR INDUSTRIAL DEVELOPMENT

Presented on his behalf by Hon. J. Kimkum, MP,
Assistant Minister for Industrial Development

The Patron, Management Science Students Association, The Chairman, MASSA, The Executive Director, United States International University-Africa, The Principal, Kenya College of Communications Technology, organisers, participants, ladies and gentlemen.

It is my great pleasure to be accorded this opportunity to address you at this seminar on the Information Technology profession and its development in Kenya. I would also like to congratulate the organisers, MASSA, and equally all the participants present here for taking two days off to discuss this important aspect of our economic life.

Indeed, after the worldwide agrarian and industrial revolutions, the new revolution in the area of development is the introduction into our way of life, the new Information Technology (IT). Kenya as a developing country cannot afford to ignore the importance of this technology in its efforts to develop the economy, including the achievement of its set target of becoming a Newly Industrialised Country by the year 2020.

Information technology, that is, the technologies of modern computer based information systems is a major force for organisational and managerial practices. As the country prepares to achieve the set goals of attaining the newly industrialised country status, there is a need to establish new industries, improve existing ones and revitalise the dormant ones. The same applies for all other sectors of our economy. Information technology plays a major role in tackling organisational complexities by supporting the re-engineering of business processes.

As you are all aware, computerisation has become a necessary component of business activities. To survive in today's competitive business world, we need to adopt computerisation in the performance of our activities.

The advantages of computerisation are evident. They include computerised banking through Automated Teller Machines (ATMs), improved processing techniques through computerised automated machines, to the latest sensation, the Global Information Super highway, more popularly known as the INTERNET. Information has not only become easily accessible but now can be received instantly, in the desired quantity and in the right quality.

As has been experienced, IT developments can dramatically reduce both time and cost to process and mail documents and thus eliminate many manual tasks and procedures. This in turn can significantly improve communications as well as coordinate in any organisation, but more so it can improve significantly the process of making correct and timely decisions. With the advent of the internet, communication has become cheaper greatly reducing the operational costs of organisations and improving efficiency. Indeed, with the liberalisation and globalisation of economies, IT is a very important feature for our economic development and industrialisation in particular. Our products need to be competitively marketed through the internet, a goal which can be efficiently achieved in the existing and emerging global markets.

Ladies and gentlemen, although highly automated systems do not require as many people as manual methods do, the IT development brings with it considerable increases in knowledgeable workers, technicians, and professionals involved in developing and running computer based Information Systems. The Kenyan public needs to be educated more and more about this positive aspect of IT and I hope that this seminar will also address this issue. Resistance to computer use, if it still exists, can be minimised by formal technology implementation programme which computer professionals should and can develop in order to encourage both users acceptance and productive use of new information technologies.

May I take this opportunity to make observations on the quality of training in IT offered to our fellow Kenyans. The government places great emphasis on computerisation. As a matter of fact, in its efforts to improve computer literacy in the country, the government has maintained low tariffs on computers. The lack of infrastructure, standards and ethics are a major obstacle to the development of the IT industry. In spite of this, it is essential for us to ensure that training in this area provides the right qualifications

and skills. The government is in the process of developing an appropriate curriculum for Kenyan schools and indeed, some schools are already having this as a subject in their curriculum.

Recently, as the yearning for computer education has been on the increase, we have witnessed an upsurge in the number of facilities offering computer education. Unfortunately, not all are offering quality education, and I hope that this forum will address this aspect. The situation seems to be further made more intricate by the speed at which technology is changing. There is, therefore, need to address all aspects embracing IT developments in order to benefit from its use at all times. In particular, it is necessary for IT professionals to constantly be re-trained in order to keep abreast with all the changes. Towards this goal, I would like to suggest that this seminar gives consideration to the need of having a professional examining body, such as the Kenya Accountants and Secretaries National Examination Board (KASNEB), which can regulate computer education and ensure computer professionalism in the country.

Equally important is the fact that seminars such as this one should be held more often in future in order to enlighten organisations and business people alike in the use of information technology on a more regular and consistent basis. In doing so, considerable attention should be accorded to the need to use information technology more efficiently.

Finally, attention needs to be given to initiating an evolutionary trend for more transactions being computerised, and effective controls being put in place, in order to ensure information systems security. This involves accuracy, integrity, and safety of information systems activities and resource controls to minimise errors, frauds and destruction in the information services organisation.

In conclusion, I recommend that in your deliberations attention be accorded to all aspects of the IT profession on which observations have been made here. This will make it possible for users to derive the most benefits from its use considering our limited resources.

Ladies and gentlemen, I wish you fruitful discussions, and I now declare this seminar officially open.

Thank you.

KEYNOTE ADDRESS

The IT Profession and its Development in Kenya

Mr Chris Hardisty
MANAGING DIRECTOR, DEVDATA LTD

Please note that this report of Mr Hardisty's presentation is a reconstruction from notes taken by the seminar participants and the slides used by Mr Hardisty.

INTRODUCTION
One of the goals set for Kenya by the year 2020 is that it would have become a newly industrialised country (NIC). For this to happen, Kenya has to be incorporated into, and play an active role in the global marketplace. In the global marketplace, attention must be paid to quality, customer service and price competitiveness.

To draw an example from the development of Britain's market, she started by developing a raw material sourcing network. As manufacturing companies grew bigger, there arose the need to develop the infrastructure to improve on such things as raw materials sourcing, location of manufacturing plants and distribution of raw materials. This therefore reduced the manufacturing costs and made specialisation easier. The introduction of IT and data communication made it possible to manage and control activities to reduce cost through economies of scale and internationalisation.

The critical element to market development is the information coming in or going out concerning activities that help a country enter a global market.

THE ROLE OF IT PROFESSIONALS
The role of IT professionals include:

a.   provision of IT infrastructure,

b.   working to overcome barriers to IT, for example the perception that local skills are inferior and for an employer to get quality (superior skill), he needs to import/pay expatriates to do the job.

THE IT INFRASTRUCTURE

The IT professional needs to lobby and work for improvement of the Kenyan infrastructure, e.g., expansion of service bandwidth, reduction of prohibitive costs of establishing and maintaining IT, e.g., the fact that you need Kshs 60,000 monthly for a 64K line. The government should for example double tax any resources that are locally available but which have been outsourced.

The IT professional also needs to lobby for economic liberalisation to allow more players in the telecommunications industry so as to induce quality service. The government should be involved in improving the communication infrastructure. Cost reductions are required to bring the infrastructure in line with those of industrialised nations.

DEVELOPMENT OF LOCAL SKILL

IT professionals must remove the perception that local skill is substandard. They should begin by:

- accepting, meeting and maintaining internationally accepted standards;

- recognising the quality of local skill and market it;

- recognising and emphasising training and certification as a skill ascertainment base;

- getting commerce to accept standards and use local skills that meet these standards;

- getting donors to use local skill and invest in their development.

SOFTWARE PIRACY

It is the biggest barrier to economic investment in IT. It stopped companies like Novell from making an investment in Kenya. Microsoft, however chose to invest and deal with the piracy problem from inside despite the fact that for instance their communication cost with the US is $16,000 (Kshs 960,000) per month!

The effects of software piracy are:

a. loss of business for system support firms. If a system was established from pirated software (which is free), the business will not value or be willing to pay for support services later.

b. minimal investment in IT. If a supplier earns no revenue from a region due to piracy and no external companies are willing to invest, then there will be no substantial investment in IT in the offending region.

c. software and systems in general will not be supported because support firms are few and far between resulting from minimal profit incentives. In addition to this, the customer will ask— why pay for support when the product is free? This will in turn lead to low salaries.

d. lack of training for system users and developers. Why should one pay for training system developers if they can get "free" (pirated) software?

e. no revenues for the government because the pirated software evades any taxes or other levies that go to the government.

f. due to lack of external investment and support services, the industry will not be up to date and the required standards are harder to meet and maintain.

g. wasted talents and poor skill development because the higher the piracy rate, the lower the importance attached to acquisition of the skills that are required for software development. Consequently, there will be constant brain-drain leaving the Kenyan scene deficient of high quality software developers.

The causes of piracy include:

a. lack of ethics among IT users and professionals.

b. prohibitive cost of software which tempts people to find a cheaper alternative to obtain it.

OUR RESPONSIBILITIES

1. Encourage and enforce adherence to international standards and disciplines.

2. Use only local internationally accredited training institutions and implement constant inspections of others that may be in existence that are not strict on professional ethics and elimination of software piracy.

3. Sensitise commerce, donors and government to locally available skill to reduce brain-drain which eventually may help to lower software acquisition costs (if it is developed locally).

4. Maintain professional ethics among all people and institutions concerned with IT.

DISCUSSION QUESTIONS

1. Microsoft has started an anti-piracy programme. Who are they targeting?

    The main target of the anti-piracy programme is the corporates and commercial organisations.

2. Is the problem of piracy connected to economic development? For instance the prices of Microsoft's software is the same all over the world irrespective of the economic conditions.

    I will respond to your question by asking another. How many of you in this room own a wrist watch? Now, if you do not own a watch as I can see many do not, does it justify your stealing mine? In just the same way most IT professionals do not drive BMW's and Mercedes for reasons I have already given, but this does not justify them to steal. So, if you cannot afford to buy software, you cannot steal it.

