

SYNTHESIS
OF SIX THEMATIC SURVEYS
STRENGTHENING
UNIVERSITY STAKEHOLDER
RELATIONS IN AFRICA

Table of Contents

ACRONYMNS	v
ACKNOWLEDGEMENTS	vii
FOREWORD	viii
EXECUTIVE SUMMARY	ix
INTRODUCTION AND BACKGROUND.....	1
1.1: Making a Case for Promoting University External Stakeholder Relations	1
1.2: The AAU Surveys on University Stakeholder Relations in Africa	4
1.2.1: Areas of Cooperation between African Universities and External Stakeholders	4
1.2.2: Emphasis of U-I Linkages in Strategic Planning in African Universities	6
1.2.3: Designated Positions to Harness External Stakeholder Relations	6
1.2.4: University Research Output and Income Generation from Linkages with Industry.....	6
1.2.5: Entrepreneurship in African Higher Education Institutions	7
1.2.6: External Stakeholders Views on Challenges to Effective Collaboration with Universities.....	7
1.3: Structure of this Report	8
METHODOLOGIES ADOPTED.....	9
2.1: Sources of Data	Error! Bookmark not defined.
2.2: The Methodologies of the Six Surveys.....	9
2.2.1: Methodology Adopted on the Graduate Employability Consultancy	10
2.2.2: Methodology Adopted on the Gender Equity Consultancy.....	10
2.2.3: Methodology Adopted on the Environmental Sustainability Consultancy.....	10
2.2.4: Methodology Adopted on the Technology Uptake Consultancy	11
2.2.5: Methodology Adopted on the Business Ethics Consultancy	11
2.2.4: Methodology Adopted on the Intellectual Property Rights (IPR) Consultancy.....	11
2.3: Limitations of the Surveys.....	11
GRADUATE EMPLOYABILITY ISSUES CONFRONTING AFRICAN UNIVERSITIES	13
3.1: The Issue of Graduate Employability	13
3.1.1: Tracer on Graduates in Sampled Universities	13
3.1.2: Responsive Curricula.....	14
3.1.3: Pedagogical Delivery Formats in African HEIs.....	14
3.1.4: Employer's Expectations of Graduate Capabilities	15
3.1.5: Establishment of Career Services Centres.....	16
3.1.6: Percentage of Students who utilise the Career Services.....	18
3.1.7: Entrepreneurship - A Special Form of Employability	18
3.2: Summary of Findings on Graduate Employability Issues Confronting African Universities	19

GENDER EQUITY ISSUES IN AFRICAN UNIVERSITIES	20
4.1: Demystifying Gender	20
4.2: Achieving Gender Parity in Education.....	21
4.3: Outlook of Women in Education in Africa	22
4.3.1: Vertical representation of females in HEIs.....	23
4.3.2: Horizontal representation of females in HEIs	24
4.3.3: Disaggregated Gender Data in HEIs	24
4.4: The Role of Institutional Culture	25
4.5: National Gender Agendas and Conditions.....	26
4.6: Development of Gender-Responsive Institutional Policies, Strategies, and Practices.....	26
4.7: Wrap Up on Gender Equity Issues in African Universities	27
THE PRACTICE OF ENVIRONMENTAL SUSTAINABILITY IN AFRICAN UNIVERSITIES	29
5.1: The Link between Higher Education and Sustainable Development.....	29
5.2: The Prioritisation of Environmental Sustainability in African Universities	29
5.2.1: Environmental Challenges internal and external to African Universities.....	30
5.2.2: Existence of Environmental Sustainability Policies and Strategies in Sampled HEIs.....	30
5.2.3: Level of Support from External Partners in Environmental Sustainability Initiatives	33
5.2.4: Resource Focus and Initiators on Environmental Sustainability Programmes in HEIs	34
5.2.5: General Assessment of Impact of Environmental Sustainability Policies and Practices	35
4.7: Identified Issues on Environmental Sustainability in African Universities.....	36
TECHNOLOGY GENERATION AND UPTAKE IN AFRICAN UNIVERSITIES	37
6.1: The Importance of Research and Development to University-Industry Linkages	37
6.2: How Science Parks and Business Incubators Interface to Facilitate University-Industry Linkages in Africa	38
6.2.1: Synergies between Science Parks and Business Incubators	39
6.2.2: Size and Infrastructures of the sampled Science Parks	41
6.2.3: Spin-offs from Universities	42
6.3: Sustainability Issues Facing Technological Establishments	43
BUSINESS ETHICS IN AFRICAN UNIVERSITIES	44
7.1: Determining Ethical Practices in African HEIs.....	44
7.2: University Core Values Aligned to Ethical Practices	44
7.3: Mechanisms Promoting Codes of Ethics in Universities.....	45
7.4: Extent of Stakeholder Buy-in in the Development of Code of Ethics	45
7.5: Approval, Monitoring and Reviews of Codes of Ethics.....	46
7.6: Identified Issues on Business Ethics in African Universities.....	47

AFRICAN UNIVERSITIES AND INTELLECTUAL PROPERTY RIGHTS ISSUES.....	48
8.1: Research and Development (R&D) and Intellectual Property Rights Issues.....	48
8.2: Policies on Protection and Commercialisation of Intellectual Property Rights in African Universities	50
8.3: Challenges to Commercialisation of IPRs in African Universities	51
8.4: Identified Issues on IPR in African Universities.....	52
KEY RECOMMENDATIONS FOR IMPROVING UNIVERSITIES EXTERNAL STAKEHOLDER RELATIONS	53
9.1: Development and Strengthening of Policy in HEIs	53
9.2: The Relevance of Strategic Planning.....	54
9.3: Widening the Involvement of Stakeholders	54
9.4: Promoting Policy Relevant Research	56
9.5: Enhancing Funding Opportunities	57
9.6: Establishing and Strengthening of Institutions/Units	57
9.7: Monitoring and Evaluation	58
9.8: Re-alignment of Learning Formats and Pedagogy	58
REFERENCES	60
KEY WORDS AND DEFINITIONS	63
COVERAGE OF THE SIX CONSULTANCIES.....	Error! Bookmark not defined.

ACRONYMNS

2iE	Institut International d'Ingénierie de l'Eau et de l'Environnement
AAmU	Association of American Universities
AAU	Association of African Universities
AIG	American International Group
ARIPO	African Regional Industrial Property Organisation
AUCC	Association of Universities and Colleges of Canada
CBE	Code of Business Ethics
CEDAT	College of Engineering, Design, Art and Technology
CIDA	Canadian International Development Agency
CIHE	Council for Industry and Higher Education
DNA	Deoxyribonucleic Acid
EBEN	European Business Ethics Network
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GIS	Geographic Information System
HEIs	Higher Education Institutions
IAU-MCO	International Association of Universities – Magna Carta Observatory
IBE	Institute of Business Ethics
IC-A	Instituto de Consejeros-Administradores
ICT	Information and Communication Technology
ILO	International Labour Organisation
IP	Intellectual Property
IPR	Intellectual Property Rights
IT	Information Technology
JEBET	Journal of Engineering and Built Environment Technologies
JKUAT	Jomo Kenyatta University of Agriculture and Technology
LFHE	Leadership Foundation for Higher Education
MIT	Massachusetts Institute of Technology
MNEs	Multinational Enterprises
NGOs	Non-Governmental Organisations
NOMA	Norad's Programme for Master Studies
OAPI	Organisation Africaine de la Propriété Intellectuelle
OECD	Organisation for Economic Co-operation and Development
PBR	Plant Breeder's Rights
PCT	Patent Cooperation Treaty
PSF	Public Sector Foundation
R&D	Research and Development
RISE	Regional Initiative in Science and Education
RNA	Ribonucleic Acid
SCOP	Standing Conference of Principals
SERM	Safety and Environmental Risk Management
SHERA	Strengthening Higher Education Stakeholder Relations in Africa
SME	Small and Medium Enterprise
SPSS	Statistical Product and Service Solutions
STI	Science, Technology and Innovation

TRIPS	Trade-Related Aspects of Intellectual Property Rights
TTO	Technology Transfer Office
UEC	University Ethics Committee
U-I	University-Industry
UUK	Universities United Kingdom
VC	Vice-Chancellor
WIPO	World Intellectual Property Organisation

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FOREWORD

The role of higher education in the production and dissemination of knowledge is not in doubt as the emerging global landscape has shown that knowledge capability and capacity contributes significantly to the scientific, technological, political, economic and social development of economies.

Africa's higher education system received high priority in the 1960s as a means of training and developing the skills and high-level manpower for the newly independent countries, was sidelined in favour of basic education in the 1980s and 1990s, and with the realisation that quality economic management could not be guaranteed in the absence of effective higher education systems, was resuscitated from the mid-1990s.

Currently undergoing reforms, higher education in Africa is focusing on becoming globally competitive and striving to be locally relevant and centrally placed to contribute meaningfully to the sustainable development of the continent. Special attention required of the African higher education sector includes equity and social justice, inclusiveness, expansion, quality, employability, skills and competencies.

With limited human and other essential resources and differing levels of development and infrastructure, and more specifically funding for research and development, higher education institutions in Africa, like elsewhere, are continuously engaging with external stakeholders, particularly the productive sector to build synergies for their mutual benefits. These stakeholders are also increasingly demanding better and relevant curricula, state-of-the-art infrastructure and graduates better prepared for the job markets.

With the advantages provided by Information and Communication Technologies as the means for instructional delivery, professional communication and knowledge distribution; with the creation of centres of excellence within each region of the continent to develop robust postgraduate studies and develop strong research base with global competitive advantage; and with the current efforts towards the harmonization of degrees under the umbrella of the Arusha Convention developed 1981, it is hoped that the African Union, the Association of African Universities (AAU), the general higher education community in Africa and other strategic stakeholders would ensure that higher education in Africa would effectively play its catalytic role in promoting socio-economic development in Africa.

EXECUTIVE SUMMARY

Making a Case for Promoting University External Stakeholder Relations

Universities are recognised as sources of knowledge creation, innovation and technological advancement in society. In pursuit of these, they endeavour to create and strengthen their linkages with external organisations through partnership frameworks for the assessment and utilisation of their products and competencies. Many of them are guided in these actions by mission statements and institutional charters and values, and carry out environmental scans to identify opportunities, competition, national needs and problems which could be addressed by their efforts.

In Africa, there is insufficient information on the steps its HEIs are taking and what is needed to provide a strengthened and more comprehensive platform to promote, build, and manage these synergetic partnerships. Though there are a few good examples of technologies and businesses that have been nurtured in African universities in partnership with entrepreneurs and Governments, what is generally known is that many African countries lack the enabling environment for their universities to adopt a favourable stance. While this is the case for Africa, the situation in countries elsewhere on the globe is completely different. Malaysia and South Korea have enacted good policies around knowledge creation and capacity building in developing a critical mass of science, technology and innovation (STI) systems. They are therefore not only able to adopt and adapt technology transferred from developed countries but also generate new technologies from within. South Korea as, compared to Ghana, has developed because of its incremental investment in STI capacity development and knowledge economy.

Given this background situation, the Association of African Universities (AAU) and the Association of Universities and Colleges of Canada (AUCC), supported financially by the Government of Canada through the Canadian International Development Agency (CIDA), in 2010 entered into a three-year partnership to support and strengthen the efforts of African universities in linking up more closely with the productive sector, particularly industry. The project, “*Strengthening Higher Education Stakeholder Relations in Africa (SHESRA)*” has three key components, namely:

- i. Strengthening African university outreach;
- ii. Development of model case studies on university-industry linkages; and
- iii. Strengthening of AAU’s ability to support its member universities’ external stakeholder relations.

In view of the little known and documented outreach between African universities and their external stakeholders, an important initiative of Component 3 was the commissioning of a survey to map the extent and nature of African universities’ external stakeholder relationships. The specific objectives were to determine what interface structures, policies, positions, incentives, and funding avenues are currently in place (or lacking), and what services or interventions African universities themselves gauge to be most important for strengthening their efforts in linking up with these stakeholders. The findings of this scoping study led to the commissioning of six thematic surveys in 2012 on Graduate Employability (Section 3); Gender Equity (Section 4); Environmental Sustainability (Section 5); Technology Uptake (Section 6); Business Ethics

(Section 7); and Intellectual Property Rights (Section 8) to serve as additional resources and advocacy tools to guide African universities improve their external stakeholder relationships.

The AAU Surveys on University Stakeholder Relations in Africa

The SHESRA Project's scoping survey of 133 African HEIs on the nature of African universities' external stakeholder relationships undertaken by Ssebuwufu et.al (2012), showed evidence of initial steps by these universities to stimulate and deepen their linkages with the productive sector.

With regards to the specific productive sub-sectors of engagement, the Ssebuwufu report indicated that the respondent HEIs had established links with most sub-sectors (micro, small and medium enterprises, multi-national corporations, chambers of commerce, and manufacturing and industry associations). In addition, they were most likely to be engaged in the following specific sectors: agriculture and agribusiness; ICTs; environmental management; computer engineering; and banking. In contrast, they less frequently reported collaboration with the manufacturing, pharmaceutical, mining and entertainment industries. Also, only a small percentage of universities in the survey reported being involved in managing science parks and engaging in technology transfer to local business communities.

In terms of the promotion of entrepreneurialism and practical skills among staff and students, the report further noted that many HEIs lack complementary and supportive policies and mechanisms for regulating interactions with the productive sector, and the designated posts were not always staffed with sufficient expertise in entrepreneurialism, intellectual property right management, and marketing strategies

The Surveys Objective and Sources of Data

The consultancies on the six themes presented in this Report were aimed at providing empirical data to build the relationships of African HEIs with external stakeholders in the productive sector. The consultants used both qualitative and quantitative data as their sources of information, with questionnaires as the main primary data collecting tool. These were administered to public, private not-for-profit and private for-profit HEIs in Africa. Most of these respondents were universities. The questionnaires were administered to samples from the 280 AAU member institutions which had confirmed their contact details with the AAU Secretariat. The list of these contacts was given to each Principal Investigator of the six consultancies.

Secondary data sources consisted of information gathered from textbooks, journals, magazines, newsletters and other publications. These have been duly acknowledged in this Report under Annex A.

Limitations of the Surveys

Time constraints, respondents' apathy and initial sample sizes were the observed limitations that cut across the six surveys. These were rectified with extension of deadlines and increase in the number of respondents. Specific surveys had their specific challenges that were resolved through different approaches. For instance, one of the challenges encountered with the administration of the questionnaires on *Gender Equity* was the variations in employment categories. At one university, lecturers were considered staff with a Master's degree with one publication; assistant

lecturers as staff with a Master's degree but no publication, tutorial assistants are those with a Bachelor's Degree, and clinical instructors are those with Advanced Diplomas. Another university alluded to temporary/contract lecturer categories, but only provided details for senior, junior, and adjunct lecturers.

Again, from the *Gender Equity* survey, several universities cited that a separate authorisation and approval process was needed to participate in the Dean/Director/Directress Survey due to the hierarchical corporate structure and professional codes of conduct. During the development of both the Leadership questionnaire and the Dean/Director/Directress questionnaire, it was noted that some lines of inquiry would have required individuals to self-report negative and potentially damaging information (e.g. perspectives on the prevalence of sexual harassment in African HEIs). Therefore, care was taken to focus on constructive lines of inquiry so that the emphasis of the study was not on the weaknesses but the strengths and capacity of the institution.

The Issue of Graduate Employability

Everywhere in the world, universities are renowned for their contributions to social productivity, the inculcation of values and the advancement of skills necessary for socio-economic development. But finding jobs over the years has become a herculean task for many African graduates.

During the years of colonialism and early post colonialism, finding jobs never used to be a problem for African graduates of most African states. In most instances, a university education was a guarantee for securing a suitable and career advancing job with reasonable pecuniary benefits. As the years rolled on and employment avenues narrowed, African graduates started seeking post-graduate degrees in order to distinguish themselves from the rest of the job-seeking youth.

The issue of graduate employability is not restricted to Africa alone as there is a plethora of evidence which shows that while the dynamics of the problem and the available solutions may differ in application, the basic principles of graduate employability remain the same globally. One should note the mistake that is often made that graduates must always practice in the field of their primary instruction. In other words, a trained lawyer must definitely find work as an attorney; an engineer must find work building and creating new technology etc. Even though the reluctance to make a foray outside the confines of a degree may be cultural (e.g. a son may want to fulfil his father's dream of having a lawyer in the family), attention needs to be paid to the concept of transferrable skills (also referred to as soft skills) which are non-job specific skills that cut across all jobs. More employment prospects open up for a graduate who is willing and flexible to view skills learned in the classroom as portable to other professions.

Thus, in analysing the issue of unemployment, a distinction has to be made between employability with employment. A major distinguishing factor between being employed and being employable is the latter's ability to continue to find work. Since the workplace is a dynamic place where new knowledge, information and practices are developed daily, employability thus becomes a life-long continuous pursuit as opposed to it being a cloak that is donned after graduation.

The study sought to address the issues of graduate employability in Africa by looking at the following.

- Tracer on Graduates in Sampled Universities
- Responsive Curricula
- Pedagogical Delivery Formats in African HEIs
- Employer's Expectations of Graduate Capabilities
- Percentage of Students who utilise Career Services
- Entrepreneurship - A Special Form of Employability

Summary of Findings on Graduate Employability Issues Confronting African Universities

The key findings of the Graduate Employability survey can be summed up as follows:

1. Higher education institutions play a pivotal role in graduate employability. Examples from institutions like Institut International d'Ingénierie de l'Eau et de l'Environnement (2iE) show that this role cannot be effectively carried out without partnerships with employers and other industry players. Another element of partnership with external stakeholders exists in the development and review of curricula as some of the universities responded that curricula are periodically reviewed with input from employers and alumni.
2. More employment prospects open up for a graduate who is willing and flexible to view skills learned in the classroom as portable to other professions. Employers prefer to hire ready talents who can make positive contributions to their businesses and on this point, the PSU report is a testimony to it.
3. The career services unit of an HEI is the hub of all career related activity in the university and ideally is the first point of contact for students, employers, alumni and others seeking career information through the university. It is incumbent that the career services staff should be effective people managers to be able to nurture and foster relationships with the different stakeholders.
4. Entrepreneurship or self-employment should not be downgraded to a second best alternative for lack of employment as it, in itself, is a positive career choice which should be made strategically.

Demystifying Gender

Around the world, there are new social and legal demands made for and by women, which are linked to education. Whether it is the informal explanations of the profound damages of female genital mutilation to communities in Ethiopia, or formal education that has enabled the professional growth of aspiring female politicians in Algeria, education and social progress are symbiotically linked. Conceiving of HEIs as *enablers* of change demands a proper assessment of everyday practices of administration, teaching, and outreach which might be considered trivial, but which may be the manifestation of androcentric values.

While gender is not the only axis of differentiation and power in HEIs, it is a critical one. Economists began to quantify the potential that investments in girls have on gross domestic product (GDP) growth rates in the late 1990s and 2000s. General statistics and sector-specific studies point to the merits of investing in girls, namely but not limited to low infant mortality, healthier families (Bicego and Boerma, 1993), and greater labour market earnings. A World Bank study of 100 countries in 1999 demonstrated that increasing the secondary education of girls by 1% results in an annual income increase of 0.3% per capita – a substantial increase for

many developing countries. The study concluded that “*societies that have a preference for not investing in girls pay a price for it in terms of slower growth and reduced income*” (Dollar and Gatti, 1999). More recently, “The Girl Effect Dividend” published in 2011 by the World Bank concludes that investing in girls so that they complete the next level of education leads to lifetime earnings of today’s cohort of girls that is equivalent to up to 54% of annual gross domestic product (Chaaban & Cunningham, 2011).

Achieving Gender Parity in Education

Achieving gender parity in education is one of the 8 Millennium Development Goals that most Southern African Development Community (SADC) countries will likely meet; most countries have already achieved gender parity in primary and secondary levels, with Lesotho having surpassed the 50% mark for girls’ enrolment at the primary level (Nyakujarah & Morna, 2012). However, the progress made, locally and globally, in primary and secondary education is not being realised in tertiary education in some world regions – particularly in Sub-Saharan Africa. The region’s Gender Parity Index (GPI) for tertiary education keeps dipping though that of other regions of the world has risen. Its already poor GPI vis-à-vis a minimum target of 97, dipped from 67 in 1999 to 63 in 2010 (United Nations, 2012c)

In addition to the low average national gross enrolment ratio of women in tertiary education, there is little information on the proportion of women as a share of total tertiary institution researchers. What information is available on African countries suggests that women researchers on the continent are generally less than 35%, with the exception of Tunisia, South Africa, Lesotho, Egypt, Central African Republic, Uganda, and Rwanda where the proportion is marginally closer to parity (UNESCO, 2012).

Outlook of Women in Education in Africa

The study sought to address the outlook of women in education in Africa by addressing the following.

- Vertical representation of females in HEIs
- Horizontal representation of females in HEIs
- Disaggregated Gender Data in HEIs

Summary of Findings on Outlook of Women in Education in Africa

The key findings of the Gender Equity Issues in African Universities can be summed up as follows:

1. Imbalance generally worsens the more senior the position or rank. On average, female representation was reported to be lowest at the highest governing body responsible for making institution-wide decisions.
2. Findings of the study suggest that the male/female ratios are imbalanced in terms of *horizontal* representation. The SHESRA survey on *Business Ethics* disaggregated student enrolments by gender and affirmed this male-female disparity in enrolment.
3. Although there was a noticeable imbalance of male and female academic staff in general, imbalances were more noticeable in certain faculties/academic units, demonstrating a horizontal imbalance by discipline. The subject areas that consistently had these imbalances were on technology; studies of the built environment (architecture, engineering,

road/building construction); natural sciences; business-related studies (economics, public administration, and commerce); and development studies.

4. Most academic units in Universities have the norm of collecting sex-disaggregated student data on an annual basis on at least three different types of data.

The Link between Higher Education and Sustainable Development

The United Nations Decade of Education for Sustainable Development (UNDESD) from 2005-2014, offers Africa a strategic opportunity to redesign its educational structures to provide answers to the environmental and developmental challenges confronting the continent. The objectives of the Education for Sustainable Development (ESD) agenda is to teach the main beliefs underlying sustainable development with the intention of making learners more proactive to develop skills to plan for and find solutions to sustainable development challenges. The thematic areas under ESD, in addition to natural environmental issues, include social, economic and even political issues such as poverty, gender, health, peace, culture, human rights and ICTs.

The Prioritisation of Environmental Sustainability in African Universities

The focus of the Environmental Sustainability survey was on the practices of environmental sustainability and its linkages with universities' external stakeholder relations. There were 2 lines of inquiry: one to investigate the perception of universities on the challenges within their campus environments, and the other to investigate the perception of universities on the challenges faced by the community outside their universities. Thus the following issues were looked at.

- Environmental Challenges internal and external to African Universities
- Existence of Environmental Sustainability Policies and Strategies in Sampled HEIs
- Level of Support from External Partners in Environmental Sustainability Initiatives
- Resource Focus and Initiators on Environmental Sustainability Programmes in HEIs
- General Assessment of Impact of Environmental Sustainability Policies and Practices

Identified Issues on Environmental Sustainability in African Universities

1. Though the three components of sustainable development (environment, economic, and socio-political wellbeing) are complementary to each other, the study has shown that many universities prioritise environmental sustainability as an area of focus and within this, they have the capability to manage environmental challenges internal to their universities.
2. Again, even though a lot of activities on environmental sustainability are taken place in African universities, many are explicit to official policy documents, and are therefore not well captured for effective coordination and monitoring.
3. There is still more room for synergetic relationship between universities and other external stakeholders other than Governments, to pursue the environmental sustainability agenda. Some of the benefits to universities include life-long learning for students, funding for contract/graduate research, and financial sustainability

The Importance of Research and Development to University-Industry Linkages

For past decades, governments the world over have been enlisting universities in their efforts to promote technological innovation, and have stimulated linkages between academia and the private sector for that purpose. They specifically invest public funds into (R&D) to bolster

technical advancement in industry and stimulate overall national development. As a result “entrepreneurial universities” such as Stanford University and the Massachusetts Institute of Technology (MIT) have responded positively to these overtures (Etkowitz, 2002; Geiger and Sá, 2009; Dill and van Vught, 2010).

Generally, universities responses to the favourable environment created for R&D include performing advanced research in technological areas with clear relevance to industry; consulting and providing technical assistance to local firms; educating highly skilled workers; and attracting talent to the local region. More directly, they also facilitate the formation of spin-off companies to commercialise technologies arising from academic laboratories; patent and license inventions; and cooperate with industry in various R&D activities (Perkmann & Walsh, 2007; Geiger and Sá, 2009).

The emergence of science parks around academic institutions has the aim of fostering technology-driven economic development and facilitating the uptake of academic inventions by the private sector. To complement this and nurture start-up companies to commercialise technologies stemming from university labs, universities started business incubators in greater numbers. What is known in Africa is that because there is no comprehensive dataset or directory of science parks and business incubators in universities and the continent is vastly underrepresented internationally in terms of the quantity and visibility of its parks and incubators. Currently, only 2% of the 385 members of the International Association of Science Parks (IASP) worldwide are from Africa.

