STRENGTHENING RESEARCH - INDUSTRY COLLABORATIONS IN AFRICA

;

;

IDRC Grant/ Subvention du CRDI: 109426-001-Strengthening research and industry collaborations in Africa: scoping study and workshop

STRENGTHENING RESEARCH – INDUSTRY COLLABORATIONS IN AFRICA

Workshop Report

Date: 27 August 2020 |10:00 – 13:00 EAT | ZOOM

Table of Contents

Introduction

This one - day online validation workshop was designed to give a clearer understanding of research-industry collaborations, provide recommendations for establishing effective and sustainable research-industry partnerships in Africa, particularly for SGCs. This workshop was organized in partnership with IDRC, DFID, NRF, SIDA and SGCs stakeholders.

Objectives of the workshop

The general objective of the workshop was to strengthen the capacities of SGCs in the area of research-industry collaborations. Specifically, the workshop sought to achieve the following:

Share preliminary findings of scoping study on strengthening research and industry collaborations.

Convene stakeholders in research and industry to discuss the findings

Identify ideas and opportunities for enhancing research-industry partnerships in Africa

Opening session – moderator, Loise Ochanda, IDRC

Some housekeeping issues:

First, keep our microphones on mute unless you will be intervening at some point.

Secondly, where you want to intervene I will ask us to raise your hand where possible, and how do you do this? Down at the bottom you will see a number of icons one of them is the participants, if you click on the participants icon then there's another window that opens on your right-hand side and from there you will be able to see icons that allow you to raise your hand.

The third item, when we get to the point where we allow the audience to intervene, we will ask you to introduce yourself, your institution and the country where you come from and if possible, you will be able to direct your question to a particular panelist, that does not mean that we do not accept general questions. You can also ask general questions where the audience would be able to interact more.

Opening remarks from DFID, Mr. Tristan Eagling

Am thankful for organizers of the workshop today and thanks everyone for making this morning to come. This event seeks to create mutual beneficial and sustainable partnerships to accelerate technology and innovation in Africa. Part of its objectives is addressing barriers to commercialization of new technologies and innovations. In commissioning this report, DFID and its partners within the SGCI and NRF of South Africa sought to increase young standing partnerships between research players in industry and increasing research commercialization and know transfer in Africa especially by identifying models that have been implemented in Africa, lessons learnt and key issues. And so having read the report, I find it very interesting and having worked on these issues extensively in UK, I look forward to learning and sharing on how similar issues play out in the African context.

Dr. Diakalia Sanogo, IDRC:

Ok, good morning, thank you Loise, my name Diakalia Sanogo and like Loise I work for Canada International Development Research Centre and am base in Dakar office. Am senior program specialist for Science Granting Councils Initiative, so on behalf of SGCI am pleased to joined the United Kingdom Department For International Development African technology innovation partnership to welcome you to this virtual workshop on Strengthening Research and Industry Collaboration in Africa, as you know SGCI is a multi-donor initiative launched in the year 2015 and now supported by the United Kingdom Department For International Development, Swedish International Development Corporation Agency SIDA, Canada's International Development Research Centre IDRC, South African's National Research Foundation NRF and the Germany's Research Foundation DFG.

Since its inception in March 2015, the initiative has been strengthening the capacities of the Science Granting Council Initiative in 15 Sub-Saharan African countries to support research and evidence based policies that contribute to economic and social development.

One (1) of the four (4) key areas of support is strengthening the ability of the participating councils to support knowledge transfer to private sector through improved capacity of comparing dialogue with the private sector, academia and research institutions.

So we are pleased to partner with the UK department International Development African Technology and Innovation partnership program in organizing today's workshop, as we strongly believe like them that bringing together a section of public and private sector development partners and other key stakeholders will contribute to a better understanding of the best practice, promoting partnerships between research players and industry and help promote research commercialization, knowledge and skills transfer in Africa.

Hannah Akuffo, SIDA

Hallo everybody I really look forward to listening to this discussion and hearing the various insights and eeeh…. Perhaps SIDA has not funded this part of the workshop but certainly it is an area of great interest to us, am glad that we can be part of it.

Tsepo Hachigonta:

To start with, I would like to thank all the colleagues who have joined here, the NRF together with SGC partners we are happy to be part of this conversation. And if you speak of industry- academia relations,

you know there is a very big potential especially in Africa when we speak of and when we work together as a team in private and public sector, so am glad to hear of the way that was done by colleagues and hopefully, this work will help us to build on what is needed with regard to this engagement and commercialization in the continent.

I would like to emphasis on the points that were raised earlier on, I think this discussion has been going on for decades, I think now it's the time to act not just talk. So am glad to hear of pathways, we need localized pathways that are based on specific countries, regions which define exactly what it is, that it will take for us to move where we are now to increase these issues around industry and commercialization at the end. So let's continue with conversation and let's just keep on the emphasis on engaging not just talk but let's come up with practical solutions.

The biggest challenge in the continent is this activity to happen but at a very soon and we need to see how to upscale this program so that it can benefit not just for the funders and universities but the broader society.

Keynote presentation: Strengthening Research – Industry Collaborations in Africa, Dr. Maurice Bolo, The Scinnovent Centre

The rationale behind this study is that we do have challenges that face research and industry collaboration in Africa as well as elsewhere. I have outlined about four issues that I think are important in terms of background and context:

1. First is that we have seen inadequate knowledge production. Much more generally, there is inadequate investment either from government or other actors but particularly from the private sector in Africa. The main reason for this is that a lot of time the knowledge that is so produced is of a "public good nature" and therefore the return to investment is sub- optimal as such the private sector is not very keen in investing or putting in money in knowledge production. That is an issue that weakens the research- industry collaborations.
2. The other issue is that we have weak capacity for knowledge and technology uptake and use, a lot of time because of weak linkages between research and industry
3. The third issue is the different organizational cultures and procedures within academia and within the private sector, that the cultures sometimes within the universities emphasizes a lot more on knowledge production and the public nature of knowledge. That you generate knowledge and you give it out for free, after all a lot of time this knowledge is publicly funded through taxes, on the other hand we have the private sector that wants to gain from this knowledge and it is profit driven, so they talk a lot more about commercialization and privatization of knowledge itself.
4. The fourth issue is Unequal information access and exchange. That we have what you might want to describe as information asymmetry. Not all the actors have the same information or have access to the same information and knowledge as each other

What is then the role of the science granting councils in addressing these challenges and the responses that we have seen falls in at least three categories. In order to address the weak linkage in research and knowledge production the SGCI do;

1. Financing of research and innovation and there are various models that they have used from you know the STI grants, innovations grants, the infrastructure grants the ray is quite big but one of the functions of SGC is to finance research and innovation and close that funding gap
2. Coordination of the national science systems. In order to make sure that there is collaboration between the different actors one of the function of the council and the responses is to do the coordination and linkages of this science system actors within the national system.
3. Supporting institutions in terms of capacity strengthening in terms of setting up regulations and in terms of general rule system governance issues.

