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Faculty of Natural Resources
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Challenges and Opportunities for Strengthening Tertiary Agricultural Education and Private Sector Collaboration in Africa

- A Case Study of the UniBRAIN Agribusiness Innovation Incubator
Consortia

Marta Zdravkovic

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I Abstract

Tertiary Agricultural Education is taking place in an environment of complex constrain in Africa. These include poor state of institutional facilities, sometimes outmoded curricula, limited institutional collaboration and too large student-lecturer ratios. In order to address some of these challenges, tertiary education institutions are venturing into collaborations with industries. One such program is UniBRAIN, a program that connects tertiary education institutions, research institutions and the private sector. The program is on a pilot roll out in five African countries, Kenya, Uganda, Zambia, Ghana and Mali. It is organized in six consortia that manage the incubators with a goal of boosting and fast-tracking innovations and technologies.

This study, cross-sectional in design with case study elements aims to clarify the challenges and opportunities for strengthening tertiary agricultural education and private sector collaboration by examining the UniBRAIN program. Data collection was done through literature review, semi-structured and in-depth interviews, and focus group interviews. In total 66 respondents from 23 organizations, businesses and institutions in Africa participated in the revealed study. The results provide insights on the challenges and opportunities for the UniBRAIN consortia and similar university-private sector collaborations. More specifically, we argue that mutual efforts in establishing student internships, curricula improvement, engaging in relevant research for industries, formalized institutional collaboration and services benefit both institutions of learning and private sector. In order for the participating individuals, institutions to maximize benefit, partners have to adopt a mutual code of conduct and mindset. Much more effort is required in building up a culture of professionalism and trust to build sustainable collaborative partnerships. These things take time, however if genuine investments are made to foster these partnerships they could enhance considerably the quality of tertiary agricultural agribusiness education in Africa.

Key words: Agribusiness, UniBRAIN, incubator, partnerships, Africa, institutions, internships, curricula

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V Abbreviations

ABI-ICRISAT, Agri Business Incubator- International Crop Research Institute for the Semi-Arid Tropics

ABP, Afri Banana Products Limited

AgBIT, Agri-Business Incubation Trust

AIDS/ HIV, Acquired immunodeficiency syndrome / Human immunodeficiency virus infection

ANAFE, African Network for Agriculture, Agroforestry and Natural Resources Education

ASARECA, Association for strengthening Agricultural Research in Eastern and Central Africa

CCARDESA, Centre for Coordination of Agricultural Research and Development for Southern Africa

CCLEAR, Creating Competitive Livestock Entrepreneurs in Agribusiness

CORAF, West and Central African Council for Agricultural Research and Development

CURAD, Consortium for Enhancing University Responsiveness to Agribusiness Development

SVCDC, Sorghum Value-Chain Development Consortium

FARA, Forum for Agricultural Research in Africa

ICRAF, World Agroforestry Centre

IFAD, International Fund for Agricultural Development

IP, Intellectual Property

JKUAT, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

MoU, Memorandum of understanding

NGO, Non-Governmental Organization

NUCAFE, National Union of Coffee Agribusinesses and Farm Enterprises

PanAAC, Pan African Agrobusiness and Agro Industry Consortium

PPP, Public Private Partnership

SAP, Structural Adjustment Policy

SLU, Swedish University of Agricultural Sciences

SME, Small or Medium Enterprise

SROs, Sub regional organizations

SSA, Sub-Saharan Africa

ToR, Terms of References

UniBRAIN, Universities, Business and Research in Agricultural Innovation

WAARI, West African Agribusiness Resource Incubator

WB, The World Bank

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1 Background

Education development within the agricultural field takes place within a context of poverty in Africa. There are several issues that have directly influenced the availability and quantity of human resources such as the HIV and AIDS pandemic (Atteh 1996), and in some cases armed conflicts and detrimental human rights violations (Gakusi 2010). Other factors include the quality of existing human resources: lack of policies, poor management and administration. Furthermore, there is a mismatch between knowledge that is produced and that which is needed in the job arena. This has been cited as one of the reasons why unemployment of agricultural graduates is high and continuing to grow, while at the same time there is scarcity of human resources within that same field (Samoff 1999).

This thesis aims at examining and clarifying the underlying problems of tertiary agricultural education in Africa. In particular the thesis explores contextual institutional issues and inventories of human resources. The main emphasis will be on challenges and opportunities from collaboration and partnerships between tertiary agricultural education institutions and the private sector as a potential employer of graduating students.

1.1 Current trends and concerns in tertiary agricultural education

1.1.1 Financing

The development of education in Africa during the 1960's and 1970's was mainly supported by favorable trade conditions of traditional African product exports. However during the 1970's and 1980's the majority of the African countries faced economic difficulties which were worsened by the oil shock and a worldwide recession of the 1970's (Gakusi 2010). This pushed a lot the African countries into deep debt that was largely externally driven.

The World Bank's response to the debt crisis in Africa was to introduce policy packages called Structural Adjustment Programs (SAPs) (Serageldin 1988). According to the World Bank, by introducing SAPs this would remove economically damaging interventions being undertaken by the African governments (Mosley, Weeks 1993). In other words this meant cutting down 'non-essential' spending such as in the social sector, including education (Fosu 2007). Mosley and Weeks (1993) argue that the inappropriate design of structural adjustment programs caused policy instability, and that this had disproportionate negative influence on the economic performance of the countries. Most of the African countries, approximately 80%, that implemented SAP's (Edelman & Haugerud 2005), moved towards privatization of their economies. That further led to devaluation of their currencies and lowering of living standards (Wallace 1997). Besides the lowering of human living standards which had indirect consequences for tertiary education, inadequate policies for development also had significant direct negative effects on development.

For the tertiary agricultural education system, this meant significantly reduced funding, which gradually caused teaching infrastructure, facilities and material degradation (Atteh 1996). "Narrow and misleading economic

analysis has contributed to the view that public investment in universities and colleges brings meager returns compared to investment in primary and secondary schools, and that tertiary education magnifies income inequality. As a result, tertiary education systems in developing countries are under great strain. They are chronically under-funded, but face escalating demand.” (The World Bank 2000, pp. 12). Lack of financing and management, caused in many cases decline in academic standards, lowered support for teachers, degradation of instructional materials and facilities (Buchert 2002).

Teacher salaries were eroded by inflation which made the profession financially unattractive compared to the others (Gakusi 2010). Having to teach with inadequate resources in terms of physical infrastructure, equipment, and communications facilities (Rivera 2006), low salaries and almost no benefits that they used to have (such as bonuses, research support, and more (Atteh 1996), professors were struggling. In other words this led to disincentives for many of the lecturers and lowered interest in teaching and in curricula development (Clark 2006, InterAcademy Council 2004, Kroma 2003, Alex and Byerlee 1999, Spielman et al 2008). This is exemplified in the words of Atteh: “The decline in public expenditure on education has not only failed to sustain viable educational systems but has consequently contributed to the shortage of professional and skilled manpower in Africa” (Atteh 1996, pp. 36). While universities situated in rich countries have been source of knowledge and innovation, universities in SSA have not been in position to do this. There are many reasons why this has not been happening. Today tertiary agricultural education institutions struggle with shortage of supplies, equipment and inadequate facilities, shortage or even lack of library materials (Belay 2008), access to internet facilities (Chakeredza 2009). After many years of insufficient financing and neglect, many African universities are not in a strong position to conduct research and technology development due to weak research infrastructure (Atuahene, 2011). Due to inadequate research infrastructure, and they lack access to up-to-date publications and other means for practicing research (Ssebuwufu et al. 2012).

After many years of neglect the World Bank is again giving to agricultural research and extensions renewed interest as well as agricultural education. Since 1995, when James Wolfensohn, took over as the head of The World Bank, there has been increased funding for tertiary education. The Bank's positive attitude influenced other donor agencies funding as well (Banya 2001). These changes are slowly contributing towards improving the capacity for development of tertiary education in Sub-Saharan Africa.

Nevertheless, there has been a shift in how tertiary education institutions should generate income. Unlike before, globalization and liberalization have brought changes in the funding of education institutions as well. Wangenge-Ouma (2008) argues that African tertiary education system has entered the era of privatization and commercialization. This means shifting university resource dependence from the state to the market. Hence, the public expenditure on education is decreased. Example is Kenya where the state subvention for education declined from 70 per cent in year 1998 to 39 per cent in year 2005. The pressure on the institutions to enter the market is increasing. Public universities are forced to act as if they were private entities, seeing students as customers, and university education as a product needing aggressive marketing (Johnstone et al. 1998). In order to be financially sustainable, universities acquire funds from student's fees, they engage in various

consultancies, commercial farming, facility and service providing, patenting and subsequent royalty and licensing agreements, spin-off companies, arm's length corporations, and university-industry partnerships. Tertiary education institutions have to move more towards commercialization of certain activities. They work closer with more private sector in order to survive global competition that is beyond the control of institutions (Ntshoe 2004, Mok 1997).

1.1.2 Curricula development

The educational system of today cannot be excluded from its historical conditions. Colonial powers were instrumental in forming today's most important Africa's Universities, such as Fourah Bay College in Sierra Leone, Ibadan University in Nigeria, and Makerere University in Uganda (Maguire 2000). After gaining independence, post-colonial countries inherited educational systems and practices of the former colonial powers (Gakusi 2010), and to this day much of Sub-Saharan Africa's (SSA) agricultural education is predominately based on these systems (Temu et al 2007). In many cases, the curricula were detached from the local context and therefore often irrelevant¹ for African settings. Colonial governments put very little priority on the needs of local communities, and even less on the building of entrepreneurial skills. Instead emphasis was given on building capacity for the public sector and the production of cash crop for consumption by the colonizing country (Temu et al 2007). Yet the old educational systems have remained 50 years after countries gained their independence. Curricula improvement rarely takes place, and that has caused problems for student education, as they are ill prepared for the changes that take place. Most curricula often do not address the needs of employers, and students are often ill prepared for the jobs. Large swathes of graduates from tertiary agricultural education programs fail to secure employment in their field of study due to miss-matching of education and skills required by industry (Temu et al 2007). In some cases such as in Mail, this has caused up to 70 percent of graduate unemployment (Gakusi 2010).

Countries are recognizing the importance of change and are making efforts to review their curricula to address the needs. In collaboration with the African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE), more than 67 agricultural colleges and universities have reviewed their curricula (Temu et al 2007) and are continuing to do so. ANAFE, the forefront of curriculum reform in SSA, in collaboration with scholars, agribusiness professionals and stakeholders, have developed a draft agribusiness curriculum (Kaufmann 2013) which can be used for further curriculum development in SSA.

¹ Curricula can be defined as a framework for planned and guided teaching and learning led by a teaching or training institution (ANAFE 2013). Curricula review/development is defined as process of identifying, planning, and organizing teaching and learning activities in order to achieve specific objectives (ANAFE 2013). The process of improvement can be significantly improved by having universities working together with different stakeholders. That way different point of views can influence the complexity and the wholeness of the programs.