How Science Parks and Business Incubators Interface to Facilitate University-Industry Linkages in Africa

The study sought to shed light on how science parks and business incubators interface to facilitate university-industry linkages in Africa. To this end, the following were addressed in the study

- Synergies between Science Parks and Business Incubators
- Size and Infrastructures of the sampled Science Parks
- Spin-offs from Universities

Identified Issues on Science Parks and Business Incubators in Africa

1. Consistent with existing literature, most science parks and business incubators were created in recent years with the earliest science parks and business incubators established in 2005 and 2008 respectively
2. Most science parks in operation or under construction are affiliated to public universities
3. Most business incubators identified operated as stand-alone organisations while majority of science parks were university-controlled
4. As relatively new organisations, science parks had relatively small infrastructures mostly up to 5,000 square metres.
5. Capital for park development and renovation and their financial sustainability were critical challenges facing the science parks. Other challenges included:
 - Local/regional market for tenant technologies
 - Investment capital for tenants

- Identifying, supporting, and growing a sufficient tenant base
- Lack of an entrepreneurial culture
- Retention of successful companies in the local area

Determining Ethical Practices in African HEIs

Ethical behaviour shot to prominence recently after the collapse of big companies like American Group International Incorporate (AIG), Enron and Tyco. It is now a common phenomenon to see Non-Governmental Organisations (NGOs), media, shareholders, consumers, clients, employees and other stakeholders putting a lot of pressure on companies and institutions to address ethics issues, and the latter trying their best to understand ethical dilemmas to meet expectations from different stakeholders (Institute of Business Ethics, 2012).

As part of the Global Survey of Business Ethics, Kagabo (2011) investigated business ethics in teaching, training and research in 5 Francophone African countries, namely, Burundi, Democratic Republic of Congo, Ivory Coast, Senegal and Rwanda. His findings revealed that in these countries, academic teaching of Business Ethics had not taken deep roots in traditional faculties of Economics, Management and Commerce, and few universities were offering this course. On the other hand, training and advocacy in business ethics had been profound particularly in the operations of NGOs as part of their pursuit of political and economic governance, development, women and gender issues.

University Core Values Aligned to Ethical Practices

In the SHESRA *Business Ethics* survey of the following variable were addressed.

- Mechanisms for Promoting Codes of Ethics in Universities
- Extent of Stakeholder Buy-in in the Development of Code of Ethics
- Approval, Monitoring and Reviews of Codes of Ethics

Identified Issues on University Core Values Aligned to Ethical Practices

1. Core values in Africa Universities include academic excellence; Christian values; discipline; ethical values; self-reliance; and zero tolerance for corruption.
2. Majority of universities have an Ethics committee or unit in charge of ethics with membership comprised mostly of Vice-Chancellors, faculty deans and registrars.
3. Though many HEIs claim they have a stand-alone Code of Business Ethics (CBE), some of these documents are basically *Codes of Conduct* which addressed only staff and students issues with some emphasis on research ethics. Nonetheless, many of the surveyed HEIs have Codes of Ethics for different disciplines
4. Stakeholders who contribute to the generation, commercialisation of innovations, inventions and research findings normally include universities and R&D institutions, researchers and inventors, inventors' research groups and departments, research assistants, students, postgraduate and postdoctoral fellows, guest researchers, sponsors, technology transfer units, national patent offices, government, and the public.
5. Code of Business Ethics is believed to be effective in achieving certain benchmarks in HEIs.
6. There appears to be little stakeholder involvement in the development of institutional codes and in some instances there is no indication of an approving authority
7. Though CBE are reviewed periodically there are no clear time lines for review in HEIs.

8. There is a lack of appropriate monitoring and evaluation (M & E) mechanism in place which makes regular reviews a challenge

Research and Development (R&D) and Intellectual Property Rights Issues

The concept of intellectual property (IP) relates to the fact that certain products of human intellect should be afforded the same protective rights that apply to physical property. Most developed economies have legal measures in place to protect both forms of property. Intellectual property can consist of patents, trade secrets, copyrights and trademarks, or simply ideas. As universities have started to emphasise innovation and R&D, protectionism is needed to encourage faculty to come up with innovations and inventions aimed at contributing to socio-economic development, develop the goodwill of the institution and obtain sponsorship and research contracts for the researcher and university as a whole.

An important role of a university's commercial enterprise is to assist the university's researchers, wherever possible, with a one-stop service for their intellectual rights protection through the filing of patent applications and the prosecution and maintenance thereof; and commercial development through the acquisition of funding to develop their concepts further.

Policies on Protection and Commercialisation of Intellectual Property Rights in African Universities

Perhaps to pursue their own self-interest, or perhaps due to the absence of policies and/or effective coordinating IPR units, individual researchers have been noted to take the initiative to register their inventions for protection, the high associated costs notwithstanding. According to the Uganda Registration Services Bureau (2012), Uganda has 72 registered patents many by individual researchers, including university professors. The situation with institutions however paints a different picture. Currently, the Bureau has 1 application from Gulu University, 1 from Mbarara University of Science and Technology, 1 from Kyambogo University and 3 applications from Makerere University. It is indicative therefore that most universities in Africa currently do not have a serious agenda to pursue IPR protection, reflected in the low request for patenting

Challenges to Commercialisation of IPRs in African Universities

Respondents in the *IPR* survey identified a number of challenges which have stunted the large-scale commercialisation of IPRs in African universities. These included:

- Weak intellectual property systems
- Inadequate technology transfer policies
- Premature dissemination of un-protected research results
- High costs of IPR protection and patent registration
- Staff promotion policies demanding prolific publications and dissemination of research results especially at conferences thus losing the patentability of inventions
- Few members of staff are engaged solely in Research and Development
- Lack of entrepreneurial culture by staff and students
- Low funding from both the public and private sectors
- Weak linkages between universities and industry
- Poor resource mobilisation by universities

- Inadequate utilisation of local materials and traditional knowledge to yield intellectual property
- Little applied research

Identified Issues on IPR in African Universities

Universities collaborate with external stakeholders for a variety of reasons including, research, funding, scholarships and internship placement. But the level of interaction between universities and industry in most developing countries for R&D are weak compared to those encountered in developed countries and even in some Asian and Latin American countries. Subsequently, the level of transfer of knowledge from universities and R&D institutions and its utilization for the creation of national wealth is low and consequently, the contribution of universities and R&D institutions to national development is insignificant.

A few universities, more evidenced in South Africa, have however established subsidiary companies to provide one-stop services to researchers for IPR protection and commercialization. In general though, universities in Sub-Saharan Africa do not seem to pursue IPR protection and commercialization as much. The few patents may be attributed to the efforts of individual researchers who take the initiative to register their inventions for patent protection.

Development and Strengthening of Policy in HEIs

To be effective, successful and sustainable, universities-industry partnerships require policies and procedures to guide all stakeholders in addressing and resolving ethical dilemmas in their interactions. The consultancies recommended that universities develop appropriate policies that best fit the pursuit of their mission and vision statements.

The Relevance of Strategic Planning

The studies recommend that strategic plans of universities should incorporate the under listed through multi-stakeholder involvement approach

- Focus on building international standards on research while addressing national priorities;
- Be ambitious and benchmark with the top 100 universities in the world;
- Prioritise the establishment of systems to promote strong industrial and external relations; and
- Promote internationalisation so as to attract international students to carry out their graduate studies and research at African universities.

Widening the Involvement of Stakeholders

Much as universities need to engage with external stakeholders when developing their policies and other documents, investigation is needed to examine what external partners' interests and perspectives are on relationship building and how these considerations can be strategically aligned with the higher education sector for mutual benefit.

Promoting Policy Relevant Research

- African universities should position themselves to be at the forefront of home-grown innovations emanating from local researchers.

- The logic of the academic research system needs to revolve around scientific merit as well as contributions to society. Professional incentive and reward systems that consider contributions to technological generation and knowledge transfer can help foster such activities. University regulations should recognize and clearly outline the conditions upon which such activities may be undertaken, recognized, and rewarded.
- African universities should adopt research strategies that aim to turn their universities into quality teaching and research institutions. In order to achieve this, they should selectively nurture and build continental leadership in a significant number of departments within each of the major academic groupings and professional schools and programmes and also prioritise equipping their libraries and research facilities to meet international standards.
- African universities should also build multidisciplinary research teams to be able to tackle complex societal problems such as poverty eradication, environment and climate change, food insecurity and youth unemployment.
- To complement the point above, a strong collaborative network between and among institutions on the continent is required to pursue best practice with the aim to attain world class status. In addition, as most universities are currently involved in regional collaboration projects which dwell on staff and student exchange and graduate training, such projects should incorporate a research component so that there is synergy between the different universities in the collaboration.

Enhancing Funding Opportunities

Limited funding and unilateral fragmented efforts undermine existing pragmatic programmes of African universities. Given the existing situation, there is the need to explore other options through which African universities could develop bilateral and multilateral relations with external partners and amongst themselves for their self-subsistence. The studies recommend that:

- African universities should aim at generating income from a variety of sources, especially from their own efforts and investments. Their strategic plans should emphasise income generation from contract research for public and private sectors; consultancies; payment of royalties from commercialization of staff and student inventions and returns on strategic investments and endowment fund.
- Universities should institute mechanisms for looking out for inventions and IPR which has potential so that it can be protected and steps taken for its commercialisation. The university could employ patent scouts in each department to be on the look-out for the potential IPR. In addition, universities could organize innovation competitions at which commercialisable IPR and innovations can be identified.
- Individual African universities should set targets on IP to be commercialised every academic year and budget for this activity with funds to enable implementation. It has been estimated that registering and administering 10 patents per year, for example, could cost up to US\$100,000 which is less than 1% of the budget of many universities but could have a very big impact on prestige and income. The example of Stellenbosch University which generates 20 - 40 patent applications per year is often cited.
- African universities should lobby their Governments to increase the spending on R&D and STI so that there are more innovations and IPR generated in the countries. Initially, African Governments should increase the gross domestic expenditure on R&D (GERD) to 1% of their respective GDPs as recommended by the African Union. After this, the Governments

should progressively increase R&D funding so that it reaches at least 2% of GDP, the average R&D expenditure of the developed world (Battelle and R&D Magazine, 2011).

Establishing and Strengthening of Institutions/Units

For effective and efficient commercialisation of innovations, inventions and research findings, or for monitoring of gender equity policies or environmental sustainability programmes, African HEIs need to establish dedicated offices/units with experts employed to man each specialised unit.

Universities undertaking R&D may require technology transfer units or consultancy bureaus equipped to undertake patent searches to assess the novelty of innovations, pay the cost of processing patent applications and take care of the marketing of the invention and its commercialisation, as well as the negotiation of the licenses and royalties.

For gender sensitivity, this may necessitate the creation of gender specific academic units or gender specific managerial units with well spelt out tasks to improve internal monitoring of university populations; increase staff development and training; and integrate gender equity into planning activities.

To promote graduate employability, a vibrant career services unit established by universities is vital to provide the foundation for the life-long self and career management of the student. Additionally, HEIs should endeavour to run dedicated and regularly updated careers services webpages providing services and giving information on resume building, interview preparations, job search assistance, work placement and internship, on-campus recruitment fairs, etc.

Monitoring and Evaluation

The studies recommend that sufficient data should be gathered to guide policy creation, monitoring and evaluation to prevent making of policies based on misinterpretation or misinformation. In addition, there is need to develop an implementation strategy with guidelines for all initiatives developed by universities to help monitor and measure their outcomes.

Continuous and periodic training should be provided for staff of all responsible units to enable them carry out their duties efficiently and report accordingly to the university administration and other stakeholders

Re-alignment of Learning Formats and Pedagogy

In most parts of Africa, it has been noted that the primary and most consistent contact that teachers have with students is in formal instruction in a classroom setting where the lecturer is seen as the repository of knowledge and his responsibility is to pass on his knowledge to the students who then regurgitate the information received at the end of the academic year in an exam. Thus, it logically follows that a significant part of skills training/development takes place in the classroom in the course of learning.

More information is needed on what learning formats are most effective for advancement of equity, and what the trends are for the provision of learning formats that foster experiential

learning (e.g. internships) and employability. The depth of this issue would require significant curriculum review, and outreach by university staff and students

The studies recommend that African universities depart from the traditional learning methods identified to a more Socratic method of learning which encourages the student to take a more active role in his education (i.e. learning to be “active and student centred”). The Socratic method of teaching, which is a form of inquiry and debate between the teacher and the student, and which is based on asking and answering questions to stimulate critical thinking, is also a useful tool to encourage analytical thinking and problem solving. Learning then becomes less of a teacher activity and more of the students’ responsibility and by so doing some of the soft skills which have been proven to be attractive to employers are imbibed.

Universities should review their curricula constantly in line with changing global trends and pool of knowledge and multi-stakeholders involvement should be highly encouraged. Review committees can consist of heads of departments, university administrators, professional associations and other relevant stakeholders with the aim of producing university graduates fit for the world of work.

Universities need to combine academic excellence with innovative and entrepreneurial approaches to research, supporting a culture that engages and challenges students and staff in their pursuit of learning. Students should recognize the need for a paradigm shift from the thinking that attainment of a degree is all that is required to be successful in life. While the universities have a part to play in information dissemination, students must also take the time to research what services are available, ask the right questions and in appropriate circumstances challenge their institutions to provide better resources and services. In some instances volunteering can lead to a full time position as the appropriate skills and capabilities displayed by the volunteer saves the time and expenses involved in recruiting and training a new employee.

Section 1

INTRODUCTION AND BACKGROUND

1.1: Making a Case for Promoting University External Stakeholder Relations

Universities are recognised as sources of knowledge creation, innovation and technological advancement in society. In pursuit of these, they endeavour to create and strengthen their linkages with external organisations through partnership frameworks for the assessment and utilisation of their products and competencies. Many of them are guided in these actions by mission statements and institutional charters and values, and carry out environmental scans to identify opportunities, competition, national needs and problems which could be addressed by their efforts.

Nowadays, there is a strong urge for organisations to identify and focus attention on a large number of stakeholders who affect and/or are affected by their operations. These stakeholders can either be external or internal to the organisation, and can be its employers, employees, customers, suppliers, shareholders, students, community development groups, environmental organisations, development organisations, non-governmental organisations (NGOs) and a host of other partners who share the ideals of the organisation. By recognising and involving a substantial number of stakeholders, an organisation would strive to meet their various demands and thereby build its legitimacy among these partners as well as ensure its survival, sustainability and growth.

In the education sector, synergies between higher education institutions (HEIs), particularly universities, and the external community (particularly industry/productive sector) are neither a novelty nor a one-sided relationship. Besides promoting innovation and technology transfer to the productive sector and society, and securing and leveraging additional resources for higher education, these partnerships also ensure that graduates acquire the skills and knowledge critical in the labour market for employability. Higher education institutions also contribute specifically to the commercial realm through patenting, licencing and establishing spin-off companies to commercialise technologies arising from academic laboratories.

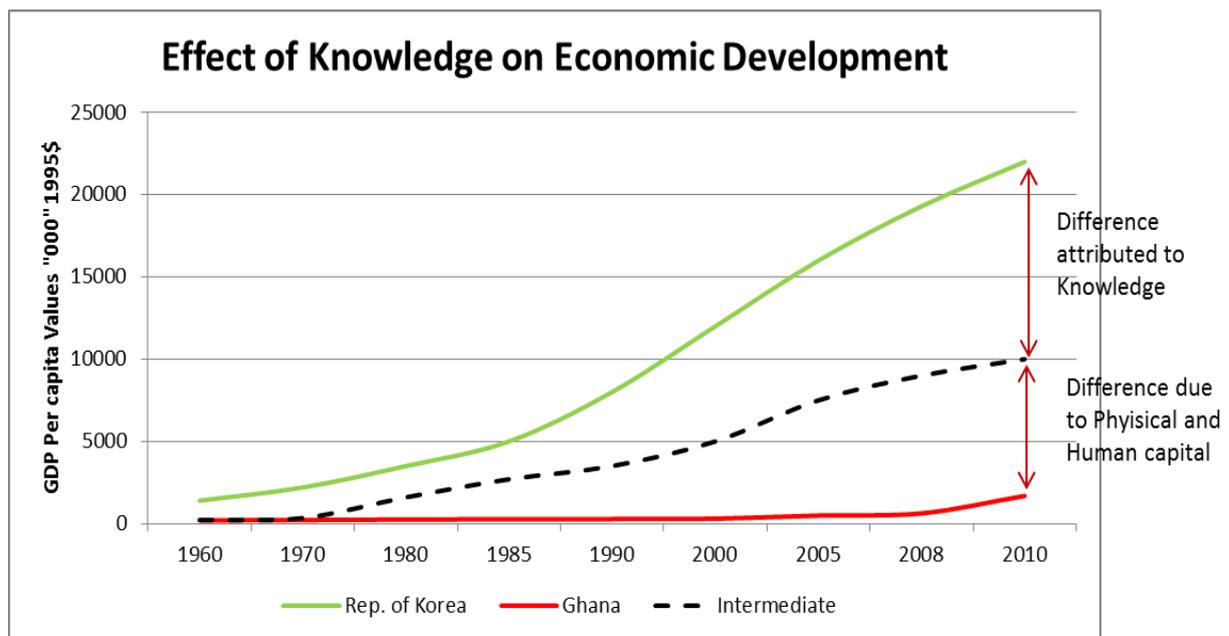
On the side of the productive sector, the ability to seek out external sources of knowledge is viewed as imperative for firms in technology-driven sectors (Chesbrough, 2003). It is now a norm for multinational corporations to seek out more research partners across sectors and countries to locate their research and development (R&D) investments and operations. In recent decades, countries such as Brazil, Mexico, China, India, South Korea and South Africa have increased public and private investments in this area. As corporate R&D have started to become geographically mobile, and as multinational companies decentralise their R&D activities, science parks have tended to provide a tool for government and university officials to recruit corporate laboratories to their regions (Sá, 2013). Internationally, these parks have emerged around academic institutions such as Stanford University and Massachusetts Institute of Technology (MIT) to harness academic-industrial partnerships.

In Africa, there is insufficient information on the steps its HEIs are taking and on what is needed to provide a strengthened and more comprehensive platform to promote, build, and manage these synergetic partnerships. What is generally known is that many African

countries lack the enabling environment for their universities to adopt a favourable stance. Most African universities experience institutional constraints such as weak research capacity and insufficient funding that limit their ability to develop relevant research programmes and connect with the private sector (Atuahene, 2011). Moreover, much of the research produced in universities is not relevant to industry as the continent lacks vibrant science-based technological industries, and a sustained R&D effort oriented to innovation (Barry and Sawyerr, 2008). Other literature confirms the limited involvement of African universities with science parks and business incubators as a means of bridging the academia-industry gap and facilitating the development and uptake of technologies (Chakwizira, 2008; Tonukari, 2008).

Data shows that with the exception of a few, manufacturing value addition as a percentage of GDP for African countries have remained almost stagnant while elsewhere like Korea and Malaysia, there are huge strides as a result of strong university-industry linkages and possibly the enactment of good policies around knowledge creation and capacity building that enable them to adopt and adapt technology transferred from developed countries. In Figure 1.1, South Korea as compared to Ghana, has developed because of its incremental investment in STI capacity development and knowledge economy.

Figure 1.1: Effect of knowledge on economic development: South Korea and Ghana



Source: Watkins (2008), World Bank Statistics (2012)

The lack of technology-based entrepreneurship in Africa has been attributed to several reasons. For instance, potential entrepreneurs are usually not the groomed “natural entrepreneurs”, but rather individuals lacking skills and experience to engage in the creation and running of new businesses. Other reasons include skills shortage in many sectors and scarce sources of financing for small as well as start-up companies (Robbins, 2010).

There are, however, a few good examples of technologies and businesses that have been nurtured in African universities in partnership with entrepreneurs and Governments. Stellenbosch University in South Africa designed and launched a satellite (Hernes, 2001), while University of Zambia has spun out major companies such as Zamnet Communications, the country’s main Internet service provider, and York Farms, one of the country’s largest

exporters of horticultural products. Jomo Kenyatta University of Agricultural Technology (JKUAT) has developed a tissue culture technology that is widely being used by cooperatives in Kenya and by a Ugandan company, Agro-Genetics Technology. The Institut International d'Ingénierie de l'Eau et de l'Environnement (2iE) in Burkina Faso has established 49 formal linkages with the productive sector that cover, inter alia, offering companies centres for development of technology and student placements.

While a new role for African universities towards national development is being socially conceptualised in terms of inclusion and benefit, other forces are also significantly shaping future universities, requiring a new “social contract” in the higher education sector. Trends in increased student/staff mobility, improved information/technology, and alternative financing mechanisms for higher education are changing institutional motivations and outcomes for partnership development, and the implications of external stakeholder diversity. Observations from data on student, academic and non-academic staff populations, and decision-making units postulate that for African universities to effectively maximise their ability to engage and interface well with a diversity of external stakeholders, they need to fully understand the socially constructed relationships between men and women within the higher education sector.

Given this background situation, the Association of African Universities (AAU) and the Association of Universities and Colleges of Canada (AUCC), supported financially by the Government of Canada through the Canadian International Development Agency (CIDA), in 2010 entered into a three-year partnership to support and strengthen the efforts of African universities in linking up more closely with the productive sector, particularly industry. The project, “*Strengthening Higher Education Stakeholder Relations in Africa (SHESRA)*” has three key components, namely:

- iv. Strengthening African university outreach: This requires a pilot of 15 African universities to pair up with experienced Canadian counterparts to strengthen the former’s strategic plans with the necessary approaches to improve relations to external stakeholders;
- v. Development of model case studies on university-industry linkages: A final of 6 African universities’ case studies would be developed, in partnership with Canadian universities, to showcase African success stories on university-industry (U-I) linkages; and
- vi. Strengthening of AAU’s ability to support its member universities’ external stakeholder relations: This includes the production of a number of policy and advocacy tools on U-I linkages for dissemination to HEIs and other stakeholders.

The first two components of SHESRA complement one another and operate at the individual institutional level while the third component brings together the outcomes of the first two components and broadens their reach and impact on the African higher education community.

In view of the little known and documented outreach between African universities and their external stakeholders and the resultant mismatch between the knowledge and skills acquired by university graduates and those required by the African economy, an important initiative of Component 3 was the commissioning of a survey to map the extent and nature of African universities’ external stakeholder relationships. The specific objectives were to determine what interface structures, policies, positions, incentives, and funding avenues are currently in place (or lacking), and what services or interventions African universities themselves gauge

to be most important for strengthening their efforts in linking up with these stakeholders. The findings of this scoping study led to the commissioning of six thematic surveys in 2012 on Graduate Employability (Section 3); Gender Equity (Section 4); Environmental Sustainability (Section 5); Technology Uptake (Section 6); Business Ethics (Section 7); and Intellectual Property Rights (Section 8) to serve as additional resources and advocacy tools to guide African universities improve their external stakeholder relationships.

Section 1.2 presents the synergetic findings of these SHESRA Project surveys.

1.2: The AAU Surveys on University Stakeholder Relations in Africa

1.2.1: Areas of Cooperation between African Universities and External Stakeholders

The SHESRA Project's scoping survey of 133 African HEIs on the nature of African universities' external stakeholder relationships undertaken by Ssebuwufu et.al. (2012), showed evidence of initial steps by these universities to stimulate and deepen their linkages with the productive sector. About 91% (n=115/127) of respondents had incorporated U-I linkages in their respective strategic plans (see also *Fig 1.4* under *Section 1.2.2*) and highlighted key areas of linkages, including consultancy, student attachments, seminars and workshops on industry-related issues, and a number of short-term courses for local businesses. The respondents benefitted from these relations through commissioned research, investments in laboratories and equipment, student scholarships and funding for graduate research.

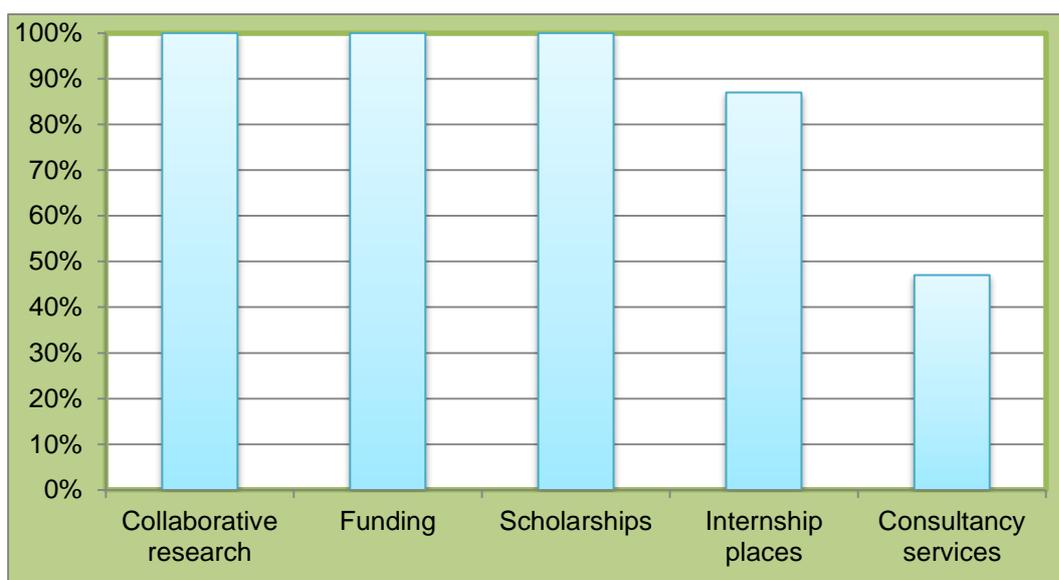
With regards to the specific productive sub-sectors of engagement, the above-mentioned report indicated that the respondent HEIs had established links with most sub-sectors (micro, small and medium enterprises, multi-national corporations, chambers of commerce, and manufacturing and industry associations). In addition, they were most likely to be engaged in the following specific sectors: agriculture and agribusiness; ICTs; environmental management; computer engineering; and banking. In contrast, they less frequently reported collaboration with the manufacturing, pharmaceutical, mining and entertainment industries. Also, only a small percentage of universities in the survey reported being involved in managing science parks and engaging in technology transfer to local business communities (see also *Section 6.1* and *6.3* of this Report).