3. A Microsoft survey in Kenya revealed that the piracy level was 98%; from my own readings, I found that the piracy level in Japan was 50%. Why is this so yet Japan is the second most industrialised nation in the world?

    I would not say the piracy level is 98%, it is between 70 and 75%. However, the problem in Kenya is worse because Microsoft's market is very small.

They therefore earn very little from this market compared to the Japanese market.

4. We know that the major culprits of piracy are multinationals who pass on software to local companies from the head office. What in your opinion can be done to stop this?

    First, those multinationals caught engaging in piracy should be fined. There is nothing really much that Microsoft can do, but it could counter this by avoiding this market. Eventually, this would mean the users are the eventual losers.

5. What have been the developments in Kenya in the period in which your company has been around?

    There have been three major developments over the last few years which have had major impact on the IT industry:

    a.   provision of high bandwidth services both international and national;

    b.   increasing investment of International IT companies; and

    c.   growing awareness of the piracy problem.

FIRST PRESENTATION

Required Qualifications of an IT Professional

Mr Nitin Bedi
SENIOR IT CONSULTANT, DELOITTE & TOUCHE

Please note that this report of Mr Bedi's presentation is a summary constructed from notes taken by the seminar participants and the slides used by Mr Bedi.

WHO IS AN IT PROFESSIONAL?
An IT professional is a person who has first and foremost studied information technology: he or she is highly skilled in information technology and computer science. No one can claim to be a professional in a field he/she has no knowledge in; therefore, the IT professional is knowledgeable in IT issues, and as well experienced in the IT field. In addition to this, the IT professional is technically competent as opposed to literate. Literacy implies only possession of knowledge whereas competence also includes effective application of this knowledge.

IT is very dynamic and changes rapidly. What was new a few years ago is now obsolete. It is therefore necessary for the IT professional to be well aware of trends in modern business and technology. He/she must be dynamic and flexible, able to change with market changes, and consequently must be willing to learn and adapt new developments and innovations.

The vibrant and unstable nature of the IT industry means that the IT professional must be willing to put in extra effort in his/her work. Most professionals put in many hours at the office. In order to cope with this demand, he/she must have a positive attitude towards the profession. It also means that the IT professional cannot be reactive, but must be proactive.

QUALIFICATIONS REQUIRED
A recognised qualification in IT or in a related field in addition to basic computer science knowledge is essential. The IT professional must understand the fast changing IT environment and common business

operations. He or she must be well aware of the impact of IT on businesses. This translates into the critical requirement of a strong academic background in terms of computer education.

PERSONAL QUALITIES

The IT professional must be proactive, as opposed to reactive, because of the dynamic nature of the IT industry. In order to cope with the demands of the profession, he/she has to be highly motivated and dedicated to IT. Most successful IT professionals have exhibited a passion for IT.

The IT professional must be flexible enough to keep pace with the dynamic IT environment, and able to learn continuously. He/she must be analytical in his or her work, adopting a systematic way of thinking and solving problems as this is how information systems work—systematically. There will probably be a team of professionals working with information systems in any organisation. Consequently, the IT professional must be a team player, able to communicate effectively with others.

IT is relatively new in Kenya, and there are several people still hesitant to adopt IT in their business operations. This means that the IT professional must be patient, especially when dealing with those who are not too conversant with IT or who are technophobic.

EXPERIENCE REQUIRED

The IT professional requires abundant practical hands-on experience and in-depth knowledge of information technology. He or she must appreciate IT as a business tool, and consequently must be familiar with business operations if he/she is to effectively apply IT in business.

The keys to success as an IT professional are keeping up to date with trends in IT and being well aware of the local and international markets. This will ensure that he or she is not left behind by developments in IT, and that he/she can effectively take advantage of opportunities available in the market.

PROFESSIONALISM

Professionalism is defined by the skills or qualities of a profession or members of that profession. It entails:

- business ethics: the behaviour of professionals in the execution of their duties;

- communication skills: effectively communicating with fellow professionals and clients;

- managerial capability: efficient management of IT resources; and

- advisory capabilities: providing direction in terms of IT strategy and implementation.

SUMMARY

The IT professional is a person who is technically competent (as opposed to being technically literate), and who possesses recognised qualification in IT. He or she is self motivated and proactive, with an understanding of the impact of IT on business. In addition, he or she has the right background and attitude towards the profession.

DISCUSSION QUESTIONS

1. What are the requirements for IT consultancy at Delloite & Touche?

   We normally require personnel with undergraduate qualifications or preferably postgraduate qualifications. However, under exceptional cases we may employ non-graduates who must have specialised skills.

2. IT personnel need to undergo frequent training. Who trains you?

   Most of training is done while on assignments as these expose you to areas that need improvement. Apart from these, appraisals are done at the end of each assignment and every six months. These help one see areas in which they need further training.
   Delloite & Touche also holds professional courses for staff. These may be in-house or by external trainers.

3. We often hear of the millenium bug. What is it? Which machines will be affected and what do you advise us to do about it?

   The problem of the millenium bug has to do with the way the dates were configured in the computer. Early programmers in a bid to save on space configured the date to have only two digits for the day, month and year. This means that come the year 2000, the last digits will be 00. For the

computer, this will be the year 1900, thus everything will be 100 years back, causing huge losses of data.

The computers manufactured before the first quarter of 1995 will be most affected. The only way to avoid getting caught is to be cautious and buy computers from reputable suppliers.

4. Why has it taken so long to solve the yak problem?

   I suppose it is the typical Kenyan attitude of "let's wait and see".

5. Is it possible to have a local body to regulate training and monitor IT standards in Kenya?

   Yes, it is possible to have a local IT regulating body in Kenya. I don't see why not, even if it takes time. Other professions have regulating bodies such as KASNEB and ICPA(K) for accountants.

6. You have told us about the need to work hard which sometimes requires spending long hours in the office. Can you comment on the importance of time spent with family or in social activities.

   It is important to spend time on social activities inorder to relax. However extra time spent in the office is also necessary for career progress. Many times it is the only way if deadliness are to be met.

7. How do you as consultants direct top level directors in the computerisation of organisations?

   We direct top level directors in the formulation of IT policy papers in addition to general consultation on IT related issues.

SECOND PRESENTATION

The Status of IT Training in Kenya: Issues, Problems and Challenges

Dr Timothy Waema

INSTITUTE OF COMPUTER SCIENCE, UNIVERSITY OF NAIROBI

INTRODUCTION

Sessional Paper No. 2 of 1996 acknowledges the importance of human resource development when it says "The availability of well educated and trained workforce is critical to the success of Kenya's industrialisation process." The sessional paper does not however explicitly deal with IT manpower training.

In the following paper, I outline the status of IT training in Kenya at all levels. Then I pose some problems, and outline some issues and challenges that I hope the seminar participants will have adequate time to discuss and make recommendations. I also give some recommendations for the way forward in handling some of the issues/problems/challenges.

I begin by posing some questions and giving answers that are the basis of the main part of my presentation.

WHAT IS IT?

Information Technology (IT) can be taken to encompass the following technologies:

- Computer technology,

- Communications technology;

- Electronics technology.

WHAT PROFESSIONS TRAIN IT MANPOWER?

The following professions are involved in training IT manpower:

- Computer Science;

- Information Systems;

- Electrical and Electronic Engineering;

- Telecommunications Engineering;

- Management Science;

- Information Science.

SUMMARY

The following table summarises the number of IT people trained at different levels.

Level	Approx. number currently trained	Current ratios	Ideal ratios
1. Engineers, Designers, etc.	350	1	1
2. Technicians	3,000	3	x
3. Craft & Artisans	5,000	14	y

The following are some issues to be discussed:

a. What are the values of x and y?

b. How do these values compare with the current values (column 3 in the above table)?

c. What are the implications of the answers to (b) for training capacities at different levels?

ISSUES AND PROBLEMS

In this section, I raise some problems and some issues affecting IT training. I hope the seminar participants will have time to debate them.

DISPARITIES IN PROGRAMME DURATIONS AND ENTRY REQUIREMENTS

There are disparities in the durations of the same programme offered by different institutions. For example, Starehe Boys Centre takes 2 years on the KNEC Diploma in Computer Studies because it has a strict academic regime, including only 3 weeks of holiday time in a year and a full day's

The following table summarises the status of IT training in Kenya. This table is not exhaustive but rather indicative of what is happening in IT training in this country.