1.1.3 Human resources

Without question, the African human capital crisis is real. Sub-Saharan Africa was affected by the loss of high-skilled workers. Human resources in teaching and research have been depleted both in terms of quantity and quality (Spielman et al. 2008). During the last century, the African continent has been affected by some major changes depleting its human resources, such as diseases, conflicts, migration and demographic transitions.

Demographic transition

The number of student in Africa is increasing. Africa is the region with the fastest rate of population growth (Rosling2010). When such a growth is not followed by a stable economic and political surrounding, it can cause human resource imbalance. In the case of tertiary agricultural education, this has meant a large number of students and a very low number of academic staff to teach them. Due to the fast growing number of students and scarcity of skilled professors, student-teacher ratio increased drastically, and it is still growing. This negatively affects the teaching quality. Additionally the rapid growth is problematic when combined with inadequate facilities and infrastructure. There are cases where the capacity of classrooms was not able to support the amount of students. To illustrate, The University of Ibadan in Nigeria had a population of 14,000 in 1972. Since then until1991, the number doubled without any addition to the institution's infrastructure. Class rooms were crowded and student dormitories overcrowded with an average of eight students packed in a room meant for a maximum of two to three students (Atteh 1996).

Diseases

A major factor influencing African human resources in tertiary education was HIV pandemic that peaked during late 80's and 90's (Gakusi 2010). It caused loss of experienced scientific and extension capacity (Maguire 2000), leaving a major gap between older university teachers, and the ones that are supposed to take over after them. Other debilitating diseases such as malaria and lifestyle diseases have an impact on absenteeism.

Conflicts

Additionally, many African countries experience persistent weak governance and in some cases even armed conflicts (Gakusi 2010). 85 percent of bottom billion countries (countries with the lowest gross domestic product in the world) experienced a civil war during the last 20 years (Collier 2008). These conflicts had a large effect on human resources annihilation and they disrupted graduate training and capacity-building programs (Eicher 2006). Hence, due to rapid population growth, there are many new-coming students while, at the same time because a whole generation is lost, due to HIV pandemics and conflicts, there are not enough professors to teach them. This leftmost of the universities with old experienced professors that are going to retire within coming years and on the other side very young inexperienced ones that have to handle too many students.

Brain drain

Thirdly there is a large skepticism over quality of students and young teaching staff due to loss of quality students. During the 1970s and early 1980s African governments sponsored thousands of its students to European and North American universities. They were supposed to get high-quality education, and then return home (Ssebuwufu et al. 2012). However, more than 30 percent of the students never went back after receiving their training (Carrington and Detraciage 1998, Gakusi 2010). The high stay rate of African students is acute (World Bank 2010). This loss of skilled professionals is known as brain drain and it is being continued ever since. Baruch et al (2007) showed that a weak labor market in the home country, as well as high level of protean career approach is strongly associated with student's higher tendency to stay in the host country.

These young people are giving strong intellectual and material support to Africa today. One of the ways for helping out is through social media (Ruge 2013).

Job satisfaction

Not only the large part of young quality students migrated to western countries, but also significant part of experienced professors choose to leave university jobs. African academic staff and researchers in average get low salaries and work with outmoded scientific infrastructure and thin operating budgets (Eicher 2006). To illustrate, until 1992 faculty wages had not risen in Nigeria since 1986 despite a 95 percent devaluation of the Nigerian currency and over 100 percent inflation rate (Atteh 1996). Due to this during the past fifteen years a high percentage of senior academics from African tertiary agricultural education institutions have migrated to more lucrative professions such as NGOs (Non-governmental organizations), the private sector or overseas posts (BIFAD 2003, IAC 2004). Consequences are high staff turnover and poor retention, and low institutional coherence in subject matter.

Attracting students

Lastly there is problem with attracting quality students to agricultural universities. This is because agriculture is not seen as lucrative occupation. It is also noted that enrollment dropped significantly due to low employment rates (Atteh 1996).

Summing up the previous chapters, we can see that there is an increasing amount of students challenging teaching facilities capacity and number of professors. The amount of professors is in crisis due to human capital loss caused by HIV pandemics and conflicts, and due to migration of quality students and professors to other countries or professions. Like in all countries that are undergoing development it is a continuous struggle for teachers to survive. Governments are embroiled in debt repayment and real salaries have less worth than 10-20 years ago as a result of devaluation of most currencies in Africa. Having older generation of skilled academic staff choosing better jobs sometimes in other countries, African tertiary agricultural education institutions are left to struggle with large a gap in generations, and shortage of experienced and well trained professors. If we add the fact that agricultural universities and colleges are failing to attract the best quality students from high

schools, there is a large question over who is going to take over the training of new students, and even larger skepticism over its quality. Graph 1 shows the discussed difficulties.

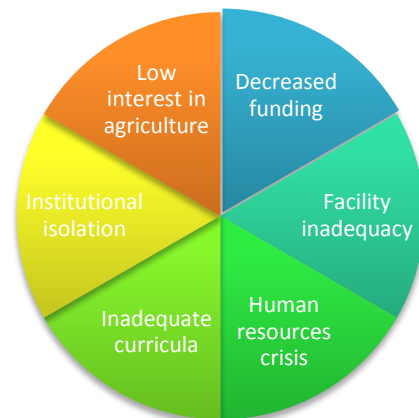


Figure 1: The historical and present difficulties constraining African Tertiary agricultural education Institutions

But this is changing. The success of countries like Malawi show that with right agricultural focus poverty can be reduced, and food security improved. Supporting agriculture needs knowledge, science and human capacity building and this is the focus of this thesis.

1.2 Universities, Business and Research in Agricultural Innovation Program (UniBRAIN)

UniBRAIN is a program that aims to link education, research institutions and business in Africa with a goal to improve education systems within agriculture, foster innovations within agriculture boost the production and improve value chains.

1.2.1 Objective of the UniBRAIN program

UniBRAIN development objective is: to contribute to enabling African countries to create jobs and raise incomes through sustainable agribusiness development (FARA 2011).

By linking universities, research institutions and private sector the program aims to:

- strengthen agribusiness entrepreneurs and introduce innovations;
- share and spread innovation output, experience and good practices;

- enhance student internships, develop different level networking (local national, regional);
- and involve business and students in curricula review, so that universities can incorporate relevant issues in their programs.

1.2.2 Structure of UniBRAIN

UniBRAIN program functions through consortia² organized in five African countries: Uganda, Kenya, Mali, Ghana, and Zambia. Each consortia in UniBRAIN consists of research institution members, business members and education institution members, and it is led by one of the members, as shown in figure 2.

The program is conceptualized by FARA³, with key partners ANAFE⁴ and PanAAC⁵. However, there are other partners as well: SROs⁶, ASARECA⁷, CORAF⁸, CCARDESA⁹, ABI-ICRISAT¹⁰ that help with certain aspects of the work. They all have different responsibilities in the program implementation, and they have been working with it since it officially started in January 2012.

Research institutions are government supported institutions that work with issues of agricultural development. They contribute to UniBRAIN program with scientists, technicians with special skills, field and laboratory facilities. They comprise ten research institutions and one governmental institution, Ghana Ministry of Food and Agriculture.

Private sector represents businesses that are run by individuals for profit. They are not part of the state economy which means that they are not directly controlled by a government. Business members are source of mentors, in business planning, financing, and management. In this paper private sector includes particular private agribusinesses that are involved in the UniBRAIN program. They make up 11 private businesses/ cooperative unions/ organizations as presented in table 1.

²Consortia is a type of, often voluntary, partnership that is under member control. It often addresses common issues, primarily concerned with academic issues such as student needs, faculty exchange or use of academic resources. It is multi-institutional and multifunctional and has long-term member support (Amey 2007).

³ Forum for Agricultural Research in Africa

⁴ African Network for Agriculture, Agroforestry and Natural Resources Education

⁵ Pan African Agrobusiness and Agro Industry Consortium

⁶ Sub regional organizations

⁷ Association for strengthening Agricultural Research in Eastern and Central Africa

⁸ West and Central African Council for Agricultural Research and Development

⁹ Centre for Coordination of Agricultural Research and Development for Southern Africa

¹⁰ Agri Business Incubator- International Crop Research Institute for the Semi-Arid Tropics

Tertiary agricultural education institutions are universities, colleges, and other education institutions supported by a government that are providing education within agriculture. They offer skilled personnel, technical and laboratory facilities. This paper looks at specific African education institutions that are involved in the UniBRAIN program, the eight Universities from five African countries.

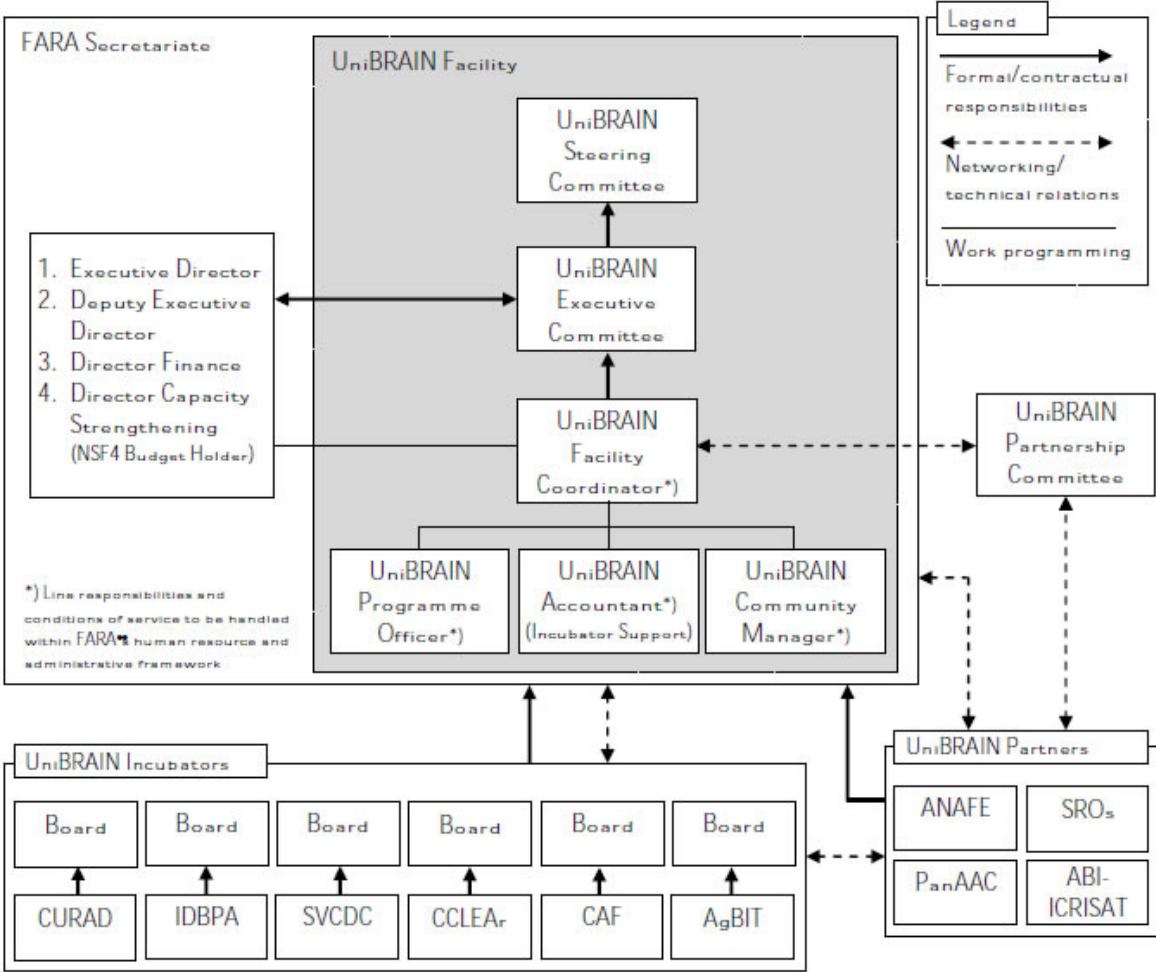


Figure 2: Outlook of UniBRAIN organizational structure; Source: UniBRAIN project document

Table 1 gives an overview of UniBRAIN incubator structure and member outline.