The responses from the complementary *Business Ethics* survey of 27 African universities showed a similar scope: the respondents had developed linkages with external stakeholders for various opportunities - to facilitate internships; for work attachments; for research collaborations; for religious collaborations; for collaborations in promoting human rights; for collaboration in environmental issues; for quality improvement; for collaboration in achieving mission, vision and core values; for scholarships; for purposes of funding; and for contract research.

The *Intellectual Property Rights (IPR)* survey of 56 respondent universities placed high premium on collaborative research, and funding as reasons for collaboration with the productive sector (see Figure 1. 2), with the most important being:

- Collaborative research (100%)
- Funding (100%)
- Scholarships (100%)
- Internship placements (86%)
- Consultancy services (46%)

Figure 1.2: Universities' reasons for developing collaborative linkages



The *Graduate Employability* survey additionally mentioned the cultivation of employer relations and maintenance of alumni networks as channels that universities use to establish external stakeholders relations. All 7 respondent universities in the survey offer work placement programmes during students' course of study which are mandatory for certain levels and faculties and count towards academic credit towards graduation (Table 1.1).

Table 1. 1: Breakdown of Internship/Work Placement Requirements in Selected HEIs

<u>University</u>	<u>Mandatory Work Placement</u>	<u>Duration</u>
Ahmadu Bello University, Nigeria	Mandatory for students in their penultimate year of study	3 - 6 months
2iE, Burkina Faso	Mandatory for all Levels except first year students	6 weeks - 5 months
Regent University College of Science and Technology, Ghana	Mandatory for all Levels and all Faculties	2-3 months
University of Johannesburg, South Africa	Mandatory for students (except first year students) of Engineering, Optometry, Health Sciences, Nursing and Teacher Training	3 - 6 weeks
Puntland State University, Somalia	At senior level for Faculties of Law and Social Science	4 - 12 months
Université de Thiès, Senegal	Mandatory for all Levels and all Faculties	3-12 months
University of Cape Town, South Africa	Mandatory for Engineering Students in their penultimate year	Data not provided

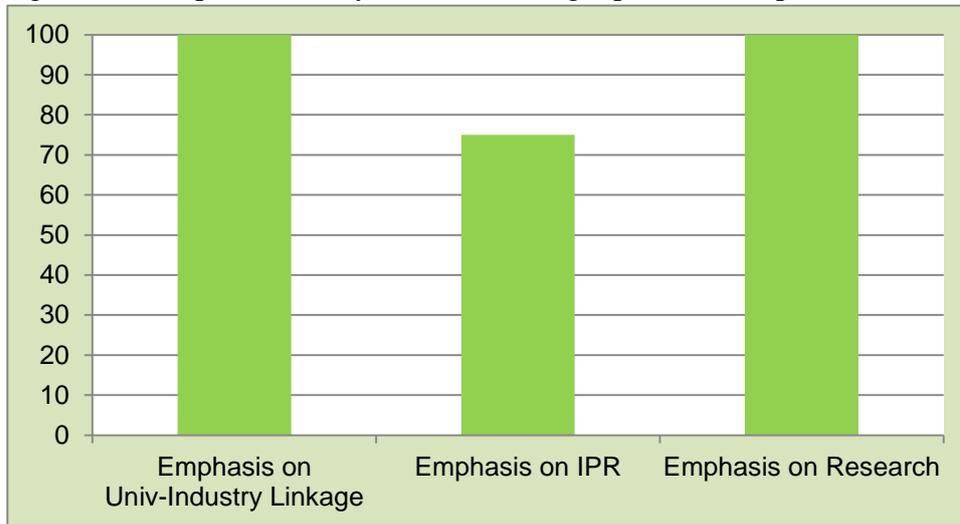
1.2.2: Emphasis of U-I Linkages in Strategic Planning in African Universities

The IPR survey findings showed that the strategic plans of most of the universities emphasised the three core missions of HEI as follows:

- Teaching and learning to ensure the value addition/transformation processes of students to graduates relevant to the world of work and society;
- Research and knowledge creation: creating capacity for knowledge generation, innovations and utilisation so that universities become research-led; and
- Knowledge transfer partnerships or community service.

All the respondent universities aspire to be centres of excellence serving not only the national but also the regional and international communities. They had strategic plans which spanned varying periods of time. Most of the respondents (72%) had a five-year plan; a few had a 10-year strategic plan (14%) or a 15-years strategic plan (14%). All the plans emphasised on external relations and research, and most (75%) on IPR issues as depicted in [Figure 1.3](#).

Figure 1.3: Emphasis on key issues in strategic plans of sampled universities



1.2.3: Designated Positions to Harness External Stakeholder Relations

Many of the respondents in the Ssebuwufu report stated that they had designated positions and/or offices to foster industry linkages. Statistically:

- 52% (n=57/110) had a Deputy VC/Pro-VC/Vice-Rector/Vice-President in charge of industry linkages;
- 58% (n=63/109) have a Provost/Dean/Director/Principal in charge of industry linkages; and
- 52% (n=52/100) have an Industry Liaison Officer.

In the follow up IPR survey, 33 (or 60%) of the 56 respondents also indicated a strong industry linkage through dedicated external relations offices, some at the level of Deputy Vice Chancellor. Yet, as [Table 8.3](#) in *Section 8.2* alludes, these offices do not operate to promote all aspects of industrial relations, including commercialisation of innovations and protection of intellectual property.

1.2.4: University Research Output and Income Generation from Linkages with Industry

With limited funding, particularly from state governments, collaborating with the productive sector and commercialising research output provide a potential channel to generate income

for HEIs in Africa, as elsewhere. But due to their low engagements, funding from the productive sector to universities was identified in the Ssebuwufu report as inadequate. Sixty one percent (61%) of respondents in the report stated that lack of financial support for research and related activities; and inadequate research infrastructure, such as equipment and laboratories within the institutions, were major challenges to HEIs. Furthermore, research output was also limited due to the low percentage of academic staff who hold doctoral degrees. About 63% of respondents (n=82/131) reported that among academic staff only 50% or less hold doctorate degrees. Thirty-one per cent (n=31/100) of all public universities in the survey indicated that less than 25% of their academic staff hold doctorate degrees while only 15% of all respondents' institutions employ over 75% of staff with this level of qualification.

Only a handful of respondents have been able to capture substantive financial gains from collaboration with the productive sector, with a wide disparity in receipts. The bottom 20% (n=24/120) reported having generated less than US\$10,000 in the last 5 years from consultancy services, commercialisation of research, joint research and other activities undertaken with the productive sector. On the other hand, the upper 15% (n=18/120) generated at least half a million US dollars.

Data from literature elsewhere shows the potential for African universities to generate income from consultancy and contract research. Some, such as Cairo University, University of KwaZulu Natal, University of Pretoria, University of Johannesburg and Stellenbosch University, have been able to make significant income from research.

1.2.5: Entrepreneurship in African Higher Education Institutions

In terms of the promotion of entrepreneurialism and practical skills among staff and students, 63% (n=81/128) of respondents in the Ssebuwufu survey reported engaging guest speakers to provide business and entrepreneurial advice; yet nearly a quarter (24%; n=31/128) had no resources specifically dedicated to supporting entrepreneurial activities by staff. Beyond the minimal engagement of guest speakers, a wide variety of other resources and incentives were also being employed, though at a much lower frequency. The report further noted that many HEIs lack complementary and supportive policies and mechanisms for regulating interactions with the productive sector, and the designated posts were not always staffed with sufficient expertise in entrepreneurialism, intellectual property right management, and marketing strategies – 36% reported on lack of skills and appropriate knowledge in entrepreneurship; and another 36% said that there was lack of formal linkages with the productive sector (see also *Section 3.1.7* on the report on *Entrepreneurship*).

1.2.6: External Stakeholders Views on Challenges to Effective Collaboration with Universities

Under the SHESRA *Gender Equity* survey, the 5 higher education external stakeholders respondents identified several foreseeable challenges hampering collaborating with African universities at the local, national, and international levels. These include:

- **Conflicts of interest**: These arise with professors looking to supplement their university salary engage in unauthorised projects/work and the use of students to supplement resources.
- **Communication and distance**: One external stakeholder working in Africa but based abroad noted that communication could be difficult. Another stakeholder cited confusion around points of contact at institutions as a challenge. Yet another noted that often it was individual professors or faculty members initiating a relationship

with their organisation rather than the institution or the related faculty/department. The quick turnover of staff and students was noted as a contributing challenge.

- Lack of information: One international external stakeholder noted that in terms of research and professional expertise, African universities were not typically approached because they can only offer very limited data or do not have the immediate capacity to collect large datasets.
- Different research and service ethics: One external stakeholder noted that half of its work is on advocacy and the other half is service delivery. Partnering universities did not demonstrate the same level of awareness and attention to the ethics needed when conducting research with this organisation's clients.
- Corruption and political instability: Lack of internal business ethics (see *Section 7*), internal transparency and political instability both internal to the university environment and in the external national environment were concern identified by one external stakeholder that has not partnered with an African university before.

As the mandate to establish external partnerships is a relatively new function for many African universities, there is likely much scope to enhance the win-win potential of future partnerships. This must, however, be placed against universities' different research capacities, expertise, locations, and other distinguishing features that affect their ability to attract external research and consultancies.

1.3: Structure of this Report

The purpose of this Report is to present a synthesis of the 6 surveys to serve as a guide to African HEIs in their day-to-day activities to engage more effectively with its external stakeholders for symbiotic benefits.

The Report is divided into 9 sections as follows:

- Section 1: Introduction and Background to the Report
- Section 2: The Methodologies adopted by the Consultants
- Section 3: Graduate Employability Issues Confronting African Universities
- Section 4: Gender Equity Issues in African Universities
- Section 5: The Practice of Environmental Sustainability in African Universities
- Section 6: Technology Generation and Uptake in African Universities
- Section 7: Business Ethics in African Universities
- Section 8: African Universities and Intellectual Property Rights Issues
- Section 9: Key Recommendations for Improving Universities' External Stakeholder Relations

The Annexes contain the following:

- Annex A: The list of references cited in this Report, and
- Annex B: Definitions of various concepts and terminologies used in this Report

Section 2

METHODOLOGIES ADOPTED

2.1: The Surveys Objective and Sources of Data

The consultancies on the six themes presented in this Report, namely *Graduate Employability*, *Gender Equity*, *Environmental Sustainability*, *Technology Uptake*, *Intellectual Property Rights* and *Business Ethics*, were aimed at providing empirical data to build the relationships of African HEIs with external stakeholders in the productive sector. The consultants used both qualitative and quantitative data as their sources of information, with questionnaires as the main primary data collecting tool. These were administered to public, private not-for-profit and private for-profit HEIs in Africa. Most of these respondents were universities.

Secondary data sources consisted of information gathered from textbooks, journals, magazines, newsletters and other publications. These have been duly acknowledged in this Report under [Annex A](#).

2.2: The Methodologies of the Six Surveys

Africa currently has about 1,000 listed higher education institutions comprising those offering post-secondary education where a degree, diploma, or certificate is awarded at the end of study. They thus include universities, polytechnics, technical colleges, teacher training institutions, institutes for medical training and agriculture, distance education centres, and research centres and institutes, with the possibility of expanding to include other forms of post-secondary education. Two hundred and eighty (280) of these HEIs were members of the Association of African Universities (AAU) at the time of the surveys. The AAU's mandate, as a membership organisation set up by universities in Africa themselves, is to promote cooperation among its members and between them and other HEIs within the international academic community, as well as encourage and empower its members to address developmental challenges to become an effective voice in national, regional and global developmental agenda.

Questionnaires were administered to samples from the 280 AAU member institutions which had confirmed their contact details with the AAU Secretariat, as well as others identified by the various consultants where the required sample size was not achieved. The list of these AAU contacts was given to each Principal Investigator of the six consultancies. An expected 10% response rate was considered representative of the entire AAU membership.

Given the initial four-week time frame for data collection under each consultancy, very low responses had been received from the respondent institutions. Extensions were granted to each consultant but yet, not all consultants were successful. Several factors have been attributed to this, including strikes by lecturers in home countries; general election in home countries; busy schedules of respondents (e.g. preparation for graduations and attending to other questionnaires) and time spent in studying the questionnaires.

Among the 6 surveys, there were marked differences in the sampling techniques, sample size and linguistic orientation of the respondents. The approaches adopted by each consultant are summarised below.

2.2.1: Methodology Adopted on the Graduate Employability Consultancy

Invitations were sent to over 50 AAU member institutions chosen across Africa's geographical and linguistic zones. AAU member institutions were invited to provide strategic plans and policies guides on graduate employability.

Questionnaire administration and data collation commenced in September, 2012 and ended approximately in December, 2012. Only 7 universities responded to the questionnaire, including one Francophone university. Due to the low response, the intra and inter status analysis (private vrs public) could therefore not be done.

2.2.2: Methodology Adopted on the Gender Equity Consultancy

Quantitative and qualitative information were gathered through four data collection phases that allowed for a layered and situational analysis of the topic. The four data collection phases were:

Institution Leadership Survey: This questionnaire targeted Rectors, Vice-Chancellors, and Presidents to collect information on institutional commitment to gender equity as well as basic sex disaggregated data on the characteristics of students, teaching staff, administrative staff, and decision-making units. Eighty (80) universities were purposively selected based on language, region of Africa, political stability, religious context, public/private, size, and level of instruction. Over a span of 4 months, 23 of them responded and participated in the study (response rate of 28.8%).

Pilot Institution Dean/Director/Directress Survey: This questionnaire targeted Deans and Directors within the universities initially sampled to collect additional sex disaggregated data at the managerial level within the faculty and to gather perspectives on university support programming, leadership in addressing gender equity issues, and the sensitivity of curricula and pedagogy. Six (6) Deans or authorised representatives from 4 universities (2 bilingual Anglo-francophone, 2 Anglophone) responded.

Pilot External Stakeholder Survey: The questionnaire collected qualitative perspectives from a small pool of stakeholders to understand how their motivations for partnerships aligned with university motivations, and what they consider as the challenges and opportunities of working with universities. Five (5) external stakeholders participated - 2 had been past partners of universities participating in the survey; 2 had recently partnered with an African university; and 1 stakeholder had never partnered with an African university before.

Secondary data analysis of policy and research on participating universities and host countries: Access to public/private government and institution documents was requested for each respective study university and country as well as available institutional documents that respondents themselves have self-identified as containing some formal expression of gender equity.

2.2.3: Methodology Adopted on the Environmental Sustainability Consultancy

This survey compiled and synthesised results of institutional strategic plans and case studies on university-industry linkages developed by African universities sponsored under the SHESRA Project. It utilised an AAU database of 163 AAU members in 31 countries and an

additional 179 contacts identified by the consultants. Thirty nine (39) completed responses, representing 11% of the overall population, were received. These were from 31 English speaking and 8 French-speaking institutions. There were no responses from the Arabic speaking universities.

2.2.4: Methodology Adopted on the Technology Uptake Consultancy

The target population of the survey was 168 institutions identified as active members of the AAU. After four weeks, a response rate of around 32% was reached (N=28). Respondents represent a wide variety of universities. The oldest university in the sample was founded in 1873, but most (N=21) have been founded after 1990. Most respondents were senior administrators in their universities, and some were directly responsible for Science Parks and/or Business Incubators.

2.2.5: Methodology Adopted on the Business Ethics Consultancy

A total of 160 universities were contacted from a population of 270 members of the AAU. Twenty seven (27) of them from 18 countries responded to the questionnaire. Originally, the consultant had planned an estimated sample of 50 institutions from among the 160 AAU members and purposively created regional strata of these institutions according to the 5 geographical regions of Africa (i.e. Eastern, Central, West, Southern and Northern). Secondly, the consultant created country strata by purposively arranging the institutions by their respective countries.

2.2.6: Methodology Adopted on the Intellectual Property Rights (IPR) Consultancy

The consultant made a selection of universities from four regions of Africa (North, South, East and West) and four languages (French, English, Portuguese and Arabic). Overall, 56 universities were selected, 10 from Northern Africa; 13 from Western Africa; 12 from Southern Africa; and 21 from Eastern Africa.

The consultant beefed up data by visiting some selected universities in Uganda to interact with officials responsible for strategic planning, industrial/external relations and intellectual property rights. This included Vice Chancellors, Deputy VCs for Academic Affairs, Academic Registrars, Directors of Planning, those in charge of External Relations and IPR. The consultant also conducted an internet search on IPR and industrial relations of AAU member universities.

2.3: Limitations of the Surveys

Time constraints, respondents' apathy and initial sample sizes were the observed limitations that cut across the six surveys. These were rectified with extension of deadlines and increase in the number of respondents. Specific surveys had their specific challenges that were resolved through different approaches. For instance, one of the challenges encountered with the administration of the questionnaires on *Gender Equity* was the variations in employment categories. At one university, lecturers were considered staff with a Masters degree with one publication; assistant lecturers as staff with a Master's degree but no publication, tutorial assistants are those with a Bachelor's Degree, and clinical instructors are those with Advanced Diplomas. Another university alluded to temporary/contract lecturer categories, but only provided details for senior, junior, and adjunct lecturers.

Again, from the *Gender Equity* survey, several universities cited that a separate authorisation and approval process was needed to participate in the Dean/Director/Directress Survey due to the hierarchical corporate structure and professional codes of conduct. During the

development of both the Leadership questionnaire and the Dean/Director/Directress questionnaire, it was noted that some lines of inquiry would have required individuals to self-report negative and potentially damaging information (e.g. perspectives on the prevalence of sexual harassment in African HEIs). Therefore, care was taken to focus on constructive lines of inquiry so that the emphasis of the study was not on the weaknesses but the strengths and capacity of the institution.

Section 3

GRADUATE EMPLOYABILITY ISSUES CONFRONTING AFRICAN UNIVERSITIES

3.1: The Issue of Graduate Employability

Everywhere in the world, universities are renowned for their contributions to social productivity, the inculcation of values and the advancement of skills necessary for socio-economic development. Countries like Japan with little natural resources have transformed themselves into leading economies relying solely on their highly skilled human capital.

Finding jobs never used to be a problem for African graduates during the years of colonialism and early post colonialism of most African states. In most instances, a university education was a guarantee for securing a suitable and career advancing job with reasonable pecuniary benefits. As the years rolled on and employment avenues narrowed, African graduates started seeking post-graduate degrees in order to distinguish themselves from the rest of the job-seeking youth. A 2012 International Labour Organisation (ILO) report notes that in Africa, the number of labour market entrants, including youth workers and recent graduates, has outpaced the economy's ability to absorb them, resulting in high youth unemployment. Also because this category lacks work experience, job-searching skills and other skills demanded in the labour market, they have a hard time gaining a foothold in the labour market.

The issue of graduate employability is not restricted to Africa alone as there is a plethora of evidence which shows that while the dynamics of the problem and the available solutions may differ in application, the basic principles of graduate employability remain the same globally. One should note the mistake that is often made that graduates must always practice in the field of their primary instruction. In other words, a trained lawyer must definitely find work as an attorney; an engineer must find work building and creating new technology; and a teacher is only equipped to teach students. Even though the reluctance to make a foray outside the confines of a degree may be cultural (e.g. a son may want to fulfil his father's dream of having a lawyer in the family), attention needs to be paid to the concept of transferrable skills (also referred to as soft skills) which are non-job specific skills that cut across all jobs. More employment prospects open up for a graduate who is willing and flexible to view skills learned in the classroom as portable to other professions.

Thus, in analysing the issue of unemployment, a distinction has to be made between employability with employment. A major distinguishing factor between being employed and being employable is the latter's ability to continue to find work. Since the workplace is a dynamic place where new knowledge, information and practices are developed daily, employability thus becomes a life-long continuous pursuit as opposed to it being a cloak that is donned after graduation.

3.1.1: Tracer on Graduates in Sampled Universities

In the survey on *Graduate Employability*, only one respondent (Puntland State University, Somalia) out of the seven provided information and documentation on its institutional strategic policy on graduate employability. The other 6 respondents admitted that no policies

existed. The Puntland State University (PSU) report on Graduate Tracing Study showed that there were adequate local market employment opportunities for its graduates due to a high demand from humanitarian agencies operating in Puntland, as well as from the government and other private sector employers. The report also noted that graduates from certain programmes had the most opportunities because PSU was the first institution in Somalia offering those subjects.

The PSU report stated that 88% of its graduates improved their organisations performance as well as general and social working conditions. While the report did not give accurate figures on the number of employed versus unemployed graduates, 85% of surveyed respondents in the PSU report were “fully employed and engaged”. A summary of the PSU report is presented in Table 3.1.

Table 3.1: Summary of Survey Analysis on PSU Graduates

Survey Questions	% Score
Market Opportunities	77
Knowledge and Skills Rating	80
Employment in Area of Specialisation	68
Personality and Ethics in Dispensing Job Responsibilities	87
Enhancement of Organisation’s Goals and Performances	88
Extent of Achievement of Graduate Expectations	82

3.1.2: Responsive Curricula

From the PSU Tracer report, it is clear that a responsive curriculum is vital to developing the employability of graduates. When asked to provide data on curriculum development and updates, and the methods of delivery of instruction, 5 of the 7 university respondents indicated that curriculum review was undertaken in consultation with employers in the public and private sector as well as with input from alumni. The mode of this consultation was not provided but it was encouraging to note that these universities recognise the role that employers play as stakeholders in higher education.

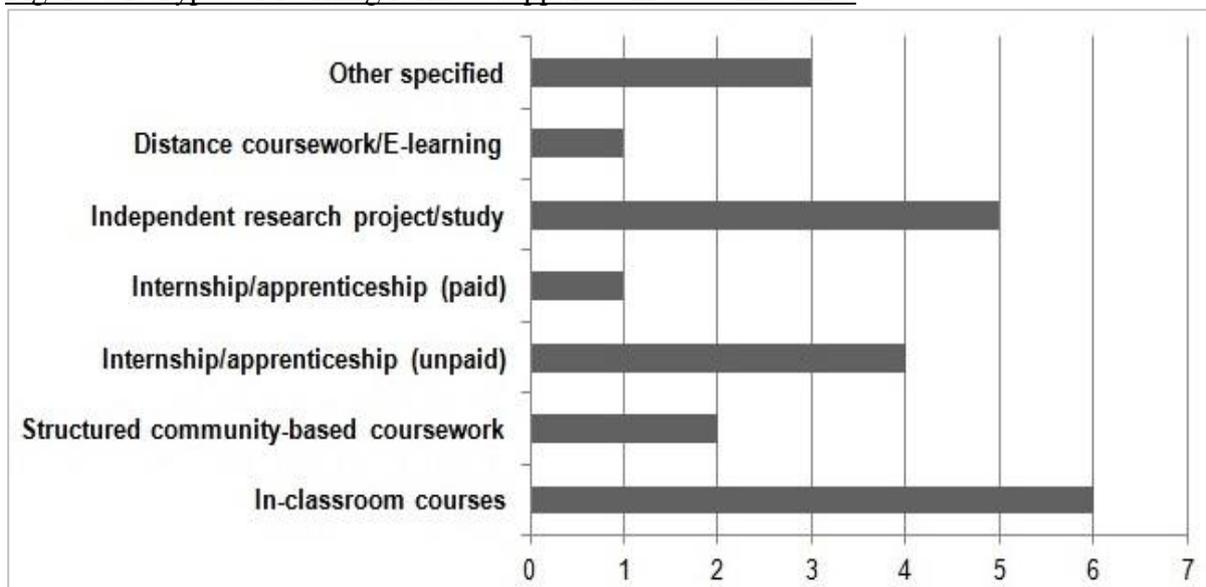
Of concern however is the frequency of curriculum updates. Some respondents (2iE in Burkina Faso, and Regent University College of Science and Technology in Ghana) updated their curricula at the end of each academic year or biennially. Others like the University of Johannesburg (South Africa) and Ahmadu Bello University (Nigeria) conduct reviews more infrequently e.g. in five year cycles except in the cases of some dynamic fields like Engineering and Medicine which receive periodic reviews at the instances of the Heads of Departments. It would however be ineffective to say that some disciplines do not require frequent curricula updates and reviews because vast developments in a field can occur in a shorter timeframe than provided by a five-year review cycle.

3.1.3: Pedagogical Delivery Formats in African HEIs

There is a growing body of research on different pedagogical delivery and learning strategies in higher education that more effectively impart practical, transferable skills on graduates. Some of these pedagogical strategies in African HEIs, extracted from the responses of Deans and Directors in the *Gender Equity* survey shows that academic units offered at least 3 different types of learning formats (see Figure 3.1). Three units supported some form of part-time studies option in addition to full-time studies – a significant gender consideration for women with family responsibilities – and the most common “other” learning format specified

was continuing education. When asked what the three most effective learning formats offered were, the most common response from the Deans and Directors was “in-classroom” courses, with “internship/apprenticeship (unpaid)” and “independent research projects” tied as the second most effective. The challenges associated with the delivery of the current learning formats were reported to be a shortage of lecture venues and infrastructure facilities; a reluctance by employers to host students for integrated work-learning arrangements; and the difficulties of constantly adapting to the labour market.

Figure 3.1: Types of learning formats supported in academic units



3.1.4: Employer’s Expectations of Graduate Capabilities

In a survey of 29 senior managers and business executives in Zimbabwe conducted by Memory Nguwi, an Industrial Psychology Consultant in (2012), 79% of the respondents said they considered a candidate’s relevant experience and skills summary when reviewing a resume. In terms of rating certain skills and capabilities, employers were most likely to highlight the importance of personality (72%), effective communication (48%), sector-specific skills/knowledge of job (38%), presentation (24%) and open-mindedness (21%) in that descending order.