So, what exactly did we do to generate this results? We had as a matter of methodology a number of stakeholder survey at least two one vie mentimeter in the mentimeter approach that happened in Dakar in Senegal in February, and then that was followed in the course of the study with a survey on survey monkey basis. We had key informant interviews and we also conducted a lot of in-depth interviews with selected actors across the continent. We had documentary interviews and then finally we had case studies.

What did that lead us into? From the mentimeter survey and for those who may not be quite familiar mentimeter is a methodology that has been developed as is like a polling system but it allows you to collect reactions from the participant in a real time basis and analyses that.

So from the surveys on the mentimeter we got issue from practitioners. A close out workshop of the SGCI that was held in Dakar Senegal in February of this year. Then we had the state of the art from the situational analysis, we asked our participants to provide information around certain thematic issues of research-industry collaborations.

In terms of case studies we derived practical contemporary examples of different models across the internet and then documentary review allowed us to look at the approaches, the experience and the impact from the different project, different models that are being used in various parts of the continent and then we had tacit and experiential insights based on the interviews we had with key practitioners.

What did we find and whom did we talk to? This in terms of the participants and the respondents this is the distributions: in terms of institutional affiliations we had people from councils, commissions, that is the SGC themselves we had people from the university, research and collages, we had people from ministries of government and then the private sector.

And In terms of the distribution of countries and the respondents you again can see that countries of origin all the way from Burkina Faso, Senegal, Uganda Malawi Kenya Mozambique essentially most of the SGC countries and then the UK so that is the distribution of the respondent that we had in terms of the survey of what issues are important on research-industry linkages.

What were the results?

In the mentimeter assignment we asked people *what are the key issues affecting technology transfer and research commercialization* on the left of your screen you can see the word cloud, this is what is generated as a result of the responses that we got from those participants if you look at somewhere in the middle you can see we had about 49 respondents to that. On the right what we have done is then analyses that word cloud to into various themes that have come out of the responses if you look at that bar chart on the right you will realize that issues of partnership and linkages with private sector has been highlighted

as one of very key issues that are affecting technology transfer and research commercialization. That is followed by policy and regulations and of course funding comes in and intellectual property rights come in at the third place.

When we asked the participants about *what approaches to technology transfer have worked in their own countries* again you can see the word cloud but the analysis at the right shows that the trade show and exhibitions have been almost the first or the most prominent approach that has been used, communication and mentorship activities come second then partnership and linkages, policy regulations and then extension services in that particular order.

When we asked about *the challenges to commercialization of research and output* again the word cloud tell it all and again the analysis on the right shows you; issues of policies and regulations, communications and coordination research policies and funding are some of the key issues that the participants and respondents highlighted.

When we asked *about commercialization pathway* again issues of partnership and linkages with the private sector topped the list, technology, licensing and sell of the IP, science path innovation hubs and innovation infrastructure in general and then issues of technology transfer offices and other support mechanisms were also highlighted.

Finally, we asked *what the SGC should do to enhance commercialization of research output*. And again you can see there are issues there highlighted; training, capacity building and mentorship came up very strongly, communication and coordination was also highlighted very strongly, platforms and forums for dialogues and then funding, infrastructure, intellectual properties rights and then qualities and standards. So that was the first part of the study it self that took responses from a wide ray of participants in different countries and those are the issues that they raised as being important to the issues of research commercialization and technology transfer.

Case studies

The other component to this is about the case studies that we conducted to up mend some of the findings on some of the issues that has been raised in the initial survey. The case studies focus on the role of institutions partnerships and the actual practice of technology transfer in the different part of the continent. We have organized them into 4 different parts.

- The new institution and the institution on architecture. This focuses on the National Innovation Agencies in Ghana, Kenya, and South Africa.
- Technology transfer and commercialization in practice in Ghana and Botswana.
- Supporting local innovators through incubations, mentorship and coaching.
- Partnership and collaborative in research and innovation in Uganda and Malawi particularly.

So, if we look at the new institutional architecture, Ghana for example is in the process of setting up the Ghana Innovation Research and Commercialization Centre what we call the GIRC Centre and Kenya we have the Kenya National Innovation Agency that was established in 2013 as a result of change in law and In South Africa we have the Technology Innovation Agency (TIA), which is a bit more established than the two that i have mentioned and it has innovation enabling division that focuses on the ecosystem and support the programmatic interventions of the ecosystem.

Three things are here that I have to highlight; one is that TIA has a facility that gives infrastructure support. It gives funding support to the ecosystem actors and it also involves in skills and capacity development. Now the two other innovation agencies both in Ghana and in Kenya are following up on the same approaches even though they are still new it is a bit too early to make any evaluation judgment on the success of what they have done. However, in terms of the new institution or the institutional architecture the TIA in South Africa is fairly good example of what is happening in the continent.

In terms of technology transfer in practice we looked at the case of Ghana Council for Scientific and Industrial Research (CSIR) and a number of things have happened. within the CSIR there are a number of research institutes and each of those institutes have come up with different products including mineral water, cement, fufu flour and other products from the different research institutes but what is important is that there are issues with institutional mandate of those different research institutes in other words CSIR since establishment did not have the mandate for commercialization and this was until around 1996 when the law establishing the CSIR was reviewed. So a lot of time and this is also the characteristic of most of the industrial research institutes across the continent that commercialization and technology transfer was never an initial mandate of this institutes. That has changed in a number of them and now they are beginning to get involved in the technology transfer issues as well.

The second thing is about institutional and IP policy strategies. The case of CSIR we found that not all the institutes under the CSIR have the institutional IP policy and as a result a lot of times two things have happened one is that they have disclosed their inventions into the public and that limits on how they can protect their own inventions. And two is that there is very little in terms of awareness in terms of the IP issues and an IP reporting in case of any infringement.