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
A. Postgraduate						
1. PhD (Computer Science or Information Systems)	MSc (Computer Science) MSc (Infor. Systems)	3 years	University of Nairobi	University of Nairobi	5–10	1998
2. MSc (Information Systems)	Bachelor's degree 2.1 + prerequisite courses or PGDip (C.Sc.)	2 years	University of Nairobi	University of Nairobi	30	1998
3. MSc (Computer Science)	BSc (Computer Science) 2.1	2 years	University of Nairobi	University of Nairobi	10	1998
4. MSc (Information Systems)	Bachelor's degree	1 year	University of Sunderland	JKUAT	Approx. 40	1998
5. PGDip. (Computer Science)	Bachelor's degree and 2 UG C.Sc. courses or 1 year experience	12 months	University of Nairobi	University of Nairobi	25	1980
				Total	105 (MSc) 5(PhD)	

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
B. Undergraduate						
1. BSc (Computer Science)	A/A- cluster av. 1998	4 years	UoN Egerton	UoN Egerton	25 30	1993 1996
2. BSc (Electrical Engineering)	A/A- cluster av. 1998	5 years	UoN	UoN	60	1970s
3. BSc (Electrical & Electronic Engineering)	A/A- cluster av. 1998	5 years	JKUAT	JKUAT	30	1990
4. B.Tech. (Electrical & Communication Engineering)	A/A- cluster av. 1998	5 years	Moi University	Moi University	30	1988
5. BSc (Information Science)	A- cluster av. 1998	4 years	Moi University	Moi University	50	1990
6. BSc (Computer, Electrical, Science & Technology)	B/B+ cluster av. 1998	4 years	Maseno University College	Maseno University College	25	1998
7. BA (Communication & Media Technology)	B+ cluster av. 1998	4 years	Maseno University College	Maseno University College	10	1998
				Total	**260**	

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
C. Diploma						
1. Higher Diploma (Telecommunications Eng.)	Ordinary Diploma (Telecomms Engineering)	4 years	KCCT	KCCT	40	1994
2. Graduate Diploma (Information Systems)	Higher Diploma or Science-based degree with 1 year experience in computer systems	1 year (full time) 2 years (part-time)	Institute for the Mgnt. of Info. Systems (IMIS)	Strathmore College Oshwal College	10–15 8	1996 1996
3. Higher Diploma (Information Systems)	Pass in Ordinary Diploma	1 year	IMIS	Strathmore College Oshwal College KCA KSPS	180 100 10 20	1990 1996 1997 1995
4. Higher Diploma (Computer Studies)	Pass in Ordinary Diploma	2.25 years	Mombasa Polytechnic	Mombasa Polytechnic	10–15	1993
5. Higher Diploma (Electrical Engineering (Electronics))	Pass in Ordinary Diploma	2 years	KNEC	Kenya Polytechnic	20	1970s
6. Ordinary Diploma (Information Systems)	C+ (Strathmore, IAT) with C in Maths & Eng.	1 year	IMIS	Strathmore College	300	1988

25

Table contd.

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
	C (Oshwal, KCA, KSPS) with C in Maths & Eng.			Oshwal College	500	1995
				KCA	400	1996
				KSPS	500	1995
				IAT	30	1995
				KSMS		
7. International Diploma (Computer Studies)	C+ with C in Maths & Eng.	15 months	NCC (UK)	IAT	70	1991
8. Diploma (Computer Studies)	C- with C- in Maths, Physics/Phy. Sc. & English	3 years	KNEC	Kenya Polytechnic	40	1982
				Mombasa Polytechnic	60	1987
				Eldoret Polytechnic	30	1992 (1988)
9. Diploma (Computer Studies)	C (C+/B- in most cases)	2 years	KNEC	Starehe Boys	30	1993
				UoN	25	1997
				JKUAT	40?	?
10. Diploma (Information Technology)	C- with C- in Maths, Physics/Phy.Sc. & English	3 years	Mombasa Polytechnic	Mombasa Polytechnic	30	1985

Table contd.

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification programme	Institutions offering	Capacity per year	Year started
11. Diploma (Management Information Systems)	Bachelors degree or A-level certificate or Certificate in computer operations	1 year	Kenya Institute of Management (KIM)	KIM	250	1954
12. Diploma (Electrical/Electronics Engineering)	C-with C- in Maths, Physics/Phy.Sc. & English	3 years	KNEC	Kenya Polytechnic	60	1960s
				Mombasa Polytechnic	40	1993
				Eldoret Polytechnic	30	1994
13. Diploma (Telecommunications)	C- with C- in Maths, Physics/Phy.Sc. & English	3 years	KNEC	Mombasa Polytechnic	40	1993
14. Diploma (Power)	C- with C- in Maths, Physics/Phy.Sc. & English	3 years	KNEC	Mombasa Polytechnic	40	1993
15. Diploma (Instrumentation & Control)	C- with C- in Maths, Physics/Phy.Sc. & English	3 years	KNEC	Mombasa Polytechnic	40	1993
				Total	**2,953**	

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
D. Craft & Artisan						
D1. Career Certificates						
1. Advanced Certificate (Information Technology)	Pass in Certificate	1 year	Mombasa Polytechnic	Mombasa Polytechnic	40	
2. Certificate (Information Technology)	D+	6 months	Mombasa Polytechnic	Mombasa Polytechnic	200	
3. Certificate (Information Technology)	D+	6 months?	Kenya Polytechnic	Kenya Polytechnic	20	1997
4. Diploma (Computer Programming & Software Packages)	O-level	6 months	Graffins College	Graffins College	100?	
5. Certificate (Computer Programming & Software Packages)	O-level	6 months	Graffins College	Graffins College	100?	
6. Certificate (Computer Operations)	C-	3 months	KIM	KIM	144	1954

Table contd.

Training programmes	Minimum entry requirements	Minimum duration	Examination & certification	Institutions offering programme	Capacity per year	Year started
7. Certificate (?)	Bridging course for those who do not meet requirements for Diploma	6 months	Institutional	KCA KSPS	140 200?	1996 ?
D2. Skill Certificates						
8. Skill Certificate (largely in application packages)	Varies (any qualification in most cases)	Varies (1 week to 3 months)	Institutional	Universities Polytechnics TTIs VTIs IT training colleges IT consultancy firms	Varies (4,000 total?)	Mush-roomed in early 1990s

teaching, in comparison to polytechnics where the same programme takes 3 years. *Should durations for similar programmes be normalised?*

There are also disparities in the entry requirements for similar programmes. For example, different institutions offering the IMIS Diploma have different entry requirements. Despite the disparities, most of these institutions have a high pass rate! *Shouldn't these requirements be normalised? If yes, who does the normalisation?*

COST OF TRAINING
The cost of training, particularly at technician and artisan/craft levels in private institutions is very high. At the same time, public tertiary institutions are beginning to charge market rates for all forms of training, including IT. The affordability of these training programmes is to some extent negating access to IT training. *What can be done to bring the costs down?*

LACK OF FACILITIES
Some of the institutions do not have adequate and current training facilities, adversely affecting the quality of training. *What can be done to ensure that training institutions that offer training, particularly at craft/artisan level, have adequate facilities for the courses offered?*

LACK OF ADEQUATE STAFF
Most of the high-end IT training takes place in public institutions and these institutions cannot retain staff compared to the private sector due to disparities in pay packages. This has the consequence of over-reliance on part-time lecturers and on lower quality trainers (i.e., trainers who should be training lower levels), with its attendant quality implications.

The shortage of staff is however not a problem that is necessarily confined to Kenya but is an international phenomenon. Some of the main reasons for the shortage include:

* lack of a national policy towards IT manpower development and linked to national development priorities;

* inadequate training programmes;

* inadequate training institutions;

- unattractiveness of the teaching profession vis-à-vis opportunities in industry, especially at tertiary level training;

- poor salaries in developing countries, leading to brain drain, inability to attract external expertise, etc.

Despite the lack of adequate staff, there is high demand for IT training. For example, the BSc in Computer Science in Kenya is very competitive and we are able to attract the best students coming from high school. The computer courses in middle level colleges are also very competitive and always over-subscribed, not to mention the commercial training colleges. In Kenya, external examination bodies, e.g., Institute of the Management of Information Systems (IMIS) are moving in to tap the demand. At the same time, commercial colleges of all shades and colours have mushroomed in the 1990s to offer training at artisan/craft level. At the tertiary level universities are beginning to offer postgraduate programmes. At the University of Nairobi for example, we have started a full-time MSc programme, a part-time Information systems programme and PhD programmes in Computer Science and Information Systems this year (1998).

The challenge is therefore to train adequate trainers to cope with the demand and the government's 2020 industrialisation vision.

INADEQUATE FUNDING

Most organisations lack adequate funding for IT in general and for IT training in particular. In most cases, organisations are more prepared to recruit someone who is already trained rather than recruit an inadequately trained person and train them—for good reasons. At an organisational level, a possible explanatory reason for under-funding of training is lack of awareness of the strategic importance of well trained manpower. At the same time, it may be understandable that most organisations may shy away from investing in training of IT personnel given the high turnover for these people in the IT industry. In Kenya, for example, the government is still one of the key trainers of IT personnel. At a national level, lack of adequate funding in IT training can be associated with lack of knowledge of the potential of IT in national development.

In the public sector, lack of funding for IT training has led to over-reliance on external donor funding. Although this funding has considerably

diminished, it however tends to have its own problems. These include the fact that it tends to be one-off, it may often not be in line with one's own priorities, and is often not sustainable.

INAPPROPRIATE CURRICULA

Curricula for training of Information Technology professionals in most of our African countries have a number of problems, including:

1. Most curricula are very much oriented towards teaching the technical aspects of information technology and ignore the social and organisational aspects of IT. Consequently, graduates lack organisational and management skills and are therefore not adequately prepared to deal with the realities of the complexity of analysis, design and implementation of information technology found in most organisations.