The International Employer Barometer (IEB), designed and run by the International Graduate Insight Group (*i-graduate*) in association with the Council for Industry and Higher Education, monitors the opinions of employers and conducts surveys on what skills employers value the most. It is interesting to note that in a 2008 IEB survey, employers view social skills and personality type as more important than degree qualification, as over 85% of them regarded the soft skills of communication and team work as being among the most important capabilities sought among new graduates (see [Table 3.2](#)).

Table 3.2: Top 10 most important skills and capabilities when recruiting new graduates

Skills	Ranking (%)
Communication Skills	86%
Team-work Skills	85%
Integrity	83%
Intellectual Ability	81%

Skills	Ranking (%)
Confidence	80%
Character/Personality	75%
Planning and Organisational Skills	74%
Literacy - Good Writing Skills	71%
Numeracy - Good with Numbers	68%
Analysis and Decision Making Skills	67%

Source: Will Archer and Jess Davidson (2008). Graduate Employability: What Do Employers Think And Want?

Relatedly, the Job Outlook survey for 2013 of the National Association of Colleges and Employers (NACE) in the United States of America ranks communication (4.63) and teamwork (4.60) higher than technical knowledge related to the job (3.99) on a 5-point scale (see [Table 3.3](#)).

Table 3.3: Employers top skills requirements

Skill/Quality	Rating
Ability to verbally communicate with persons inside and outside the organisation	4.63
Ability to work in a team structure	4.60
Ability to make decisions and solve problems	4.51
Ability to plan, organise, and prioritise work	4.46
Ability to obtain and process information	4.43
Ability to analyse quantitative data	4.30
Technical knowledge related to the job	3.99
Proficiency with computer software programmes	3.95
Ability to create and/or edit written reports	3.56
Ability to sell or influence others	3.55

Source: National Association of Colleges and Employers, Job Outlook 2013

3.1.5: Establishment of Career Services Centres

Five (5) of the 7 participating universities in the *Graduate Employability* survey reported the establishment of a functional career services centre. Though the structure of these centres and the services provided varied from institution to institution, the basic objective remains the same – providing students with the information and resources required to succeed in the labour market.

The 2iE in Burkina Faso responded that its Centre is dedicated solely to strengthening relationships between the private sector, researchers and students; and continuously works in partnership with employers to assess and match their needs to the students' skills and knowledge base.

The University of Cape Town (UCT), another respondent in the *Graduate Employability* survey, reported that it has a dedicated office for employer relations and has consistently been voted by the Association of Graduate Recruiters as having the Best Careers Service in South Africa.

The level of information provided by some of the universities shows that care and planning have been put into the development of a career services programme for maximum service

delivery. Table 3.4 highlights summaries of the programmes provided by 5 of the respondents.

Table 3.4: Breakdown of services provided by the Career Services Centres of the surveyed universities

<u>University</u>	<u>Nomenclature of Career Services Unit</u>	<u>Nature of Career Services Provided</u>
Ahmadu Bello University, Nigeria	Career (Guidance and Counselling) Services Centre	<ul style="list-style-type: none"> •Advice given to students on success tips during course of study •Information on scholarship opportunities •Information on employment opportunities
2iE, Burkina Faso	Technopole	<ul style="list-style-type: none"> •Publish internships and job opportunities •Organise recruitment forums, which attracts over 100 local and international employers •Ensure that student competencies meet the needs of the private sector •Conduct employment surveys among graduates •Promote the university's alumni network
Regent University College of Science and Technology, Ghana	Education Support Services	<ul style="list-style-type: none"> •Provide guidance and counselling to students regarding academic and social life •Coordinates students' work placement programmes •Coordinates job placements for students and alumni •Encourage the organisation of extra-curricular activities
University of Johannesburg, South Africa	Centre for Psychological Services and Career Development (PsyCad)	<ul style="list-style-type: none"> •Provision of career assessment/counselling to assist students in career decision making •Provision of practical career education e.g. resume writing workshops, job hunting, preparation for job interviews •Maintenance of Career Resources Centre with career and company information resources •Annual career and recruitment fairs •Hosting of Job Portal, an online recruitment resource open to employers wishing to recruit students and graduates of the university

<u>University</u>	<u>Nomenclature of Career Services Unit</u>	<u>Nature of Career Services Provided</u>
University of Cape Town, South Africa	Careers Service: Centre for Higher Education Development	<ul style="list-style-type: none"> •Career Information •Career Advisory Services •Career Fairs •Presentations and Showcases •Web Based Job Search and Posting Engines

3.1.6: Percentage of Students who utilise the Career Services

The patronage of these career service units were given as estimates as no concerted effort had been made by many universities to document the required data. Furthermore no documentation was provided to back up the figures provided so there was no way to verify their accuracy. From the estimates (Table 3.5), it can be deduced that patronage in percentage terms may not be as high in universities with higher student enrolments (Ahmadu Bello University, Nigeria; and University of Johannesburg, South Africa) as in those with small numbers (2iE, Burkina Faso; and Regent University College of Science and Technology, Ghana). The University of Cape Town (UCT) did not provide percentages but reported that 7,071 students, of which 399 were females, used the universities' career services via the online careers services webpage.

Table 3.5: Percentage of students who utilise University Career Services Centre

<u>Name of University</u>	<u>% of Utilisation</u>
Ahmadu Bello University, Nigeria	20%
International Institute for Water and Environmental Engineering (2iE), Burkina Faso	75%
Regent University College of Science and Technology, Ghana	100%
University of Johannesburg, South Africa	45%-60%

3.1.7: Entrepreneurship - A Special Form of Employability

When asked what the challenges facing entrepreneurship by HEIs were, respondents in the *Graduate Employability* survey listed among others, the lack of financial resources, dearth of lecturers with entrepreneurship skills and education, lack of student contact after graduation, and lack of capacity to provide resources to the entrepreneurial students (e.g. in the form of a centre for entrepreneurship development) as some of the challenges.

On the other hand, the approach of 2iE towards entrepreneurship is worth emulating. The institute provides entrepreneurial resources and advice to students through the following specific steps:

- 23% of the curricula is dedicated to managerial sciences aimed at providing essential tools to set-up and manage a business;
- students are given the opportunity to attend conferences centred around innovation and responsible management strategies, delivered by professionals;
- 2iE hosts an annual Business Plan Competition for students to present their business ideas. The contesting students are coached by faculty members and professionals and present a business plan after 6 months of planning. The top 5 ideas won monetary prizes;
- a student organisation called Junior Business Enterprise has been established to provide trainees with a professional and practical framework to apply their acquired theoretical

competencies. The student organisation offers tools to students to advance personal projects and made a profit of 35,000 Euros in 2010;

- 2iE students are encouraged to take part in international contests and have been finalists of the Global Social Venture Competition, hosted by the University of Berkeley, California, in 2011 and 2012;
- Business incubator for graduates to foster the development of business plans are initiated and services provided by the business incubator include technical and managerial support, equipment, financial and legal advice; and
- Business nursery for start-up businesses for 2iE graduates are available.

2iE's efforts towards entrepreneurship have reaped dividends. In 2011, the institution states that 29 of its graduates set up their own businesses and became entrepreneurs in their own right. As of 2012, the institute's 'business incubator' initiative had yielded 6 business ideas and there were 2 businesses in the start-up nursery.

3.2: Summary of Findings on Graduate Employability Issues Confronting African Universities

The key findings of the Graduate Employability survey can be summed up as follows:

5. Higher education institutions play a pivotal role in graduate employability. Examples from institutions like 2iE show that this role cannot be effectively carried out without partnerships with employers and other industry players. Another element of partnership with external stakeholders exists in the development and review of curricula as some of the universities responded that curricula are periodically reviewed with input from employers and alumni.
6. More employment prospects open up for a graduate who is willing and flexible to view skills learned in the classroom as portable to other professions. Employers prefer to hire ready talents who can make positive contributions to their businesses and on this point, the PSU report is a testimony to it.
7. The career services unit of an HEI is the hub of all career related activity in the university and ideally is the first point of contact for students, employers, alumni and others seeking career information through the university. It is incumbent that the career services staff should be effective people managers to be able to nurture and foster relationships with the different stakeholders.
8. Entrepreneurship or self-employment should not be downgraded to a second best alternative for lack of employment as it, in itself, is a positive career choice which should be made strategically.

Section 4

GENDER EQUITY ISSUES IN AFRICAN UNIVERSITIES

4.1: Demystifying Gender

Around the world, there are new social and legal demands made for and by women, which are linked to education. Whether it is the informal explanations of the profound damages of female genital mutilation to communities in Ethiopia, or formal education that has enabled the professional growth of aspiring female politicians in Algeria, education and social progress are symbiotically linked. Conceiving of HEIs as *enablers* of change demands a proper assessment of everyday practices of administration, teaching, and outreach which might be considered trivial, but which may be the manifestation of androcentric values.

While gender is not the only axis of differentiation and power in HEIs, it is a critical one. Economists began to quantify the potential that investments in girls have on gross domestic product (GDP) growth rates in the late 1990s and 2000s. General statistics and sector-specific studies point to the merits of investing in girls, namely but not limited to low infant mortality, healthier families (Bicego and Boerma, 1993), and greater labour market earnings. A World Bank study of 100 countries in 1999 demonstrated that increasing the secondary education of girls by 1% results in an annual income increase of 0.3% per capita – a substantial increase for many developing countries. The study concluded that “*societies that have a preference for not investing in girls pay a price for it in terms of slower growth and reduced income*” (Dollar and Gatti, 1999). More recently, “The Girl Effect Dividend” published in 2011 by the World Bank concludes that investing in girls so that they complete the next level of education leads to lifetime earnings of today’s cohort of girls that is equivalent to up to 54% of annual gross domestic product (Chaaban & Cunningham, 2011).

International literature and the international development community continue to be saturated with a lot of ‘gender’ jargons ranging from the ambiguous – “gender responsiveness”, “gender integration”, “gender sensitisation” – to the downright absurd, such as activities to “engender” government policies. This requires those involved with gender programmes to become experts in its interpretation and deployment. An indication of the significantly different conceptualisation of gender to the African is well captured in recent statements by Malawi’s President, Joyce Banda, at the official opening of the CCAP International Women’s Conference in Blantyre in December 2012. She asserted that:

I come from the NGO sector. I have been a gender activist for a long time, but whenever I am doing this I always remember that I am an African woman, hence the need to fight for gender equality within the confinement of African tradition and cultures...We cannot be doing it in the same fashion as our counterparts in the West. After all, we need to respect our men first if we are to earn their respect... (*Malawi Voice 2012*).

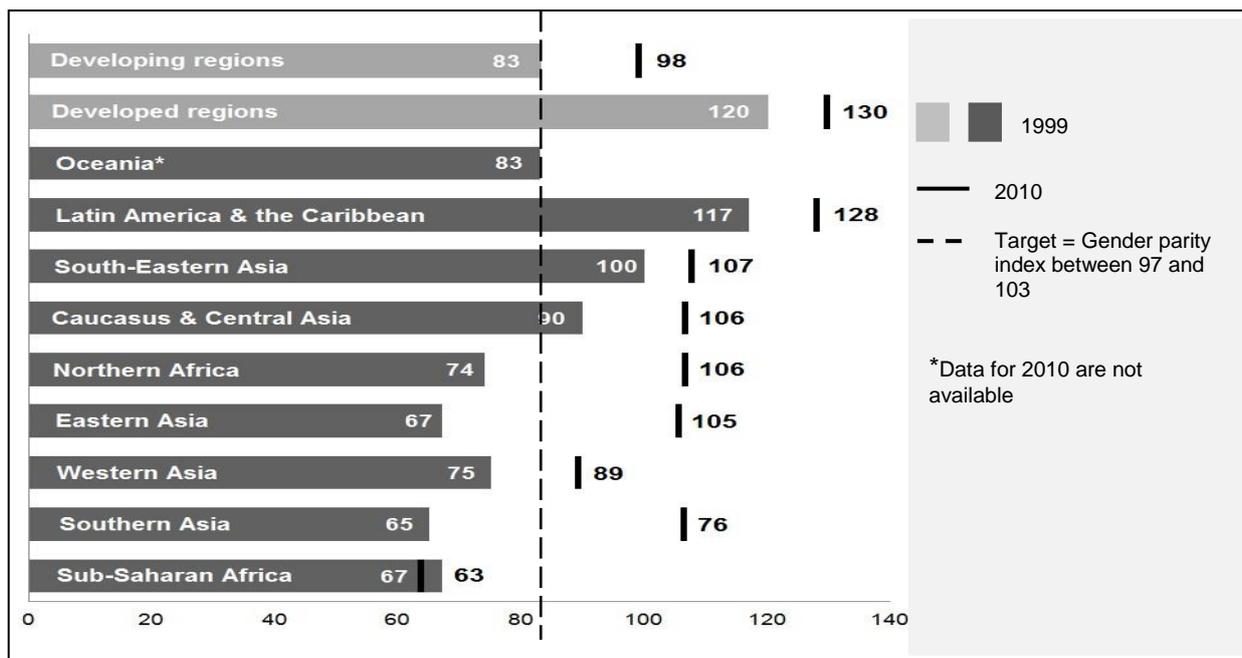
Many in the industry have argued that a standardised terminology, such as “gender mainstreaming” and “cross cutting issues”, save time otherwise wasted by having to explain what they mean.

4.2: Achieving Gender Parity in Education

On the face of it, African regional bodies, governments, and women’s organisations have adopted the gender agenda with enthusiasm: the African Union (AU) adopted a “Solemn Declaration on Gender Equality in Africa” in 2004, and has declared the 2010-2020 decade, the “*African Women’s Decade*”. However, the meaning of even basic terms like women’s rights, gender equality, and gender equity vary in interpretation and application across different African countries. The relevance of national gender commitments and goals built around these concepts is not always well connected to planning activities in different sectors, including the higher education sectors of African nations.

Achieving gender parity in education is one of the 8 Millennium Development Goals that most Southern African Development Community (SADC) countries will likely meet; most countries have already achieved gender parity in primary and secondary levels, with Lesotho having surpassed the 50% mark for girls’ enrolment at the primary level (Nyakujarah & Morna, 2012). However, the progress made, locally and globally, in primary and secondary education is not being realised in tertiary education in some world regions – particularly in Sub-Saharan Africa. The region’s Gender Parity Index for tertiary education keeps dipping (see [Figure 4.1](#)).

Figure 4.1: Gender Parity Index for gross enrolment ratios in tertiary education



Source: United Nations, 2012c

From the 2012 UNESCO World Atlas of Gender Equality in Education, the following is evident about the current condition of higher education/tertiary education in Africa:

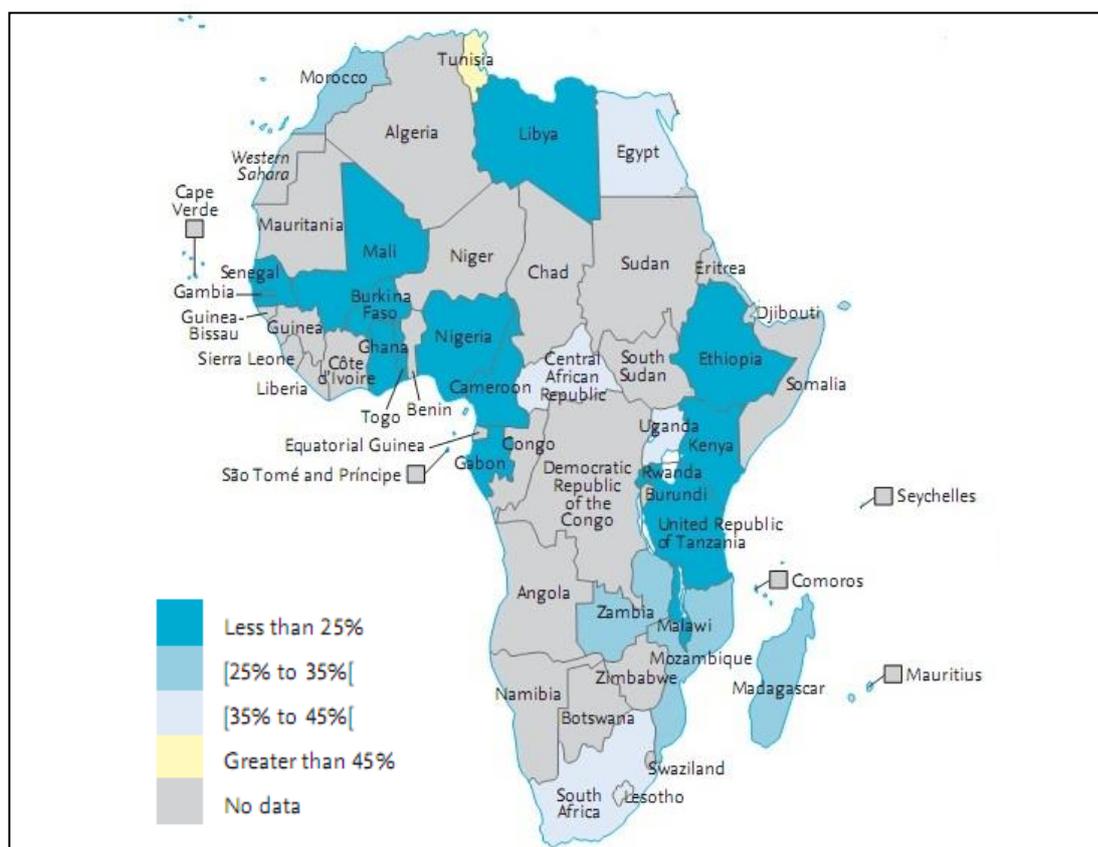
- Despite growing global gross enrolment ratios, Africa is the continent with the lowest average national gross enrolment ratio for tertiary education; the majority of African countries report a gross enrolment ratio of less than 20% of the total population.
- While the Gender Parity Index (GPI) rose in all world regions between 1970 and 2009, Sub-Saharan Africa’s GPI dropped comparatively and Africa now rests as the lowest scoring region in the world (the GPI hovers just above 0.6). This suggests that

women are not the biggest beneficiaries of rising tertiary enrolments in Sub-Saharan African countries.

4.3: Outlook of Women in Education in Africa

In addition to the low average national gross enrolment ratio of women in tertiary education, there is little information on the proportion of women as a share of total tertiary institution researchers (see Figure 4.2). Information available on African countries suggests that women researchers on the continent are generally less than 35%, with the exception of Tunisia, South Africa, Lesotho, Egypt, Central African Republic, Uganda, and Rwanda where the proportion is marginally closer to parity (UNESCO, 2012).

Figure 4.2: Share of women among researchers in Africa



Source: United Nations Educational, Scientific and Cultural Organisation (UNESCO), 2012

Other literature has focused on *qualitative* trends in higher education such as pedagogical development, institutional cultures, and female experiences from the early post-colonial era in the 1960s up to date. Some of the most illuminating work in this regard is the recent two-part series of articles published by the African Gender Institute in the *Feminist Africa Journal* in 2007. The publications feature well-grounded qualitative testimony of the politics, trajectories, and challenges of female staff and students at selected African universities. Although the collection of articles featured are not meant to be quantitatively representative, the editors of the publication astutely noted that the depth and extent of the problems caused by inequalities in education and knowledge production emphasises the continuing importance of investigative and support work of transnational organisations in this area to respond to a severe absence of data (Mama & Barnes, 2007).

In labour market analysis, the terms “horizontal segregation” and “vertical segregation” are used to explain the unbalanced distribution of men and women *across* professional categories and *within* labour market hierarchies (Meulders et al, 2010). These concepts are also applicable to the significant imbalances of men and women in the university environments, but are more appropriately understood as horizontal and vertical *representation* rather than segregation.

4.3.1: Vertical representation of females in HEIs

In terms of vertical representation of women in the sampled universities of the *Gender Equity* survey, the imbalance generally worsens the more senior the position or rank (see [Table 4.1](#)). On average, female representation was reported to be lowest (16%) at the highest governing body responsible for making institution-wide decisions.

Table 4.1: Average percentage of females represented as a proportion of internal HEI stakeholder types (October 2012)

Type of internal stakeholder	% of female representation
Enrolled students	38%
Non-academic staff (Administrative/support staff)	42%
Academic (teaching) staff	22%
External partnerships planning unit	42%
Research & development planning unit	30%
Governing body for institution-wide decisions (Academic Board, University/Administrative Council, Board of Trustees, etc.)	16%

The imbalance accentuated in the top governing bodies is significant given the breadth and depth of internal and external powers exuded by these institutional organs including, but not limited to:

- Passage of university bye-laws, rules, and regulations.
- Academic, administrative, and senior personnel promotions and appointments
- Approval of the number of masters and post-doctorate degrees granted to students
- Decisions finalising national and international agreements with other institutions and research centres
- Deliberations on budget & business plan development, and the execution of financial management decisions
- Monitoring of account keeping and authority/oversight of annual audits
- Approval of mission and strategic plans
- Determination of fees and other dues to be paid by students
- Provision of advice to the Rector on questions of quality at the institution
- Liaison activities with government ministries (e.g. Ministries of Education)

Stellenbosch University was an interesting exception to the sample’s general prevalence of vertical imbalances that favoured men. Stellenbosch reported a slight student imbalance in favour of females (51%) in 2011. Furthermore, the proportion of women in the university’s R&D unit was reported as 81% in 2012. However, Stellenbosch University reported a very low proportion of women in its governing body, which is responsible for making institution-wide decisions: only 10% (3 of 26 representatives) were reported to be women as of 2012.

4.3.2: Horizontal representation of females in HEIs

Whereas vertical representation is related to the “glass ceiling” concept, horizontal representation describes the concentration of women and men in certain profession categories, sectors or disciplines (Meulders et al, 2010). The university student and staff population data also suggests that the male/female ratios are imbalanced in terms of *horizontal* representation. The SHESRA survey on *Business Ethics* disaggregated student enrolments by gender and affirmed this male-female disparity in enrolment. While the survey findings acknowledged that there are more female students in HEIs today than there were a decade ago (and that the trend is likely to continue in the foreseeable future), the male students made up 56% of the total student population of the 27 sampled universities.

From a sample of 23 respondent universities in the *Gender Equity* survey, only 16 of them (70%) provided the requested disaggregated academic teaching staff numbers by sex for 2011. All those that provided sex-disaggregated data for academic staff had at least one faculty/academic unit that had less than 20% female representation; one francophone university reported less than 20% female representation in all 4 of its faculties. These universities had an average of 9 academic units for the purposes of instruction or training – the number of these units ranged from 2 to 23 depending on the size of the university. Although there was a noticeable imbalance of male and female academic staff in general, imbalances were more noticeable in certain faculties/academic units, demonstrating a horizontal imbalance by discipline.

The subject areas that consistently had less than 20% female representation amongst teaching staff were on technology; studies of the built environment (architecture, engineering, road/building construction); natural sciences; business-related studies (economics, public administration, and commerce); and development studies. However, exceptions at Ahfad University for Women in Sudan, Addis Ababa University, and Stellenbosch University were noted. Due to the orientation towards educating women at Afhad University for Women, none of the 11 academic units had less than 20% female representation as of 2011, and almost all units were reported as imbalanced in favour of female staff.

In Addis Ababa University, it was reported that 94.4% of the academic staff at its Institute of Gender Studies as of 2011 were female. Stellenbosch University was also unique in that only one academic unit reported having less than 20% female representation among its academic staff (Faculty of Engineering, 13.7%). It experienced close to an overall balance (46% of academic staff in 2011 were female), though imbalances were reported both ways (male and female) across disciplines.

While it was not possible to draw reasonable conclusions about the horizontal representation of female staff in Stellenbosch University, the horizontal representation of female students across the academic units was characterised by “gendered” subjects. In the science unit that focused on energy, bio-technology, and eco-construction, only 49 of 343 students were female in 2011 (or 14.3%) whereas in a participating health sciences faculty, the proportion of female students was 72%, and 54.3% for nursing faculty reported in 2011.

4.3.3: Disaggregated Gender Data in HEIs

When the Deans and Directors were asked whether their academic unit collects sex-disaggregated student data on an annual basis, all six respondents indicated positively that this was the norm within their Faculty or Centre, and all respondents described the collection

of at least three different types of data. The availability and disaggregation of staff (both academic and administrative/supportive) and students by gender, employment type (academic and administrative/support), and academic unit suggests that monitoring of staff employment and retention is more properly established within the HEIs studied. In fact, the only information gap in terms of staff was the inability of three universities to provide non-academic staff (administrative/support) disaggregated by sex. Two francophone universities (Université des Lettres et des Sciences Humaines de Bamako and Université Nangui Abrogoua) indicated that they were undergoing organisational reform whereby some of the institution-wide planning and decision-making bodies will change in composition and function.

The extent to which awareness of unequal representation and participation is sensitively translated into practices that change the activities of institutions will ultimately affect the institution’s ability to competitively engage with a full diversity of external stakeholders.

4.4: The Role of Institutional Culture

There are differing ideas about higher education and citizenship in different institutional cultures. These have resulted in varying orientations to how unequal representation should be addressed. The findings of the *Gender Equity* survey and secondary data analyses echo the ideas presented by Bennett (2002) on the varying conceptions of equity in general, and gender equity in particular. For example, equity in the South African context has included the consideration of *race* and gender when referenced against access and benefit to education. This is due to the historical discrimination on the basis of race and language within the country’s apartheid education system. In Stellenbosch University’s Employment Equity Policy (2010-2015), there is no specific mention of advancing women through the established affirmative action strategies but rather the policy expresses the broad aim of integrating *diversity* within the university: a temporary measure with the main objective of establishing equal opportunities and a fair representation of the “designated groups” in the workplace, and for which targets are determined flexibly.