Incubator	Country Consortia	Research Institution	Private sector	Education Institution	Goal
AgBIT (Agri-Business Incubation Trust)	Zambia	Zambian National Institute for Scientific and Industrial Research	Frontier Development Associates	University of Zambia, Mulungushi University,	Mango and other local fruits value chain development
WAARI (West African Agribusiness Resource Incubator)	Mali	International Center for Innovation and Sustainable Development	AID-SA Cooperative Union	IPR IFRA	Agro-forestry produce (Shea butter, honey and tea) and agro-based value-chains development
CURAD (Consortium for Enhancing University Responsiveness to Agribusiness Development)	Uganda	Ugandan National Agricultural Research Organization	National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE), Uganda Coffee Development Authority, NIRAS International	Makerere University	Coffee value chain development
CCLEAR (Creating Competitive Livestock Entrepreneurs in Agribusiness)	Ghana	Council for Scientific and Industrial Research-Animal Research Institute in Ghana, Ministry of Food and Agriculture, Heifer International in Ghana	Humberg Farms	University of Ghana	Livestock and poultry value chain development
ABP (Afri Banana Products Limited)	Uganda	Uganda Industrial Research Institute, Kenya Agricultural Research Institute	Excel Hort Consult Ltd, FREVASEMA, Uganda Carbon Bureau and Adaptive Seed Company	Kyambogo University, Mbarara University of Science and Technology	Banana value chain development
AVCDC (Sorghum Value-Chain Development Consortium)	Kenya	Kenya Agricultural Research Institute, International Crops Research Institute for the Semi-Arid Tropics	Pipal, Agritrace and Farming Support International	Jomo Kenyatta University of Agriculture and Technology	Sorghum Value-Chain Development

Table 1: Overview of UniBRAIN members

Every UniBRAIN consortia manages one incubator¹¹ project. These incubators represent collaboration between education, research institutions and private sector that support incubatees. Incubatees can be start-up enterprises, small and medium enterprise (SME), or enterprise that is expanding, diversifying, experiencing difficulties in their work.

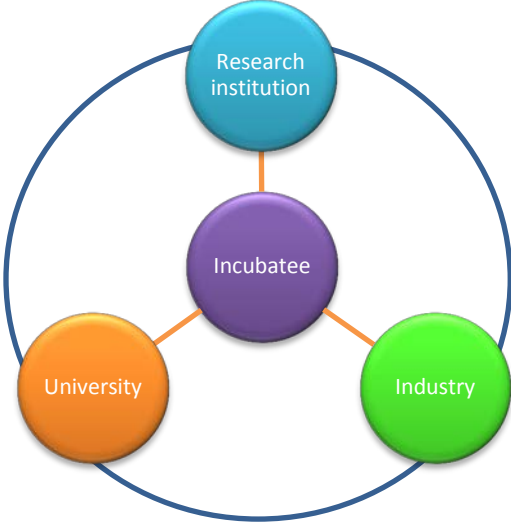


Figure 3: Simplified relations among UniBRAIN members and incubatees; Source: Author

Collaboration between education, research institutions and businesses is of key importance for the UniBRAIN incubators. The ultimate goal is that each UniBRAIN member should gain some benefits from it. Some of the advantages for universities are opportunities for career-enhancing research and research opportunities for postgraduates, funding for on-campus research related to the innovations, access to private enterprise and research communities, opportunities for student internships, supporting curricula change, fostering linkages and interactions with non-African universities and capacity building institutions. The private sector can also benefit by accessing specialized technical support, facilities and services and receiving student internships. Research institutions gain business partners for commercializing products and technologies, collaborators and temporary staff support through attachments and internships, collaboration in research to combine human and physical assets, and more (Chakeredza 2012). Lastly incubates benefit from getting help with business planning and financing, specialized technical support, mentoring, premises with facilities and services, receiving student internships, and more.

However it is important to acknowledge that, in order to harvest the benefits from the collaboration, it has to be constructed in such a way that all members understand their role and the way to relate to each other.

¹¹Incubators are programs designed to support the successful development of entrepreneurial companies through an array of business support resources and services, developed and orchestrated by incubator management and offered both in the incubator and through its network of contacts. Successful completion of a business incubation program increases the likelihood that a startup company will stay in business for the long term.

1.3 Justification

UniBRAIN is a novel way of envisioning collaboration between universities and the private sector in Africa. There is a need to examine the collaboration process and the way they are identified, formed, developed and sustained. Most importantly it is important to show the impact of the new kind of collaboration and look at experiences of the stakeholders. Exploring deeper the nature of these partnerships will enable us to understand better the problems and provide solutions to manage some of those problems and benefit. The findings from this study could have important relevance for similar undertakings.

1.4 Overall aim of the study

This thesis aims to identify the challenges and opportunities for strengthening tertiary agricultural education and private sector collaboration in Africa. The study used the case study of UniBRAIN Agribusiness Innovation Incubator Consortia partnerships to explore in depth¹².

1.4.1 Research questions

Specific objectives of the study are:

1. To identify the challenges that African universities and private sector face in university-private sector collaboration
2. To elaborate how African Universities can benefit from these collaborations
3. To explore how the private sector can benefit from these forms of collaboration

¹² The paper will look at partnerships where at least one of the partners is a UniBRAIN member.

2 Conceptual framework

African universities can play a central role in producing and disseminating technical solutions for local challenges. Yet, across much of Africa, universities have minimal linkages with the private sector¹³ at every level (Ssebuwufu et al. 2012). Agricultural education institutions continue to operate as loose sets of isolated organizations with weak connections between education, research and private sector (InterAcademy Council 2004, Michelsen and Hartwich 2004, Michelsen et al. 2003, Spielman et al 2008). Agricultural universities are isolated from other parts of university systems and at the most of the times with agricultural ministry (Maguire 2000). More often than not agricultural universities are not seen as a resource of competences and knowledge to contribute to agricultural development. The lack of collaboration hinders the progress and this is increasingly being recognized. Recent years have seen raised recognition of importance of collaboration. Efforts for fostering collaboration among tertiary agricultural education institutions are increased as well (Kvale 2009). Many of the universities are taking measures to strengthen institutional capacity to support linkages with industry (Ssebuwufu et al. 2012), as well as trying to create learning communities, service and community-based learning, and interdisciplinary research and teaching (Kezar 2005). So what is UniBRAIN?

2.1 Defining collaboration

Collaboration can be defined as “a process in which a group of autonomous stakeholders of an issue domain engage in an interactive process, using shared rules, norms, and structures to act or decide on issues related to that domain” (Kezar 2005). Gray (1989) argues that collaboration involves problem setting, direction setting, and implementation. The motives for joining a collaboration are numerous ranging from sharing facilities, external pressures-resource scarcity, technology demands, and also personal networks, and state mandates such as in Ethiopia where the government pressurized on HAEI¹⁴ to take part in national research and development contribution (Belay 2008).

The most common name addressing partnerships fostered by universities and private sector is public private partnership (PPP). Canadian Council for Public-Private Partnerships (2004) defines a PPP as a “cooperative venture between the public and private sectors, built on the expertise of each partner, which best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards” (Tang 2010, pp. 684, Narrod et al. 2009, p. 10). Van Ham and Koppenjan (2001, p. 598) also write that public private partnership is “cooperation of some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs, and resources which are connected with these products”. Lastly, Warner, Kahan, and Lehel (2008, p. 9), PPPs entail “reciprocal obligations and mutual accountability, voluntary

¹³ Term private sector is used as a synonym to industry. It encompasses a broad term which refers to all areas of the productive sector, including agriculture, entrepreneurship, marketing, banking and sales.

¹⁴ Higher Agricultural Education Institutions

or contractual relationships, the sharing of investment and reputational risks, and joint responsibility for design and execution”.

2.2 Benefits of collaboration

Some of the most important benefits of collaboration are greater efficiency, effectiveness, and improvement of governance and management, and perhaps the most important for tertiary education institutions is that it can enhance student learning, research production, enhance interdisciplinary research, and create innovation (Kezar 2009), and faster technology transfer (Krattiger 2007). Partnerships enhance sound IP¹⁵ management (Krattiger 2007). Research conducted by the Association of African Universities showed that universities benefit with commissioned research, investments in laboratories and equipment, student scholarships and funding for graduate research (Ssebuwufu et al. 2012). Additionally it contributes to enhancement of indigenous research capability (Belay 2008), and increased likelihood of receiving external funding (Kvale 2009). Tang (2010) writes about different advantages of PPPs. They include: better risk management; clearer government policies¹⁶; revealed critical success factors; improved maturation of contract; and more appropriate financial analysis.

However it is important to note that, regarding financial benefits from collaboration with private sector, results of studies indicate that only few institutions have been able to capture substantive financial gains through industry partnerships (Ssebuwufu et al. 2012). That is one of the reasons why it is very important to evaluate different collaborations and provide guidelines on how to be more efficient and bring benefits.

2.3 Evaluating collaboration

Amey (2007) suggested the following framework for looking at processes of collaboration. The first step involves looking at the context of collaboration. It usually involves internal and external organizational factors, sociopolitical climate, human resource concerns, and timing. The second step involved looking at process of collaboration. As collaboration is a living system (Morgan, 1998 cited in Amey), there is a need to look at it as a process that encompasses continuous changes. The third step examines the collaboration key components. These are: The reasons for joining; What are the economic, political, and sociocultural circumstances? How is the partnership understood by others? Outcomes, benefits, and costs of the partnership? What is required to sustain the partnership (Amey 2007)? These five key components were used as a guideline for assessing the UniBRAIN collaboration.