2. Most programmes for training of information technology professionals are copied from those in economically developed countries with little modification to reflect the realities of individual country industrial and developmental goals. These training programmes need to be adapted to the local environment to reflect, among other things, the application environment, resource availability and capabilities of existing training institutions.

3. Most curricula are rarely modified. In certain situations, some curricula are still geared towards producing IT personnel who are more comfortable working in operations-oriented application areas. This is largely because the curriculum as originally drawn up only addressed an aspect of the DP department's requirements for personnel at the time, particularly for COBOL programmers. Many organisations have needs that go beyond (E)DP applications in using information technology and the curriculum has not evolved sufficiently to deal with the changed situation. This does not necessarily imply that curricula should be reactive to technological and other environmental changes as many authors have argued. On the contrary, the author believes that training curricula and programmes for information technology professionals should change both in anticipation of changes and in response to them. For example, programmes need to be dynamic to accommodate emerging concepts such as the Internet technology.

4. In most institutions, the curricula is not supported by adequate and relevant computing facilities and other supporting infrastructural facilities such as literature, audio-visual aids, etc.

LACK OF STANDARDS

Questions have been asked regarding the credibility of many private training institutions, the objectives behind establishing some of these institutions and the quality of training they offer. In general, there has been lack of standards to ensure quality of information technology training in many private institutions. This has in part led to exploitation of the public by unscrupulous participants as well as production of low calibre information technology staff.

THE CHALLENGE?

The challenge can be summarised as follows:

a. Training of trainers.

b. Appropriate curricula.

c. Increased participation of private sector, especially in supporting training in public institutions.

d. Standards of IT training.

e. Guiding IT policy. IT development plans for the various sectors of the economy should be used to develop the national IT manpower development strategy, and this in turn provides the framework for IT training institutions.

RECOMMENDATIONS FOR THE WAY FORWARD

Some of the issues, problems and challenges have been partly addressed. I hope the seminar participants will have time to exhaustively discuss some of the other issues, problems and challenges.

APPROPRIATE CURRICULA AND PROGRAMMES

The following are some recommendations:

1. *Multidisciplinary team of trainers.* This is largely due to the growing multidisciplinarity of information technology. A staff complement

of "traditional" Computer Scientists is a recipe for disaster in training IT manpower.

2. *Dynamic curricula/programmes.* Training curricula and programmes for information technology professionals should change both in anticipation of changes in industrial requirements, changes in technology, etc. and in response to these changes.

3. *Adequate supporting resources and facilities.* There is need to have adequate support resources (human, capital, etc.) and facilities (computers, literature, etc.) in order to improve the quality of training.

4. *New programmes.* Introduce new programmes to deal with evolving challenges.

STANDARDS FOR QUALITY TRAINING

The quality of training is critical. There is need to look for methods to regulate the quality of training institutions. The following are some recommendations:

1. Development of standards in all areas of information technology training, such as a system of accreditation of all IT training institutions. This includes developing guidelines on trainee entry requirements for the various courses at different levels, on qualifications of trainers for the various courses, on staff/student ratios, and on adequacy of a host of training resources, including computers and literature.

2. Professionals to be involved in the development of the standards.

3. Mechanisms for ensuring adherence to the standards put in place.

4. Dynamism in standardisation to ensure that standards reflect changes in expected quality.

ACTIVE INTERVENTION BY GOVERNMENTS

Many developing economy countries have not given IT a central role in the management of their economies just like many organisations in some of these countries have not placed IT at the centre of their businesses,

particularly in situations where IT has a strategic business impact. Some countries, however, have recognised the potential role of IT and have evolved IT policies and plans with specific and identifiable objectives linked to economic growth.

The following are some of the main interventions that governments can effect:

1. Development of IT manpower policies that support national socioeconomic and human development and having the commitment to implement these policies.

2. Development of an enabling legal framework that would facilitate growth of local and reputable examination bodies and the growth of IT training standards.

3. Help to grow a culture that more effectively harnesses the IT human potential that facilitates indigenous IT manpower development and that prepares people for the emerging information society.

OTHER RECOMMENDATIONS
The following are some general recommendations on training:

1. Diversify the areas of training to create a pool of experts in all areas.

2. Adopt innovative approaches to training, including part-time programmes, computer-mediated learning (e.g., the Virtual University Project in which Kenyatta University is participating), or open university concept.

3. In IT training, attempt to achieve the following objectives: emphasise practical application of knowledge and skills acquired, encourage a high degree of trainer/trainee interaction such that trainees become participants in the training process rather than passive recipients, and stress teamwork among trainees.

4. To achieve the above objectives, an IT trainer should use a mix of a wide range of pedagogues including case studies that are based on real life IT applications and that illustrate ideas and concepts learned;

group discussions and presentations; projects on real life problems; and seminars by trainees, faculty and outsiders covering a wide cross-section of topics.

5. Training of trainers who would in turn train others en-mass.

6. At primary level, the objective is IT awareness. At secondary level, the objective is IT literacy and preparation for IT careers.

QUESTIONS AND ANSWERS

1. Would you encourage crafts and artisans in the IT industry?

   They should be encouraged because that is the entry level of anybody in the IT industry. There should however be some level playing ground.

2. The more the schools/colleges the better. Considering some colleges are dubious, don't you think there should be some controls to avoid this?

   Control is difficult because there is a willing buyer. This makes intervention difficult. The Department of Industrial Training has developed a curriculum of IT operations. Not many people register with the Department of Industrial Training unless they are targeting corporate clients.

3. Are you in other words saying that ignorance is one of the raw materials of IT?

   It is not impossible to set up standards. There are no jua kali lawyers or accountants. Is it impossible to control hawkers of the IT industry? I believe that like accountants we can do it. I have not lost touch with some of our legislation. Be prepared to spend extra hours volunteering our time for developing the IT industry.

4. You mentioned that there are approximately 350 trainers at university level. Does this include those from others?

   The figure represents the output as a country.

5. You did not comment on the issue of certification by companies like Microsoft and Novell. Where do they fall?

These are aimed at developing a specific skill at a different level. It is not training at a rounded level.

6. Considering the Kenyan economy, the emphasis is on cost efficiency. How do you strike a balance between cost efficiency and qualifications?

   I do not know. There are many trained people who are not asking for too much money. Many people are coming from universities now. Organisations are looking in the wrong direction.

7. Looking at the status of IT training in Kenya, there are too many levels. Dont you think this may be duplication of courses which causes a problem in development of IT, e.g., electrical engineering and electronic engineering?

   I do not think that is a problem because different universities specialise in different things, such as software engineering, telecommunication engineering and power engineering. The variety is very useful for the industry.

8. The costs are exorbitant in IT. Based on this and job marketability, which training areas do you recommend for us as business graduates?

   Join a postgraduate programme available within or without. There is a lot of interdisciplinarity which gives people different advantages. Follow a professional line. The public sector is of course cheaper. IT is a field many people can go into. The concept of management today is to have generalists. We need to diversify our training.

9. Most of us here are management scientists. Where do we fall? What strategy would you suggest to let people know about it?

   Many people do not know the role of management science. It has been swallowed up by information science, but it is different. There is lack of knowledge. Market management science! Why not change the name to what people are more familiar with?

PANEL DISCUSSION

This report is a summary of the discussions held between the Panel and the seminar participants.

PANELLISTS
Dr Meoli Kashorda— United States International University-Africa
Mr Harry Hare— Editor-in-Chief, *PC World East Africa Magazine*
Mr Patrick Malungu— Sales and Marketing Consultant, Africa Online
Mr Patrick Omutia— Deputy Director, Kenya College of Communications
Technology

1. **Dr Meoli Kashorda: The status of IT training in Kenya**

   The problem facing IT training industry is lack of a quality control mechanism. Universities are normally autonomous and offer courses independently. Other problems are that there are no adequate human resources to offer the courses as demanded. There is also no strong national body capable of enforcing standards on a theoretical level and skills to be attained and also to have uniformity of curricula. This therefore make some institutions more credible than others.

2. **Mr Harry Hare: Current trends in Kenya's IT industry.**
   I would like to look at trends in terms of items that are considered as moving

   - *Hardware.* There has been a considerable reduction in hardware costs. This may be attributed to the location of hardware companies. More hardware companies have located their regional offices in Kenya. This also enables suppliers to offer warrantees and support services to clients.

   - *Software.* Software prices have also reduced. This is attributed to the relocation of regional offices of software houses. This has also reduced the roll-out dates of software.

   - *Networking.* This is an increasing trend that is leading to more optimum use of resources.

- *The Internet.* There are problems with internet access especially with regard to bandwidth and connectivity. The root cause of this problem is the policies regulating the Kenya Posts and Telecommunications Corporation (KP&TC).

3. **Mr Patrick Malungu: Current trends in Kenya's IT industry**

I would like to look at current trends in terms of:

- *The human resource factor.* Kenya has well-trained IT technical staff. Most of Africa Online's technical staff are locally trained.

- *Infrastructure.* The internet requires a very strong bandwidth. This is not currently available and is greatly affecting internet service providers. The solution to this problem is to make use of satellite technology.