Similarly, but emanating from an institution with a significantly different history in South Africa, is the story of the Transformation Office at the University of Johannesburg. The Office serves as further evidence of this broad interpretation of equity of representation and opportunity that is more prevalent in South African higher education. Its mandate covers all aspects of cultural and social diversity at the university, including gender equity. It conducts a culture survey on different demographic perspectives every three years to determine if transformative interventions are working. The survey collects detailed information of the five themes seen in [Table 4.2](#) and serves as a barometer of inclusion and value created in the university’s culture. The scores for each theme are averaged and adjusted to calculate the Overall Index as a score out of 100 for comparison over time.

Table 4.2: Themes of the UJ Culture Survey and the Culture Index from 2008-2012

<u>Theme</u>	<u>2008</u>	<u>2010</u>	<u>2012 - Section B</u>	<u>2012 - Section C</u>
Fairness and Equity	45%	48%	61%	58%
Transformation	47%	55%	60%	70%
Trust, Respect and Support	53%	56%	69%	59%
Valuing/Accommodating Diversity	49%	54%	67%	71%
Values and Vision	57%	61%	76%	64%
Management	60%	65%	75%	70%

Job Satisfaction	63%	65%	75%	81%
Overall Index	52%	57%	69%	68%

Source: University of Johannesburg Transformation Office, 2011

For the 2012 culture survey, a number of focus group discussions were held before the actual survey to assess the relevance of issues and to determine if there were new emerging themes. This initiative brought interesting insights that were captured into the Survey by means of additional statements (captured in Section C), and the inclusion of two additional themes, namely “Ethics” and “Wellness”. Apart from the new themes, the 2012 Survey also included additional demographic categories but still to a degree that enabled comparison with the results of previous surveys. The higher the score, the healthier the institutional culture.

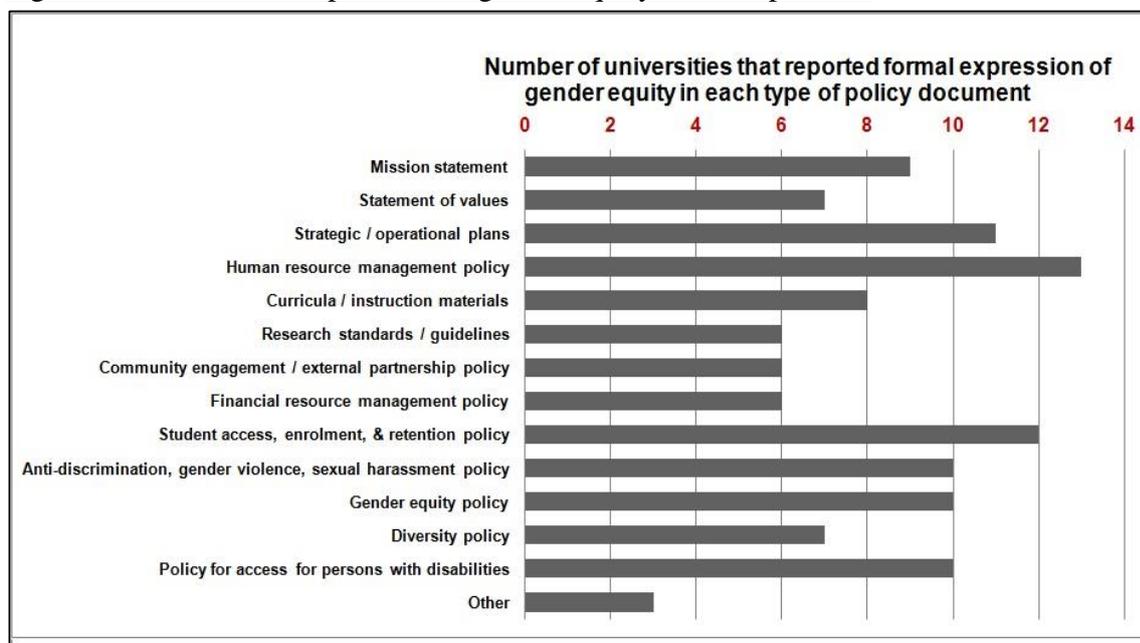
4.5: National Gender Agendas and Conditions

The extent to which institutions can sensitively respond to unequal representation and participation, and inequitable education outcomes is influenced in part by the national socio-political environment. The reality in many African countries is that there exist different enabling environments to pursue gender equity in all sectors. For example, upon ratification of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1981, Egypt made reservations to three articles (9[2], 16, 29) pledging compliance provided it does not run counter to Islamic Sharia Law (United Nations Population Fund, *nd*). Article 16 of CEDAW pertains to the commitment of state parties to take measures to eliminate discrimination against women in all matters relating to marriage and family relations. This includes the same personal rights of a husband and wife, the same right to property and the same right to choose a family name, profession, and occupation (United Nations, 2009). More can be inferred about changing gender relations in Egypt as the Egyptian government begins interpreting the new 2012 Constitution.

4.6: Development of Gender-Responsive Institutional Policies, Strategies, and Practices

The sensitive translation of practices that change perceptions and practices of institutions on gender issues requires a formal commitment and systemisation of efforts by institutional decision-makers. All the 23 participating universities in the *Gender Equity* survey indicated that their institutions were committed to equitable access and enjoyment of higher education opportunities/benefits by both men and women (gender equity). However, 8 of them reported that this commitment is not formally expressed by their institutions while the rest had the commitment to gender equity formally expressed to varying degrees through institutional policies as shown in [Figure 4.3](#).

Figure 4.3: Sources of expression of gender equity in HEIs policies



When asked whether gender issues were incorporated into curricula, 3 of the 7 Deans/Directors in the survey answered in the affirmative and 3 others were unsure. Only 1 Faculty/Centre offered a gender studies programme, while 2 respondents reported that they offer selected courses on gender topics within distinct programmes of study or Departments. Some also reported that they rely on individual faculty members to integrate gender topics as sub-topics in course material.

Some universities reported developing key policy instruments, with at least one university confirming it was in the process of developing a policy on gender equity. Notable policy documents that fell into the “Other” category included HIV/AIDS policy. Many of these *expressions of commitment* remain unconfirmed as some universities did not provide the supporting policy documents. However, this integration is part of the growing development of situational ethics, whereby institutions are re-conceptualizing their social responsibilities in education delivery and research. To be effective, all these initiatives require the allocation of resources to enable periodic analyses of gender impacts, monitoring, evaluation and follow-up.

To show their commitments, 4 of the respondents (National University of Rwanda, Bindura University of Science Education, Addis Ababa University and Puntland State University) had gone further to develop affirmative actions to meet student enrolment targets. The implementation strategies are centred on special admission criteria that would enable disadvantaged groups (e.g., female students) be admitted in the institution with lower entry points than male students, as well as the active encouragement of female student enrolment through targeted student support programmes and additional tutorials. Some institutions have female staff employment targets. For example, the University of Cape Coast in Ghana aims at ensuring that at least 25% (up from the current 19%) of staff members employed are female by the end of the 2017 academic year, as set out in the 2012-2017 Corporate Strategy.

4.7: Summary Findings on Gender Equity Issues in African Universities

Despite the small size of the sample of this pilot *Gender Equity* survey, the preliminary findings produced should not be overlooked as the respondents have significant insight into the historical development of their institutions: the average number of years the respondents had served in their managerial role within their respective Faculty or Centre was 5.5 years, while the respondents had all spent a notable number of years working at their institutions in general (average 20 years).

From the emphasis on parity targets and physical representation of female staff and students amongst the respondent institutions of the survey, it is evident that the general response to gender equality and gender equity has been inappropriately simplified to constitute the mere boosting of female numbers. However, the assumption that this increased female presence within universities will have a homogenous, unified, and willing voice to champion equity, while at the same time pursuing individual academic and employment roles is, perhaps, not well-grounded.

Despite their total support for gender equity to become an institutional priority, the respondents in the survey had differing but complementary views on what would be the most effective policy tools for expressing this. They all indicated that strategic plans would be effective, and further asserted that human resource policy; anti-discrimination, gender

violence, sexual harassment policy; gender equity policy; and disability policy would also be effective tools to mainstream gender considerations into HEIs.

Section 5

THE PRACTICE OF ENVIRONMENTAL SUSTAINABILITY IN AFRICAN UNIVERSITIES

5.1: The Link between Higher Education and Sustainable Development

Africa remains the world's poorest and most underdeveloped continent despite its abundant natural resources. However, the United Nations Decade of Education for Sustainable Development (UNDESD) spanning 2005-2014, offers the continent a strategic opportunity to redesign its educational structures to respond to its developmental and environmental challenges. The objectives of the Education for Sustainable Development (ESD) agenda is to teach the main beliefs underlying sustainable development with the intention of making learners more proactive to develop skills to plan for and find solutions to sustainable development challenges. The thematic areas under ESD, in addition to natural environmental issues, include social, economic and even political issues such as poverty, gender, health, peace, culture, human rights and ICTs.

The task of promoting ESD falls highly on higher education which has the responsibility for developing the necessary capacity required for a sustainable future. In fact, a number of sustainability declarations in higher education have defined specific roles for them to pursue sustainable development. The declarations include the 1977 Tbilisi Declaration, the Talloires Declaration (1990), the Kyoto Declaration 1993, and the 2001 Lüneburg Declaration. What is particularly clear about the identified roles of HEIs in sustainable development is that they can be addressed through university day-to-day functional activities and management operations. The challenge for Africa is whether its universities and other HEIs are actively fostering an increased quality of teaching and learning towards sustainable development on the continent.

The focus of the *Environmental Sustainability* survey was not on the holistic sustainable development pursuit of environment, economic and social wellbeing in higher education but rather the practices of environmental sustainability and its linkages with universities' external stakeholder relations. There were 2 lines of inquiry: one to investigate the perception of universities on the challenges *within* their campus environments, and the other to investigate the perception of universities on the challenges faced by the community *outside* their universities.

5.2: The Prioritisation of Environmental Sustainability in African Universities

Since the Brundtland Commission defined sustainable development as “*meeting the needs of the present without compromising the ability of future generations to meet their own needs*” (Brundtland 1987), subsequent definitions and refinements have just been rebirths of ideas to match with current and upcoming challenges. Desirability of resources to human society may imply “green growth” which is argued as not only theoretically possible but economically achievable. This indicates that any intervention intended for economic development can also be in line with environmental sustainability. Therefore, there can be a condition of compatibility between economic growth and environmental sustainability.

Many publications outline measures by which environmental sustainability, as it occurs in the real world, may be judged while contributing to economic growth. For example, Green Gross Domestic Products indices are calculated based on the use of indicators of natural resource use and environmental damage. This may imply that sustainability is rapidly moving from an abstract concept to a measurable state of dynamic human-ecological systems. However, even when using the same indicator, sustainability indices may not rank countries (or activities) consistently. This inconsistency may be because sustainability depends on context, development status or some other factor.

5.2.1: Environmental Challenges internal and external to African Universities

With the focus of the survey on the environmental challenges *within* as well as those faced by the community *outside* their campus environments, respondents in the *Environmental Sustainability* survey were given a list of 8 environmental issues and asked to indicate the extent to which they were either internal and/or external challenges to them. A greater percentage of the respondents reported that there were more environmental problems external to their universities than within the universities themselves (see [Table 5.1](#)). Within the university, solid waste management, noise pollution and air pollution were reported as the top three challenges while the three most significant challenges external to their universities were over-harvesting, land degradation, and liquid waste treatment.

The aggregated data demonstrates that universities have the capacity to deal more with their internal environmental challenges than what pertains outside their confines.

Table 5.1: List of environmental challenges internal and external to HEIs

<u>Responses to Question</u>	<u>% Internal to the Universities</u>	<u>% external to the Universities</u>
Solid waste disposal	43	57
Liquid waste disposal	34	66
Over-harvesting of natural resources [degradation of biodiversity] (e.g. wild plants, animals, forests)	9	91
Land degradation (e.g. soil erosion, salinity)	26	74
Toxic waste disposal	31	69
Water pollution	21	79
Air pollution	36	64
Noise pollution	42	58

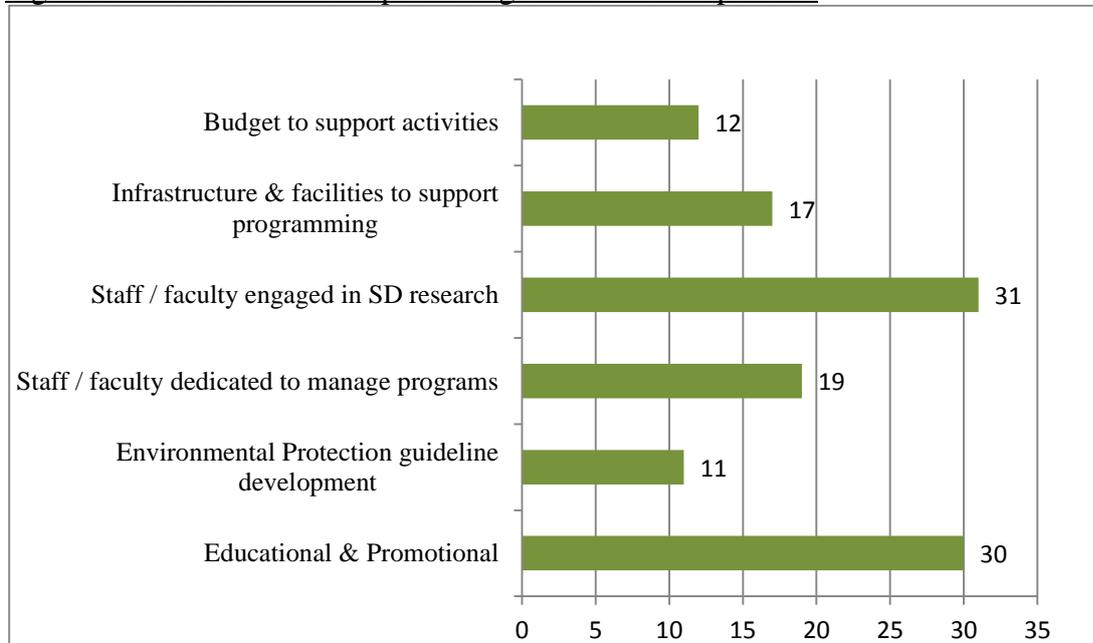
5.2.2: Existence of Environmental Sustainability Policies and Strategies in Sampled HEIs

Thirty one percent (31%) of the universities surveyed had an environmental policy or strategy in place. Of the rest, 46% were in the process of developing one while the remaining 23% were yet to have any. After reviewing the strategic plans and websites of SHESRA beneficiary institutions, in addition to the feedback from the *Environmental Sustainability* survey, the study observed that more than developing policies, universities were demonstrating a commitment to environmental sustainability through the development of environmental programmes and projects in academic and research programming, and community outreach initiatives. Specific outreach initiatives supporting the ‘green economy’ ranged from tree planting through to start-up companies based on knowledge coming out of the universities.

Of respondents having environmental policies or programmes, 84% of them had staff/faculty engaged in research focusing on environmental sustainability, and an almost equal number

were involved in educational and promotional activities on environmental sustainability within their communities (81%). Other engagements by these respondents included managing environmental programmes; development of infrastructure and facilities to support programming; environmental protection guideline development; and creating a budget for environmental sustainability activities and programming (see [Figure 5.1](#)).

Figure 5.1: Focus of HEIs in promoting environmental policies



The following are short descriptors of the initiatives shared during the survey. As the survey respondents were limited to the number of words they could use, web searches were conducted to add further details.

Arba Minch University, Ethiopia: *The University has an environmental project involving solid waste and dry faeces collection from urban homes for composting. This is based on dry latrines urine separation as nitrogen input for composting and urine to dry NP (nitrogen, phosphorus) fertilizer. The university does not have an environmental department, directorate or programme separately but run the programmes through the College of Agriculture. The environmental focus of the university is on water, establishing partnerships with community-based projects and organisations and conducting Needs Assessments (NA) in communities neighbouring the university campuses for mutual benefit.*

Mbarara University of Science and Technology, Uganda: *The University is home to the Greater Mbarara Regional Centre of Expertise (RCE). This centre is mandated to promote partnerships between civic and private sector organisations to enhance sustainable utilisation of human, capital and natural resources for prosperous and sustainable livelihoods in the Greater Mbarara Region.*

The activities of RCE Mbarara include: community-based health and sanitation education; participation in ESD Awareness Week with Conservation Efforts for Community Development (CECOD); and community mobilisation in tree planting activities;

University of Botswana: *This University has a safety health and environmental policy which governs issues of safety, health and the environment in general terms. The University also has a Department of Environmental Science.*

Osun State University, Osogbo, Osun State, Nigeria: *This University has a Centre for Alternative Energy and Rural Technology where research is conducted on the conversion of waste to useful economic products. The Centre focuses on developing appropriate and sustainable technologies that address contemporary needs of the society, such as reducing poverty and enhancing the attainment of the nation's Millennium Development Goals (MDGs).*

University of Swaziland: *The Senate of this university approved the mainstreaming of environmental sustainability in all academic programmes in 2010. In the next five years, the university intends to emphasise environmental management through making its students and staff aware of their impacts on the environment and the actions they can take to help reduce environmental degradation and destruction. The university endeavours to take a leading role in promoting environmental conservation and protection through resource conservation, recycling, energy and water conservation, green space improvement, chemical minimisation, education and awareness campaigns, biodiversity protection and use of innovative sustainability techniques.*

Wisconsin International University College, Ghana: *This University has a policy aimed at total waste management, including use of biogas from sewage. A programme on environmental sustainability and management has been developed at the Masters level and awaits accreditation. The programme will put aspects of education at the forefront of policy which they anticipate will revive the need for a sustainability policy.*

All Nations University College (ANU), Ghana: *In conjunction with Chempure Technologies of India (waste management technology), ANU has undertaken initiatives to be implemented over the next few years such as: prefabricated toilets with treatment at a prominent public place in Koforidua (a town); sewage treatment facility for the campus; liquid waste treatment plant for New Juaben (a town); and power generation from biomass and eco-friendly buildings on campus. The All Nations University-Chempure Technologies agreement will see ANU representing Chempure Technologies in finding permanent solutions to the waste management debacle in Ghana. Chempure Technologies is also supporting the university's initiatives in mounting academic and professional courses in waste management.*

Also within the School of Business Administration, ANU in February 2012 established the Centre for Case Studies and Research. A Business Development Unit will soon be established to capitalise on industry-university collaborations to find commercial applications to some of their classroom ideas.

University of Port Harcourt, Nigeria: *The University supports waste disposal and conservation of national habitat and the planting of trees through its Regional Centre for Biosresource Development and Conservation. The university has also completed several environmental management and assessment projects through its Consultancy, Research and Development Centre.*

2iE, Burkina Faso: *This Institute specialises in water and sanitation; environment; energy and electricity; civil and mining; and managerial sciences. Its Technopolis Centre creates*

linkages between the private sector, research and academia and has 4 key objectives, of which one is to support small- and medium-scale enterprises and social entrepreneurship to fight against poverty and grow the green economy through a business incubator programme.

University of Johannesburg, South Africa:*The Council of University of Johannesburg approves and monitors annual performance targets for: carbon footprint, energy use reduction, percent of total waste recycled, and occupational health and safety. They have a Sustainable energy Technology and Research (SeTAR) Centre, and under their ‘Corporate Services – Operations’, “maintenance and safe operation of facilities; protection of facilities, environment and university community; as well as advice and support to comply with health, safety and environmental law and the optimal utilisation of assets will be high priorities.” Another initiative that the Executive Director of Operations plans to undertake is to optimise the usage of electricity and water and reduce carbon footprint to become ‘green’.*

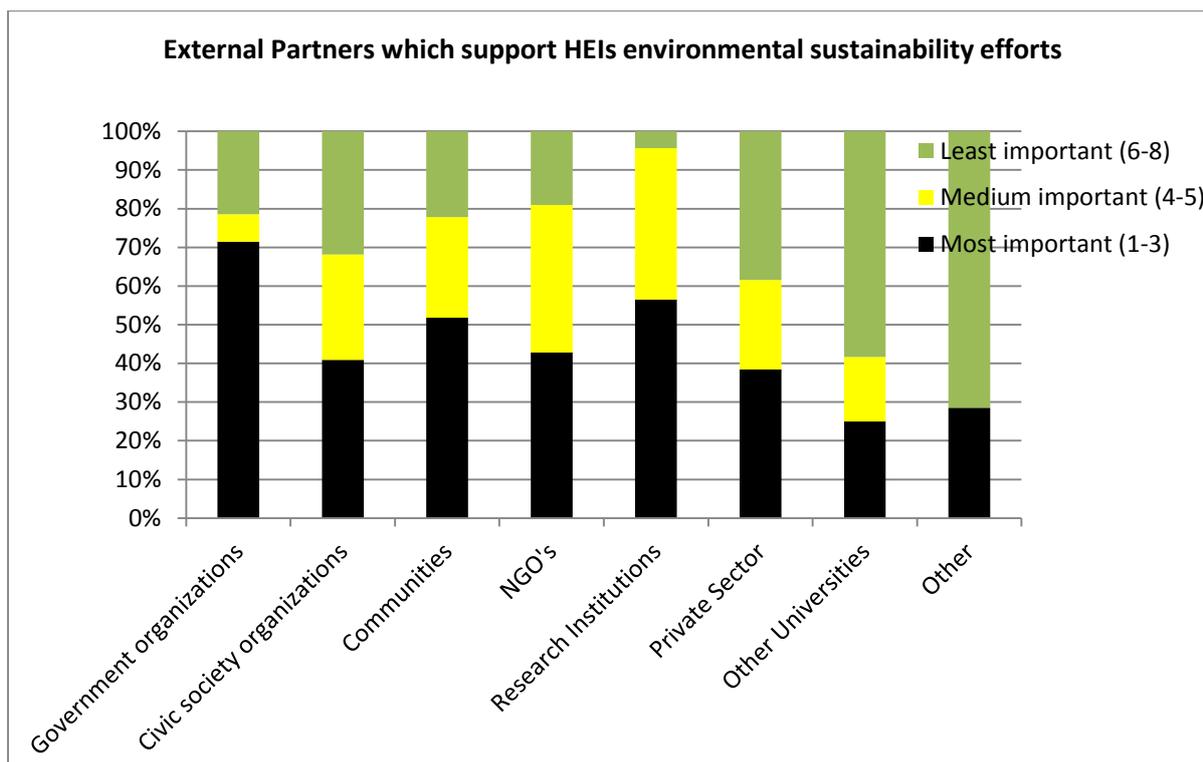
University of Ziguinchor, Senegal: *The University is putting in place a scientific platform (LMIPATEO) with the Institut de Recherche pour le Développement (IRD) to analyse strategies of local actors towards the environment.*

In summary, it is clear that in practice, environmental sustainability activities are happening in many universities and many of them are making efforts to promote sustainability practices both within and outside their communities.

5.2.3: Level of Support from External Partners in Environmental Sustainability Initiatives

Eight categories of external partners were given for survey respondents to rank the level of support they receive from each to support their environmental sustainability initiatives. With a score ranging from ‘1’ “most important” to ‘8’ “least important”, government organisations received the highest aggregate score of 71%, followed by research institutions (56%), and communities (52%). The private sector (37%) and other universities (25%) were also ranked while those labelled under “other” included donors and international funding agencies (see [Figure 5.2](#)).

Figure 5.2: External Partners which support HEIs environmental sustainability efforts



5.2.4: Resource Focus and Initiators on Environmental Sustainability Programmes in HEIs

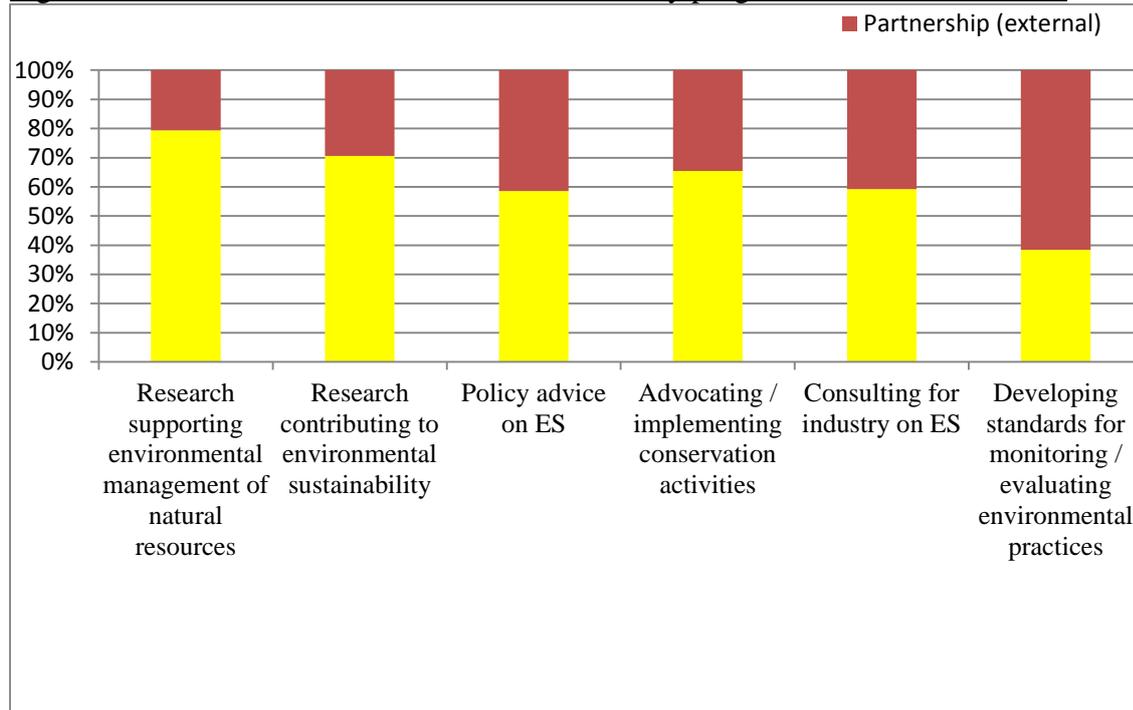
Activities were categorised to determine where universities were focusing their resources and where they have developed expertise in pursuing environmental sustainability. It was also important to know who was driving the activity, for example, whether the initiative was stimulated by the university or whether it was being initiated by an external partner.