¹⁵ Intellectual Property is a critical tool for enhancing and protecting innovations. It is protection of private interests of creators of innovations (Krattiger 2007)

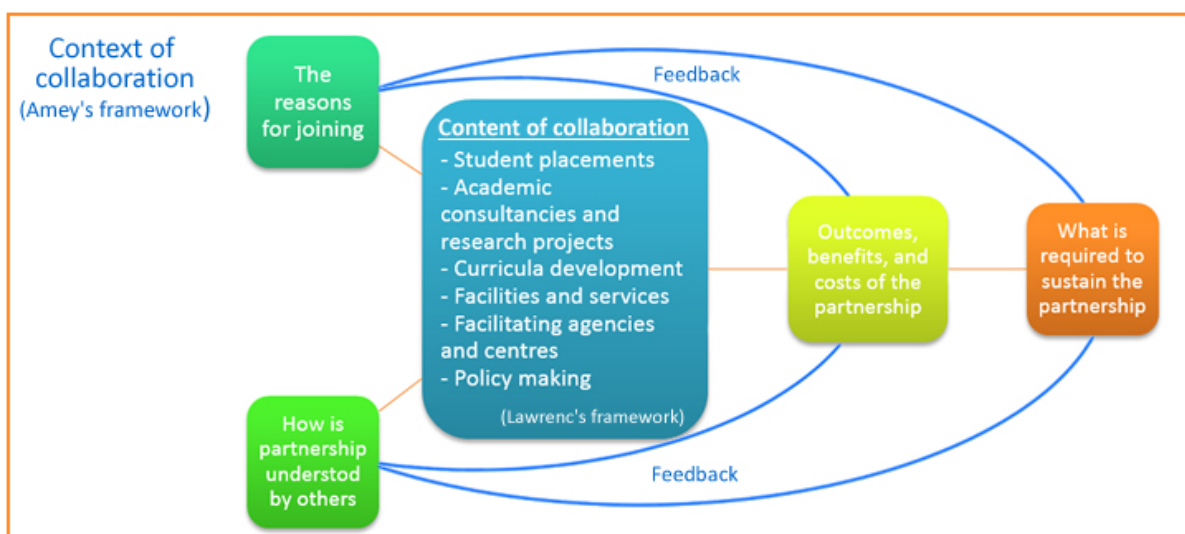
¹⁶ Government policy can be defined as conduct of public affairs, and policy can be defined as plan of action; a way of management (Book dictionary cited in Wallace 1972). The process of policy development should encompass three stakeholders: researchers that can bring historical sensibility, understanding of wider role of education institutions, and novel insights; the practitioners, in other word teachers, researchers, other academic staff and managers that can validate and use the evidence from their practice; and the politicians that can bring in the sense of urgency, resources and democratic validation (Watson 2011).

Based on the evaluation of the Australian tertiary education collaboration Lawrence (1990) suggested a framework for looking at tertiary education institution collaboration features. The eight following categories of collaboration were derived from 62 identified forms of collaboration that existed in Australia. They were: student internships¹⁷, academic internships (academic research and consultancies), courses development-curricula development, research projects, facilities and services, facilitating agencies, centers, and policy making.

Frameworks of Amey (2007) and Lawrence (1990) are applied evaluating UniBRAIN university-private sector collaboration. The two frameworks are conceptualized in a model (figure 4).

Figure 4: Model for tertiary education institution collaboration evaluation

This framework puts the reasons for joining and how partnership is understood by others at the beginning of the collaboration process. When the collaboration starts, we ought to look at its content which is addressed by



Lawrens. The factors included in it were: student internships, academic consultancies and research projects, curricula development, facilities and services, facilitating agencies and centers, and policy making influence. The collaboration will provide benefits and there will be certainly costs of the collaboration which will then need to be addressed. That is why the next point in collaboration is looking at what is required to sustain the partnership. At this point, same as in the prior one, it is needed to compare these with the initial phase of the collaboration which is looking at the reasons for joining and how is the partnership understood by others. In

¹⁷ In the literature student internship is also referred to as internship or student attachment, and even as cooperative education, work-integrated learning, practicum and industry experience (Walsh and Byrne 2012). Grodon et al. (2011) define the concept of internship as an activity where a student spends time at a college or university with one semester in the workplace as a student employee. Internship can be also defined as an educational strategy where classroom learning is being complemented with learning in the workplace and where practical knowledge is obtained as a support and complement the theoretical studies (Akomaning et al. 2011). Alpert et al. (2009) emphasized few goals of an internship: practical application of theory, enhanced job preparation, and better employment prospects. Additionally, student internships assist universities to attract new students (Gault et al., 2000), especially the higher quality ones (Toncar and Cudmore, 2000).

other words, it is important to reflect back to the reasons for joining the collaboration at the first place. The requirements for the future of the partnership should be constantly compared to the first two points of this framework.

3 Study design

3.1 Cross-sectional survey

According to Russel, cross-sectional design is the most predominant study design used in social science. It measures few (sometimes many) variables in a single period of time (Russel 2011) aiming to generate statements that apply regardless the place and time (Bryman 2008). Bryman (2008, pp.44) defines cross-sectional research as “collection of data on more than one case and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables, which are then examined to detect patterns of association”. It involves a large number of unstructured or semi-structured interviews at a single point in time (Bryman 2008). They are usually conducted to estimate the prevalence of the outcome of interest for a given population (Levin 2006). Cross-sectional design is used in this thesis in order to look at eight Universities and their experience in the collaboration.

3.2 Case study method

In this thesis I use the case study of UNiBRain to understand the role of collaboration. A case is an object of interest on its own in which a researcher aims to provide an in-depth description (Frankfort 1996). A case study design includes particular historical, political, and cultural context of the studied program, event, or community (Desai&Potter 2006). It entails the detailed and intensive analysis of a single case which can include studies on a single community, organization, or event (Bryman 2008). It addresses the complexity and particular nature of the case in question (Stake 1995 cited in Bryman 2008). Yin (2003) defined 5 types of case studies: the extreme or unique case, revolutionary case, longitudinal case, critical, and the representative or typical case. Representative or typical case aims to capture the circumstances and conditions of an everyday or common case. This case type can be chosen in order to describe a broader category of a member, or provide appropriate context for some research questions to be answered (Frankfor 1996). The aim of using the case approach was to be able to draw some general conclusions considering university-private sector collaborations. As the UniBRAIN is in its initial phase, this study will look at the experiences that UniBRAIN members have outside the program. However it will look at a few aspects of collaboration that are measurable at this point of program implementation, and the expectations from the UniBRAIN program collaboration.

Even though this research looks at specific experiences from eight African universities and eleven industries, they are part of one program UniBRAIN. That is why this research combines two research designs in one Cross-sectional design with case study elements.

4 Methodology

In this study we use qualitative research methods. We use a two level approach starting with literature review and followed by semi-structured interviews, focus group, and in-depth interviews. This is illustrated in figure 5 below.



Figure 5: Study implementation process

4.1 Literature review

The starting point of this study was the literature review. The articles and books referenced in the study were searched using the following databases: Google Scholar; Scopus, Science Direct and others. The articles were found in scientific journals, ANAFE documentation, and UniBRAIN documentation. The following search words were used: tertiary education, agriculture, Africa, collaboration, public private partnerships, UniBRAIN program, incubator, industry, financing.

4.2 Data collection

The data was gathered through semi-structured interviews, in-depth, and group interviews. Semi-structured interview is a method in social research used in social sciences in order to extract qualitative information from an interviewee. It is responsive which means that it is asking further questions in response to what is seen as significant (Rubin 2005). In-depth interview is a type of interview which tends to last longer than a normal interview and to extract more in-depth information on a certain topic. It is unstructured or semi-structured interview which means that the questions can be very flexible (Bryman 2008). Group interview provides insight on how the participants view an issue, how interaction is constructed and how the conclusions are jointly created (Bryman 2007).

4.2.1 Inclusion criteria and sampling size

The study did not use random sampling but purposive sampling relying on snowball effect. It is a nonprobability sample method¹⁸ where the sampling size grows with each interview. It is also known as chain referral method and it is used to study hard to find study populations, or in limited communities (Russel 2011). The process of information gathering starts with small group of people who are relevant to the research, and then uses them in order to establish contacts with others (Bryman 2008). This method was used due to the small size of the UniBRAIN officers that manage the program, and because it was possible to reach all relevant respondents. ANAFE officers provided contact information of the key informants from the consortia. This way all key contacts both from the private sector and the universities were able to contribute to the study.

4.3 Data analysis

Data analysis of the gathered information was employed right after the interviews. Microsoft Excel was used in order to group answers in analytical categories. Content analysis was used to analyze the data collected from the group and in-depth interviews. The empirical data from the semi-structured interviews as well as observations were analyzed with the help of the two models.

The model suggested by Amey (2007) was used in order to look at collaboration as a process. In other words, to understand university and private sector motives for joining UniBRAIN; to look at the circumstances and terms of the UniBRAIN consortia and their involvement. This model was mostly used in order to give more complex answer on the second and third research questions: To elaborate on how can African Universities benefit from these collaborations, and to identify how can private sector benefit from the collaboration.

The model suggested by Lawrence (1990) was used in order to look deeper into specific benefits and challenges of the university- private sector collaboration. It was also used to acquire a picture of current and past collaboration that universities and private sector in represented cases fostered. This model provided a tool to answers the first research question: What are the challenges that African universities and private sector face in university-private sector collaboration; and on the second and third research questions: To elaborate on how can African Universities benefit from these collaborations, and to identify how can private sector benefit from the collaboration.

¹⁸ Respondents are chosen on purpose, not randomly (Russel 2011)

4.4 Limitations, triangulation and validity

This thesis is a case study which means that the results cannot be generalized but some of the findings can be applicable to institutions undertaking similar activities. The study made use of three different types of data and data sources. Primary to data gathering, an extensive literature review was conducted. Also, in order to validate the results gathered from universities and private sector that take part in the UniBRAIN program, additional data sampling was done in ten external tertiary education institutions from nine African countries. The aim was to get an overview about the state of collaboration fostered by the institutions that have no direct connection with programs that focus on collaboration. In total twelve respondents, from ten tertiary education institutions responded to the questionnaires (Appendix 6). These institutions were reached during the ANAFE pedagogy workshop held in Nairobi during May 2013.

Table 4: External tertiary education institution respondents

External tertiary education institution respondents			
	Name of institution	Country	Number of respondents
1	The higher Polytechnic Institute of Manica	Mozambique	1
2	Natural Resources Development College	Zambia	2
3	Catholic Universty of Bukavu	DRC	1
4	University of Nairobi	Kenya	1
5	Federal College of Agriculture	Nigeria	1
6	University of Nigeria	Nigeria	1
7	University of Kordofan	Sudan	1
8	Malawi College of Forestry and Wildlife	Malawi	1
9	Nyabyeya Forestry College	Uganda	2
10	University of Namibia	Namibia	1

By comparing the results from the study with the relevant literature and the results from the external education institutions, the results from the study were triangulated. Figure 7 shows the triangulation process that enabled the author to reiteratively analyze the data.

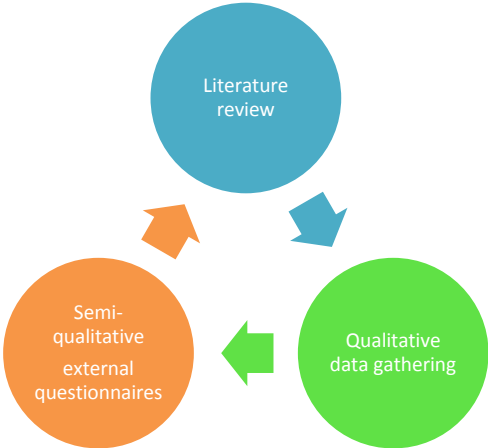


Figure 7: Triangulation of the results

5 Results and discussion

This chapter is organized in four sections. The first part looks at the study respondents, the second part gives an overview of what has been happening with regards to university-industry partnerships in UniBRAIN so far. The third section gives an in-depth understanding of the partnership processes. Lastly, the fourth section provides an in-depth perspective of the context of partnerships. The results and discussion are grouped into themes and analyzed accordingly. These themes were identified during data analysis based on responses and keywords that emerged during the group, semi-structured and in-depth interviews.