- *Sensitising the public.* There is need to sensitise the public about the importance of computer technology. At Africa Online the demand is driven by the users. This is mainly due to an influx of people who have spent some time abroad and have therefore been exposed to IT. They are also those making most use of IT.

4. **Mr Patrick Omutia: Kenya vs. The rest of the world in terms of IT**

The major changes taking place in the contemporary world of business focus on:

- globalisation, and

- economic transformation, which is more knowledge based.

To make the two philosophies work, IT is coming in to enable business process re-engineering and total quality management. IT is to break the rules of methods.

The limiting factors in effective IT development have been mentioned by previous speakers and many have touched on KP&TC. This will be solved by the splitting of KP&TC services. The first is cellular phone services and the second is measures to use satellite technology e.g., VSAT (Very

Small Aperture Technology). A tender has been issued to put a hub to enable internet service providers communicate easily. The solution is increased liberalisation. This will create opportunities such as shared databases and expert systems, and reduced redundancies.

QUESTIONS

1. **To Dr Kashorda.** Many of us know what computer literacy is. What is it in your opinion?

   At the USIU-A we call it competence. The requirements for computer competence are:

   - *familiarity with computer technology as a user,*

   - *ability to prepare business reports,*

   - *awareness of opportunities including access to telecommunications, and*

   - *ability to use the technology in your work.*

2. **To Dr Kashorda.** Is there a control mechanism placed to check standards of training, and if not what are you doing about it as professionals?

   At the USIU-A we have accreditation of the degree programmes by a US college. We are also required to give accurate requirements every so often. Other universities are not regulated by the Higher Education Board, or checked by external examiners from a specific country. The Higher Education Commission should check all universities to ensure that they have all the required resources to offer any course.

3. **To Mr Patrick Malungu.** What criteria is used in the pricing of internet services?

   This is determined by the pricing of infrastructure, the cost of leasing lines for instance.

4. **To Mr Malungu.** Would the increasing number of internet service providers (ISPs) reduce the prices?

No, an increase in ISPs would not lower the cost of internet, it would only increase competition. There are several new ISPs, such as Interconnect, yet the costs are still more or less the same, because the costs of internet communication infrastructure will remain the same irrespective of the number of ISPs.

5. **To Mr Malungu.** How do you view the IT market in Kenya?

The market is very vibrant. In fact, Kenya could very easily give South Africa a run for its money. Actually, cellular phones were first introduced in Kenya before South Africa, but the South African market has grown much faster due to lower cost of infrastructure through advanced technology, e.g., use of satellites.

6. **To Mr Harry Hare.** On the year 2000 problem, hardware outlets cannot adequately advise their clients on which hardware to purchase. What can be done?

The year 2000 problem is global. However, hardware vendors do not understand it. I do not know why. The role of the vendor is to advise the customer but they are in business, so why tell them. The law is "Buyer beware"!

Is there any legal redress in Kenya for a vendor who fails to give correct advice?

In the US, it is possible but in Kenya it is not. A way out could be to request for year 2000 compliant equipment when requesting for tenders. Confirmation should be made before purchasing and upon delivery, and these should be countersigned by the supplier. After all the law is "Buyer beware".

7. **To Mr Hare.** How do you sensitise the public on computer literacy?

I am a publisher and I write a magazine—PC World East Africa Magazine. It writes about trends in IT and encourages people to use computers.

8. **To Mr Hare.** The magazine is targeted towards different groups. Does it really inform people?

The magazine is targeted towards the "techie type", managers and the ordinary users. It is difficult to cater for the "normal" person without compromising the rest of the categories.

9. **To Mr Malungu.** Do you agree that there is need to set up a commission to look into IT?

Yes I do. In fact Africa Online supports the Information Technology Standards Association (ITSA), which is headed by Dr Onunga, in its efforts to streamline IT standards in Kenya.

10. **To Mr Malungu.** KBC and other government institutions are not currently on the internet. To what is this attributed? Is it technophobia?

The IT industry needs to do a better job on educating the public on the importance and use of IT.

11. **To Mr Patrick Omutia.** Is KP&TC slowing down the process of IT development in Kenya?

KP&TC previously concentrated mainly on exchange networks. The problem of connecting from consumers to exchange networks needs a lot of investment through film, VSAT and other companies to come in and invest. In Tanzania for example, people paid for receiving calls since there was only one company. When another company came in, costs were considerably cut down. Kenya needs to expand access networks and install boosters to communicate. Laws also need to be passed to liberalise the cellular phone business and allow other companies other than KP&TC to operate.

12. **To Mr Omutia.** Cellular phones are said to have serious health repercussions such as prostate cancer. Is there any need to place a warning?

Even wireless phones emit radiation. When you become used to this equipment, you are at risk of contracting cancer, since you absorb high levels of radiation such as x-rays. Even computers has high radiation earlier, but now it has been reduced. A Ministry of Health warning is essential. Self-protective measures are also essential such as time limit for use. There is however no real empirical evidence to prove that cellular phones cause cancer.

13. **To Mr Hare.** What does PC World do for the hard-hit Kenyan?

Sends free copies to the University of Nairobi. Contact me for free copies. The challenge in IT education is that not many companies have automated their business processes. Most corporations like KPA are not automated.

14. **To Mr Malungu.** Are there any viruses specific to the internet?

The internet is a network of computers—an information highway—hence there are no specific internet viruses. Any virus may be transmitted through the internet. Preventive measures against viruses include: Dedicated computers connecting to the external environment; no other computers are connected. Using intranet: downloading "clean" material onto the intranet for other users in the organisation. Proxy servers, firewalls, higher executives with higher access providing different levels of access for different users.

15. **To Mr Omutia.** What are the implications of moving from a stratified to a flat structured kind of organisation, that is where a messenger and manager can communicate directly with the managing director using e-mail?

Low level employees have to be given incentives to learn and be taught how to use computers. If we take KCCT for instance, there are two campuses. KCCT is a college of KP&TC but is autonomous from KP&TC. One campus is at Mbagathi while the other is in Loresho. There are plans to link the two campuses using optical fibres. These communication links will reduce physical movements to different departments and also reduce paper work.

There are various software which have been developed in-house to handle normal day to day operations and the staff working in the respective automated areas trained. KCCT has not retrenched any staff despite retrenchment done by the parent company, KP&TC. Only unproductive staff are however retrenched. The Human Resource Department of KCCT holds a database of all employees and their training qualifications. Should a unit be automated and hence require less staff, the extra ones are relocated. KCCT reduces redundancy by retraining and relocation. For example, some of the executive secretaries were retrained and are now lecturers of business studies at the college.

GROUP DISCUSSIONS

Making better use of computers in a firm, e.g., better use by secretaries instead of reducing their computers to typewriters.

1. This should first begin by sensitising users, e.g., secretaries, accountants and doctors, on how they can make better use of computers.

2. Evaluate user needs before investing in computers so that proper purchase decisions can be made and organisational goals can be achieved optimally.

3. Encourage computer users to use computers for other non-conventional ways such as intranet and personal finances.

4. Break away from tradition and re-define roles, for instance, managers may type their drafts and then pass (e-mail) them to the secretary for refining and printing rather than handwriting drafts on paper. This will pave the way towards a paperless office.

5. Pay attention to quality assurance as opposed to quality control. Focus on customer orientation in the way one uses IT. Eliminate processes that do not add value to the customer. This would enhance customer satisfaction (e.g., increased customer access and empowerment), save time and increase efficiency.

6. There is need to make use of computers and IT a matter of common sense to reduce technophobia, e.g., encourage more people to use ATMs and phonecards.

QUESTION 2
The need for a regulatory framework for:

*   qualification of IT professionals;

*   IT publications and textbooks;

- IT colleges and schools.

1. An Act of Parliament is required to institute legislation to regulate the industry.

2. A professional body is needed to monitor examinations and maintain standards in the IT industry, in the same way that KASNEB and ICPA(K) do for accounting. The standards should be internationally and locally accepted for purposes of uniformity.

3. A body must be formed to control and monitor the quality of books and duplication of publications. This would ensure that quality is maintained even though the market is always the determinant.

4. A standardised curriculum (syllabus) is needed to guide authors and avoid irrelevant publications.

5. Regular revision of IT related textbooks because of the dynamism of the industry.

6. Publications adaptable to the Kenyan environment are required, e.g., in the local languages. The local press, e.g., the newspapers, can be used to promote IT.

7. A central examining body can be established to eliminate colleges which cannot meet examination standards.

8. A commission or body should be set up to inspect resources (equipment and qualifications of trainers) in colleges to see that they satisfy the required standards (a form of auditing).

QUESTION 3
The impact of IT on employment—is it creating or reducing jobs?

IT has contributed to the reduction of jobs available in the market in the following ways:

a. the effectiveness and efficiency of computers in some routine operations, such as ATMs and other automated machines, has reduced the jobs available in these areas;

b. those workers not willing to learn and adapt will be retrenched, leaving behind the aggressive ones;

c. the use of the internet could reduce the number of employees required, such as researchers and librarians, due to its nature as a source of an unfathomable amount information;

d. IT has led to the restructuring of some firms where middle managers are laid-off, leaving top level executives and low level employees;

e. employment has responded to IT by insisting only on persons who are computer literate rather than on those who will have to be trained in IT.