The third thing that is important around the practice in commercialization especially in the case of the CSIR is that you have different pathways to commercialization we found in CSIR for example that the water research institute have built their own production and distribution facility of Shacool water which is the mineral water they distribute. The building and research institute has the cement, they have engaged a foreign investor. The Oil Palm project has decided a joint venture with a foreign company, while the food research institute has their own internal structures they are trying to do commercialization. So there are different ways that different institutions are actually organizing themselves.

In terms of supporting local innovators through incubations, mentorships and coaching we have examples from Ghana and Botswana particularly, and Ghana has a lot of innovation hubs, there's what they called EQWIP hubs, the Ho Node hubs and they have the university based hubs as well.

In Botswana we have the Botswana innovation hubs, Kenya has other examples as well as other countries but we highlighted particular the hubs in Ghana and Botswana in these case studies. Now what are those issues that are more important in terms of transfer and technology exchange as relates to this innovation hubs;

One, is that there's need for in-building, coaching and mentorship as integral part of this programs and we found this particularly in the EQWIP hub in Ghana and Ho Node hubs in Ghana that have had projects that have internal capacity buildings and coaching approaches in them.

The second thing is about inclusivity, that sometimes you have incubatees that have special needs, the EQWIP hubs in Ghana have what they called " girls-only-space" and "child care services" and this allows

the participations of the incubatees that may have child care requirements. The final thing that I would like to mentioned around that is issues of standardization and stratifications are quite important into penetrating the markets both domestically and in the export market and in Botswana we find this in the Botswana innovation hub and their support to the local innovators particularly a case study on the donkey milk products has been high lighten in this study.

Now the other component is about partnerships, case studies on partnerships and collaborations and I will do this using examples from Uganda and Malawi where the Science Granting Councils initiative supported public-private-partnership projects in Uganda and in Malawi for example. In Uganda the initiative supported projects on Agro-processing and manufacturing and we had projects on bee products, we had projects on bakeries and cookeries and then we had projects on cocoa in Uganda. A number of issues came up, one project on maize germ and bran projects reported issues that require quality and standards and the fact that getting the right quality and standards from local raw materials and local products was a big challenge both for the university and their private sector partners.

The second issue is about the need for building partnerships with the beneficiaries that is still key and we saw this in the bee projects where the bee keepers were part of the research and commercialization project through from the inception to the execution of the project itself.

The third important issue is that as we have seen from the previous life the issues of the technology fairs, field demonstrations and other extension and advisory services are still required and this has been demonstrated in the cocoa waste project in Uganda.

We come to the renewable sector in Malawi, again three (3) projects stand out, there was a project on biogas in one of the municipal markets and then there was another project on dairy and solar milking machines. Now those two (2) case studies highlighted important things; one is user participation in project implementations and in the biogas case from Malawi about how they were as a private sector company involved in the designed and executions of the biogas projects. The role of communication again, we want to add more on this but the dissemination pathways of the findings of that study have seen the productions of policy briefs and briefings with parliamentary committees, the important of it is that as we speak there is a lot of government interest in up scaling the biogas project in Malawi, we shall listen a little more from the private sector in Malawi in short while.

The third component of my presentations is about what lessons we may have leant from the Science Granting Councils Initiative as most of you may already know one of the activities of the Science Granting Councils initiative what we called the Annual Forum (AF) and these are like huge conference that brings in different stakeholders to deliberate on topical issues, so in 2017 in Livingstone in Zambia, the initiative focus on issues of public-private-partnerships, in 2018 in Abidjan Cote d'Ivore it focus on issues of financing research and innovation in the continent and last year in Tanzania we focused on issues of open science and research in science and innovation development. We picked through the discussions of those different Annual Forums and distilled what issues came out of those forums that might be of use and help in this discussion on Research Industry Collaborations and so a number of things do come, one

One is issue around research prioritization and agenda setting, in Livingstone we learnt that in Netherlands, for example there is a top priority sector approach that is used by the government to decide

on what those areas are important to channel government funding. So this is something that or councils could borrow from that instead of spending too thinly we could have priority sector in terms of funding.

In Costa Rica we also learnt that the ministry of science and technology and ICT championed the issue of agenda setting and prioritization. In the UK the research council we know work very closely with business to understand their needs and work with innovate-UK to support the businesses. And in Africa, we had cases that are being supported by the SGCI in Botswana, in Ghana as well and we have had cases where some of this priorities have been set like in Kenya for example.

The other thing that we learnt from the SGCI is the role of the institutional architecture or infrastructure and governance patterns and another of example could be sighted here right from the PASRES programme in cote d' ivory to what has happened in Costa Rica in terms of supporting the small and medium enterprises. We will make note that a lot of our private sector in Africa is really of SME nature and it is important that some of this lessons from other areas inform how respond to their needs were.

Finally on that section we have lessons from the initiative around funding models and how we could mobilize domestic resource for research and innovation. And on discussions on Cote d' lvoire highlighted the issue of consistency of funding. This is a big challenge that a lot of time the funding we have research is very adhoc. We have funding that mostly support pilot project but there is very little in terms of continuation or consistency of the funding over the long term.

The second issue is about the sufficiency of funding, we know that the NEPAD- African Union Commission have emphasized on the need to put at least 1% of GDP into research and development. Not many countries have reached that even though there impressive effort in countries like Kenya and Ghana for example that have said they are going to put a lot more on research funding and of course there is issue of relevance and previous slide have just talked about research prioritization.

Now with that background we come now to the section on recommendations. Of what we think from the study, from the interviews should be done, the first thing that we purpose is to create platform for dialogue between research and industry. Now in Rwanda they have implemented what they called the knowledge transfer partnership and this was a project of DFID that supported some 6 African countries to try and support a system that allow for a platform where private sector will come together with the industry and support a graduate student to address some of the needs of the industry with support from the universities. And so in Rwanda the Ministry of Education (MINEDUC) has been in charge of the platform so that is an example of what a research platform, I mean the platform of dialogue will look like. We have other examples in Zambia, the National Technology Business Center (NTBC) and we have other examples; the Southern Africa Innovation Support Programme (SAIS) which is a regional programme. So we think if we create those kind of dialogue platforms across the region then we are going to strengthen the collaboration and knowledge exchange between industry and academia.