5.1 Respondents

In total, 20 semi-structured interviews, one group interview discussion that involved 30 participants, 3 in-depth interviews, and 13 structured self-administered questionnaires were conducted. In table 2 an overview of the respondents is outlined.

Table 2.Characteristics of respondents classified by interview type

Overview of methods and respondents				
Respondents	Semi-structured interview	In-depth interview	Focus group interview	Open-ended questionnaire
UniBRAIN coordinator (FARA)				1
ANAFE officers		3	30	
Incubator manager	5			1
Private sector	7			1
University	8			
External university				

In table 3 we present the respective consortia and their country of origin. The acronyms for the consortia also denote the commodity focus. All six consortia were interviewed and information about the respective members collected. In four instances it was not possible to collect data related to private sector members, and incubator manager, however this did not affect the results.

Table 3: UniBRAIN consortia members based on country, private sector or university grouping

	UniBRAIN Consortia	Country	Private sector members		University members		Incubator manager
1	Afri Banana Products Limited(ABP)	Uganda	Excel Hort Consult Ltd	2	Kyambongo University	1	1
2	Agri-Business Incubation Trust (AgBIT)	Zambia	FDA	3	Mulungushi University, University of Zambia	1+2	1
3	Creating Competitive Livestock Entrepreneurs in Agribusiness (CCLEAR)	Ghana	No data		University of Ghana	1	1
4	Consortium for Enhancing University Responsiveness to Agribusiness Development (CURAD)	Uganda	NUCAFE	1	Makerere University	2	1
5	Sorghum Value-Chain Development Consortium (SVCDC)	Kenya	No data		Jomo Kenyatta University of Agriculture and Technology	1	No data
6	West African Agribusiness Resource Incubator (WAARI)	Mali	AID-SA Cooperative Union	1	No data		1

In total 26 respondents were approached in person out of which 23 agreed to undertake the semi-structured interviews. We sent out 5 online open-ended questionnaires out of which only two responded after receiving one or two follow-ups. Additionally, we administered 20 open-ended questionnaires during a workshop hosted by ANAFE. We received back 13 responses representing 10 institutions. The answers from the same institution were counted as a middle value and that value was used as a final response. Lastly information was gathered from the group interview during the workshop hosting 30 participants. We evaluated that around 17 respondents actively contributed to the gathered results, and that five more contributed indirectly by participating in the discussions.

In the cases with personal contact respondent rates (81%) were higher than when approaching respondents online and or simply giving out questionnaires (31%). Because of the physical presence, respondents were more likely to give a response. The reasons that were given for not responding were: lack of time, and respondent's incompetence to give the answers perceived as being correct.

5.2 UniBRAIN partnerships to date

Since the UniBRAIN program started in January 2012, at the time of the interviews, the partnerships were in their initial phase. All consortia members had signed the MoUs with their partner which was seen as an essential step in establishing formal partnerships. The following sections will show the level of existing collaboration within the UniBRAIN consortia in the field of student placements, academic consultancies, curricula development, services and facilities.

By the end of June 2013 Afri Banana Products Limited from Uganda (ABP) and the Consortium for Enhancing University Responsiveness to Agribusiness Development from Uganda (CURAD) had started collaboration on *student placements*. ABP had 15 students attached to organizations affiliated with the incubator while CURAD had 26 students attached to organizations within the incubator and some in firms that were member institutions of NUCAFE (National Union of Coffee Agribusinesses and Farm Enterprises). These two incubators in Uganda have been supporting and promoting partnerships for a number of years. The internship programme, for example, was in place even before UniBRAIN began. Collaboration between institutions e.g. in CURAD: Makerere University, NUCAFE and National Agricultural Research Organization (NARO) were there prior to UniBRAIN, hence the reason for the success in implementation. From the interviews it was gathered that in both ABP and CURAD, UniBRAIN came into an already existing program and the money provided further assisted them in setting up incubation centers that house their activities.

On the other hand, the other consortia had not yet started, but the Agri-Business Incubation Trust from Zambia (AgBIT) had already identified students and incubatees that they could include in their program. Creating Competitive Livestock Entrepreneurs in Agribusiness from Ghana (CCLEAR) had also yet to commence. This was due to fact that the position of the incubator manager was not finalized. The Sorghum Value-Chain Development Consortium from Kenya (SVCDC) were in the process of coming up with structures that would guide the internship program. The reasons given were that one partner - Kenya Agricultural Research Institute having initially agreed, pulled out of the collaboration and the incubator manager resigned. The incubator only started functioning in June 2013 with a newly appointed manager. The West African Agribusiness Resource Incubator from Mali (WARI) has yet to establish collaboration at the time of writing up this thesis.

In the field of *academic consultancies* and projects one of the UniBRAIN consortia, CURAD from Uganda, had commenced university private sector partnership. For example NUCAFE from Uganda was collaborating with the Makerere University in the field of research. The nature of this partnership was not permanent rather on an as needed basis. The partnership had started before the UniBRAIN program started upon the initiative of NUCAFE. NUCAFE approached Makerere University for new coffee seeds, having experiences a reduction of more than 50 percent of coffee yield due to a disease attacking their plants.

With regards to *curricula development*, the Agri-Business Incubation Trust from Zambia (AgBIT) hosted collaboration between FDA and University of Zambia. On the initiative of FDA, the veterinary medicine programme began to offer a full time course in poultry medicine. Furthermore, Afri Banana Products Limited (ABP), enterprise ExcelHort and Mbarara university have been together working on improving the University curricula. The collaboration started when ExcelHort employee, former lecturer from Mbarara University, initiated conversation about curricula improvement. This collaboration was a result of one of the employees of ExcelHort initiating collaboration with Mbarara University. It is this kind of forward thinking that enables certain universities to conceptualize on meaningful collaborations that contribute to current development within the field of agribusiness.

Finally one of the consortia has been working on establishing collaboration in the area of *services and facilities*. Namely, Kyambogo University from Uganda. At the time of the interviews, the university was in the process of establishing a center for various experiments and studies. Although planned prior to UniBRAIN the financial support provided by UniBRAIN, significantly contributed to the development of the project.

It can be seen above that, in many instances, the UniBRAIN partnerships were in the process of starting up or were in their initial phase. However this doesn't mean that the UniBRAIN members have not been active in collaborating with other (non UniBRAIN) businesses and institutions. On the contrary, as we will show in the coming sections, all the interviewed institutions and businesses have been fostering collaboration in different areas. The collaboration spanned from local, as in young University of Mulungushi, to national level as in Makerere, JKUAT, and University of Zambia. In such cases UniBRAIN presence has enhanced these partnerships financially and by helping them to formalize and expand.

Because the UniBRAIN partnerships are in their initial phase, and because of the variety of other partnerships fostered by UniBRAIN members, as stated in the aim of the study, this paper examines only the partnerships where at least one of the partners is a UniBRAIN member.

5.3 Understanding collaboration

5.3.1 How partnerships are understood

Data from all the interviews that was qualitative in nature was subjected to content thematic analysis, and recurring themes were identified. In this section we apply the Amey's (2007) model in analyzing and discussing the collaboration. This model looks at: how the partnerships are understood and the reasons for joining; outcomes, benefits, and costs of the partnership; and what is required to sustain the partnerships.

The data gathered from the conducted in depth interviews showed that there were many uncertainties over the way UniBRAIN partnerships should be carried out. The majority of the respondents had little experience in cross institutional collaborations. This was supported by ANAFE respondents stating that: *"SSAs universities do not have a culture of working in consortia with different stakeholders. There are some collaborations but they are most often not including private sector. UniBRAIN puts research institutions, education institutions, and private sector in a consortia to work together at the same level."* Not only that, in most cases, there was a lack of tradition in collaboration, but the respondents from both sides also expressed skepticism over collaboration due to low trust levels that continues even today. Data gathered from the group interview and the in-depth interviews revealed that the academics are not always much appreciated by industries. AgBIT stated that: *"Traditionally universities have operated in isolation. Their research has not been relevant for industry needs. So it is not strange that industry does not have so much trust."* Academics' competences are questioned and they are thought to be slow and being too much occupied with theory. This is illustrated by the statement of ExcelHort: *"Professors need to realize that there is a more practical world out there and to adopt to their needs."* On the other hand respondents from the UniBRAIN universities stated that industries are only oriented towards financial gains and are not interested in quality research that might improve their businesses stating that: *"They do not understand that you need that theory in order to base your research on. They think that you are only wasting time. On the other hand, we think that they are very sloppy and do not have patience."* (CCLEar respondent) It is believed that industries need fast solutions and reactions, and as they don't believe they can expect that from the universities, they choose to collaborate with private laboratories and even institutions from far away regions.

Besides the traditionally low levels of trust, the conducted interviews and focus group interview identified a great deal of optimism for the future of the UniBRAIN program. With the presence of the UniBRAIN frame, partners felt much safer to invest their time and resources in these partnerships. The financial support is shown to be particularly important for the process of setting up the partnerships. Respondent from University of Zambia stated that: *"Without the funds being given, nothing will happen."*

5.3.2 Benefits, and opportunities of partnership

Identified benefits

Findings from the in-depth and group interviews revealed that all the interviewed universities were benefiting from the existing collaborations with the private sector they had fostered prior to UniBRAIN. In the following chapter we will briefly look at student placements, academic consultancies, facilities and services, curricula development, and influence on policies. Then later on in the chapter “Context of collaboration” we will go deeper into each of the collaboration areas and discuss them.

Student placements were present at all of the interviewed universities. These were enabling students to gain work experience, deepen their practical knowledge on studied topics, and get them closer to a prospective future job. For universities, this was a way to keep contact with the private sector. It was important for the universities because it could produce further collaboration in other areas such as academic consultancies and even, bring money to the institution. Direct benefits for the institutions were often translated into favors, gifts, and stipends for students or in kind. None of the universities reported that there were any direct financial gains from the student placements. In some cases, students (or the institutions supporting them) needed to pay in order to be placed in an attractive company.