On the flip side, IT has led to the creating of new employment opportunities:

a. the internet has been accepted as a strategic business tool and organisations have responded by employing persons to both market their firms through the internet, as well as search for useful information from the world wide web;

b. there is a rush for IT education which has led to several colleges emerging, which provide employment opportunities in computer training;

c. manufacturers of hardware and software developers have also emerged;

d. IT has led to the growth of the telecommunications industry which in turn has increased the number of jobs available in this industry, such as the case of Dell computers;

e. IT has also found an interesting niche in the film industry in the area of computer generated graphic images, e.g., in the making of the movie *Jurassic Park*;

f. IT has facilitated the diversification of several firms, e.g., MNCs, enabling them to transact business in many places through telecommunication.

Information technology has clearly had a significant impact on the nature of employment in Kenya. Some businesses may not be able to invest in IT for their operations and will tend to use manual labour in the short run, but they will aim at making use of IT in the long run.

There has been a general transformation of the industry. The service industry has expanded, creating jobs at higher levels. The service industry however needs the personal touch, e.g., waiters and waitresses, and as such cannot be computerised. Middle level management can have their jobs computerised. There is also integration of work, where a person can know what happens in each department, in effect reducing specialisation. Some jobs are being changed from tradition to something new through automation, especially in banks.

Poor management strategies have led to excessive retrenchment of workers in Kenya. As part of their strategies to automate in the future, they should train their personnel during that period instead of retrenching.

QUESTION 4
Computer training in primary schools.

Computer training may be applied in interactive learning. The internet can also be used for learning.

OPPORTUNITIES/ADVANTAGES
a.   Exposure to more efficient ways of doing things.

b.   It is a beginning to the development of a global village.

c.   It broadens the minds of children at an early age.

d.   Mass usage of technology will lower costs in the long run.

e.   Improvement of the quality of students. According to Impact Magazine, CNN International, children exposed to the use of computers at an early age tend to learn faster than those not exposed. This will also improve the quality of skills and increase innovativeness.

BARRIERS/CONSTRAINTS

a. Perception of the industry and donors of local IT skills being substandard.

b. Computer technology requires huge capital outlays, thus making it a low priority issue for the government.

c. There are few well-trained teachers available at the moment to teach.

QUESTION 5
Disparities in IT programme durations.

Deviations in IT programme durations should not be normalised if the curriculum is efficient. The market should be left to do what it feels it can do. The abilities of people should not be limited or made rigid.

To lower the cost of training:

• the government should check its regulatory framework; tariffs on computers should be reduced;

• generate awareness and increase access to computers in order to lower technophobia;

• government involvement in seminars should be increased, through participation and funding.

Local training should be encouraged and marketed to gain international recognition. Local training especially at the technical level should involve hands-on examinations through examination centres that have the necessary equipment as opposed to theoretical exams only.

QUESTION 6
The problem of inappropriate curricula.

A professional body is required to standardise the current curriculum; it is outdated. The curriculum differs from place to place and there is no professional body to deal with this. The IT industry is also fast changing and this generates the issue of redundancy which must be addressed. There is a general lack of adequate resources in some institutions to

provide practical training, and there is therefore too much concentration on theory. In addition to this, there exist differences in the software the institutions use in training. This is aggravated by organisations that are not decided on what they really want in terms of IT qualification.

Despite the inappropriateness of the curriculum, the different colleges have helped in increasing the level of literacy/competence in the IT industry. There has been an increase in the number of jobs requiring computer literate persons. Reduction in rates of IT training has resulted from competition due to the increased mushrooming of colleges.

CLOSING REMARKS

Dr Freida Brown
EXECUTIVE DIRECTOR
UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

Chairman, Management Science Students Association,
Director, Kenya College of Communications Technology,
conference participants,
ladies and gentlemen.

I am pleased to be with you this evening to make the closing remarks for your seminar on "The IT Profession and its Development in Kenya". As a psychologist , I become a bit nervous with what I might share with you "techie" types. But the area of information technology is one that is critical for students in all disciplines. In today's world one is seriously hampered by the lack of information technology—be it a computer for personal use or an information system for better operation in an organisation. Information technology has become a buzzword for all businesses and industries all over the world. Most agencies have turned to information technology to gain and maintain competitive or cooperative ventures.

As I examined your programme objectives and questions to be answered, I thought I would address two of the questions you posed:

> How adequate are the university IT programmes compared to industry requirements? What can be done to rectify any inadequacy?

> What does the industry require?

About five years ago, I was talking with a group from the business community at our Mexico City Campus. They stated that they wanted graduates who were more computer literate, employees who could enter their multinational companies and are prepared to use software on the first day. And some of my favourite discussions with managers I have worked with centres on sure, they know all that theory but what can they do?

How does one begin to meet the needs of educators and work place so as to provide the best learning opportunity for students? The Europeans contend that "A Winning European Formula: Schools + Industry = Work Readiness (Steinburg, 1993)." In the US, it is a partnership between Corporate America and Academia America. Even the venerable Harvard Business School revised its curriculum based on 10 years of criticisms of business programmes by corporate America.

But at times our roles appear divergent. McBriety and O'Neill (1991) in their article on *The college role in innovation and entrepreneurship: an Irish experience*, contend the industrialist, the educator and the student must operate in harmony.

However, the goals of university life are perceived differently by each group. The industrialist interprets the goal as "acquiring knowledge specific to current technology which ensures that the new recruit to industry is immediately useful and productive". The educator "seeks to produce a well-rounded graduate with developed personal qualities (judgement, tenacity, ability to communicate and to receive communication) as well as one with a sound grasp of the fundamentals of his or her chosen discipline, coupled with the flexibility of thought necessary for continued and sustained growth and development". From the students' perspective their overriding aspiration is the pursuit of a rewarding and stimulating career from a choice of options that is not constrained in regard to the nature of the job or its geographical location. So the industrialist wants a trained worker, the educator wants a well rounded graduate and the graduate wants a career.

How do universities in Kenya harmonise with industry to produce graduates for a newly industrialised country by the year 2020?

Mission
Let me use USIU as a case study. About five years ago, we reviewed our mission to determine what kind of university we wanted to be and what type of graduates we wanted to produce. A part of our mission is to prepare students to contribute effectively and ethically as citizens of a changing and increasingly technological world. Two of our educational outcomes are competence in technological skills and career preparedness. This meant that USIU needed to provide a learning environment to fulfil this aspect of the mission and learning outcome.

CURRICULUM

The next step was to design the curriculum to meet our mission. In terms of IT this meant computer literacy became a requirement for graduation for all our students regardless of field of study. The College of Business Administration in San Diego reviewed various curricula from numerous universities in the States, followed the AACSB guidelines for business schools and consulted the Business Advisory Board. This resulted in several new IT courses for business administration. For example, there are computerised accounting and finance classes, survey courses in IT and Business Communications courses that require computer usage. In fact, some of our faculty returned to class over the summer to learn accounting packages since most had not been trained during their programmes. In order to stay abreast of changing trends we are required to do continuous assessment of our programmes. We recently completed a review of all our programmes in Nairobi and have proposed some additional course in IT to meet the needs of our student body.

RESOURCES

Once the curriculum was in place the resources had to be provided. When I joined USIU-Africa in 1994, there were 14 stand-alone computers in the lab and 5 in the administration. A plan was devised with the IT faculty to improve academic computing. Four years later there are 40 networked computers with 20 having access to Internet. Two years ago, the library began its automation project and the staff is completing the training for an integrated system. Three years ago we decided to automate administration using the same system as our San Diego campus so we could interface with each other. We are now able to track our students from the point of inquiry to graduation and beyond. We can produce a variety of reports that facilitate our planning and development.

The infrastructure is now there for the university to have access to the information technology needed to prepare students to meet the needs of "industrialising" nations.

WHAT INADEQUACIES DO WE FACE?

As was mentioned earlier, industry wants work ready graduates. Students who can enter the job market prepared to work. Can universities realistically keep abreast of the rapidly changing technology? MS-DOS, Windows 95, Windows NT, coaxial cables and now fibre optics, Office 95

and Office 97. What happened to Office 96? Software develops rapidly requiring increasingly more memory and upgrades on computers: 286's, 386's, 486's, 586's, Pentiums, multimedia computers. The shelf life of a computer is 3–5 years if you are lucky.

Let's look at the costs associated with the development of IT at USIU. Over the past three years we have allocated and spent over 40 million shillings on IT. Internet and e-mail monthly charges alone are 300,000 Kenya shillings. Not to mention highly paid qualified persons, who must be constantly trained to keep pace with technology, upgrades on software that are not free, and maintenance contracts that are costly.

What can be done to help us keep pace?

INDUSTRY
Industry can assist us in a number of ways:

1. Partner with universities. We are not looking for a handout. Let us assist you to become and stay competitive in today's global market place. There is a lot of creative talent in the universities. Young minds that can bring fresh approaches to old problems. Sponsor research projects that will assist you in your business endeavours. In today's paper they talked about the role Kenya Polytechnic played in the development of various research ventures.