The responses from respondents showed resources were channelled towards:

- Research supporting environmental management of natural resources;
- Research contributing to environmental sustainability;
- Policy advice on environmental sustainability;
- Advocating/implementing conservation activities;
- Consulting for industry on environmental sustainability; and
- Developing standards for monitoring/evaluation for environmental practices

Most research was initiated internally by universities (65%). Of the six focus areas given to respondents, approximately 75% of researches on the management of natural resources were internally driven. Three other initiatives, namely policy advice on environmental sustainability (58%); advocating/implementing conservation activities (65%); and consulting industry on environmental sustainability (58%) were also driven primarily by the university. Developing standards for monitoring/evaluation for environment practices was the only category that was driven more by external partners (52%) as depicted in [Figure 5.3](#). A lot more ought to be done to ensure that both universities and their external partners collaborate equally on environmental sustainability issues for mutual benefits to both sides.

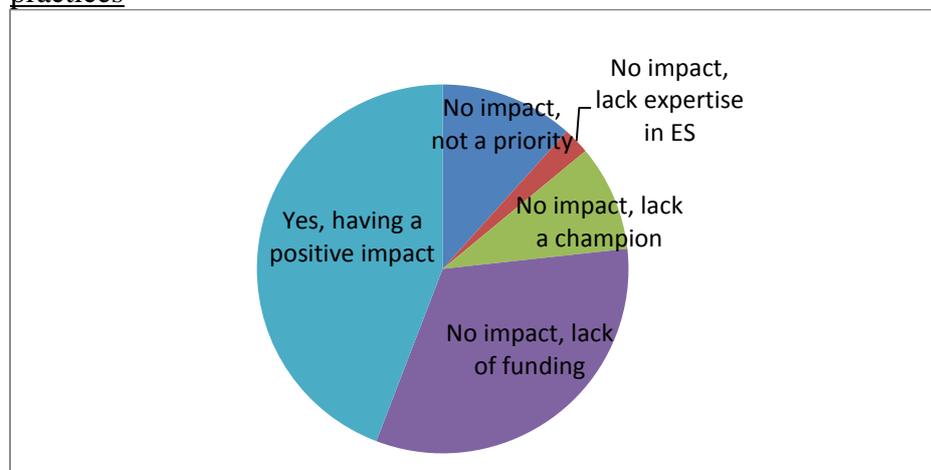
Figure 5.3: Initiators of environmental sustainability programmes in African HEIs



5.2.5: General Assessment of Impact of Environmental Sustainability Policies and Practices

Forty-nine percent (49%) of the 39 respondents in the survey believed environmental policies and practices in African universities are having a positive impact on the environment surrounding the campus. However, some challenges were also noted. Thirty-six percent (36%) of the respondents believed their greatest challenge is inadequate funding to support ES initiatives. Other respondents believed environmental sustainability was not a priority for the university (13%) and another 10% felt their lack of success was due to not having a champion to take the lead (Figure 5.4).

Figure 5.4: General assessment of impact of environmental sustainability policies and practices



It is gratifying to note that despite the challenges, 97% of the respondents in the survey indicated that they have the expertise to support environmental sustainability initiatives towards poverty reduction and overall socio-economic development.

5.3: Identified Issues on Environmental Sustainability in African Universities

Though the three components of sustainable development (environment, economic, and socio-political wellbeing) are complementary to each other, the study has shown that many universities prioritise environmental sustainability as an area of focus and within this, they have the capability to manage environmental challenges internal to their universities.

Again, even though a lot of activities on environmental sustainability are taken place in African universities, many are explicit to official policy documents, and are therefore not well captured for effective coordination and monitoring.

There is still more room for synergetic relationship between universities and other external stakeholders other than Governments, to pursue the environmental sustainability agenda. Some of the benefits to universities include life-long learning for students, funding for contract/graduate research, and financial sustainability (see *Section 1.2.4*).

Section 6

TECHNOLOGY GENERATION AND UPTAKE IN AFRICAN UNIVERSITIES

This section provides an overview of the African landscape on technology generation and uptake, and highlights cases derived from desktop research and the survey on science parks and business incubators (as channels of technology generation and uptake) and their intersection with the higher education sector. Generally, science parks and business incubators are an emergent phenomenon in Africa, but concentrated in a few regions. Some cases identified provide insight into the experimentation occurring in HEIs across the continent.

6.1: The Importance of Research and Development to University-Industry Linkages

For past decades, governments the world over have been enlisting universities in their efforts to promote technological innovation, and have stimulated linkages between academia and the private sector for that purpose. They specifically invest public funds into (R&D) to bolster technical advancement in industry and stimulate overall national development, and “entrepreneurial universities” such as Stanford University and the Massachusetts Institute of Technology (MIT) have responded positively to the overtures (Etkowitz, 2002; Geiger and Sá, 2009; Dill and van Vught, 2010).

Generally, universities responses to the favourable environment created for R&D include performing advanced research in technological areas with clear relevance to industry; consulting and providing technical assistance to local firms; educating highly skilled workers; and attracting talent to the local region. More directly, they also facilitate the formation of spin-off companies to commercialise technologies arising from academic laboratories; patent and license inventions; and cooperate with industry in various R&D activities (Perkmann & Walsh, 2007; Geiger and Sá, 2009).

In a growing trend, a more challenging competitive environment has put pressure on firms to innovate more quickly and efficiently as their ability to seek out external sources of knowledge is now viewed as an imperative for them to remain in the competition (Buderi, 2000; Chesbrough, 2003). It is also propelling multinational companies to seek out more research partners across sectors and countries.

The emergence of science parks around academic institutions has the aim of fostering technology-driven economic development and facilitating the uptake of academic inventions by the private sector. To complement this and nurture start-up companies to commercialise technologies stemming from university labs, universities started business incubators in greater numbers. What is known in Africa is that because there is no comprehensive dataset or directory of science parks and business incubators in universities and the continent is vastly underrepresented internationally in terms of the quantity and visibility of its parks and incubators. Currently, only 2% of the 385 members of the International Association of Science Parks (IASP) worldwide are from Africa. As partial and tentative indicator, this is suggestive of the recent adoption of such organisational structures in African universities.

Recently, the IASP conducted a survey of science parks and business incubators in 137 organisations (including universities) in the following African countries: Algeria, Angola, Botswana, Cape Verde, Chad, Congo, Ethiopia, Ghana, Ivory Coast, Kenya, Liberia, Libya, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe (Sanz, 2012). With a 22% response rate was, the key findings from the survey were as following:

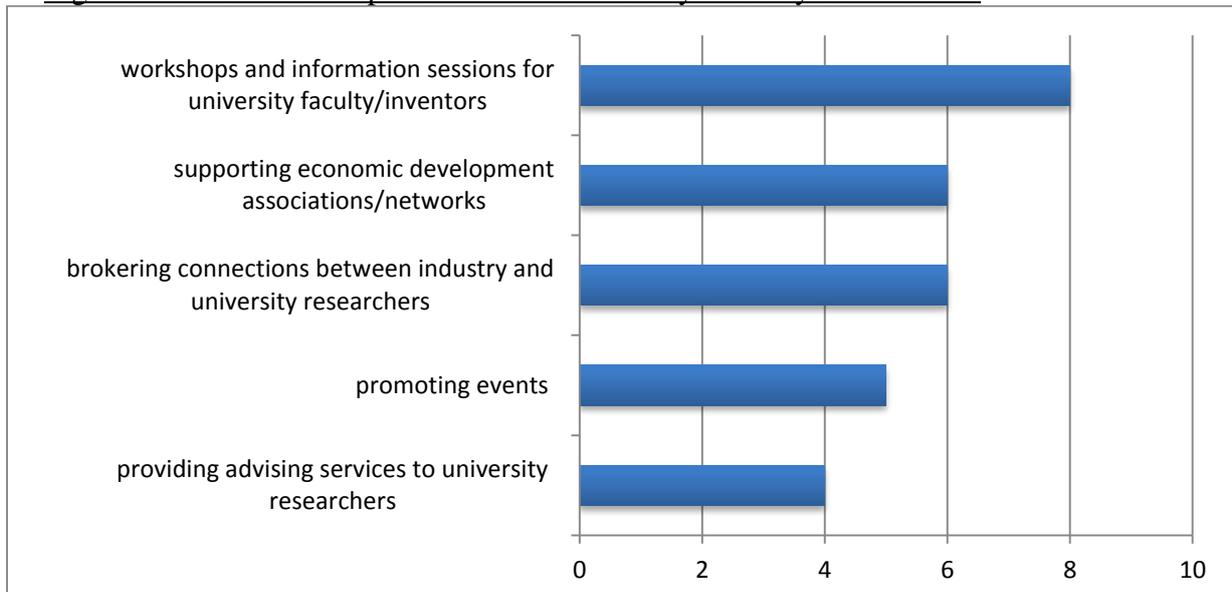
- Most science parks and business incubators surveyed were created in the last decade.
- Government was the greatest instigator of business incubators (72%), while universities were the main proponents of science parks (50%). Altogether, government and universities acting in isolation or together were the most usual actors behind the creation of science parks (100%) and business incubators (86%) surveyed.
- Most business incubators were stand-alone units, and only 20% were based in universities; in contrast almost 60% of science parks were university-controlled.
- Once science parks and business incubators were launched, the private sector tended to get more involved, although at relatively low levels (c. 21%). Accordingly, 70% of the science parks were publicly owned, in most cases by a university or national/regional government.
- The most usual objectives for science parks were the creation of new technology-based companies (50%) and promotion of local economic development (30%). Enhancing university-industry linkages featured modestly as an objective (10%), although almost all of the units housed R&D activities.
- Attracting foreign companies (80%) was an important objective of the surveyed science parks.
- Half of the science parks were based in large cities, and 70% were at least in a medium-sized city (population of 500,000 or greater), while 84% of business incubators were at least in a medium-sized city.

This report builds on existing literature and paint a partial picture of the current landscape of technological uptake in African universities.

6.2: How Science Parks and Business Incubators Interface to Facilitate University-Industry Linkages in Africa

Respondents of the SHESRA Project's survey on *Technology Uptake* threw more light on how university-industry partnerships and entrepreneurship were fostering the creation, development and commercialisation of technologies through the establishment of science parks. The most frequent initiatives were running workshops and information sessions for university faculty/inventors; supporting economic development associations/networks; and brokering connections between industry and university researchers. Others included promoting events and providing advisory services to university researchers. In general, the respondents seem to place their effort on activities that foster the human and social capital underlying entrepreneurial innovation than facilitating and promoting the commercialisation of university inventions (see [Figure 6.1](#)).

Figure 6.1: How science parks facilitate university-industry connections.



These findings complement what was similarly stated in the Ssebuwufu survey that industry liaison offices in universities had a relatively modest role in managing science parks (19%; n=18/95), and that not enough policies were available to promote the commercialisation of university inventions (see also [Table 8.3](#)).

6.2.1: Synergies between Science Parks and Business Incubators

Consistent with existing literature as noted in [Section 6.1](#) above, the survey found that most science parks and business incubators were created in recent years. The earliest science parks were established in 2005 and the earliest business incubators in 2008. Some universities also indicated that they were planning and/or building new science parks and business incubators.

From the survey, 60% of the 10 identified science parks in operation or under construction were affiliated to public universities while the rest were linked to non-profit, private institutions. The 6 already established science parks in operation were identified at or in cooperation with the following institutions:

- Adama Science and Technology University - Oromia ICT Incubation - Ethiopia
- All Nations University - Ghana
- National College for Medical and Technical Studies - Sudan
- National University of Science and Technology - Zimbabwe
- University of Johannesburg – South Africa
- University of Sfax - Société de Gestion du Technopôle de Sfax - Tunisia

The 4 science parks planned/under construction were located at Kenyatta University (Kenya) Puntland State University (Somalia), University of Thies (Senegal) and the University of Zambia (Zambia).

Similarly, of the 16 business incubators in operation or under construction, 63% were based in public universities. With some intersection with the institutions above, 11 of the incubators were identified at:

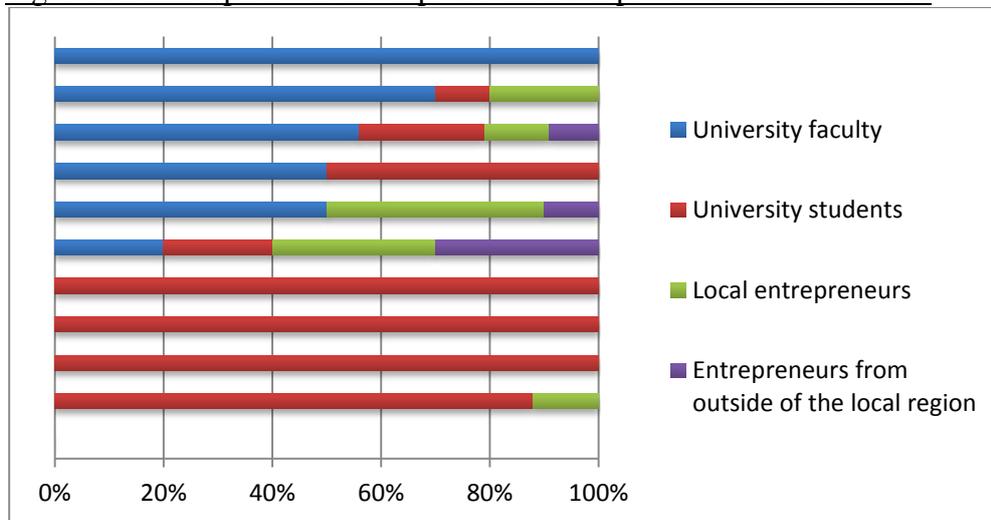
- Adama Science and Technology University - Oromia ICT Incubation – Ethiopia
- AFI-L'Université de L'Entreprise – Senegal

- Benadir University – Somalia
- l'Institut Supérieur de la Communication, des Affaires et du Management (ISCAM) – Madagascar
- Kenyatta University – Kenya
- National University of Science and Technology – Zimbabwe
- North-West University (NWU) – South Africa
- Riara University – Kenya
- University of Johannesburg – South Africa
- University of Pretoria – South Africa
- University of Sfax - Société de Gestion du Technopôle de Sfax – Tunisia

The 5 business incubators being planned or under construction were to be located at National College for Medical and Technical Studies (Sudan), University of Swaziland (Swaziland), University of Thies (Senegal), University of Uyo (Nigeria) and University of Zambia.

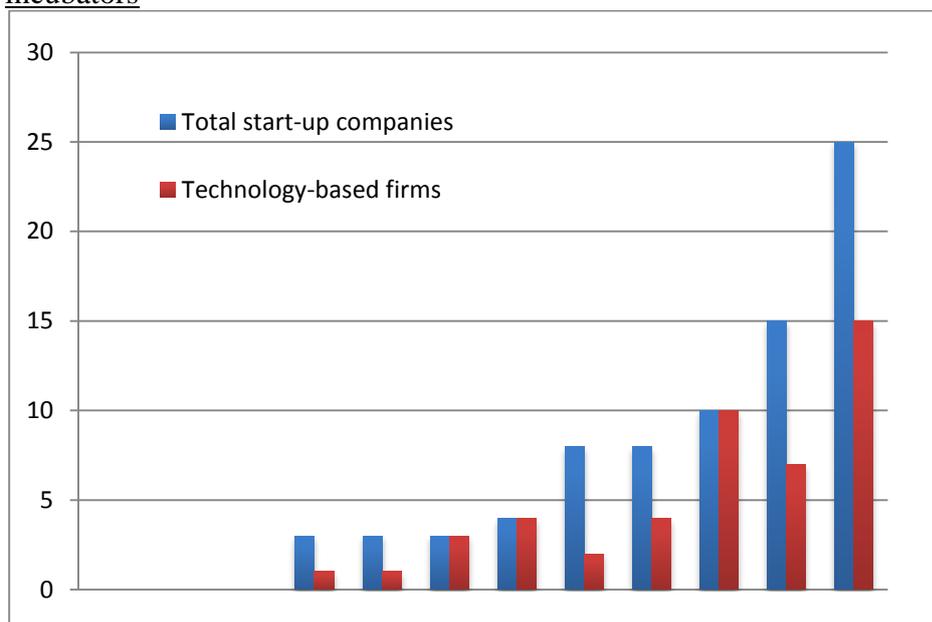
It is worth noting that while the IASP survey showed that governments were the key instigator of business incubators (72%) and only 20% were based in universities, the reverse seems to be the case in the SHESRA *Technology Uptake* survey. In reality though, the latter survey focused only on universities while the former sampled a whole spectrum of organisations. In the SHESRA survey, university faculty and students were the most usual entrepreneurs at the business incubators, as depicted in [Figure 6.2](#). Entrepreneurs from outside the local region were the least usual.

Figure 6.2: Entrepreneurial composition of sampled business incubators



As with the IASP survey, most business incubators identified in the *Technology Uptake* survey operated as stand-alone organisations. Only two were based in existing science parks: at the National University of Science and Technology in Zimbabwe; and Kenyatta University in Kenya. They also had relatively few incubated companies. Most had fewer than 10 incubatees and although there was some variability, technology-based firms – defined as those companies focused on commercialising technologies they develop – were common (see [Figure 6.3](#)).

Figure 6.3: Total start-up companies and technology-based firms borne from business incubators



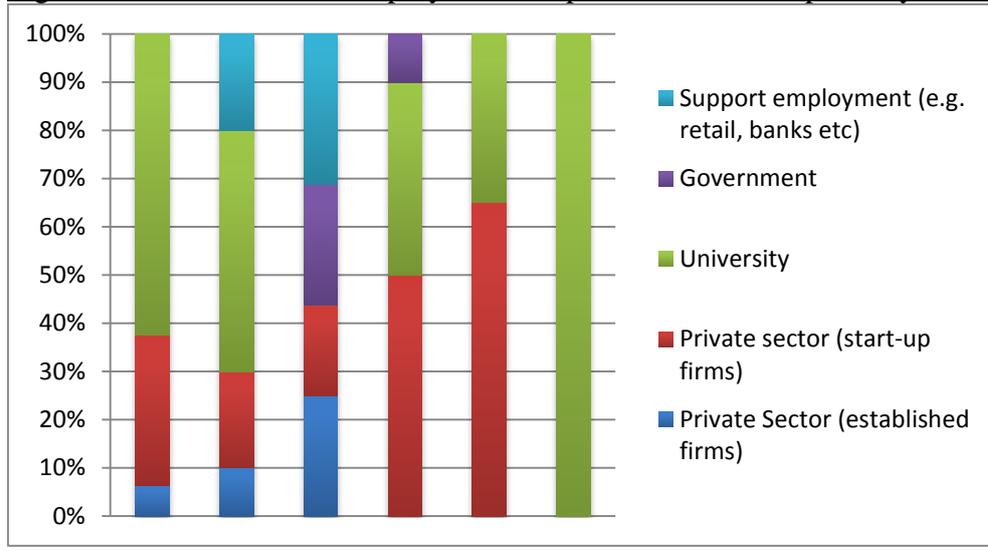
The SHESRA *IPR survey* (findings presented in Section 8) also found out that among African universities that have incubators and technology parks, especially those in Northern and Southern Africa, mostly operated as semi-autonomous entities with own Boards and management. It further confirmed that the establishment of incubators and parks in sub-Saharan African universities is new, and listed HEIs which were piloting this to include: Kwame Nkrumah University of Science and Technology (Ghana), Eduardo Mondlane University (Mozambique), University of Dar es Salaam (Tanzania), University of Nairobi (Kenya), University of Botswana, University of Namibia, Jomo Kenyatta University of Agriculture and Technology (Kenya), Makerere University (Uganda), and 2iE (Burkina Faso) as examples.

Regarding the operation of science parks, respondents in the *Technology Uptake* survey indicated that most were operated directly by the university. This thus confirms the findings of the IASP survey which stated that despite universities being the main proponents of science parks (50%), almost 60% of science parks were university-controlled. Even in the *Technology Uptake* survey, the university plays a formal leadership role in the 2 parks being administered as a joint venture between public and private organisations. In only one case was the university regarded as one among many entities playing a leadership role.

6.2.2: Size and Infrastructures of the sampled Science Parks

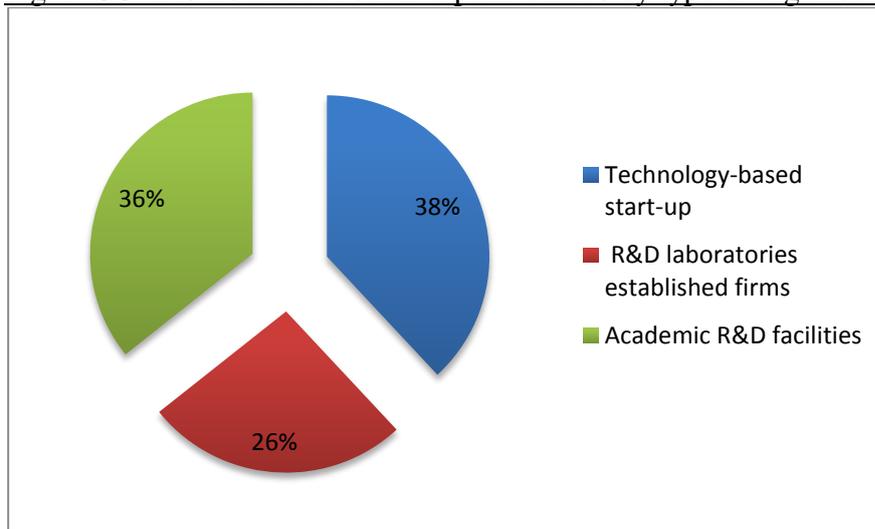
As relatively new organisations, the 6 sampled science parks had relatively small infrastructures. In terms of area for real estate development, most had up to 5,000 square metres. In two cases, the parks had between 5,000 and 15,000 square meters, and in one case between 25,000 and 35,000 square meters. Most had just one constructed building. Only two parks had 10 or more buildings. The make-up of employment by sector varies across the parks (see [Figure 6.4](#)).

Figure 6.4: Breakdown of employment in operational science parks by sector



Unlike new science parks and business incubators elsewhere, the units identified had relatively few tenants made up mostly of technology-based companies, R&D labs of established firms, and academic R&D facilities (see Figure 6.5).

Figure 6.5: Distribution of science park tenants by type of organisation



6.2.3: Spin-offs from Universities

Academic spin-offs are new ventures meeting the following criteria: the founding team is composed of university researchers and/or university students; the activity of the venture is based on scientific and technical knowledge generated in the university environment; and the transfer of knowledge has to be direct and not through intermediate employment. Since academic entrepreneurs are likely to have little business experience, business-related learning is crucial for their success.

Many universities in developed countries have had numerous spin-offs which contribute a significant amount to their countries' economy while employing thousands of people. For instance, Chalmers University of Technology (Sweden) has spun-off hundreds of companies and currently spins off 15 -20 per year; Massachusetts Institute of Technology (United States)

also spins off about 20 companies per year; and Cambridge Enterprise holds equity in 68 companies on behalf of the University of Cambridge (UK) as of 2011.

As was the case of science parks and university incubators, spin-offs were found mostly in universities in South Africa and Northern Africa in the *Technology Uptake* survey. The *IPR survey* also noted that universities such as Stellenbosch, Johannesburg, Cairo, Cape Town, Pretoria and Witwatersrand have spin-off companies created out of research results and innovations of university staff and students. Universities in sub-Saharan Africa are just starting to embark on the commercialisation of research results and innovations and not many examples of spin-offs have been documented.

6.3. Sustainability Issues Facing Technological Establishments

Capital for park development and renovation and their financial sustainability were critical challenges facing the science parks. Other challenges identified by respondents included:

- Local/regional market for tenant technologies (N=7 out of 8)
- Investment capital for tenants (N=6 out of 8)
- Identifying, supporting, and growing a sufficient tenant base (N=6 out of 8)
- Lack of an entrepreneurial culture (N=6 out of 8)
- Retention of successful companies in the local area (N=4 out of 8)

Several external and internal determinants of success were noted by respondents, including:

- Commitment of university leadership
- Administrative capacity to assist early-stage companies
- Full-time support staff independent of university
- A good match between research strengths of university and tenant recruitment
- The local/regional market for tenant technologies.
- Acceptance by local economic development community
- Access to capital to construct buildings
- Access to investment capital sources for park tenants
- Physical proximity to university campus
- Priority access to university resources, facilities, faculty, students
- Availability of amenities (retail, recreation, etc.)
- Availability of space for multiple tenants
- Space at lower cost than local alternatives
- Presence of a corporate or government “anchor” tenant (well known institution that gives the park visibility)
- Physical proximity to an industrial/business centre
- Ability to manage real-estate and hold vacant space for expansion

Section 7

BUSINESS ETHICS IN AFRICAN UNIVERSITIES

Ethical behaviour shot to prominence recently after the collapse of big companies like American Group International Incorporate (AIG), Enron and Tyco. It is now a common phenomenon to see Non-Governmental Organisations (NGOs), media, shareholders, consumers, clients, employees and other stakeholders putting a lot of pressure on companies and institutions to address ethics issues, and the latter trying their best to understand ethical dilemmas to meet expectations from different stakeholders (Institute of Business Ethics, 2012).