Commissioned academic research and facility usage were also common at all of the interviewed universities. This kind of collaboration enriched the universities with a business way of thinking increasing their capabilities to create, sustain and improve new collaborations, while bringing in money to the institution. This is important because, as Wangenge-Ouma (2008), Ntshoe (2004) and others have argued, there has been a shift in the way universities are funded, and now they need to look for opportunities outside the institutions. CCLear respondent said that: *“The presence of private sector contributed to my institution greatly by bringing in a business way of thinking. Now more of our proposals are being accepted. World Bank said to us that we had the best proposal among around hundreds of them.”* Additionally institutions that already foster partnerships are in a better place to attract interest from other potential partners. The academics benefit by enriching their experience in research, as well as financially. They also benefit through royalties. Makerere University respondent confirmed this saying: *“We must patent and protect our innovations. The researchers should ask for royalties so that they can also benefit from their own research.”* This need has been understood by the private sector as well. NUCAFE responded added that: *“IP issues for the researchers are very important. Researchers that come up with the varieties should get a certain percent of my sale and recognition.”* However, in order to do that the national regulations regarding IP has to be functioning, which is not the case in the five examined African countries. The benefits for the private sector are solutions for their development and research challenges. AfriBanana Products respondent supported that saying: *“The private sector has serious problems in production and it needs university help.”* For example NUKAFE respondent suggested that: *“Our priority needs are new varieties- access to new technologies, branding, and value chain addition.”*

As stated above, collaborative curricula development has been documented in two instances Mbarara University and University of Zambia. It significantly increased trust among the institutions and businesses. This makes the universities and the students, more relevant for the current needs of the industry, benefiting both the university and the private sector. The collaboration and ongoing dialog between universities and private sector, significantly increases their power to influence policy changes. This consequently improves the conditions for the further development of the partnerships and their expanding.

Opportunities

The current capacity of the institutions to develop these partnerships, and harvest more benefits is limited due to the limited human resources, according to Buchert (2002), and Wallace (1997), and facility and financial resources, as Ssebuwufu (2012), Gakusi (2010) have argued. Additionally, the results from the interviews with universities revealed that universities and private sector had few opportunities for meeting, discussing and developing partnerships. For example respondents at Kyambogo University said: *"We have lack of forums to meet and discuss. We need to dialog with private sector."* Also respondents from JKUAT stated that: *"It is hard to reach the private sector. They do not see the relevance of universities for their business. UniBRAIN is a framework for long term collaboration."* From the foregoing statements we see that the identified lack of forums for communication pose challenges to establish meaningful partnerships. From the interviews, we understood that the lack of forums was due to low commitment, limited engagement, and limited leadership participation with decision making powers. By establishing formal communication, both private sector and universities would have opportunities to harvest more benefits from the collaborations. We believe that these challenges can be significantly enhanced by the UniBRAIN program due to the financial support as well as the organizational framework within which this programme works.

The starting point of any UniBRAIN collaboration is the signing of terms of reference (ToR). This document defines all the important aspects of the collaboration, and it is very important for the formalization of the collaboration which contributes to enhanced transparency, trust, quality assurance, quantity, and time span. One of the aspects defined in each ToR signed with a UniBRAIN university member are the student placements and their purpose, as well as mentorship. That is why we expected that the number as well as their quality will increase, subsequently increasing content with the students and bringing more interest among businesses in the future. The financial support coming from the UniBRAIN will also support the efforts to improve this aspect of collaboration.

Considering academic consultancies and facility usage as well as different testing done by the universities, UniBRAIN is expected to enable easier access to these services enabling businesses. CCLEAr respondent stated that: *"Joint consortia helps private sector, research and education institutions have facilities that is not easy to reach otherwise."* We believe that the UniBRAIN can increase the level of financial gains for the universities, by formalizing the process of money flow. This has been confirmed by respondent from JKUAT: *"We hope that UniBRAIN will enable us to reinforce our budget. We would use that money to improve our facilities. In that way we would be able to make gains by offering them for private sector use, and to do a better research and*

testing for them.” A respondent from FDA Zambia stated: “We hope to benefit financially from UniBRAIN, so that we can set up the processing plant. We also hope to be the future market for coming UniBRAIN incubatees.” The financial gains are also expected indirectly through increased experience and better visibility. As ANAFE respondent stated, the partners will also “Gain financially, get better visibility and potentially create new business partnerships.” Not only that work with industries will influence institutions to become more competitive on the market, but the individual academics will gain valuable experience. As, ANAFE respondent argued, this will improve the performance of academics in teaching delivery: “Partners will gain experience of working in a consortia. Having lecturers being involved in this kind of collaboration can also add to improving the delivery of courses as well as the development of more relevant learning materials”.

Due to the increased communication and the formalized collaboration, we believe that these aspects of university-private sector collaboration can be improved, including the joint curricula development. Also, in the field of influence on policy changes, joint efforts of universities and businesses, being a part of an international project like UniBRAIN would be expected to be able to have more impact on policy makers.

Figure 6 gives an overview of benefits among private sector and universities.



Figure 6: Overview of benefits among private sector and universities

5.3.3 Sustaining partnerships

In order to sustain the partnerships two issues are essential. These are: keeping high interest in partnership, and maintaining the confidence and trust among the partners. The interest in collaboration will remain high if the outcomes of it will benefit both sides. These outcomes are, as stated above: financial gains, adopting a business way of thinking, providing valuable experience to academics, addressing specific challenges, improved curricula development, student internships and increased influence on policy changes.

Confidence among the partners is also of key importance. Current data shows that academic consultancies are still very poor. Industries are not sharing their knowledge with universities due to low trust. Respondent from NUCAFE said that: *“In this process confidence and trust is very important for us. I do not want them to share our improved varieties with other producers.”* UniBRAIN respondents claim that there is a conflict of interests in the field of consultancies. Namely industries want to keep the results of studies for themselves in order to profit, and academics want to promote their knowledge by publishing. Due to lack of communication, this becomes a problem. That is why, besides the more financially favorable deals offered by the universities, industries often choose to work with private research institutions. This clearly shows that the trust among the partners is in most of the cases more valuable than the price of services, and it is essential for long lasting collaboration. As several studies exploring linkages between public and private sector have found (Kezar 2009, Tang 2010) partnerships work best under conditions of mutually agreed upon strategies and goals. Which is why the partners should aim to form official institutional collaborations. In instances where trust has been eroded partnerships can face enumerable challenges.

5.4 Context of collaboration

Data from the group interviews and in-depth interviews were analyzed using the Lawrence (1990) model. The model was utilized to examine the following components: student internships, academic consultancies and services, curricula development, facilitating agencies and centers, and policy making.

5.4.1 Student internships

The gathered data from group and in-depth interviews showed that all out of the eight interviewed universities sent their students for internship. It was part of curricula and all students were supposed to do an internship once during studies. In JKUAT¹⁹ students sometimes undertook two internships during their study time. Well established universities, such as JKUAT sent their students to various companies, and even to the biggest national companies. Respondents from JKUAT stated that the initiative for student internships originated from both sides. The university normally would communicate with various industries through the National Industry Authority that also coordinated the student internships.

¹⁹ Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

Smaller universities sent their students to local industries in smaller numbers. Makerere, Kyambogo, University of Zambia, Mulungushi University respondents stated that the initiative came from the university's side and that the students did not benefit financially from the internships. In some cases, student (or universities, if a student was government sponsored) sometimes had to pay in order to get attached to a company. In these universities, not all students were attached to some company during their studies due to lack of industries willing to take in students. Even beside many benefits such as economically less demanding labor, innovative ideas from students, problem solving research on their behalf, gaining employees that understand their business, it is still hard to motivate private sector to be more active in this issue.

These examples illustrate that depending on the size and reputation of a university, students get different benefits from industries. Universities that have a long tradition, are well established, have much better conditions for managing student internships. Internships are part of their curricula and are well managed by university staff or even have university collaboration office (like in JKUAT). On the other hand, smaller universities are still struggling to attract industry's interest for the collaboration in this area, to establish official agreements and to earn their respect them.

The interviewed respondents from the private sector taking part in UniBRAIN, were between seven (ExcelHort) six (FDA Zambia) or less, and thirty students attached (NUCAFE). FDA Zambia stated that they had agreements that regulated student internships with various faculties, and that external students approached them independently. However, the students that did not get the possibility to do an internship had alternative ways to get in contact with the business world. Universities organized student visits to farms and different industries. Additionally many universities hosted guest lecturers of distinguished people from different industries. Private companies gave student awards and stipends to the best students. For example, companies such as FDA Zambia had a youth challenge fund with which they encouraged brilliant student ideas.

The ToR²⁰ for internships was initially developed by the university giving a scope of experiences that students should acquire. Then it was additionally modified by the private sector in order to meet their needs. The requirements for work differed a lot between companies. FDA Zambia expected students to work on their proposals, and innovative ideas. Even AgBIT, model for now existing UniBRAIN incubator, was conceptualized by an intern. *"We want them to join our research work (with less demanding work), and so on."*(Respondent from FDA Zambia). Ideally during the period of internship, many students identified their research question and, by writing thesis, they contributed to development of their businesses. The overall aim was to have students doing academic work for private sector needs, not purely academic. Additionally the objective was to equip students with practical skills, experience and opportunities for future employment. *"Sometimes students get job even before they finish the university."* The private sector gains by having trained workers that understand their business.

²⁰ Terms of References- planned activities

The group interview revealed that many industries did not see the internships as beneficial for them, even though the students would work for free, they would require too much supervision time, and were not productive. Recent years had brought much discussion about the poor practical skills that African students had. The importance of internships has been emphasized, and it has become part of many universities' curricula. Group interviews also showed that some universities were aiming towards 50% of the students acquiring practical skills and 50% of theory in their programs. However, industries still complained that the students perform poorly when they entered the professional world. This highlights the issue of internship quality. The group interviews showed that the initial goal of student internships, were to address the needs of the supervising business, and equipping the students with the relevant skills for the future job, but this had often been overlooked. In many cases, the students were shown little supervision and trust. Consequently their output was valued minimally, and the interest from the private sector decreased. Our private sector respondents stated that the low supervision was due to time constraints and their work overload.

5.4.2 Curricula development

Most of the universities have longer tradition in agricultural programs and they have been conducting curricula review (ideally every four years) and development before. However, younger universities such as Mulungushi University are entering that phase for the first time 2013, as it established its programs only four years ago and has first students graduating this year (Before it was College of Mulungushi).

The process at all universities begins with department consultations. From there it continues through various university bodies, so that it can be completed in commission for university education/ university governing council/ academic board/ university senate with the final version approved. The process, in all cases, involves an event where different relevant stakeholders can give their input to curricula. These are members of private sector, research institutions, representatives from other universities, government representatives, and students. The process was in most of the cases very complex and long. In some cases the process involved seven steps only within the university institution, and in order to be officially recognized by the state, it took even more steps on the governmental level. In some cases it was so long that the time for the next review came before the first one was approved. Below is how for instance curricula review looks like in JKUAT: *"The review is done after a full cycle of 4 years which is reviewed by expert committee. Board reviewing and development follows. Then we preliminarily talk to private sector and set a team to develop curricula with which we approach different stakeholders on stakeholder workshop (employers, former students, ministries, NGOs, private sector take part). The next step is faculty board, and then director of academic quality insurance. If the proposal passes, the university senate looks at it. The last step is commission for university education where the final version is approved."*

In some cases the curricula development process started at the request of the private sector like in the following case: *"I used to teach at Mbarara University. After working in private sector, I approached them saying that they need to teach students more practical issues that are needed in private sector."* Also in some

cases the input from private sector shows to be very influential: *"We lobbied that university will include us in the process of curricula development. We gave great input. For instance veterinary medicine program began to offer full time course in poultry medicine on our suggestion."*(AgBIT Zambia).

Despite so many experts, different external stakeholders being involved, and so much time spent on curricula development, often times the curricula remains mismatched with the current needs of the private sector, as Temu et al (2007).The students are criticized as lacking relevant practical skills, and universities are accused of being ignorant towards the industry.

This study also took into account the students opinion related to curricula development. . Firstly students usually did not give input as they cannot leave their lectures in order to participate in the meetings where the curricula is being discussed. Also a student source during the group interview stated that there were other reasons as well why students do not take part in the curricula development:*"Curricula development only officially involves students. I have never heard that any of my friends was involved in such a process. Students think that professors and university management are never there for them, so when they are asking for input in curricula development, they feel that they do not have the responsibility to contribute."*Secondly, it has been stated that stakeholder meeting might not choose the right private sector to take part in the process, and that is why their input is not being valuable. Lastly, university structure is evaluated to be rigid. *"It is hard to put in private sector inputs. In the best case a professor can be also involved in an industry, so he can give an input from private sector representative."* (Respondent from University of Ghana).

However, this research argues that even though there were problems in the process of curricula development, the larger problem occurs when it comes to its implementation. Interviewed university members argued in group interview that even though curricula looked great on a paper, its implementation was problematic. The implementation was constrained by poor institutional facilities, teaching delivery, low status of agriculture and therefore poorly attracting the best quality students. The study also showed that, as work by Atteh (1996), The World Bank (2000), Buchert (2002), Rivera (2006) argues, facilities that universities offer are in many cases not able to support the rising number of students and limited number of academic staff. The group interview indicated that it is practically impossible to train all students with the existing facilities, labs, lab material, academic staff and available teaching time. The example from Uganda illustrated the current pressure: *"I have taught classes that are 400 students. Only 200 have a place to sit. The rest are standing around and in the windows."* The contact between student and professor is hardly established because student/teacher ratio is too large. Secondly, teaching skills lecturers poses are sometimes very low. A responded taking part in the group interview stated that in some cases, the lecturers have been employed because they are experts in their fields, and in many cases these professors have never had trained in lecturing, giving presentations and pedagogy. This can cause very passive classes, where students are not encouraged to question, discuss and do critical thinking. Later on this influences their low performance on job. Additionally, as agricultural lecturers claim, and the relevant literature supports (Atteh 1996) there is low interest in agricultural education. Agriculture is not seen as attractive occupation, and these programs are usually the second choice for students

in SSA, because the best quality students usually get admitted to other more popular and more prestigious programs.

Finally, it is important to mention that the importance of the input of the private sector is greatly emphasized among interviewees. They can bring in issues that academic sometimes lack experience of, such as business approach, practical skills and more. This thesis argues that the lead should not be given to the private sector. Universities have a huge role to play in knowledge production and dissemination. The process of curricula development and changes has to be done with a lot of caution. Universities are not only producing students for industry and practical work. The students are also human resources for future professors, consultants, researchers, government, and other societal needs.

5.4.3 Academic consultancies and services

The empirical data shows that most academicians are active in external research and consultancies. All out of the 8 universities interviewed, claimed that they have been undertaking research, consultancies or offered services to industries. The range of services and research that is being done is wide. The respondents of this study were for instance designing animal feeds, doing lab testing, sampling, food and soil analysis, did problem solving and more. For example a coffee producer from Ugandan NUCAFE Company said that: *“Recently a disease killed more than 50% of our Robusta coffee. Then I approached Makerere University asking them for help to come up with improved coffee varieties resilient to the disease. Now we have seven new varieties that we are multiplying for seeding.”* Today the initiative for those kinds of services usually comes from the private sector when needed. At Mulungushi University they carry out demonstrations for farmers. In some cases industries are forced by government to work with universities like in Kenya: *“In some instances, our government makes a requirement that they have to do certain testing. For instance in horticulture there has to be agrochemical testing done before going out in market. Our University is an approved testing center.”* (Professor from JKUAT). However universities are also very keen to expand collaborations and they are initiating the process. For instance Kyambogo University recently conducted a baseline study where they explored how they could help the private sector more. At the same time the respondent from Mulungushi University stated that: *“The academia has to be relevant for the industry, and to begin the process. They have to prove that they are the ones to conduct the research for them, that they are competitive with other institutions offering the same services.”*

Fifty percent of the university respondents in the study stated that the services of testing, analysis and facility usage were offered for free. Benefit for the universities were that they got users for the technology they produce, the industries take their students for internships, and the students get student awards and stipends from the industry, while the university received support for infrastructure upgrading (lab or library improvement for instance). In the case of Makerere University, some industries even donated vehicles, equipment, chemicals that they needed for the analysis. These favors were not a part of any official contracts and were neither fixed nor obligatory. The other half of the universities had a commercialized facility usage,

and they had set (lower than market prices) fees. *“The services are being charged and the funds go to a department bank account. The money from that is used for small department needs and upgrades. It is not a large amount of money.”* (Responded from JKUAT) The universities that have commercialized their services and consultancies were also the ones with long tradition, good organization and institutional stability. They were also hosting partnerships with a larger number of industries even at national level.

The in-depth interviews highlighted that the reasons for unfavorable conditions of partnering in the field of consultancies and services as following: Firstly, the business sector in SSA is in many case not set and most of the businesses are small scale. Tracer studies done by Nyabyeya Colledge showed that 44% of companies in Uganda have less than 10 workers, and only 5 % have more than 100 workers. That means that in most of the cases the industries cannot afford the costs of research. Secondly, the interviews with private sector stakeholders showed that there was a type of thinking that universities are funded by governments with their tax money. That is why they should not be forced to pay twice to universities for the research/testing. ExcelHort respondent argued that: *“Universities get money from government, so it is important that we can use their facilities as well.”* Lastly as several studies reveal Spielman et al. (2008), Atteh (1996), Maguire (2000), Eicher (2006), the lack of human and financial resources in many African educational institutions, have significantly weakened their position for negotiations. Current human capacity of and the existing facilities are under pressure from the increasing number of students. A professor from University of Ghana said: *“My labs have not changed and now I have 4 times more students. And I do not have more time either.”* Another professor from JKUAT said: *“Our facilities are even insufficient for our student usage, and we haven’t seen much financial gains from collaboration with private sector. Still, we do offer different services such as testing and analysis.”* These examples illustrate how teaching alone can be challenging, and how additional engagement in partnering with industries is sometimes too much to take. Still the need for external funding (or favors in the form of student internships, teaching material, facility upgrading and similar), and increasing reputation by collaboration with businesses is large. With not much to offer and a lot in need, the interviewed universities are forced to go lower than market prices and even work in return for favors in order to attract industries.

5.4.4 Facilitating agencies and centers

All of the eight universities indicated that the collaboration often goes through private contact and that it is unofficial. The universities foster official agreements as well. *“If a research is done officially, the university gains 8% of the payment. However, there are much more unofficial individual consultancies being done. So most of the times there are no direct financial benefits for the university from these kind of collaboration.”*(JKUAT) Interviewed universities mostly did not have any facilitating agencies or centers supporting collaboration with private sector. However JKUAT had a collaboration office that managed all collaboration with industries. Also, Kyambogo University in Uganda, was in the process of establishing a facilitating center for doing different kinds of sampling and testing. The respondent stated that: *“Now we are making a science park with support of UniBRAIN so people can come and analyze different samples, and do*

training and technology transfer.” In order to set up one such center, they need large support from external donors and UniBRAIN provided very important support in this process.

Ten out of the twelve university and private sector respondents stated that UniBRAIN is formalizing, sealing, and strengthening collaboration. This thesis argues that formalizing partnerships brings multiple benefits to all stakeholders. Firstly, formalized collaboration is perceived as being more honest. It means switching from personal to institutional collaboration ensuring longer lasting relationship and growth. As Kezar (2009) argued, industry benefits with better quality research/service. Secondly, as Ssebuwufu et al. (2012) argued in their research, the financial means from the conducted research are used in facility upgrading and building of human capacity. These improvements, bring increased recognition to the universities, improving their position to negotiate and widen collaboration with the industry. Thirdly this thesis argues that the researcher conducting consultancies gains from the formal collaboration with greater support from the university in facilities, materials, colleague support and more. Additionally, in line with Krattiger (2007) our study results show that official collaboration helps better IP²¹ management, and publishing of scientific results. Formal university-industry collaboration ensures more fair, simple and time saving processes.

5.4.5 Policy making

As relevant literature (Tang 2010) suggests, none of the respondents stated that their university was largely influencing the state policies. All of the eight university member respondents said that even influencing internal university policies was a very slow process. On the other hand, everyone saw the importance of policy changes. This thesis argues that collaborative work on policy changes is very important for the efficiency of university-private sector collaboration, but it has not been present in respondent institutions. As already stated in the previous chapter, the UniBRAIN collaboration is expected to bring increased importance to consortia voices and hopefully increase the influence on policy changes. This has already been shown, that this kind of collaborative effort make a difference. During an official meeting with the Zambian Government in 2013, AgBIT consortia manager presented the UniBRAIN program and their achievements and challenges, attracted a large interest for investment and other support.

²¹ Intellectual Property

6 Conclusion

This thesis argues that although constrained by the complex the past, poverty and various challenges in the present, African Universities and industries are active in improving their collaboration with the private sector. As opposed to a large amount of literature that is presenting the situation of African tertiary education as very critical and hopeless, this thesis argues that much has been done during the past years to improve the situation. A large number of African-based NGOs and networks such as ANAFE are making a lot of effort into development of sustainable education systems, and their work is producing the desired results. By examining the past few years, we find significant achievements that could potentially be scaled out. This is largely due to the introduction of the UniBRAIN program. The organizational and financial support that has been given to the participating institutions enables them to build up formal, more honest and promising collaboration for the future. The thesis also shows that the areas of collaboration are student internships, academic research and services, collaborative curricula development, facilitating agencies, offices space, and policy development. All these areas of collaboration offer multiple benefits for both stakeholders. Some of the benefits for the tertiary education institutions are improved academic knowledge, teaching delivery and research. The public private partnerships can create more student internships and scholarships for graduate research, enhancing student learning and acquisition of practical skills needed for future employment. The private sector benefits with fresh ideas, financially less demanding working force, and by getting into contact with possible future employees. The better communication improves the research, creates innovation, and faster technology transfer. Universities get to have their technology in use, benefit financially, and it has been shown that this kind of collaboration increases external investments in laboratories and equipment. Universities also benefit by gaining a business way of thinking, making them more competitive on the market, and attracting external partners. Mutual efforts on improving university curricula, results in curricula that is adjusted to the current business needs, is more attractive to students, more content is industry related, and university status is enhanced. The collaboration in different areas brings these institutions closer, building capacity and trust for the future. This makes their joint voice much stronger when arguing for policy changes. Our results furthermore show that governments put a higher value on suggestions coming from institutions that are making an effort into improving their situation and collaborating on these issues with other institutions.

Depending on their starting position universities were able to utilize the benefits in different scales. In some cases, university and private sector respondents were constrained by a set of difficulties that were decreasing the stated benefits. In these cases, student internships were missing. The university curricula was at times claimed to not address the needs of the industry, and the process of its development has been rigid and the stakeholder input questionable. Additionally we found problems with implementation of the curriculum. University respondents were chronically underfunded and at the same time facing rising demands due to the population growth which causes increasing pressure on the existing facilities. We also found that the trust between universities and industries needed more working on, and that existing collaboration in many cases was not official, which made the partnership unstable and short term.

The UniBRAIN program was designed to address the stated challenges and it is expected to enhance partnerships and improve its efficiency. The financial and organizational framework under which it works has been boosting the collaboration hosted by our respondents. Only a year after its start, UniBRAIN consortia could report significant achievements in their work. In order to embrace the UniBRAIN program, the education institutions and the private sector have to commit themselves to the collaboration. In order for the participants of the program to maximize the benefits, partners have to adopt a mutual code of conduct and mindset. Much more effort is required in building up a culture of professionalism and trust to build sustainable collaborations. The mutual efforts of private sector and universities also have to be invested into establishing effective collaboration with their respective government and gaining their support. The great power governments pose in the terms of policy influence and financial support is absolutely necessary. Building trust, and establishing a strong base for collaborations take time, however when genuine investments are made they could considerably enhance the university-private sector collaboration in the field of agribusiness and innovation in Africa.

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Appendix 1: Recommendations

While this was an academic thesis undertaking, ANAFE and UniBRAIN were keen to have some suggestions on the way forward. Appendix 1 elaborates, based on the findings from this study, some suggestions for the consortia's work in the future.

1. Adopting the way of thinking and working to fit the collaboration

The universities will have to become more business oriented and to establish strong policy that will be able to host increased collaboration. This involves building up the human capacity to manage the increased collaboration. This also means adjusting university structure and policies.

On the other hand the private sector will also have to change organization in order to back up and benefit from the increased collaboration. This should involve sparing a part of its budget for research for development, and other collaboration costs.

2. Keeping the motivation for the collaboration high

Patience as a key for a successful collaboration

The collaboration is often not giving results very fast. Even when it does, the financial gains from it have to be invested back in order to grow further. Knowing this, the consortia members have to be prepared for long and hard work with not necessarily visible benefits. The patience is of key importance for the success of the collaboration especially because its structure is very complex (the smallest of six consortia involves four members). Because there are so many stakeholders involved, it is impossible that all of them are going to benefit at once. It is most likely that some of the members will have to wait for the benefits for some time before they come. Hence, their motivation might drop down with the time. Addressing this issue involves constant communication between the stakeholders. In this process it is very important to have the reasons for joining in mind and reflect upon them in the moments when the process is facing difficulties. In some cases, after a while when a collaboration is proceeding slowly and not giving results very fast, partners tend to forget about the goals of the collaboration and the benefits that are to be harvested. That is why many partners lose interest and collaborations die.

Up-to-date information sharing

In order to overcome the motivation crisis, the members of UniBRAIN consortia should have access to up-to-date information about the process of collaboration. In that purpose, this paper offers sum of the opportunities and challenges that should be addressed in order to harvest the benefits.

Sharing good practices

Sharing of good practices within UniBRAIN, but also other similar programs taking place in Africa and wider is useful when keeping motivation for collaboration up.

Communication and participation

It is of essential importance that all partners feel like they are taking part in collaboration process. Their participation in planning is very important for implementation success. In order for all to be engaged and contribute to the collaboration, they have to feel like important, equal part that has influence on decision making. That is why UniBRAIN coordinators have to leave plenty of decision making freedom to the consortia members. In the same manner, UniBRAIN incubates should have a freedom of a common business. Even besides the large amount of help from education, research institutions and private sector, the incubatees should be free to drive their business independently from them.

3. Expanding the partnerships

The partnership should also be expanded and include other promising partners, and especially in diaspora. African diaspora drives many businesses in northern and western countries and partnership with them is a large opportunity for African industries to expand to foreign markets, but also get knowledge, business and other kind of support. This expanded partnerships should include both foreign companies and universities, giving many opportunities for internships, staff, and student exchange and capacity building, collaborative research and much more.

4. Looking at the quantity and quality of the internships

A larger number of students still do not get to be attached to an industry. Even though internship is part of university curricula, universities are struggling to find industries that are willing to have students because they do not see the benefits from it. In order to address this, there should be extensive information dissemination among industries about the benefits.

The quality of internships should be also looked at. What are students actually doing while attached? Who are they interacting with? How closely are they supervised? The existence of internship does not mean that student is going to be enriched with additional skills that are valuable for future employer. With UniBRAIN, it is predicted that internships will gain on quality because of formal agreements between universities and private sector. Addressing this issue, there should be studies done exploring the quality and effectiveness of existing internships. The results should be disseminated among all actors involved in internship including industry taking the student, university sending the student, and the student itself. The university and the student should take responsibility for the preparation for the internship. On the other hand the industry should be aware of the study results when having the student attached trying to make the best out of the period when the student is attached (both for his own benefit, and student's learning).

5. Finding the ways to improve state of university facilities

In order to address more complex issues, the problem of poor teaching facilities and materials has to be addressed first. In order to achieve this, closer collaboration with governmental entities has to be developed. University leaders have to be taught how to apply for facility upgrading and other institutional needs, not only from the governments but also other donor agencies.

6. Improving teaching delivery and enhancing student's critical thinking

Teachers should be obligated to go through short courses on pedagogy, presentation and teaching skills. Practical skills acquired at certain industry are often not going to be relevant when the student gets employed within another industry. Hence, the student is still going to be considered to have "poor practical skills" even though it is only wrong type practical skills. Hence, universities, are never going to be able to teach student everything she/he needs to know for a future work. However they can teach her/him how to learn faster by her/himself. It is essential to equip student with skills that are going to enable her/him to learn and adopt fast. It is essential for student's future to be trained in critical thinking, fast adopting, and problem solving. To address this, lecturers have to be trained in developing these skills on students. That involves pedagogical and lecturing trainings, and also up-to-date scientific updating from the producers of knowledge, research institutions.

7. Promoting agriculture

Low interest in agriculture and its low status can be partly addressed by promoting agriculture as attractive occupation through successful role models. This is essential in order to attract the best quality students to join the agricultural programs.

8. Establishing collaboration offices

Likewise the collaboration in regard to academic consultancies, university facility usage, and services offered by a university should be formalized. In that respect, UniBRAIN program is very helpful because it helps to form the official collaboration between universities, industries and research institutions. In order to enhance these, the university should form an office which will deal with partnership in regard to research, consultancies, services such as testing, sampling, problem solving and more. The person working at the office should be active in marketing the university as well. In the smaller universities where the collaboration is not developed yet, this person could also manage other kinds of university-private sector collaboration such as student internships. In the process of setting up collaboration offices and systems, university staff has to be very careful not to make bureaucracy too complicated because this might force two parts to go back to unofficial collaboration. Figure 8 shows the activities that should be undertaken in such offices.

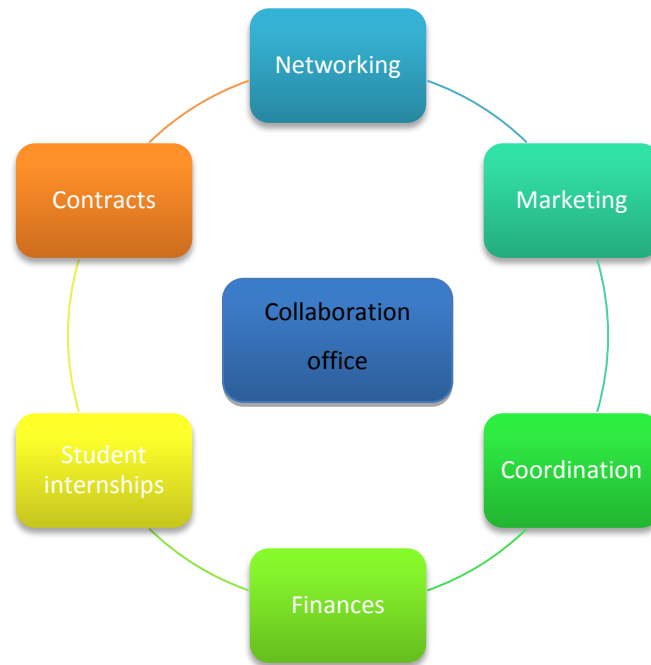


Figure 8: Responsibilities of a university collaboration officer

Universities have to build a base for the collaboration to take place. More specifically, they need to:

- 1. Organize and establish strong system for collaboration (to establish collaboration office and have a full time forking personal on),**
- 2. Expand their network with private sector, same as with other universities, research institutions, and relevant government bodies**
- 3. Switch to business type of thinking and organization**
- 4. Build up the human capacity which can support increased collaboration.**

Gathered data showed that academics are already too much pressured by the amount of work. Increased collaboration is hardly possible with current human capacity. In order to address this, universities should aim to include their senior students into commercial research/services done for private sector.

9. Increasing influence on policy changes

There is a strong need for more significant policy influence. The universities play big role in knowledge creation and dissemination. On the other hand policies are the framework for their work. That is why the universities should be able to influence it and enable the implementation of changes, and innovations. Industry input is equally important when it comes to enhancing practical skills and fostering innovations. That is why collaborative work on policy changes has to be done. In order to influence policies, universities together with partnering industries have to get closer to policy makers and governments, and show how their input is essential for the education development. These contacts can be made on conferences, workshops, similar events, and even directly in the ministries.

Appendix 2: Questions for UniBRAIN university members

1. **Becoming a part of UniBRAIN**
2. **Current collaboration with private sector**
3. **Student internships**
4. **Consultancies and research**
5. **Use of university facilities.**
6. **Curricula Development**
7. **Difficulties of collaboration**
8. **Importance of UniBRAIN**
9. **Future within UniBRAIN**

Appendix 3: Questions for UniBRAIN private sector members

1. **Becoming a part of UniBRAIN**
2. **Current collaboration with universities**
3. **Student internships**
4. **Consultancies and research**
5. **Use of university facilities.**
6. **Curricula Development**
7. **Difficulties of collaboration**
8. **Importance of UniBRAIN**
9. **Future within UniBRAIN**

Appendix 4: Questions for UniBRAIN coordinator and partners

1. **How were the consortia formed?**
2. **How were the incubators formed?**
3. **We see different kinds of ppp all over the world. What makes UniBRAIN special?**
4. **How important role have universities played so far in the consortia work?**
5. **How do you see the distribution of benefits and contribution among the consortia's members?**
6. **Project mentality --> business mentality. How does that apply to universities?**
7. **How important is existence of UniBRAIN for ongoing collaborations within the consortia?**
8. **How do you see the future of UniBRAIN?**

Appendix 5: Questions for UniBRAIN incubator managers

1. How did you become a UniBRAIN incubator manager?
2. What is your educational and professional background?
3. What are your 5 foremost responsibilities as a UniBRAIN incubator manager?
4. What kind of challenges do you see in the university-private sector collaboration?
5. Are you involved in staff internships within the private sector organization?
6. Are you involved in the university curricula development process?
7. Are you involved in the university-private sector facility and service exchange?
8. How do you see the future of university-private sector collaboration within UniBRAIN?
9. How important is UniBRAIN for existence of university-private sector collaboration?