The second thing is we need to promote the use of new and innovative funding mechanism as you can see the issue of funding has come up very strongly and there are different ways of doing this; we give grants mainly and we give other technology support facilities. But we have highlighted here also the use of input vouchers – the case of Farm Input Subsidy Programme (FISP) in Malawi is used here as a case example, it is not exactly an innovation input but we believe we can borrow from the input subsidy voucher programme to build and support innovation as a funding mechanism within our councils and within the continent.

The third recommendation we are making is to improve innovation and commercialization infrastructure and that has come out in the discussions quite a bit and we have councils that are beginning to give infrastructure grants. The infrastructure grant scheme in Kenya is an example

The other side of recommendation is about promoting equipment and infrastructure sharing and we have highlighted in the report the case of communities of research excellence under the now changed National health research. I mean in supporting research excellence in Kenya particularly. So there is the issue of neglected vector borne disease that is being run by ICIPE a good example on how we can share infrastructure among research institutes in the country.

The other recommendation is to promote inter-country joint programmes and collective actions and as an example we have highlighted the issue of university researchers in Kenya and South Africa, NACOSTI in Kenya has piloted and worked on the university researchers on at least two or three different areas and we have same approaches in south Africa from the NRF an recently there was an announcement Oliver Tambo researcher. So we have areas in which countries have mutual interest, we are suggesting that we promote those inter-country joint programme.

The second thing recommendation as well is on how to enhance skills and capacity in product development and intellectual property right management, we have given the example Center for Research in Therapeutic Science (CREATES) in Kenya.

The final set of recommendation is that we need to provide opportunities and incentives for commercialization and uptake through public sector policies we have in the report highlighted the issues of the Oil Palm Research Institute under the CSIR in Ghana, where they are using the institute to support the government projects and government programmes and supporting those.

Supporting local innovators through the incubation, mentorship and coaching, we have given the example of innovation hubs in Kenya and in Ghana, in Botswana as well.

And finally our recommendation is for further research on impact assessment. What we have done in this scoping study is to highlight by way of case studies and practical examples but there is need for a more in-depth analysis in terms of the impact and performance appraisal of some of this interventions and approaches.

PERSPECTIVES FROM THE ACADEMIA

Loise: Prof. Wekesa is the dean faculty of law in Daystar University, in Kenya. Prof will focus on Intellectual property rights commercialization and technology transfer with a particular emphasis on technology commercialization framework and institutional IP policies and strategies.

Prof.Wekesa: Knowledge is generated mainly by universities or academic institutions and research institutions. In so doing more often than not especially in sciences some new knowledge may be generated that could eventually lead to production of certain products needed by the society in such a case we say the researcher have invented something. That is to say they have come up with some useful knowledge which can then be translated into marketable products. Having said so then the challenge with many researchers is how to translate their research findings into some form of property, this is where

the intellectual property rights comes in, and in this particular case the researchers may wish to register their product, their knowledge either in the form of the patent or industrial design.

We also have utility models that is where registration requirement are not very stringent. Now the whole point here is that the registration in an IP office gives protection to those inventor so that others do not unfairly grab the invention and run away with them. Having so registered the next thing would be what to do with the registration.

Many researchers avail what they are doing their work focusing on churning out new knowledge rushing to publish suffering with the number of publication in there CVs and so on. However, when it comes to intellectual property rights one may in the first place need to delay publication and ensure that the new knowledge so generated is secured through some form of registration. And this is where again we need to talk about the patents, the industrial design and the utility models. Now having so registered we then need to translate that into some tangible products on the market, the knowledge say for producing a vaccine for Covid-19 will just be knowledge but then the knowledge need to be translated into some form of molecule or chemical which will be used either to prevent or treat Covid-19. At that point there is need for some kind of collaboration.

In terms of collaboration we have industry whose business is to make profit, they are able to smell what can be able to sell in the market, able to smell what can move around and move very fast, unlike the scientist whose main concern is production of knowledge, researching with the aim of wanting to solve a problem. But then now where the two can meet and meet very well is now under what we call selling or renting or also known as leasing if you allow me to use example of a piece of land one can sell land as a property one can sell a car as a property one can sell of the property rights one can sell aircraft as a property with respect to intellectual property rights which properties are not tangibles we say assigning. So one can also assign their rights when you a sign one gives up all the rights completely so the rights can be assigned say to a pharmaceutical company to now start developing the research further into some tangible molecules to use or the rights can be licensed.

Licensing is like renting when you rent your car you rent for a certain period under certain conditions and then it is returned to you, when you rent a house or lease you house to somebody the person can only use it for the period as agreed in like manner a patent can also be licensed, so licensing is the equivalent of leasing or renting, that is in this particular case the owner of the patent be it individual or an institution can then license several companies to work out the end product, that way then then through the licensing agreement money flows in, through the assignment agreement money flows in which can the go, which the researcher and the institution they are coming from will also benefit.

So then here It is very important that researchers, research institutions, academic institutions be very careful on how they then handle what they would have registered as patent, as industrial design and as the utility models in terms of production and availing the products on the market. The corollary to that is that it will be very useless just to register a patent for the sake of registering because again here registration is limited to 20 years in most countries, for utility models is a much shorter period, industrial design is a much shorter period. Once that period of protection is over anybody else can go to the registry look at your knowledge fish out that information and use it to make products and put them in the market for free, so again here time become of essence.

There is another part that Loise wanted me to touch, I hope I have touched on all of them if I haven't please remained me so that I use the remaining half a minute to clear up that part.

Loise: Alright there were to part to this the broader part was the intellectual property rights commercialization and technology transfer and the sub part of it was the technology commercialization framework and institutional IP policies and strategies.

Prof. Wekesa: In terms of technology transfer, the word technology first can be very intimidating, but when we talk of technology we are talking about the know how the knowledge, this can be transferred through collaborative studies through collaboration in research projects and this can also be transferred by direct sell if people require to use the knowledge the same can also be sold to them. It becomes challenging where a certain laboratory is renowned for doing certain things in certain way, they have that technology which others require to use and they do not have but they need it in such a case an arrangement can be made between the owners of the technology and those who desire the technology so that they agree on the modes of the operation the way they want to share that technology and the way they want to the knowledge or technology transferred.