2. Become a resource for the university. Sit on Advisory Boards to review the curriculum, guest lecture in classes so that students can gain exposure to critical issues in businesses today. Provide an internship opportunity for students so that they can obtain on the job experience at no cost to you. Mentor a student so that they can learn from you as a professional about the various aspects of your industry.

3. If you are in the industry offer educational discounts to institutions. Provide test products or use the various universities as pilots for new products.

GOVERNMENT
There are several developments and initiatives in Africa and Kenya in particular that might lower the cost of IT.

1. Mercure Satellite Communication System for the UNEP was initiated with the aim of interconnecting all UNEP sites and collaborating institutions. The final agreement between the Kenya Government and UNEP was signed recently. Although the details are not out yet, it is likely that universities offering relevant programmes will be allowed to access environmental information at no cost.

2. The Leyland Initiative for Africa was established to provide a microwave radio link at up to 2 MB/s speeds to the Internet gateway in Nairobi at no cost. Seventeen countries were a part of the original project and Mozambique has completed setting up the internet gateway as part of the Leyland Initiative. The project has been delayed in Kenya for about 2 years. We encourage the government to complete this project for the benefit of all university students.

3. KP&TC National Internet Infrastructure is in the planning stages. They will provide an international hub that can be used by ISPs as well as educational institutions in Kenya. This is a commercial project but is projected to bring down costs for the Internet.

4. The government needs to improve the infrastructure such as telephone and power supply to facilitate communication and reduce repairs due to power surges. This has been proposed through privatisation telecommunication services. Similarly, government support for projects such as the networking of the US, Europe and Africa by AT&T.

In summary, the decline in hardware costs globally and the development of IT manpower locally are encouraging. Despite these efforts, costs associated with IT in the areas of systems development, procurement, hardware, networking, raining, maintenance and replacement due to obsolescence are relatively high for a developing country like Kenya not to mention universities whose budgets are dwindling all over the world. While the challenges of IT development in Kenya abound, collaboration between the private sector, academia and the government in the development and use of IT are essential to overcome these obstacles. We must work together in harmony for the development of this nation.

Thank you for your attention.

RESOLUTIONS OF THE SEMINAR

IT Professional Bodies

1. There is need to create a recognised association of IT professionals to look into standardisation and regulation of curricula and examinations, similar to accountancy's Kenyan Accountants and Secretaries National Examination Board (KASNEB) and the Institute of Certified Public Accountants of Kenya ICPA(K) such as Kenya Information Technology Examination Council (KITEC).

2. This body if formed should develop a code of professional ethics for IT professionals. There is a lack of ethics in the IT profession. Most trainers are guided by the customer when they should be guiding the customer, and by the search for quick profits.

3. The body should come up with levels of competence similar to Microsoft and Novell, which must be reviewed regularly in order to maintain quality.

4. The body formed should be recognised by all professionals, and should have the power to prosecute or discipline those who break the rules or code of ethics.

5. The body would be responsible for registration and monitoring of training centres and trainers in order to stop the wave of "jua-kali" IT trainers currently growing in Kenya, especially in Nairobi.

6. The body should lobby for recognition of local expertise with support of both the government and the industry through employment, good remuneration, scholarships for outstanding students. The body should ensure that local companies are given contracts in Kenya in order to improve the capability to handle contracts from foreign countries. Highly skilled personnel may also be sent out as expatriates to other countries on secondment.

7. The body together with the industry should set up a local policing organisation to fight against software piracy in Kenya. This may be done in liaison with the Business Software Alliance (BSA).

8. The body will also promote the effective use of IT and computers in business firms.

IT Training and Curricula

1. The IT curricula need to be overhauled with a view to standardising it, especially with regard to content and entry requirements.

2. Training should be developed locally but with international recognition.

3. Hands-on examinations should be offered especially at technical levels through well equipped examination centres as opposed to theoretical exams only.

4. Trainers would obtain recognised certification from a recognised professional body.

5. Training should be focused on IT professionals per se. There is need to have more seminars or workshops to share skills, ideas and experiences. The resolutions passed should be forwarded to the relevant decision makers in the government and industry. Other methods are documentation of material and papers discussed for dissemination to interested parties through the mass media.

6. The public should be sensitised to IT by setting up IT booths in accessible areas in rural and poor sections of urban areas to enable more people to use computers. This has already been successfully implemented in South Africa.

7. The perception people have of computers being a luxury should be changed to that of computer being an essential commodity.

8. Computer studies should be introduced at primary school level so as to create awareness among the youth as early as possible.

The Industry

1. The industry should dictate the way forward in IT. Commerce needs to be the leader in the development of IT in Kenya.

2.	If IT is to be available to all Kenyans, there is need to develop the local software industry by producing software in local languages such as Kiswahili for the common mwananchi who does not speak English. For example, is it impossible that when Microsoft launches Windows 98, *Madirisha 98* in Kiswahili should also have been launched or at least be in the pipeline?

3.	The root cause of the problems in the IT industry should be addressed—lack of standards and computer incompetence, corruption, politics, bureaucracy, ignorance and economic hardship.

4.	There is a false perception that automation of business operations comes with retrenchment; automation comes with personnel changes or "re-engineering", usually retraining. The employees must be made aware of this: they may be retrained or re-assigned to other areas, not necessarily retrenched.

KENYA POSTS AND TELECOMMUNICATIONS COMPANY
The monopoly KP&TC has in telecommunication needs to be broken in order to let in other players. This will cut down costs of IT communication infrastructure through competition.

THE GOVERNMENT
1.	The government should speed up the legislation process especially in the IT environment and work fast on priorities. The government should take the blame for the slow development of the IT industry. A good example is the CAP 411 KP&TC Review Act. The buck must not stop with the law.

2.	The government should lower or scrap tariffs on computer hardware and software to make them more affordable and available.

3.	Government agencies should be hooked on the internet and have in place an intranet environment, especially in the military, finance, police, intelligence and administration. The government should not be left behind in IT administration.

4.	There should be a ministry of IT strategies as well as a parliamentary IT committee to take care of intellectual property rights, internet content, data protection and digital signatures.

5. IT must be accepted as a strategic national development tool. An IT policy framework must be formulated and implemented urgently if Kenya is to fit in the knowledge-based global economy.

6. Parliament should enact a law to guide contracts relating to the year 2000 problem to protect unsuspecting customers from unscrupulous suppliers. The sellers should be bound by law in the sale of computers.

7. An awareness campaign sensitising the public on IT as an essential economic tool rather than a luxury is needed.

LIST OF ORGANISERS AND PARTICIPANTS

The Organisers

The seminar on *"The IT Profession and its Development in Kenya"* was organised by the Management Science Students Association (MASSA).

Paul G. Kaminchia— Chairman
Bernard M. Mwangi— Vice-Chairman
Sarah A. Oulu— Secretary-General
Wilson N. Mbugua— Financial Secretary
Cynthia K. Muhonja— Organising Secretary
Josephine N. Nyambura— Publicity Secretary

The Executive Board was greatly assisted by the following MASSA members:

Jamleck Chomba— Second year Class Representative
George M. Kamau— Projects committee member

The Participants

GUESTS OF HONOUR
Hon. Dr F. Y. O. Masakhalia—MP, Minister for Industrial Development, represented by Hon. Mr Kimkum, MP, Assistant Minister for Industrial Development and
Dr Brown—Executive Director, USIU-A

MASTERS OF CEREMONIES
Mr J. K. Kipng'etich—Patron, MASSA assisted by
Mr G. Z. Oyomno— Lecturer, Department of Management Science, Faculty of Commerce

SPEAKERS/PRESENTERS
Mr Chris Hardisty— Managing Director, DevData Ltd
Mr Nitin Bedi— Senior IT Consultant, Deloitte & Touche
Dr Timothy Waema— Director, Institute of Computer Science, University of Nairobi

Mr Harry Hare— Editor-in-Chief, *PC World East Africa Magazine*
Dr Meoli Kashorda— Head, IT Department, USIU-A.
Mr Patrick Malungu— Sales and Marketing Consultant, Africa Online
Mr Patrick Omutia—Deputy Director, KCCT

GUEST PARTICIPANTS

Prof. Francis Kibera— Principal, College of Humanities and Social Sciences, University of Nairobi.
Mr Geoffrey Shimanyula— Major Accounts Manager, Africa Online
Mrs Faye Hardisty
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Richard Warugongo
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Faculty of Law
James Mari
Anne Ndungu

The MIS Club of USIU-A
Alote Ewinyu
Solomon Lutta
Charles Mativo
Robert Metto
Duncan Muniu
Vincent Rapando
Patricia Wachira

"Kenya as a developing country cannot afford to ignore the importance of this technology in its efforts to develop the economy, including the achievement of its set target of becoming a Newly Industrialised Country by the year 2020."

Hon. Dr F. Y. O. Masakhalia, MP, Minister for Industrial Development, 12 March 1998 in his opening speech during this seminar.
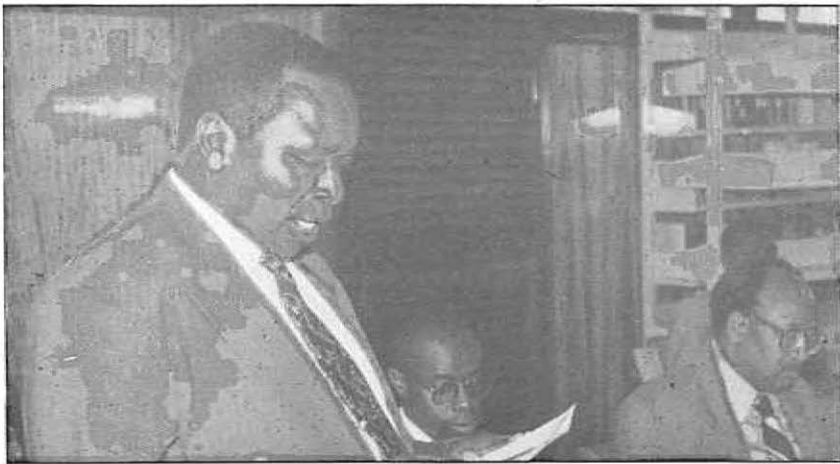
PICTORIAL

Prof. Francis Kibera, Principal, College of Humanities and Social Sciences, University of Nairobi, delivering the introductory speech

Dr Freida Brown, Executive Director, USIU-A, delivering the closing address

Hon. J. Kimkum, MP, Assistant Minister for Industrial Development, delivering the opening speech on behalf of Hon. Dr F. Y. Masakhalia, MP, Minister for Industrial Development
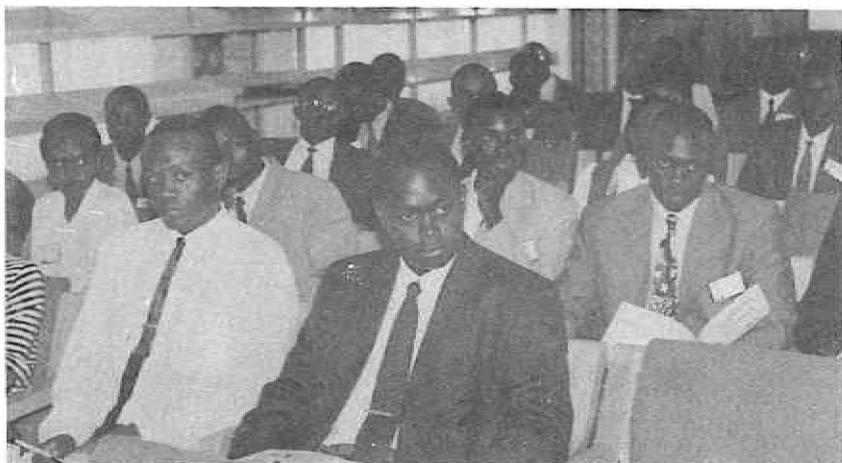
Left to right: Mrs Hardisty, Mr Nitin Bedi, and Mr Chris Hardisty keenly following the opening speech

Mr Chris Hardisty, MD, DevData Ltd stressing a point during the keynote address

What do you think ? Evans Mahero, student, Faculty of Commerce; W. Iraki, Lecturer, Faculty of Commerce; Edward Munene, student, Faculty of Commerce exchanging notes

A section of participants keenly following proceedings

Nitin Bedi, Senior IT Consultant, Delloite & Touche and Wilson Mbugua, Financial Secretary, MASSA, having a chat during tea break

Mr Julius Kipng'etich, Patron, MASSA and lecturer, Faculty of Commerce responding to participants' comments during a discussion session

Members of the panel (from left to right): Patrick Omutia, Deputy Director, A & F, KCCT; Patrick Malungu, Sales and Marketing Consultant, Africa Online; Harry Hare, Editor-in-Chief, *PC World East Africa;* Dr Meoli Kashorda, Head, MIS Department, USIU-A

Group discussions: Mrs Harry Hare (left) joining one of the groups in discussing issues raised in the seminar

Time for a hearty meal at KCCT's Twiga Restaurant

Is everything alright? (left to right) MASSA officials: Josephine Nyambura (Publicity Secretary), Paul G. Kaminchia (Chairman) and Sarah Oulu (Secretary-General)


Group presentation (left to right): Orlando Lyomu, Evans Mahero, Joseph Nthiga, Susan Mwendo and Cynthia Muhonja (Organising Secretary, MASSA)

Left to right: Dr Freida Brown, Mr Patrick Omutia, Deputy Director, A & F, KCCT; Mr Bernard Mwangi, Vice Chairman, MASSA and Mr Wilson Mbugua, Financial Secretary, MASSA, listening to Mr Omutia's closing remarks

Group photograph of participants to the seminar
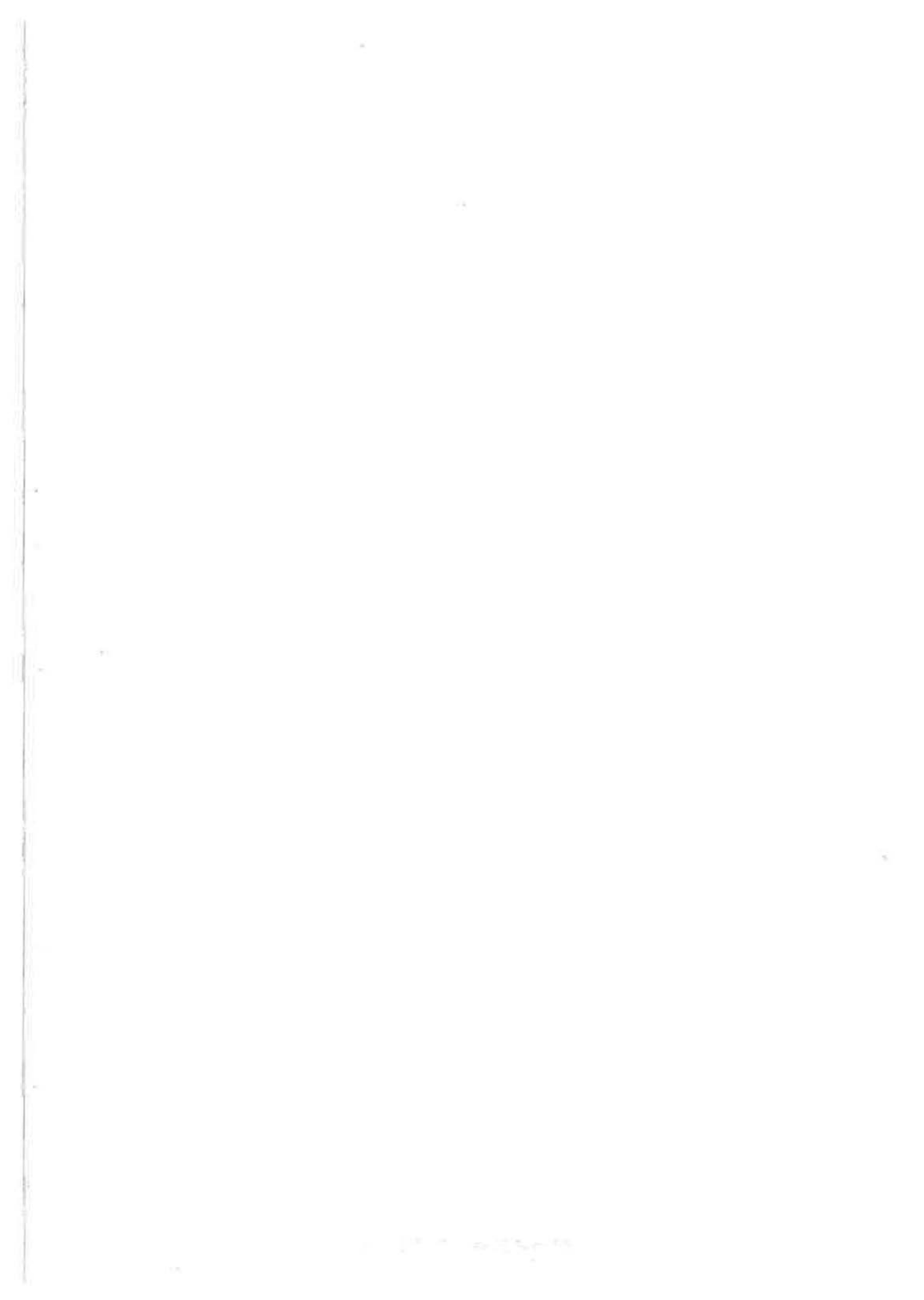
Information Technology (IT) is increasingly becoming an integral part of organisational life and an essential tool for business operations and management. Only organisations that adopt effective use of IT have potential of gaining strategic and competitive advantage.

The government has also set a very ambitious and achievable target for the country to become a newly industrialised nation by the year 2020. Information and communications technology can play a critical catalytic role in the attainment of this goal.

This seminar was organised by the Management Science Students Association (MASSA) and it brought together students, IT professionals and government officials to share experiences, ideas, expectations, hopes and dreams to envision and shape the role and contributions that IT should make to strengthen and develop our business organisations and public institutions.

This publication contains papers, discussions and resolutions presented during the two-day seminar.