The International Association of Universities (IAU) and the Magna Charta Observatory (MCO) have jointly produced a set of Guidelines for an Institutional Code of Business Ethics (CBE) in Higher Education to help HEIs adopt and adapt it as well as assist those who would wish to review their existing Codes of Business Ethics to use it as a prototype (IAU-MCO, 2012). The *Guide* is based on the core values the Constitutions of the IAU and the Magna Charta Universitatum, which translate into the following principles:

- Academic integrity and ethical conduct of research;
- Equity, justice and non-discrimination;
- Accountability, transparency and independence;
- Critical analysis and respect for reasoned opinions;
- Responsibility for the stewardship of assets, resources and the environment;
- Free and open dissemination of knowledge and information; and
- Solidarity with and fair treatment of international partners.

7.1: Determining Ethical Practices in African HEIs

As part of the Global Survey of Business Ethics, Kagabo (2011) investigated business ethics in teaching, training and research in 5 Francophone African countries, namely, Burundi, Democratic Republic of Congo, Ivory Coast, Senegal and Rwanda. His findings revealed that in these countries, academic teaching of Business Ethics had not taken deep roots in traditional faculties of Economics, Management and Commerce, and few universities were offering this course. On the other hand, training and advocacy in business ethics had been profound particularly in the operations of NGOs as part of their pursuit of political and economic governance, development, women and gender issues.

The respondents in the survey considered corruption and economic embezzlement; economic inequalities; poverty; aid; and intellectual property rights as major ethics issues that needed to be tackled as soon as practicable.

7.2: University Core Values Aligned to Ethical Practices

In the SHESRA *Business Ethics* survey of 27 HEIs, a number of core values were listed by respondents which are aggregated as follows: academic excellence; Christian values; discipline; ethical values; self-reliance; and zero tolerance for corruption. These values tied in perfectly with the respondents' mission statements whose frequency of responses were on:

- Quality education (41%);
- Research (19%);

- Creativity and innovation (7%)
- Religious values (11%)
- Ethics of good governance (7%);
- Scholarship (33%); and
- Knowledge and skills (30%)

7.3: Mechanisms Promoting Codes of Ethics in Universities

Sixty five percent (65%) of 26 respondents in the survey reported that their institutions have an Ethics Committee; 31% did not; and the remaining said there was a unit in charge of ethics. Membership of these committees were varied but comprised mostly of Vice-Chancellors, faculty deans and registrars. Sixty one percent (61%) of the Committees were located in the offices of the Vice-Chancellor/President; 28% were not accommodated in any particular office; and 11% were in some other offices.

Carefully perused, it was found out that even though 13 respondents reported that they had a stand-alone Code of Business Ethics (CBE), and 3 of them had tended in their documents, these were basically *Codes of Conduct* which addressed only staff and students issues with some emphasis on research ethics. Conclusively, many of the surveyed HEIs have Codes of Ethics for different disciplines (pharmaceutical technology, engineering and technology, medical sciences); activities (examinations, human research including gender issues, animal care, environment and bio-safety research, drug policy, quality management system; performance contract quality manual, and strategic plan); and professions (Professional Councils, Nursing, Law, etc). While some of these codes were complementary to others, the typical codes of business ethics that strengthen institutions' engagement with external stakeholders were not fully developed or operational.

What has come up as the cross-cutting policy that highly involves university's external stakeholders is a code of ethics on research. The *Gender Equity* survey found that Université Cheikh Anta Diop de Dakar (UCAD), Senegal has an advanced research ethics through the constant scientific and technical research conducted by staff at the institution or in partnership with external research partners (L'Université Cheikh Anta Diop de Dakar, 2012).

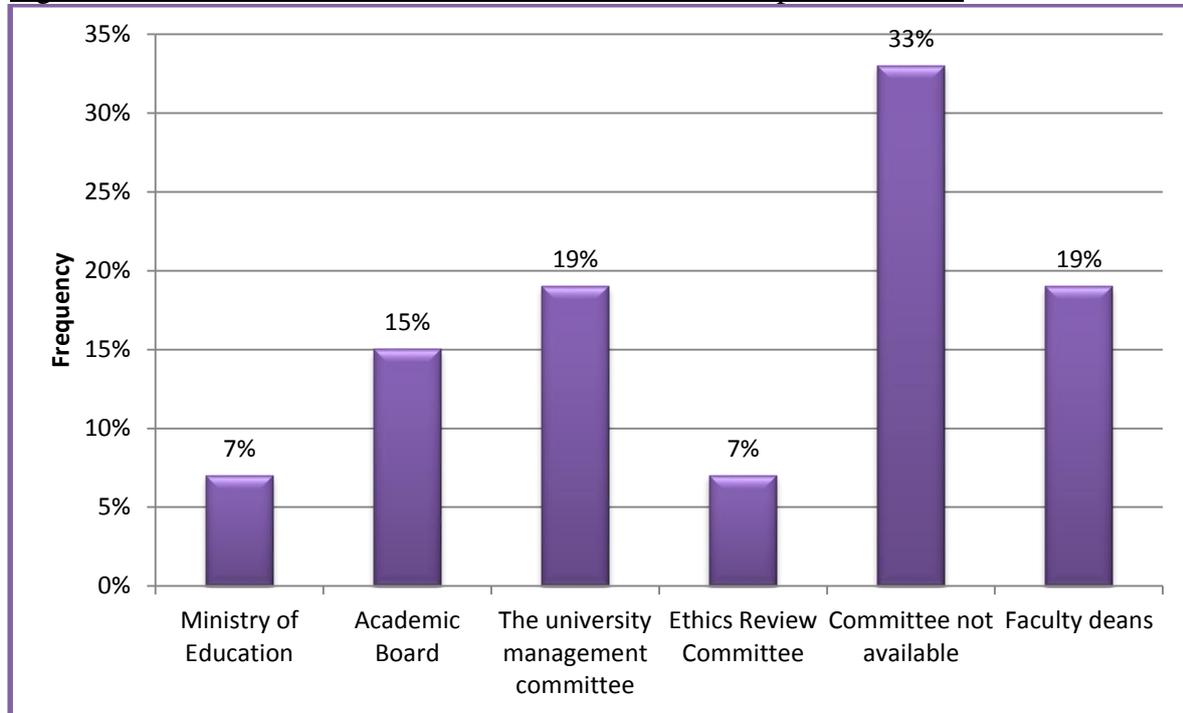
7.4: Extent of Stakeholder Buy-in in the Development of Codes of Ethics

Stakeholders who contribute to the generation, commercialisation of innovations, inventions and research findings normally include universities and R&D institutions, researchers and inventors, inventors' research groups and departments, research assistants, students, postgraduate and postdoctoral fellows, guest researchers, sponsors, technology transfer units, national patent offices, government, and the public. These stakeholders have their interests and expectations, which in many cases are in conflict with each other. Their activities are therefore guided by a code of business ethics which may be developed using a number of approaches (e.g. stakeholder model, issues-based model, functions-based model and hybrid model).

The involvement of external stakeholders in developing CBEs in the sampled institutions were so low that it is not surprising that this weakness was identified by an external stakeholder in the *Gender Equity* survey (see *Section 1.2.6*). Even though their core values tied with their institution's mission statements, of 23 respondents in the *Business Ethics* survey, 57% of them reported that they did not specifically base the development of their institutional codes of ethics on the core functions of the university (namely, teaching, learning, research and community outreach). And most of them did not consult widely while

drafting these ethical documents. Only 7% involved an external stakeholder (Ministry of Education); 15% involved the Academic Board; 19% involved University Management Committees; 7% involved an Ethics Review Committee; and 33% did not even have an Ethics Committee that was involved (see [Figure 7.1](#)).

Figure 7.1: Extent of stakeholder involvement in the development of CBE



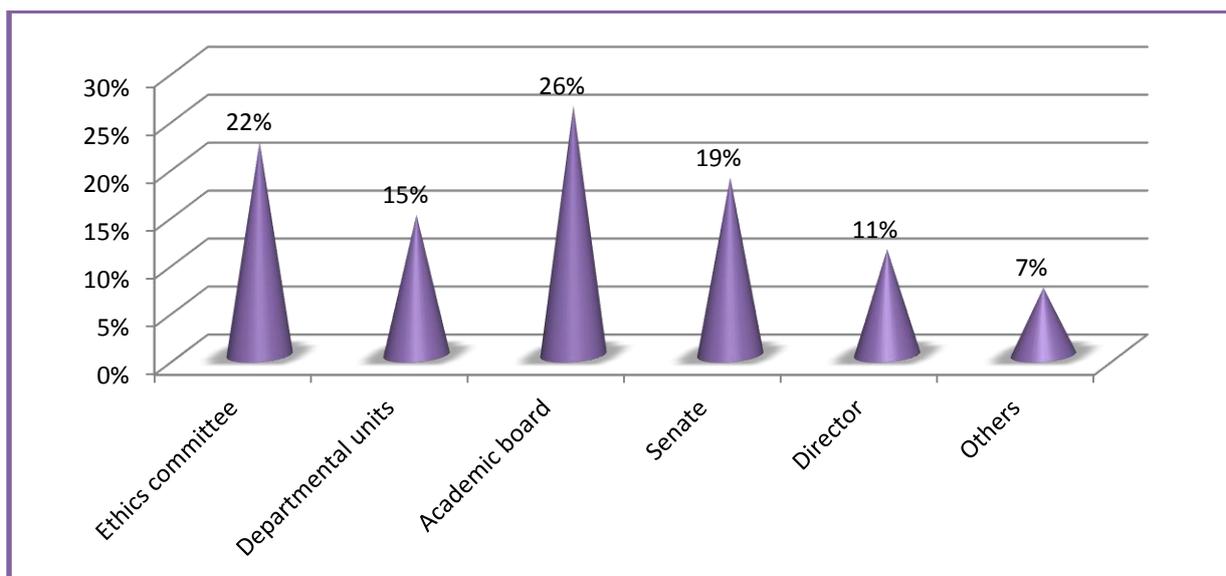
7.5: Approval, Monitoring and Reviews of Codes of Ethics

On the effectiveness and applicability of the various codes of business ethics, 11% said that it was effective in bringing good relationship between students and staff; 63% said that it has a positive effect on the entire activities of an institution; and the rest said that it contributed to respect for staff, dressing codes, guide in decision making, and enrolment. All these responses indicated that the policies in reference were not CBEs but other codes to guide the internal dealings of the institutions.

With little stakeholder involvement in the development of institutional codes, it is not surprising that approvals by the institutions governing authorities were low. Nineteen percent (19%) of respondents did not indicate any approving authority which could mean that they have not been approved while others were approved by University Councils (22%); Senate (33%) and Academic Board (19%).

The same channels of approval almost invariably are used to monitor the implementation and review of the codes. Twenty-two percent (22%) of respondent institutions had an Ethics Committee that monitors and reviews the codes; 15% said this was done by departmental units; another 26% said it was done by the Academic Board; and 19% said that it was being done by the Senate (see [Figure 7.2](#)).

Figure 7.2: Monitoring and reviewing CBE



With regards to reviewing of the codes, 22% of 18 respondents did not have a time frame for the review of their CBEs; and 33% said that they are reviewed during amendments of policy manuals. Some of the challenges identified by respondents in undertaking these reviews included lack of appropriate monitoring and evaluation (M & E) mechanism in place; problems associated with monitoring human beings; power imbalances in institutions that prevented some members to report cases; occasional incidences of plagiarism of students' projects; a culture of silence; delays in receiving feedback; financial problems; and interference from opinion leaders.

7.6: Identified Issues on Business Ethics in African Universities

The survey recognised a strong urge for HEIs to identify and collaborate with a large number of external stakeholders because they affect and are affected by the institution's operations. In reality, however, the respondent institutions have had little engagement with these stakeholders in the development of their codes of ethics, as mentioned earlier. More importantly, very few of the sampled HEIs have operational Codes of Business Ethics to guide their collaboration with all their stakeholders. Without a CBE, HEIs stand a risk of losing out on opportunities for effective linkages with the productive sector. On the other hand, the stakeholder involvement provides various opportunities, such as internships and work attachments; research collaborations, quality improvement; scholarships; and collaboration in achieving mission, vision and core values (see *Section 1.2.1*).

Though many of the sampled HEIs responded that they had Ethics Committees, most of the Ethics Committees which were being referred to were for particular disciplines, such as research and did not address broader aspects of ethics. It is however gratifying to note that where Ethics Committees existed, membership included Vice Chancellors and other senior level university managers. However, more needs to be done to effectively implement the various codes due to several challenges identified under *Section 7.5*.

Section 8

AFRICAN UNIVERSITIES AND INTELLECTUAL PROPERTY RIGHTS ISSUES

The previous section has shown how universities confuse Codes of Conduct and other codes with Codes of Business Ethics, which is a principal instrument that builds trust among key external stakeholder partners. This section explores the intellectual property rights (IPR) issues implicitly or explicitly stated in official university policies with the aim of building and sustaining the relationships between African universities and their external stakeholders.

8.1: Research and Development (R&D) and Intellectual Property Rights Issues

The concept of intellectual property (IP) relates to the fact that certain products of human intellect should be afforded the same protective rights that apply to physical property. Most developed economies have legal measures in place to protect both forms of property. Intellectual property can consist of patents, trade secrets, copyrights and trademarks, or simply ideas. As universities have started to emphasise innovation and R&D, protectionism is needed to encourage faculty to come up with innovations and inventions aimed at contributing to socio-economic development, developing the goodwill of the institution, and obtaining sponsorship and research contracts for the researcher and university as a whole.

According to OECD (1993), R&D is “creative work undertaken on a systematic basis to increase the stock of scientific and technological knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications”. While R&D is often thought of as synonymous with universities and high-tech firms that are on the cutting edge of new technology, many established consumer goods companies spend large sums of money on improving old products as well.

Usually it is the university researchers, staff and students, who generate excellent innovative ideas (see [Figure 6.2](#) under *Section 6.2.1*), but they are sometimes uncertain of how to develop these ideas to commercial success, including the important step of protecting these innovations. With a few exceptions, these innovations generated by research staff and students belong to the university and, in turn, the university has a generous reward policy should such innovations be commercialised and result in income into the university. Some universities have subsidiary companies, as is the case for Witwatersrand University – Wits Enterprise; Stellenbosch University’s InnovUS Technology Transfer PTYLtd; and JKUAT Enterprise Ltd. for Jomo Kenyatta University of Agriculture and Technology, which anchor the commercialisation of their innovations.

An important role of a university’s commercial enterprise is to assist the university’s researchers, wherever possible, with a one-stop service for their intellectual rights protection through the filing of patent applications and the prosecution and maintenance thereof; and commercial development through the acquisition of funding to develop their concepts further. Inventors, on the other hand, are encouraged to make invention disclosures to the company for consideration of the necessity to protect these inventions and intellectual property by the filing of patent applications.

Towards the university, the subsidiary company has the role of managing and administering its patent portfolio, and to investigate ways of exploiting the patents in the portfolio for the benefit of the university and the inventors. This is carried out under the terms of the university's IPR Policy and this arrangement creates a win-win situation for both the inventors and the university.

Commercialisation into marketable products and services after a patent, copyright, trade mark or industrial design is essential to get returns for the investment expenditure. On a country by country basis, Africa invests very little in R&D, and hence has very little commercialised patents. Table 8.1 shows that the R&D expenditure for a selected number of African countries averages 0.4% of GDP.

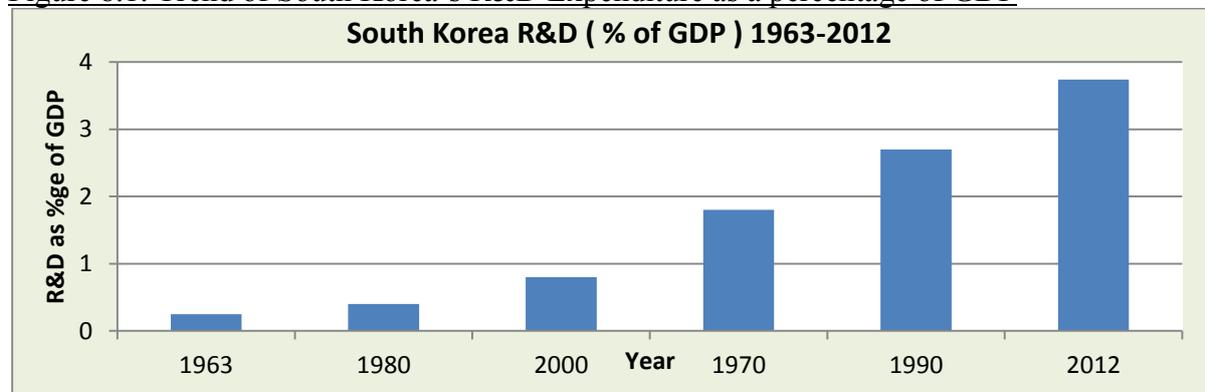
Table 8.1: Funds allocated to R&D as a % of GDP of selected African countries

Country	% of GDP
Ethiopia	0.17
Egypt	0.27
Kenya	0.42
Ghana	0.23
Nigeria	0.22
Senegal	0.37
Tanzania	0.43
Uganda	1.00
Zambia	0.34
Burkina Faso	0.21
Chad	0.39
South Africa	0.93

Source: World Bank Indicators 2007-2009

South Korea's rising expenditure on R&D (Figure 8.1), which has risen to almost 4% of its GDP, has contributed to significant research and innovation results which have been translated into useful IPR as shown by the high number of patents applications (178,924) as reported in the WIPO Statistical Tables, 2012.

Figure 8.1: Trend of South Korea's R&D Expenditure as a percentage of GDP



(Source: World Bank, 2012)

8.2: Policies on Protection and Commercialisation of Intellectual Property Rights in African Universities

Strategic plans are often regarded as the broad framework upon which several policies are developed by universities. As most respondents did not have stand-alone Codes of Business Ethics to streamline university-industry partnerships (see *Section 7*), institutional strategic plans become the key policy documents that provide this guidance. In the Ssebuwufu survey report (2012), 35% of respondents' strategic plans did not contain issues of conflict of interest, and another 35% did not have any statement on the sharing and ownership of intellectual property. Forty three percent (43%) did not have a framework for costing and pricing of contract research and consultancy services and another 43% did not have guidelines for the sharing of royalties and profits from collaborations with external actors (see [Table 8.2](#)), a situation that could have been forestalled if the HEIs also operated one-stop service subsidiary companies like the Wits Enterprise of Witwatersrand University.

Table 8.2: Availability of policies promoting commercialisation of innovations in HEIs

Institutional strategic plan contains reference to building linkages with productive sector	91%	115/127
<ul style="list-style-type: none"> • Do <i>not</i> have the following: <ul style="list-style-type: none"> • a policy on conflict of interest • a policy on the sharing and ownership of intellectual property • a framework for costing and pricing of contract research and consultancy services • guidelines for sharing of royalties and profits from collaborations with external actors • environmental policies governing activities undertaken with the productive sector 	35%	45/130
	35%	44/126
	43%	55/127
	43%	55/127
	46%	58/126

Perhaps to pursue their own self-interest, or perhaps due to the absence of policies and/or effective coordinating IPR units, individual researchers have been noted to take the initiative to register their inventions for protection, the high associated costs notwithstanding. According to the Uganda Registration Services Bureau (2012), Uganda has 72 registered patents many by individual researchers, including university professors. Currently, the Bureau has 1 application from Gulu University, 1 from Mbarara University of Science and Technology, 1 from Kyambogo University and 3 applications from Makerere University. But the applicants apply in their individual capacity and not on behalf of the respective universities. It is indicative therefore that most universities in Africa currently do not have a serious agenda to pursue IPR protection, reflected in the low request for patenting (see [Table 8.2](#)).

On the other hand, in the *IPR* survey, 80% of the 56 respondent institutions indicated that they had IPR policies and their universities have some patent policies as well (50%) which were embedded in their strategic plans. Yet very few of the strategic plans had protection for companies incubated in the communities (23%) and policies of spin-offs (see [Figure 8.2](#)). It must however be noted that within Africa, only universities in South Africa and some in Northern Africa that have made significant strides to make IPR protection a key strategy of their operations such that some have more than 200 patents as of 2011 (see [Table 8.3](#)).

Figure 8.2: Responses on IPR issues and commercialisation in African Universities

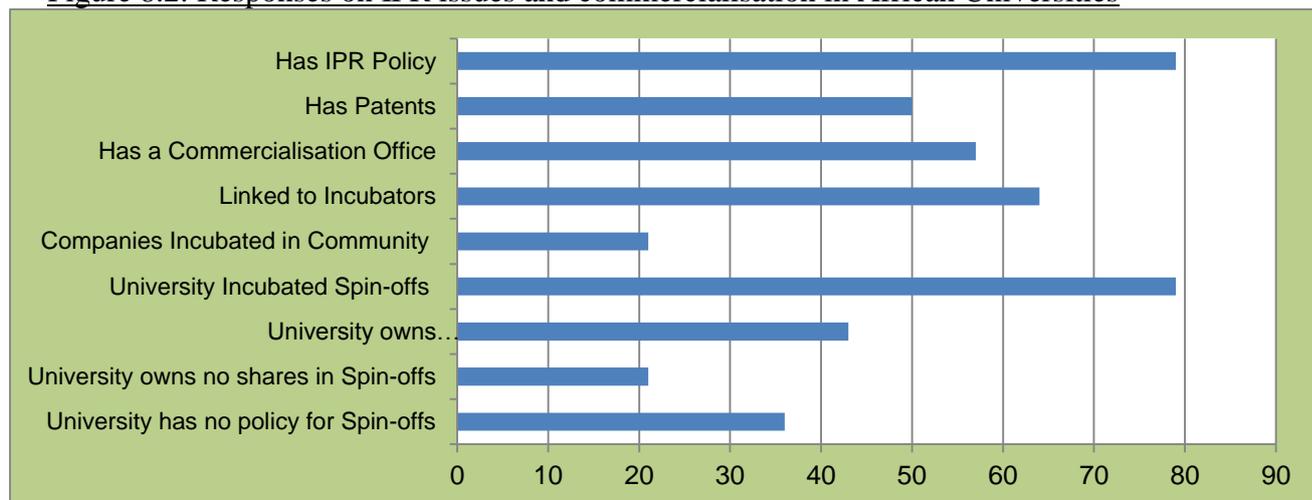


Table 8.3: Number of patents by selected African universities (2011)

<u>Name of University</u>	<u>Number of Patent</u>
University of Witwatersrand, South Africa	220
University of Cape Town, South Africa	200
University of Pretoria, South Africa	65
University of Johannesburg, South Africa	55
Alexandria University, Egypt	95
Stellenbosch University, South Africa	84
University of Namibia, Namibia	7
MISR University of Science and Technology, Egypt	5
Kwame Nkrumah University of Science and Technology, Ghana	2
Kenyatta University, Kenya	2
University of Nairobi, Kenya	1
Moi University, Kenya	1
Makerere University, Uganda	3
American University of Cairo, Egypt	1
University of Dar es Salaam, Tanzania	2
Gulu University, Uganda	1
Mbarara University of Science and Technology, Uganda	1
Kyambogo University, Uganda	1

8.3: Challenges to Commercialisation of IPRs in African Universities

Respondents in the *IPR* survey identified a number of challenges which have stunted the large-scale commercialisation of IPRs in African universities. These included:

- Weak intellectual property systems
- Inadequate technology transfer policies
- Premature dissemination of un-protected research results
- High costs of IPR protection and patent registration
- Staff promotion policies demanding prolific publications and dissemination of research results especially at conferences thus losing the patentability of inventions
- Few members of staff are engaged solely in Research and Development.
- Lack of entrepreneurial culture by staff and students

- Low funding from both the public and private sectors
- Weak linkages between universities and industry
- Poor resource mobilisation by universities
- Inadequate utilisation of local materials and traditional knowledge to yield intellectual property
- Little applied research

8.4: Identified Issues on IPR in African Universities

Universities collaborate with external stakeholders for a variety of reasons, including research, funding, scholarships and internship placement (see *Section 1.2.1*). But the level of interaction between universities and industry in most developing countries for R&D is weak compared to those encountered in developed countries and even in some Asian and Latin American countries. Subsequently, the level of transfer of knowledge from universities and R&D institutions and its utilization for the creation of national wealth is low and consequently, the contribution of universities and R&D institutions to national development is insignificant.

All the universities surveyed emphasized research in their strategic plans and had a research policy and supplementary ethics and conflict of interest policies. Compared with their counterparts in developed countries and in the emerging economies of Asia and Latin America, most universities and R&D institutions in developing countries are currently faced with several problems.

A few universities, more evidenced in South Africa, have however established subsidiary companies to provide one-stop services to researchers for IPR protection and commercialization. In general though, universities in Sub-Saharan Africa do not seem to pursue IPR protection and commercialization as much. The few patents may be attributed to the efforts of individual researchers who take the initiative to register their inventions for patent protection.