In terms of institutions it is very important that institutions be very clear on how they want to deal with this and set up ground rules. However let also quickly say that in Africa we have two models we have the institutions that fund research, like the one in Uganda and the one in Kenya upon funding they say they are the owners of the intellectual property rights. In South Africa we have the medical research council and the science council. This ones they both fund research and then they also carry out research, meaning that they have to make arrangement with those they are funding on how to handle the intellectual property rights and then as institutions themselves am referring to the ones in South Africa. They have to also organize themselves to see how they want to transfer technology, how they want to transfer and commercialize intellectual property rights that they would be owning in the process. So then for the other model of countries that purely receive funding or fund institutions for research those institution needs to kind of step back and ask themselves whether it is true they would want surrender all the intellectual property rights to the funders.

In Uganda and Kenya we have National Research Council NRF do the funding and even an organisations like National Agricultural Research Organization. NARO of Uganda receives the funding passes it over to other organisations but their intellectual property rights are held by those funding according to the law. So then now that being the case it will then be upon this funding institutions those that. The Science Granting Councils to see how or work out modalities to see how to transfer technology, how to transfer and commercialize intellectual properties rights that they in turn own. I think let me stop here if they are specific questions I will be glad to respond to them.

PRIVATE SECTOR PERSPECTIVES

Mr. Admore Chiumia is the executive director of green impact technologies limited in Malawi. Mr. Chiumia will tell us about the collaboration that his company had with Malawi University of science and technology in a bio gas project. This project was supported under SGCI theme 3 projects which seek to promote public private partnership.

Mr. Chiumia: Thank you very much, good morning everyone once again my name is Admore Chiumia am the managing director for green impact technologies based in Malawi so our company responded to a call from science granting council in collaboration to the Malawi National Commission in Science and Technology in Malawi in which we were supported to pilot the commercialization of biogas system for cooking and fertilizer production. So through this call we collaborated with Malawi University of science and technology and we deployed a 50 meter cub digester which was implemented in one of the districts in Malawi called Ntcheu district. So the system is converting vegetable waste from small holder farmers to manure for farming at the same time the other side of revenue stream is that we are producing gas for cooking through 1meter cube back bags so when household run out of gas they come to our station to refill and then we have the stove if they use it for 10-5 days they come to pay for that. So now my main area that I would like to stress much is an issue of commercialization of the system.

In Africa or in Malawi or other west African countries people have tested biogas systems but what is lacking is the change of practice on demonstration to say do this things work? Can we commercialize bio gas system and at class work level people have be tried but at market level has not been tested.so Through this support we were able to test and now we have seen that even the government here in Malawi they flock to the site to see how does this thing work, are this thing sustainable.

The major question we were trying to answer is how we could make biogas system sustainable, by making in the two revenue streams through production of bio liquid fertilizer and also selling of biogas system. We are able to get revenue which sustain to the operation of the plant operators, the watchmen, the waste collectors and people who are involved in the marketing of fertilizer as well as bio gas system. To me is in my perspective I see the approach where there is a collaboration between a public entity and private entity coupled with institution who provide guidance how best to make this approaches is the best way to sustainability of this technology. Because when projects are just implemented by public entity for instance a university, after a long run there is no ownership but in our arrangement where there is a public entity we came in as the private partner our interest is how do we make money and how do we continue making money, with that mindset we were able to meet sustainability aspect to make sure that all operations are covering the cost in that way the system would be sustainable, whenever we commercialize in whichever country we are trying to work in, but in a situation where we are just testing the research without putting them in the ground we may end up having waste of resources but none has been tested on the ground. So if we could have evidence based research like the one we did, I think in that way we would be able to learn from other people then this thing we don't need to repeat otherwise if we do not take this research ideas into action by the end of the day we will continue to be speaking things on theoretical aspect.

But with this support from science granting council and science and technology for us we were able to and other stakeholders other organisations they have been coming to see how best could we improve this

programme but at the state where we are now and we are looking at replicating this technology to other vegetable market waste collection sites because Malawi is an agro based economy, people use vegetables, that is the most cultivated things in Malawi. So we are not the only country the other countries like Zambia even in Kenya there are a lot of small holder farers and you could see that most of this agricultural waste are being wasted. Why can't we turn this waste into wealth? By creating such revenues the way we have done, yea I wanted to speak more on that on how to make the system sustainable and the best arrangement may be between the approach like the public –private partnership like we had with Malawi University of science and technology. Thank you very much for that.

QUESTION AND ANSWER (Q&A) SESSION

Question 1. Roy Mugira, NACOSTI

Thank you Dr. Bolo for a great presentation and a comprehensive study. I noted very low private sector participation in the survey at 3 as presented in slide number 7. Why is this? I thought the private sector is a key focus area and therefore required more representation in the survey?

Response from Dr. Bolo.

Thank you very much for that question and Roy thanks so much for raising that I do agree with you that Private sector is a big stakeholder in this whole process however there were limitations that lead to that low level of participation in the initial survey. We made use of the participants that had been convened for a separate meeting - the meeting in which we did the metimeter survey in Dakar in February was scheduled under the closure of the workshop of the SGCI under theme 3 workshop.

From the beginning the private sector participation and attendance in that meeting was low, so when we used that participants for the meeting for the survey, that explains why the private sector numbers were low because initial the meeting itself had low numbers of private sector participation.

However in the subsequent survey monkey and key informant interviews we tried to balance that, there was a lot more focus in private sector issues as you have seen in Malawi we just had that intervention from Admore and we have seen the same thing was in Uganda as well. We used other projects and other case studies to balance that low number of the respondent in the survey itself.

Question 2: Hannah Akufo, SIDA

Question to Prof Moni Wekesa: Can you say something about the "costs" of IPRs?

Response from Prof. Moni wekesa

When you talk of cost of the IPR there are two forms: there are the cost for registering and the cost for licensing or assigning, the cost for registering varies from country to country. Registering a patent is slightly more expensive than registering a utility model or industrial design. As I said this vary from country to country but they are not exorbitant, however there are the other cost of selling the IPR the cost will vary on what is actually being sold, our friend from Malawi has told us about the bio gas, now if one wanted to sell that to a private entrepreneur who can produce that in mass and sell that beyond Malawi to neighboring countries and so on then the value of the IPR will be determined by say the kind of sale that is likely to come from that.

Take for example Covid-19 vaccine, the whole world requires that vaccine we are looking at 7 billion people, so now if some researcher somewhere registered a patent for Covid-19 vaccine and considering that this is going to serve 7 billion people one can sell it at a very high price. That will vary depending on the marketability of what is at stake.

Question 3: Filipo Zulu, Zambia

Prof. Wekesa, thank you for the presentation. Kindly share your experience with regard to management of IPR from Publicly funded research. The Patents Act in Zambia is explicit on ascribing more rights to government in any publicly funded research. Don't you think this can stifle innovation and creativity and scare away participation of private players? Further, the different institutions have different IP statements. Kindly comment

Prof. Wekesa: The main challenge we have is that of Science Granting Council being the ones now that own the rights that come from research. In the US before 1980 a similar situation was obtained like the one that was obtained in most of Africa.

The government will fund research and then any IP resulting from the research would belong to the government as a result there was very little transfer between the knowledge emanating from academic and research institutions to the industry and the main reason was that the government being the one holding the intellectual property rights was not in a hurry one to commercialize two the government had licensed several private enterprises at the same time, so now when you license several people to produce the same product at the same time you dilute the market therefore private sector does not find that to be a good enough incentive, the private sector would want to enjoy the situation where they benefit from the monopoly provided for by the intellectual property right laws. So now after on 12th December 1980 the law in the US was changed under what is called Bayh-Dole Act. So under the Bayh-Dole Act of 12TH December 1980 now the government allowed research institutions to own IP rights so whichever research institution, researchers in whichever institution they owned the rights and also owning the rights means i think they had the powers to also assign and license those rights now that also applied to academic institutions from 1981 to date that change in the law saw a real drastic change in the number of IPR that were being commercialized or that were ending up in commercialization and this is because say if the university of Zambia ha a new valid wheat and it has the power to license it then it will collaborate with one private enterprise to produce that on large scale and this private enterprise will see it self as being able to market that both in Zambia and in neighboring country and therefore up its profit so if we look at the Kenyan act, NACOSTI act, at section 29, paragraph one paragraph M that is under the innovation it says any outcome supported by the innovation Centre is under the innovation office Will go out and support the scientist to do what but they own the rights they own the inventions that come from that so that being the case no private sector will want to struggle with the government over that because it would have no guarantee that it can get an exclusive license. This is the situation in Kenya, Uganda, Malawi, Zambia, Namibia, Botswana, Ghana and so on, let me make a distinction here we have the intellectual property rights laws, those laws are kind of extracted from the international regimes. And under the international regimes it is the inventor who owns the rights.

If we look at the Botswana industrial act of 2010 section 10 it says the inventor own the rights. Now the same is to be found in the industrial act of Uganda 2014 and in the industrial property act of Kenya 2001 however, when now the national research funding body comes in and says they are giving you this money and any intellectual property right coming from there belongs to us that is to say scientists are on hire and are being hired by the science granting councils so after they have received the grants they have done the research they surrender the results and then they wait for the next grant, that will give us the kind of disconnect now between the institutions themself carrying out the research and the market place. The

government is not themselves ready to really promote private enterprise, for public private collaboration especially with respect to intellectual property rights.

It is the law that set up those councils that is actually preventing the flow of technology, the exchange of technology from the laboratory to the market place and when you sit in your meetings can you place take very hard to look at your laws, change the laws to allow research institutions, academic institutions to own the intellectual property rights. The question then is if say the government has funded and now it surrender the rights to such institutions how does government get back its money? The government will get back its money through taxes. In all our countries we have what we call value added tax so if you allow the university of science and technology in Namibia to collaborate with a drug manufacturer, once the manufacturer puts drug on the market then you tax from the sells, the government will get its money. With respect to the funding institution themselves they will also make money from the license or assignment of the intellectual property right and they can use that money to improve themself in terms of equipment, in terms of promoting their individual researchers and so on, but the biggest hindrance are the laws establishing our research council that is where the problem lies.

Question 4: ANN WESTON, IDRC, Ottawa

On the point of funding sources, how much do we know about the role of impact investors to complement public funding to bridge the gap between public researcher/private company and SME and support commercialization? Are impact investors useful in this space?

Maurice: One I must admit that we didn't quite have a lot of the information around impact investing, but I know of the few cases in Kenya trying to come up with the new funding initiative around impact investment, I may not have much detailed information to provide at this stage but this is something am willing to check out and share with the participant and audience at a later stage but I do know Loise that there are people in audience that have the more information on this. Tristan is on as well as other members of the SGC. So I feel if someone has information should share but I will check back and revert to the audience with some responses around this specific issue in impact investing.

Question 5: Prof: Bamiro, Nigeria

Thank you very much for the invitation to this meeting I must say that we have really gained a lot from the study and then from the experiences from others. But a quick one along with what the Prof Wekesa said about handling the IP policies you saw me agreeing because in Nigeria NRF we deliberated excessively on that and eventually the government now agree with us that NRF which is funding. Research in the university system that the IP should be given to the university and in other words the form filled by researchers should clearly stated that the outcome of you research is subject to the IP policy of your institution that is the university you originate. So it is like the problem has been transferred from the government to the university. Then you now see the universities coming with different IP how to handle intellectual property but we are hoping that sooner than later because some researchers say that they are not happy with the IP policy even at the university because of the sharing formula, how much goes to the researcher , how much goes to the institution. They fill that some university management they want to take everything saying that they have used their space used their money, but anyway we hope that that will be sorted out. Bu the point that I would like to make is that most of this research outcome that we are talking about most are still not ready for the market they still need some funding to develop them and that is why we are trying to encourage the government that it is easy to sponsor research but to take it to the market in some cases you still need to put in a lot of funding.

The government need to understand that to fund commercialization you need to first of all find out that this research can be commercialized but how do you again help. Because private sector even the investors are not ready to put in all to the market it is like they want something. We encourage government to fund further even though they are not tempering with IP policy, so it is important that we appreciate this. The funding is not just one off you may need continues funding to get to the market, it goes along way when you include the end users or the sectors. I think what we have said is really the direction to go, number of IP that has been a success story in Nigeria especially in the area of agriculture, and that is not surprising, universities all over Africa research in agriculture have been on for years, others are just coming in now. So I think look at the direction of the institution is the direction to go handling the IP.

Question 6: Gaothuse Ontlametse, Botsawana

I just wanted to share that in Botswana during the lockdown one of the heated topics was that government Parastatals seemed to be crowding out the private sector. There was general mistrust mostly by the private sectors who felt that some of their innovations or their ideas that they had presented previously to government Parastatals for possible collaboration or funding, they are seeing it now being led by this government Parastatals, professors in the public universities, while saying that this is our innovation now the private sector, I even have screen shots from facebook. The private sector companies they were complaining mostly about being crowded up by the government institutions who seem to have copied their innovation, so there is general mistrust which is crowding the innovation space currently.

Prof. Wekesa: This experience rom Botswana is very interesting. Now the thing about infringing or stealing of other people's intellectual property this is something that is already protected under the law. Now looking at the industrial property act of Botswana 2010 it says it is the inventor who owns the property. If somebody else in a Parastatals or in a university steal that and start using it the person stands sued especially if they are using it to put products on the market, we have something that we call the Add on pillar remedy in which all those products can be confiscated and all profits made by the individual be given to the inventor or the owner of the rights. injunction where it can be used to stop any further production or infringement of the rights of the inventor say now in this case from the private sector own. So in terms of protection the law is very clear this law is arched on an international legal framework which is equally clear let the people complaining take legal actions.

PERSPECTIVES FROM THE SCIENCE GRANTING COUNCILS

Namibia: Moses Mulatendi:

We are taking about research – industry collaboration but one thing we should be concern about is the fact that the industry appears to be more prepared when it comes to for example Intellectual Property issues that deals with the research results. That being the fact that they are more profit oriented whereas the Science Granting Councils (SGCs) are more public service oriented. Therefore my advice personally is that we should at least try and help Intellectual Property and Technology Transfer, policies and strategies within our councils so that when we negotiating with these industry giants we have our house in order because if we don't have that, it would not be a win-win situation they will always walk away with the big angle of the research results and they will oppose to negotiate our grievance course we don't have anything to leverage on.

Therefore, our advice is to first and foremost make sure that the Science Granting Councils (SGCs) have Intellectual Property, Technology Transfer policy and Strategies in place that are a line to the National Policies if any, if not, then it's either our advice for us to collaborate among ourselves and learnt from each other's experience with regard to the formulation of these particular Institutional Policies.

Kenya: Dr. Jemimah Onsare, National Research Fund (NRF):

From NRF perspective, in terms of the governance structure we have three institutions which have distinct roles starting from the delegatory and advisory role and that is vested under National commission for science and technology NACOSTI, then there is the facilitative role to promote research and that is where I sit as the acting CEO National Research Fund (NRF)and the other institution which is key in this subject is the Kenyan National Innovation Agency which is expected to promote the translation of research findings into the next level.

I want to agree with the challenges that were presented that cut across all African countries like in our case the most bearing ones include the aspect of silo mentality which has actually been a hindrance in strengthening partnership between researchers and industry.

The other bit that proves to be the hindrance, the policies I think it is Prof. Wekesa who mentioned the issue of our institutions of higher learning focusing more on research that end up to the level of publication and do not want to pursue it further to the level of commercialization and also some of this policies when it comes to the issue of promotion within this institutions the main areas of focus are pegged onto issues that cannot move research beyond the publication level and therefore I think it is high time that we review such policies so that we may put in place the number of IP issues or the number of patents that a person produces so that it could be one of the indicators that could be considered in promotion in the institutions of higher learning.

The issue of funding also was highlighted as the main challenge which I tend to agree and it comes in as a challenge in various ways one of the issue is the sufficiency of the funding level which is not adequate in Kenya the government has committed by law to raise the funding by 2% GDP but ass it is we haven't reached that target we consider what is going into R & D is 1% or near there and therefore we still have a task of convincing the government to try and raise the research fund into a level that will be meaning full into realization of moving research or completing the research circle from inception to the industry. Then

the issue of consistency at the report indicated also is a major issue that hinders research industry linkage and this is brought about by various issues for instance in the current financial year starting from last financial year up to now nobody expected what is going on and you can all agree with me that all focus is now towards handling the pandemic of Covid -19 and this has affected even the funding to some of the programmes including research which is one of the essential areas that needs to be supported so as to get lasting solution to the challenge that is currently a global pandemic.

Now in terms of how we are trying to strengthen research and industry collaboration we at NRF we try to use carrot and stick approach by putting conditions to our calls where by some of our conditions requires collaborations that are malt disciplinary in nature to include the industry within a particular project so that it would be easy, we will have an assurance enabling a particular project that is wanted to be realized or to move beyond laboratory level from projects which are laboratory oriented and then this I can attest participants that it is a lesson we have learnt from the Science Granting Councils Initiative on how other countries have been handling this particular area and I think it is working I can tell from the calls that we have already learnt we could see some level of collaboration between academia and industry which is quite promising.

In terms of policies I think the way forward in that is to review policies so that we are able to bring in aspects that would be able to promote the academia industry linkage. Within our research funding policies we have some provisions that would encourage or will strengthen the researchers move their work to beyond the laboratory level where by we have the innovations grant and in this particular grant we are collaborating with Kenya national innovation agency where by KENIA plays the role of identifying the local innovator and we do the funding role. Then there is the incubation programme grant and this is basically meant to upscale the previously funded projects which has exhibited a great potential ad this is the first time that we are going to support this particular programme as it was mentioned NRF is a pretty new institution and we are trying to lay structures as well a try to implement some of the programme that follow on our mandate.

Research infrastructure grant also what was mentioned in the report and that is one of the programme we identified an it is incorporated in our funding, research funding policy and the reason for this is to prepare the environment for researchers to have it easy to carry out work and enable them to be more productive as opposed to how it was. How we do this it is a competitive programme where we launch the call and project that meet the qualifications and the ones which merit funding and the institutions which apply plays a role of hosting and this are taken as the national research center of excellence where by any researcher within Kenya can access that kind of facility. And of course the issue of dialoging could be an ideal approach in addressing the issue of research industry linkage and it will bring on the level of understanding on how each party, the role of each party in such engagement.

Ghana: Mr. Oliver Boachie, Ministry of Environment, Science, Technology and Innovation, (MESTI):

In particular I want to say that the recommendations he came up with are very much on point, we are interested in about four of the points in the sense that a lot of the things that we are doing here in Ghana as touch on those recommendations.

1. Promotion of new innovative mechanism. I will talk a little more about that.
2. Promotion of equipment and infrastructure sharing
3. Promotion of inter country joint projects
4. Support for local innovators and research

As you may know Ghana started membership in the SGCI at a very terrible disadvantage there was no funding mechanism set up at national level to support research and innovation, there was lack of infrastructure which still exist, so STI or Science Technology and Innovation in Ghana as very weak and continued to be so, the capacity as to manage research was also lacking in the sense that even though there were a lot of research activities taking place in our public research institutions and in our tertiary institutions there was no coordination and there was no sense of aligning the research activities we are undertaking so up until now all our efforts in Ghana has been towards development of basic infrastructure and the system of course human capacity to be able to participate and play our role properly as an SGC.

So what specifically are we doing? The first one is funding on various platform we have talked to you that the government has pledged to allocate 1% of GDP towards research and innovation and with the goal of eventually increasing that to 3% GDP, I can say with confidence right now that we reached a point where before the end of this year a bill will be passed in parliament known as the a National Research and Innovation Fund Bill is before parliament right now so we know that before the end of this Year that will become law. As stated it will start with a minimum of 1 % GDP with the goal of increasing that to about 3% in the future.

The second one is the setup of Ghana innovation and commercialization center the goal of this initiative is to formally present it to what would be the Ghana innovation agency similar to what has been done in south Africa and several other member SGCI. While we are trying to build infrastructure to play our role as an SGC we have been confronted with some requirement that reason determine the priority of the work plan we need to follow to set up the gate center. The first one is the Oliver Tambo Africa research initiative you know two of institutions in Ghana have been selected to setup this research; one at University of Ghana and the other one at Kwame Nkrumah University of Science and Technology . We as an SGC has the responsibility to support NRF to ensure this grants are managed appropriately and that the objectives of those research per initiative are achieved, so we are forced to speed our efforts towards the setup of grant management system that would be used to support this initiative for that we are in the process of procuring grant management system for that.

We have reached out to our partners in NRF and in Uganda for us to work together to set this thing up and this brings us to the idea of inter country collaboration, the knowledge we have in mind is to set this thing up as a partner to NRF and Uganda such that even when we are not ready we can acquire security on their system to be able to do the work that we have to do and to use ours as a backup in the future so that in the future when ours is ready would set as a backup in south Africa and Uganda and theirs will also work as a backup for us. That is one of the sharing strategy we are talking about

In support of local innovation and research we are in the process of developing a framework for what we call the national innovation challenge. We have secured funding to set this thing up and by the end of this year we will be able to pilot it and then ask innovators to come up with proposals on selected areas within the priority areas that we have set.

We are also working closely with the government of Israel and the government of Germany through GIZ to define the ultimate innovation ecosystem in Ghana. This two initiatives are working with us by providing coordination and the stakeholders that we are working with in Ghana to set this up. To define, the vision for it and also work together to achieve it include, MESTI, our self, the ministry of trade industry the ministry of communication the ministry of business development and then the Ashesi university and then university of Ghana true the schools of research and innovation.

The last thing that I want to mention which was highlighted by Dr. Bolo is the need for prioritization as he said our countries have very limited resources and we stretch our self when we try to look at all areas of our all sector, Ghana we have prioritized an have come up with what we call the strategic technology area and the concept of strategic technology centers. The strategic technology areas for us are in agro agriculture and food processing in environment waste management and secular economy, in manufacturing, in renewable energy in information and communication technology in health and pharmaceutical in mining and mineral processing and then finally in oil and gas of course this will change as time goes by but for now this is the area we are focusing on.

When it comes to agriculture and food processing again the government has proposed some funding for us working with the ministry of food and water working with MESTI and ministry of finance to do a pilot in setting up a manufacturing base on farm and machine tool to be able to design and build basic tools meant for increasing great productivity and then add value as well as the agro processing takes place and so on Monday, this coming Monday the president is going to lay the foundation for the construction of a modern farm an d construction center and that will be highlighted starting from on Monday the other thing that we are doing apart from this manufacturing facility is the project that is being sponsored by the global environment facility being implemented by UNIDO & MESTI that is to develop or establish a framework for secular economic for plastic sector and part of this is the implementation of some pilot along plastic value chain. And in terms of technology value center we are among the pilots to build the establishment of a center of excellence, where technology for the management of plastics right from the top of the value chain to the bottom of the value chain will be established for the partners in the region to see Ghana as a model for development of secular economy regime in the country.

Zambia: Filipo Zulu, Acting Executive Secretary, National Science and Technology Council (NSTC):

I would like to indicate that it is not very easy to get industry to participate in research and R&D it is not very easy to create such particular collaborations or linkages but what has really worked is in the seed industry in agriculture we have seen R&D and university and the industry collaborate and we have seen smaller seed companies begin to come but we have seen the bigger seed companies trying to leverage from their interaction with our research system.

I would give an example of the Zambia seed company that one had to be hived off from Zambia agriculture research institute and it became a private company and that relationship has actually grown over the years. This other seed companies do engage with our research system in agriculture and I do am aware of

one valid wheat which was developed by the university of Zambia and they are in discussion with this private seed companies and we are anticipating that would actually grow. Our interest in all this was to see how they are managing their intellectual property and technology transfer.

I would really like prof. Wekesa to respond to my question because I think, am now zeroing it into the question. I think the IP landscape is critical for private sector participation in this particular linkages in industry and R&D if the patent Act 400 of Zambia is explicit on ascribing more rights to government in any publicly funded research. It will automatically mean that when the industry do that their risk is gone up they are careful they would not want to collaborate where they are not sure how they eventually manage money. And further they may have problems which need R&D to solve or indeed universities to solve to contribute to the efficiency and profit maximization but there fear is how do they ultimately handle the problem of intellectual property. We have had engagements with the ministry of commerce that is where our IP law sit and we are grateful to them because they have been responding over time the first thing we have seen is there are now able to, they have introduced institute utility model to handle other aspects of IP which has been absent for the last 3-5 years those have been introduced. They have done a number of revisions they have been reviewing almost a after 3 years, it is not easy to review laws that fast they are actually responding but we think more needs to be done, especially that in Zambia today the NSTC is the only in institutions that provides public funding to research it might not be a lot of money but it is apparently the only one the others are donors that will go directly to the ministry, or a bank give the government loan for supporting research. But we still think it is important that we get experience from other countries with regard to how such a thing can be resolved ultimately especially when the government has put it in laws of seeing IP being held much by them as opposed to the other opponents.