Section 9

KEY RECOMMENDATIONS FOR IMPROVING UNIVERSITIES EXTERNAL STAKEHOLDER RELATIONS

This Section categorises and presents the key recommendations from the 6 thematic research consultancies under the following sub-headings:

1. Development and Strengthening of Policy in HEIs
2. The Relevance of Strategic Planning
3. Promoting Policy Relevant Research and Development
4. Enhancing Funding Opportunities
5. Widening the Involvement of Stakeholders
6. Monitoring and Evaluation
7. Establishment and Strengthening of Institutions/Units
8. Re-aligning Learning Formats and Pedagogical Reforms
9. Good Governance

It is hoped that the recommendations, as explained below, would serve as a guide to African universities' external stakeholder relation development to facilitate mutual benefits to each party and also contribute to the overall socio-economic development of the continent.

9.1: Development and Strengthening of Policy in HEIs

A policy is meant to focus on issues of priority and strategic importance to an institution. For universities, policies are meant to guide the pursuit of their core mandates of teaching and learning, research and engagement with the community. Beside the core mandate, other policies developed by universities are to guide the management of a wide range of issues, such as gender equity, environmental sustainability, intellectual property and ethical dilemmas. One of the dangers of not creating a policy would be the lost opportunities (synergies, collaborations and cross pollination of ideas) for strengthening initiatives that are already taking place in some universities.

To be effective, successful and sustainable, university-industry partnerships require policies and procedures to guide all stakeholders in addressing and resolving ethical dilemmas in their interactions. The responsibility for promoting these policies mostly lies with the leadership in these institutions. Ability to envision and nurture buy-in; think strategically in the context of a diverse intellectual environment; sustain achievement, attract and retain faculty of exceptional talent are part of the critical ingredients of an effective and successful institutional leader. *“Without leadership, there is no commitment to change, and little chance of shifting institutional culture, of creating a sense of urgency, or of mobilising key stakeholders”* (ACU, 2002).

The consultancies recommended that universities develop appropriate policies that best fit the pursuit of their mission and vision statements. For instance on environmental sustainability, nearly all of the universities surveyed agreed to a common environmental sustainability policy framework for universities to incorporate into their strategic plans. The policy focus

should therefore be to integrate environmental practices, one of the three pillars of sustainable development, into all decision making processes.

9.2: The Relevance of Strategic Planning

Strategic plans present a holistic view of what an institution seeks to attain in the foreseeable future. It thus serves as a platform for the development of a number of policies. For HEIs, strategic plans include initiatives for improving the quality of teaching and research, incentives and infrastructure.

The studies recommend that strategic plans of universities should:

- Focus on building international standards on research while addressing national priorities;
- Be ambitious and benchmark with the top 100 universities in the world;
- Prioritise the establishment of systems to promote strong industrial and external relations; and;
- Promote internationalisation so as to attract international students to carry out their graduate studies and research at African universities.

In view of the above, the studies recommended multi-stakeholder involvement in the development of all institutional strategic plans. Since there is no cast-in-stone method for employer/stakeholder engagement, each university may develop its own model to engage its external partners.

9.2.1. IPR

With regards to the specific themes of this Report, the recommendations are for strategic plans to make the commercialization of IPR a major objective. The segment on IPR should include the following:

- Intellectual Property Policy
- Intellectual Property Advisory Committee (to provide oversight).
- Intellectual Property Manager.
- Intellectual Property Database.
- Intellectual Property Fund (to assist inventors).

9.2.2. Codes of Business Ethics

On Codes of Business Ethics, universities' well-articulated core values and mission statements should form a solid foundation on which a comprehensive CBE should be built. The strategic plans should ensure that all existing ethics documents are linked to the institutional CBE and compliance with the CBE be extended into staff contracts and promotions.

9.2.3. Gender Issues

With regards to gender issues, strategic plans should incorporate: the pursuit of localized gender equity research to enable universities to develop their own concept of gender equity and situational ethics; improve data collection at the institutional and faculty level; investigate internal issues that are sensitive in nature (e.g. sexual harassment); support stakeholder awareness and ownership of any subsequent policies, plans, or initiatives on gender; and ensure equity in gender representation at the highest decision making level.

9.3: Widening the Involvement of Stakeholders

Much as universities need to engage with external stakeholders when developing their policies and other documents, investigation is needed to examine what external partners'

interests and perspectives are on relationship building and how these considerations can be strategically aligned with the higher education sector for mutual benefit.

Universities need governments, both at local and central levels, to support R&D initiatives through inducements (e.g. tax incentives, project funding, seed funding) to attract external partners and industry, in partnership with universities, to engage in such activities. The availability of such opportunities underpins what goes on in science parks and business incubators which need physical, human, and IT infrastructure that universities alone are hard pressed to afford.

On specific study themes, the gender studies suggested enhanced collaboration on gender-disaggregated data between and among national governments, UN agencies (e.g. UNESCO), the World Bank, and the AAU and its member institutions to enable all stakeholders better understand the long-term challenges and opportunities around gender equity in education. The value of longitudinal analysis in providing depth to our understanding of the trends in gender equity is significant.

Regarding environmental sustainability, the survey recommends multipronged environmental sustainability policies initiated by a variety of stakeholders (governmental organizations, research institutions, community, NGOs, civic society, private sector and other universities) to benefit all partners and, in turn, their regions.

Since the commercialization of research and technology transfer involves the transfer of innovative research results, inventions and other creative works from the university research community to the industrial and commercial sector, it is important that universities establishes meaningful, beneficial and practical relationships with appropriate industrial and commercial stakeholders that can convert these research outcomes into practical applications. Hence, for African universities to thrive, they should actively engage industry involved in their realm of research activities. The universities could do the following:

- Organize open days to showcase university innovations especially those which can be taken up by industry and be produced so as to solve societal problems.
- Employ dedicated Industrial Relations Officer(s) to spearhead relations with industry and other external stakeholders.
- Demonstrate their capacity to solve problems so as to build confidence of their industrial partners.
- Make external relations a distinctive feature of university education.
- Construct a unified concept and vision for the university's external relations mission.
- Develop vigorous, systematic evaluations of all outreach and extension programmes.
- Strongly connect external relations to on-campus research and educational strengths.
- Generate ideas for university research that aim to solve industry problems.

Industry and other stakeholders should do the following:

- Attend conferences organized by universities especially those for dissemination of research results.
- Contribute to formulation and revision of university curricula.
- Sharing the burden, university conducts research while industry provides funding and utilizes research results.
- Offer of student attachments for research and internships.

- Promote stronger collaborations and partnerships between the university and stakeholders that can make use of and strengthen the university's research.
- Seek solutions to their problems from collaborating university faculty.
- Provide funding for university chairs and research.

9.4: Promoting Policy Relevant Research

A lot of recommendations were focused on the need to promote policy relevant research. The following have been categorised:

- African universities should position themselves to be at the forefront of home-grown innovations emanating from local researchers.
- The logic of the academic research system needs to revolve around scientific merit as well as contributions to society. Professional incentive and reward systems that consider contributions to technological generation and knowledge transfer can help foster such activities. University regulations should recognize and clearly outline the conditions upon which such activities may be undertaken, recognized, and rewarded. Governments have a role to play in this in terms of the relevant legislation governing academic institutions and the academic profession.
- There would be great value in investigating research ethics in higher education in Africa as a cross-cutting area of research through which improvements to other substantive areas of equity can be systemically made.
- African universities should adopt research strategies that aim to turn their universities into quality teaching and research institutions. In order to achieve this, they should selectively nurture and build continental leadership in a significant number of departments within each of the major academic groupings and professional schools and programmes and also prioritise equipping their libraries and research facilities to meet international standards. Furthermore, they should:
 - Increase the number of postdoctoral fellowships
 - Increase number of research professors
 - Strengthen research management and coordination
 - Incentivise research publications, especially in international journals
 - Improve research and publications culture
 - Improve funding for research and innovations
 - Increase access to internet and other ICT services
 - Improve researcher's time compensation.
 - Enable research results to be granted IP protection.
- African universities should also build multidisciplinary research teams (e.g. on materials sciences, life sciences and environmental sciences) to be able to tackle complex societal problems such as poverty eradication, environment and climate change, food insecurity, gender inequality and youth unemployment. Such teams will have a better chance of attracting funding from both the public and private sector as they are better equipped to carry out research whose results can solve wider societal problems. It will also assist in raising the profile of the university.
- To complement the point above, a strong collaborative network between and among institutions on the continent is required to pursue best practice with the aim to attain world class status. In addition, as most universities are currently involved in regional collaboration projects which dwell on staff and student exchange and graduate training, such projects should incorporate a research component so that there is synergy between the different universities in the collaboration. Further such regional projects will have a wider variety of resources to work with in the form of equipment, researchers and materials such as plants and minerals.

9.5: Enhancing Funding Opportunities

Limited funding and unilateral, fragmented efforts undermine existing pragmatic programmes (environmental sustainability, building and maintenance of science parks, etc) of African universities. Given the existing situation, there is the need to explore other options through which African universities could develop bilateral and multilateral relations with external partners and amongst themselves for their self-subsistence.

The studies recommend that:

- African universities should aim at generating income from a variety of sources, especially from their own efforts and investments. They should create resources mobilization unit with trained staff and their strategic plans should emphasize income generation from contract research for public and private sectors; consultancies; payment of royalties from commercialization of staff and student inventions and returns on strategic investments and endowment fund.
- Universities should institute mechanisms for looking out for inventions and IPR which has potential so that it can be protected and steps taken for its commercialization. The university could employ patent scouts in each department to be on the look-out for the potential IPR. In addition, universities could organize innovation competitions at which commercialisable IPR and innovations can be identified.
- Individual African universities should set targets on IP to be commercialized every academic year and budget for this activity with funds to enable implementation. It has been estimated that registering and administering 10 patents per year, for example, could cost up to US\$100,000 which is less than 1% of the budget of many universities but could have a very big impact on prestige and income. The example of Stellenbosch University which generates 20 - 40 patent applications per year is often cited.
- African universities should lobby their Governments to increase the spending on R&D and STI so that there are more innovations and IPR generated in the countries. Initially, African Governments should increase the gross domestic expenditure on R&D (GERD) to 1% of their respective GDPs as recommended by the African Union. After this, the Governments should progressively increase R&D funding so that it reaches at least 2% of GDP, the average R&D expenditure of the developed world (Battelle and R&D Magazine, 2011).

9.6: Establishing and Strengthening of Institutions/Units

For effective and efficient commercialization of innovations, inventions and research findings, or for monitoring of gender equity policies or environmental sustainability programmes, African HEIs need to establish dedicated offices/units with experts employed in each specialised unit.

Universities undertaking R&D may require technology transfer units or consultancy bureaus equipped to undertake patent searches to assess the novelty of innovations, pay the cost of processing patent applications and take care of the marketing of the invention and its commercialization, as well as the negotiation of the licenses and royalties.

For gender sensitivity, this may necessitate the creation of gender specific academic units or gender specific managerial units with well spelt out tasks to improve internal monitoring of university populations; increase staff development and training; and integrate gender equity into planning activities.

To promote graduate employability, a vibrant career services unit established by universities is vital to provide the foundation for the life-long self and career management of the student. Additionally, HEIs should endeavour to run dedicated and regularly updated careers services webpages providing services and giving information on resume building, interview preparations, job search assistance, work placement and internship, on-campus recruitment fairs, etc.

9.7: Monitoring and Evaluation

The studies recommend that sufficient data should be gathered to guide policy creation, monitoring and evaluation since with a weakness in the data, a policy could be based on misinterpretation or misinformation, making it ineffective. In addition, there is need to develop an implementation strategy with guidelines for all initiatives developed by universities to help monitor and measure their outcomes.

Continuous and periodic training should be provided for staff of all responsible units (e.g. career services, external relations, ethics, etc.) to enable them to carry out their duties efficiently and report accordingly to the university administration and other stakeholders. Formal summative evaluations should be carried out every 3 or 4 years to assess progress and improve results.

9.8: Re-alignment of Learning Formats and Pedagogy

In most parts of Africa, it has been noted that the primary and most consistent contact that teachers have with students is in formal instruction in a classroom setting where the lecturer is seen as the repository of knowledge and his responsibility is to pass on his knowledge to the students who then regurgitate the information received at the end of the academic year in an exam. Thus, it logically follows that a significant part of skills training/development takes place in the classroom in the course of learning.

More information is needed on what learning formats are most effective for advancement of equity, and what the trends are for the provision of learning formats that foster experiential learning (e.g. internships) and employability. The depth of this issue would require significant curriculum review, and outreach by university staff and students.

The studies recommend that African universities depart from the traditional learning methods identified to a more Socratic method of learning which encourages the student to take a more active role in his education (i.e. learning to be “active and student centred”). The Socratic method of teaching, which is a form of inquiry and debate between the teacher and the student, and which is based on asking and answering questions to stimulate critical thinking, is also a useful tool to encourage analytical thinking and problem solving. Learning then becomes less of a teacher activity and more of the students’ responsibility and by so doing some of the soft skills which have been proven to be attractive to employers are imbibed.

Universities should review their curricula constantly in line with changing global trends and pool of knowledge and multi-stakeholders involvement should be highly encouraged. Review committees can consist of heads of departments, university administrators, professional associations and other relevant stakeholders with the aim of producing university graduates fit for the world of work.

Universities need to combine academic excellence with innovative and entrepreneurial approaches to research, supporting a culture that engages and challenges students and staff in

their pursuit of learning. Students should recognize the need for a paradigm shift from the thinking that attainment of a degree is all that is required to be successful in life. While the universities have a part to play in information dissemination, students must also take the time to research what services are available, ask the right questions and in appropriate circumstances challenge their institutions to provide better resources and services. In some instances volunteering can lead to a full time position as the appropriate skills and capabilities displayed by the volunteer saves the time and expenses involved in recruiting and training a new employee.

Annex A

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Annex B

KEY WORDS AND DEFINITIONS

Basic Research is aimed at gaining more comprehensive knowledge or understanding the subject under study, without specific applications in mind. A few general examples of basic research would be research on the chemical properties of bacteria, analysis of the interaction of the oceans with the atmosphere, and investigation of neural pathways in the human brain.

Applied Research is aimed at gaining the knowledge or understanding to meet a specific, recognized need. Following on the examples of basic research, parallel examples of applied research would be using bacteria to inoculate plants against particular diseases, developing computer models of the atmosphere to improve weather forecasting, and creating drug therapies for brain-related illnesses.

Development is the transformation of research findings or knowledge into plans for new or improved products or processes. This includes product design, testing, creating of prototypes, and pilot projects. Development includes not only civilian products and processes, but also national defence weapons and systems.

A **Science Park** is a property-based organization managed by specialized professionals and designed to encourage the formation and growth of knowledge-based businesses. It supports technology transfer and has a management function that actively pursues the development of the Park by attracting and retaining public and private organizations.

A **Business Incubator** is a facility that supports the formation of start-up companies. It offers services such as management assistance, access to finance, legal advice, operational know-how, networking opportunities and access to new markets. It may operate in the context of a Science Park or be a stand-alone organization.

Innovation is a change in the thought process for doing something, or the useful application of new inventions or discoveries. It may refer to an incremental emergent or radical and revolutionary change in thinking, products, processes, or organizations. Process by which an idea or invention is translated into a good or service for which people will pay.

To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different value from resources, and encompasses all processes by which new ideas are generated and converted into useful products. In business, innovation results often from the application of a scientific or technical idea in decreasing the gap between the needs or expectations of the customers and the performance of a firm's products. In a social context, innovation is equally important in devising new collaborative methods such as alliance creation, joint venturing, flexible working hours, and in creating buyers' purchasing power through methods such as hire purchase.

The four requirements of Innovation

Innovation is the lifeblood of any organization. It is therefore important that we have a good working innovation definition. Innovation can apply to many things. It is usually the term

applied to a new product, but it can also be used to describe new processes, methods or inventions. Here are four essential ingredients to a definition of innovation:

i) Something New

Everyone likes something new. How many advertisements have you seen that use the words "new and improved"? We all want the latest and greatest products and ways of doing things. Newness, however, is just the beginning.

ii) Better Than What Exists

New for the sake of being new is of little value. It must also be improved. A new and improved toothpaste must have a 'new' that increases its perceived value. A new office procedure must actually do something better than the old way.

iii) Economically Viable

Does it make or save money? If it does not then it should not be implemented. If the new and improved toothpaste makes more sales that in turn makes more profits, it is a profitable addition. If your new office procedure improves the efficiency of the work place and therefore saves labour costs, it makes the organization more profitable.

iv) Widespread Appeal

All the first 3 elements are very important and even related to this one. However, there needs to be a basic appeal to the new innovation. If not, it will not sell. If your new and improved toothpaste is liquorice flavoured, then it might have very limited appeal. It is new and improved. Liquorice may even be a cheaper flavour to implement than any others. If nobody wants it, then it is not a true innovation.

Gender Sensitivity is the translation of awareness into practices, which result in changes in the perceptions, plans and activities of institutions and organizations that are responsive to the needs of both men and women.

Gender Equality relates to the allocation of resources, opportunities, support and encouragement without *any* discrimination on the basis of biology, between men and women.

Gender Equity is a component of gender equality because of the realization that many societies are organized in ways that make it difficult to organize and plan for simple and mechanical equality in inputs and quantities of resources. Regardless of the differences in the gender divisions of labour, resources, opportunities, treatment and potential and other factors, the rewards accruing to men and women for similar work, skills and knowledge, have to be of the same quality and reflect the inputs they have contributed.

Gender equity can be considered as a policy concept which places emphasis on redistribution of resources between women and men in a way that addresses the asymmetries in investment and capacities of women and men. Gender equity strategies are those that recognise that in order to promote equality between women and men to, within and through education, special measures may be required to redress prior inequalities that constrain women's access to and utilization of resources on an equal basis with men.

Research and Development (R&D) is the investigative activities that a business chooses to conduct with the intention of making a discovery that can either lead to the development of new products or procedures, or to improvement of existing products or procedures. Research

and development (R&D) is one of the means by which business can experience future growth by developing new products or processes to improve and expand their operations (Investopedia, 2012).

While R&D is often thought of as synonymous with high-tech firms that are on the cutting edge of new technology, many established consumer goods companies spend large sums of money on improving old products. For example, Gillette spends quite a bit on R&D each year in ongoing attempts to design a more effective shaver.

On average, most companies spend only a small percentage of their revenue on R&D (usually under 5%). However, pharmaceuticals, software and semiconductor companies tend to spend quite a bit more.

Employability is defined by Yorke (2006) as “a set of achievements - skills, understandings and personal attributes - that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy”. Yorke and Knight (2006) also identify four components to employability, namely:

- Skills (including communication skills, self-management, continuous learning);
- Deep understanding with a foundation in specialised knowledge i.e. subject specific knowledge e.g. in education, dentistry or accounting;
- Metacognition which refers to self-awareness regarding the student’s learning and the capacity to reflect on, in and for action i.e. an understanding of the reason for the study of a concept as opposed to a knowledge of the concept; and
- Personal attributes such as personal identity and self-worth with roots in seeing tasks not as a pass/fail but as an opportunity for learning.

Ethics refers to standards of behaviour of how human beings ought to act in a number of situations, for example, when they are with friends, parents, children, business partners, teachers and others (Velasquez Manuel et al., 2009). Ethics can be defined broadly to cover institutions. In this case, ethics means the way an institution understands and articulates its values and how those values are put in policy and practice in all its operations.

The institutional connotation calls for the creation of a right culture in institutions, meaning one that enables staff and others to make decisions that are both effective and consistent with the institutions’ values and principles. In higher education institutions of learning, the responsibility of promoting a culture of ethics lies with its leadership (Weegar, 2007).

Business Ethics is the application of ethical or core values to business behaviour in all business activities. Business Ethics involves discretionary decisions and behaviour that are guided by a set of core values. It applies to the conduct of both individuals and an organisation as a whole. It is simply the application of everyday moral or ethical norms to business decisions (De George, 2005). It should be noted that Business Ethics is not confined to commercial businesses but extends to institutions of higher learning, government departments, not-for-profit organisations, etc. Business Ethics is applied to groups of individuals as well as one-on-one dealing with a single individual.

A **Code of Business Ethics (CBE)** is an instrument that puts in practice a set of core values. A CBE clarifies an organization’s approach to ethical matters, specifies its ethical

commitments and standards, and gives guidance to staff on how to deal with ethical dilemmas (Institute of Business Ethics, 2012). In Section 406(c), the Sarbanes-Oxley Act defines "CBE" as such standards as are reasonably necessary to promote (1) honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships; (2) full, fair, accurate, timely, and understandable disclosure in the periodic reports required to be filed by the issuer; and (3) compliance with applicable governmental rules and regulations.

A CBE shows how a company's values are translated into definite policies, procedures, standards and principles. A CBE will, in most cases, be aspirational and supportive which is not so in case of a Code of Conduct that is generally "do this or else," (Webley, 2003).

Core Values are ideas about how people should live and the ends they should seek (Fisher and Lovell, 2009). They are thus a set of standards which are treated as non-negotiable and which form a basis for ethical standards and commitment. Core values guide acceptable and responsible behaviour that lie beyond the requirements of laws and regulations (Institute of Business Ethics, 2012). It is important to note that core values inform ethical principles.

In business circles, values describe what a company is and what it is about but actions make values meaningful. A number of institutions and businesses have core values such as respect, openness, transparency, efficiency, reliability, treating stakeholders with respect and dignity, sincerity, humility, courage, teamwork, excellence (Brunel University, 2012).

According to UNESCO's European Centre for Higher Education (2004), a set of core values of an academic community consists of integrity, honesty, trust, fairness, respect, responsibility and accountability. Those values are very important for the delivery of effective teaching and high-quality research. Values and ethical principles provide strength as well as sustainability of HEIs' activities in terms of education, research and service to society.

A **Patent** is a government license that gives the holder exclusive rights to a process, design or new invention for a designated period of time. Applications for patents are usually handled by a government agency. In Africa, the African Regional Industrial Property Organization (ARIPO) handles the patenting for English-speaking nations while Organisation Africaine de la Propriété Intellectuelle (OAPI) handles patent matters for French-speaking African countries (source: <http://www.ipo.gov.uk/types/tm.htm>).

Patents issued under ARIPO and OAPI are valid for up to 20 years. By granting the right to produce a new product without fear of competition, patents provide incentive for companies or individuals to continue developing innovative new products or services. For example, pharmaceutical companies spend large sums on research and development and patents are essential to earning a profit.

The other points to note are that:

- Patent protection allows publication of research findings that leads to innovations.
- Patent rights (for certain applications) can be transferred.
- Patents are valid only where they are registered.

Patentability of an invention is that it must be new, i.e. if it does not form part of state-of-the-art immediately before the priority date of the invention. The other considerations are:

- An invention used secretly but on a commercial scale will form part of the state of the art.

- Publication prior to patenting destroys the novelty.
- Disclosure before patenting should be made under pledge of secrecy preferable in writing.
- Innovation disclosed in any country can destroy novelty.
- The invention must involve an inventive step that merits patent protection i.e. is not obvious to a skilled person in the sector.
- The invention must be capable of being used for a commercial purpose.

i) What is patentable?

The following are patentable:

- Non-living entities
- DNA, recombinant DNA, RNA promoters, plasmids, vectors, peptides, proteins, antibodies
- Living entities, Genetically Modified Organisms (GMO), plant and animal cultures
- A discovery
- Methods: Assays; method of manufacture

ii) What is not patentable?

A patent may be granted for any new invention which involves an inventive step and which can be used or applied in trade or industry or agriculture. Generally, inventions have a technical content component and could be in the form of new articles or devices, apparatus or equipment, processes for producing or manufacturing a product, chemical substances or formulations. These may take the form of:

- Mathematical methods and Scientific Theory
- Discovery
- Work protected already by Copyright
- Business Methods or Games
- The presentation of information
- Methods of treatment practiced on the human or animal body
- A variety of animal or plant (non-GM)

A **Copyright** is a legal concept, enacted by most governments, giving the creator of an original work exclusive rights to it, usually for a limited time. Generally, it is "the right to copy", but also gives the copyright holder the right to be credited for the work, to determine who may adapt the work to other forms, who may perform the work, who may financially benefit from it, and other related rights. It is a form of intellectual property (like the patent, the trademark, and the trade secret) applicable to any expressible form of an idea or information that is substantive and discrete (source: <http://www.ipo.gov.uk/types/tm.htm>).

Copyright initially was conceived as a way for government to restrict printing; the contemporary intent of copyright is to promote the creation of new works by giving authors control of and profit from them. Copyrights are said to be territorial, which means that they do not extend beyond the territory of a specific state unless that state is a party to an international agreement. Today, however, this is less relevant since most countries are parties to at least one such agreement. While many aspects of national copyright laws have been standardized through international copyright agreements, copyright laws of most countries have some unique features. Typically, the duration of copyright is the whole life of the creator plus fifty to a hundred years from the creator's death, or a finite period for anonymous or corporate creations. Some jurisdictions have required formalities to establishing copyright, but most recognize copyright in any completed work, without formal registration. Generally, copyright is enforced as a civil matter, though some jurisdictions do apply criminal sanctions.

Sustainable Development can be defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). It recognizes that social, economic and environmental issues are interconnected and that decisions must incorporate each of these aspects in order to be successful over the longer term.

Education for Sustainable Development is a dynamic concept that utilizes all aspects of public awareness, education and training to enhance an understanding of the linkages among issues of sustainable development and to develop the knowledge, skills, perspectives and values which will empower people of all ages to assume responsibility for creating and enjoying a sustainable future.”

It thus includes education for poverty alleviation, human rights, gender equality, cultural diversity, international understanding, peace and many more. UNESCO proposed that the vision of education for sustainable development is a world where everyone has the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation.