AFRICAN UNION
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FOR ANIMAL RESOURCES

EUROPEAN UNION

DEVELOPMENT OF A BUSINESS MODEL FOR THE ESTABLISHMENT OF AFRICAN TECHNOLOGY AND INNOVATION INCUBATION HUBS (A-TICHUBS)

"Centerpiece for revolutionizing technology, innovation, skill development and promoting knowledge-based economies in the African livestock sector"

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report is a result of consultancy work undertaken by Prof. Henry Bwisa for the AU-IBAR to develop a business model for the establishment of African Technology and Innovation Incubation Hubs (A-TiChubs). The A-TiChubs will focus on Animal Resource Value Chain (ARVC). The consultant was given terms of reference with objectives and deliverables. The main methodology was a writeshop which brought together selected experts and stakeholders to brainstorm and discuss key issues relating to the A-TICHUBS.

There was a pre-writeshop period to plan for the writeshop and a post writeshop period to compile the write-ups from the writeshop. At the writeshop participants were spilt in four groups for each to come up with a business model for discussion.

The methodology of splitting writers into groups produced very rich results. As much as there were similarities in the group models none of them could qualify to be a standalone model. The consultant value added to produce a hybrid out the four.

The main elements of this report are the results of the objectives and deliverables of the consultancy. These are:

1. Outline of a technology and innovation ecosystem for the A-TICHUBS
2. Selected key partners and stakeholders with strategies to engage them
3. Guiding principles on functionality and administration of the A-TiChubs
4. Template of criteria for identification of innovative start-ups
5. Step-wise strategic options to guide commercialization and skill transfer of novel technologies for the livestock sector
6. Business Model for the A-TiChubs

The report carries appendices of selected proceedings at the writeshop plenary meetings

1.0 PREAMBLE

AU-IBAR recognizes the adoption of a 10-year Science, Technology and Innovation Strategy for Africa (STISA-2024) by the African Union Heads of State and Government Summit. It further recognizes the continent's transformation agenda which re-affirms the impact envisioned through the Livestock development strategy for Africa (LiDeSA) and Agenda 2063.

It is partially for the said recognitions that as part of providing leadership and coordination in the sustainable development of the continent's Animal Resources, AU-IBAR designed the "Sustainable Development of Livestock for Livelihoods in Africa - Live2Africa" programme. Live2Africa pioneers a coherent continental programme approach to building systemic capacity in seven livestock components, that include: Investment in Value Chains, Animal Health; Animal Production, Productivity and Ecosystem Management; Resilience Building; Technology adoption in the Value Chains to inputs, services and markets; and strengthening institutional capacities.

Within the brackets of Live2Africa, AU-IBAR intends to build capacity in technology and knowledge transfer across the livestock sector in Africa. To achieve this objective, AU-IBAR engaged the services of a consultant to facilitate a write shop to develop a business model for the establishment and operationalization of African Technology and innovation incubation hubs (A-TiChubs). The A-TiChubs will function as assembly points for inventors, agribusiness entrepreneurs, and technology entrepreneurs. The A-TiChubs will provide creative spaces, infrastructural services, mentorship, intellectual property management, access to financial resources and networking opportunities.

The consultant was given the general objective of developing a draft business model for the establishment of African Technology and Innovation Incubation hubs (A-TiChubs). Specific objectives included:

1. To establish a technology and innovation ecosystem
2. To identify key partners and stakeholders
3. To formulate guiding principles on functionality and administration of the A-TiChubs
4. To establish criteria for identification of innovative start-ups
5. To formulate step-wise strategic options to guide commercialization and skill transfer of novel technologies for the livestock sector

The consultant was expected to deliver three key outputs:

1. Business Model for the A-TiChubs developed
2. Robust criteria to guide identification of innovative start-ups developed
3. Strategic guidelines document on commercialization and skill transfer of innovative technologies finalized

The write shop was successfully carried out from 19th to 21st November, 2018 in Arusha, Tanzania. This document is the consultant's report

2.0 INTRODUCTION

A technology and innovation hub (sometimes referred to as a tech hub or ICT Hub) is a space where technologists, computer scientists, hackers, web developers and programmers congregate to network, share programs and design to bring their ideas to fruition (Gathege & Moraa, 2013). In broad terms, they represent a form of co-working office space that can offer a variety of services like community building, pre-incubation, incubation and acceleration.

Tech hubs in Africa have grown consistently over recent years, and now number over 100 (Kelly & Firestone, 2016). The discourse around tech hubs in Africa has been characterized by an optimistic and promising view. International organizations, venture capitalists and other relevant actors have placed a lot of attention into these tech hubs, promoting "entrepreneurship" and "innovation," encouraging people to set up their own start-ups and work toward their own development. For International Organizations, the effect of these tech hub phenomena will help "grow successful businesses stimulating job creation and generating new sources of revenue for the mobile industry […]" (GSMA Mobile for Development, 2014).

This view is consistent with academic literature. Many authors have concluded that innovation and entrepreneurship are crucial for poverty alleviation and long-term economic growth (Fagerberg, 2009; Hall, Matos, Sheehan, & Silvestre, 2012). This narrative of driving development through innovation and entrepreneurship implies that individuals are considered firstly entrepreneurs and innovators, who are seen through principles of individualism and the market, and secondly as citizens involved in development processes. The decision by AU-IBAR to develop African Technology and innovation hubs could be said to be long overdue hence is plausible.

Technology and innovation hubs can be said to be specialized incubators and accelerators. A business incubator is a company that helps any new and start-up company to develop by providing services such as management training or office space. There is an overlap between a business incubator and a business accelerator. This difference is mainly in the stage of development. If incubators can be likened to a tool for the "childhood" of a start up, then a business accelerator guides entrepreneurs from "adolescence to adulthood. A technology and innovation hub nurtures start-ups and growing companies in the technology and innovation space. Hubs assist innovators developing applications and websites that offer solutions in various sectors: retail, health, education, agriculture, finance, corruption even.

Globally, tech and innovation hubs are known to provide space for the start-ups/students to operate from with the hope that they can benefit from collaboration and critical mass in engaging partners or other resources. While occasionally some start-ups may generate income for the tech hub, sustainability of these spaces is usually a headache, the start-ups may not gain traction fast enough, may not find a way to generate consistent revenue, let alone scale and create some income for their base. An innovative business model will be required if the proposed AU-IBAR hubs have to be sustainable. Innovations that have been incorporated in hubs that are sustainable include engaging in consulting work, research and creating apps on order, amongst other things.

Like business incubators/accelerators, tech and innovation hubs can deliberately seek to grow ideas to a point of commercialisation. In this respect they incubate the selected/invited participants to build a minimum viable product, test and validate it with potential customers, iterate or pivot entirely then bring it to scale. For AU-IBAR hubs to accomplish commercialization they will need a very robust selection process for their incubatees.

Successful Tech and innovation Hubs normally focus on developing innovative products, services and training in a specific area of their Innovation Community, taking targeted actions to help overcome key challenges in that field. Each Innovation Community is known to operate with its own management, legal structure and business plan with its own clear, measurable objectives to deliver value to its stakeholders. For AU-IBAR this implies that the proposed hubs may have general characteristics but must take into consideration regional and local specifics in the ecosystems.

Innovation Hubs constitute the backbone of an Innovation Community hence they should have a strong management, enabling collaboration within the Hub itself and with partners from other Hubs. There should be an inbuilt simplification agenda to keep overheads and management costs low. This is an important consideration that AU-IBAR hubs must take on board.

Successful hubs do knit together organisations of different sectors, countries and disciplines. The AU-IBAR Innovation Hub being the AU-IBAR invention should be the main instrument for managing continental activities and knowledge flow. Each regional Innovation Community should have its own partners in close proximity. This will be essential to facilitate interaction among members of the regional community. The regional hubs should act as the focal points for the Innovation Communities' activity within their areas of focus.

Some hubs the world over occupy imaginatively repurposed iconic buildings, including museums, warehouses, train stations, navy yards and hospitals, giving new life to underutilized parts of cities that had lost their previous vibrancy. AU-IBAR hubs may be built on existing infrastructure such as campuses of some of the Innovation Community's core partners, which will serve as clusters for a particular region. They should be locations that support an open innovation business model, foster co-location, and promote easy and constant interaction among livestock farmers and their stakeholders.

Each region may choose an appropriate hub model. However, the management structure of every hub should conform to principles of good governance, in particular reflecting the diversity in the composition of the partners, ensuring an open and high-quality decision-making process, and separating the supervisory function from the operations.

Key functions of the Hubs that the proposed AU-IBAR could borrow from include, but are not limited to:

- Connectivity: the provision of physical space for interaction within the local ecosystem. These spaces should attract a wide range of actors from within each Innovation Community and beyond
- Knowledge management: Functioning as points for knowledge exchange (within, between and across Innovation Hubs)

- Activity management: acting as a centre for many activities.

In a technology-driven world, a traditional business with a physical presence can still be a viable option for budding entrepreneurs. Called brick-and-mortar businesses, these companies are stand-alone structures, or located within larger shopping complexes or malls. There are advantages to this type of business structure. Many people still prefer face-to-face relationships when making purchases. However, there are disadvantages of running a brick-and-mortar business. Most of these involve costs. The AU-IBAR hubs should take a more than bricks and mortar approach to innovation hubs to include virtual and online channels of reaching customers.

Key for AU-IBAR hubs would be:

- Looking at innovation hubs through an ecosystem or habitat lens and assembling a multidiscipline leadership team and partners to ensure that the region is being ambitious and comprehensive in taking on the core elements that drive innovation;
- Reimagining the spaces around existing organizations such as universities as places that can be shaped physically and strategically to anchor an innovation ecosystem, providing all sorts of critical ingredients for innovation—smart people, research institutions, entrepreneurial training and mentors, professional networks as well as those place-making attributes (e.g., walkability, public spaces, and mixed land use) that are known to support innovation

Successful hubs have been reported to work within a supportive ecosystem. Key elements of such Innovation Ecosystem include but are not limited to:

- Institutions that attract and support the people with the talent and foresight to create new ideas;
- Industry networks that encourage interaction, stimulate further innovation, help develop specialized services to support area companies, and encourage cross-industry partnerships;
- Facilitation of entrepreneurship to commercialize concepts so that ideas, and businesses based on them, grow in the area; and
- Cultural and social amenities constituting quality of life that motivate knowledge workers and the innovation-based companies that rely on them to stay in the area.

It is important to mention that successful hubs have been reported to operate in a policy framework that:

- Builds Expertise by building strong research capabilities and attracting world-class talent in strategic areas.
- Facilitates Interaction by requiring collaboration among universities and others, cultivating strong networks, shared research facilities and compact geographical areas.
- Links diverse knowledge fields and industry sectors together by multidisciplinary institutions, well-designed research facilities, and mixed-use research parks to ensure that creative "sparks fly."
- Pushes the application of technology and commercialization of research by experimenting with university-industry partnerships, pioneering open IP policies and faculty tenure changes, and keeping industry engaged.

3.0 METHODOLOGY

A write shop composed of 35 writers from selected AU Member States, Universities, Private sector, regional and International organizations amongst other key stakeholders. The writeshop was convened from 19th to 22nd November 2018 in Naura Springs hotel, Arusha Tanzania.

For purposes of bringing the writers on the same page, the facilitator made brief presentations on the following topics:

1. The concept of business incubation (with case studies for the continental African Agribusiness Incubators Network – AAIN and Nailab from Kenya).
2. Criteria for identifying innovative start-ups
3. Technology commercialization
4. Incubator stakeholder analysis
5. Incubator management and administration
6. Business Canvass model

The writers were then split into four groups with an assignment to do a stakeholder analysis for the proposed A-TiChubs and a business model for the same.

Writers were given two templates to guide them. One was a stakeholder analysis template (fig. 1) and two was the business canvas model template (fig. 2).

Stakeholder analysis template

Stakeholders	What is their stake/interest in the hubs?	What is their impact on the hubs?	What is the power of influence on the hubs?	How do we engage them?
Primary (direct beneficiaries)				
Secondary (indirect beneficiaries)				
Tertiary (those with influence)				

Fig. 1: Stakeholder analysis template

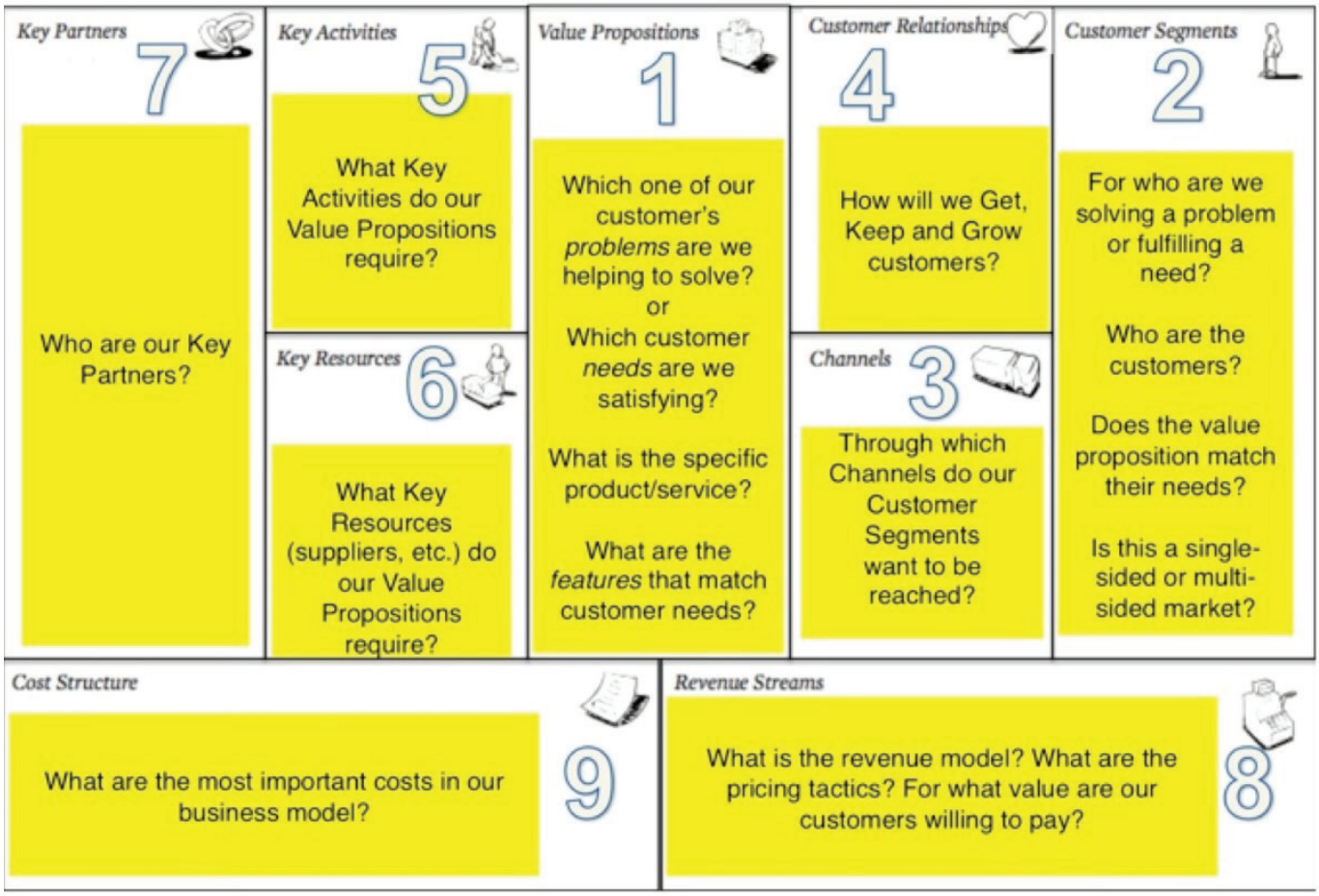

Fig. 2: Business canvass model template

4.0 RESULTS

The four groups produced excellent results which can be viewed in the appendices. None of the stakeholder analyses and none of the business models from the groups could qualify to be adopted as a stand-alone stakeholder analysis or business model. The consultant married the strong elements of each stakeholder analysis and business model and produced the following a single hybrid business model.

5.0 OUTCOMES

5.1 TECHNOLOGY AND INNOVATION ECOSYSTEM

The A-TiChubs technology and innovation ecosystem should refer to the collaborative efforts of key stakeholders to develop, adopt, and scale new products and services. The individuals and organizations engaged in these joint efforts should represent a variety of skill sets and priorities. In the ecosystem, research of several kinds should be done to result in appropriate technologies and innovations for the customer.

We here (in figure 3) propose a generic/basic technology and innovation ecosystem for the proposed hubs.

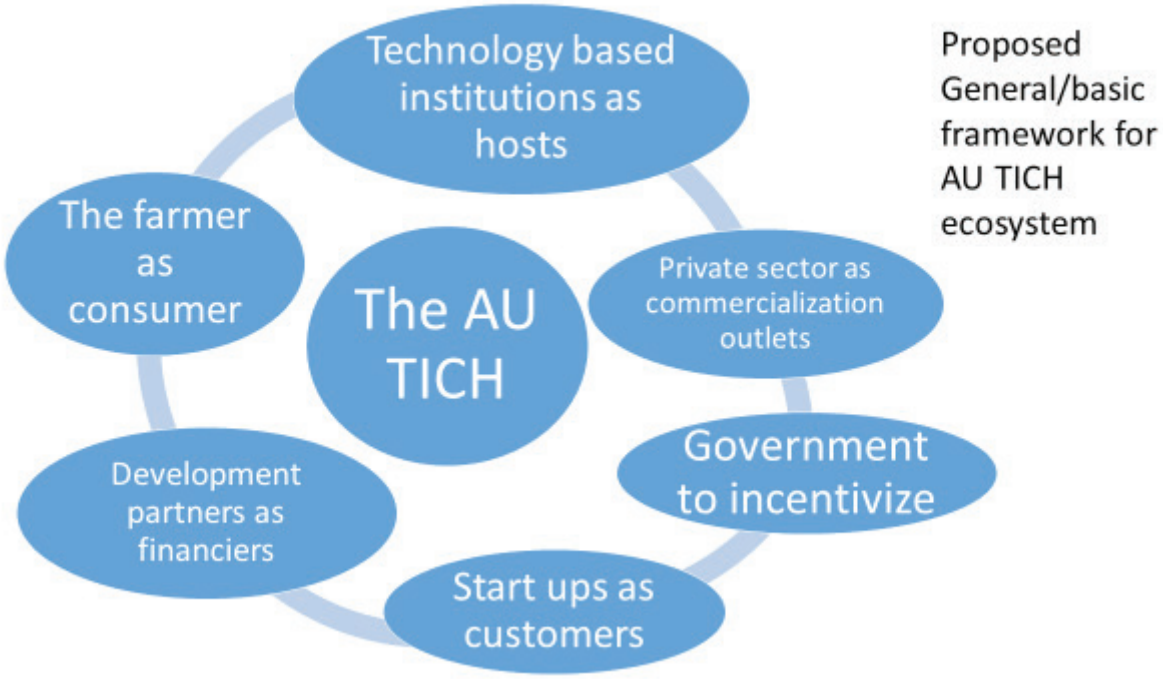

Fig. 3: Basic technology and innovation ecosystem

5.2 KEY PARTNERS AND STAKEHOLDERS

The ecosystem above has spelled out the key partners and stakeholders. The following is an in exhaustive list of key partners and stakeholders

Selected Key Primary stakeholders

- Inventors
- innovators
- Ag-entrepreneurs;
- Tech developers;
- Interns
- Early stage Start Ups
- Agricultural Extension Service Providers
- University students with ideas

Selected key Secondary stakeholders

- Learning and research Institutions
- Farmers
- Government agencies and regulatory authorities (IP organisations, Standard bodies)
- International Institutions and development partners
- Venture Capital/Funds, Angel Investors
- Financial institutions
- Business Development Support Organisations
- Media actors
- Farmers cooperatives and farmer associations
- Industry players (Processors/ Manufacturers/Markets/ inputs suppliers
- Private sector (service provider, Inputs services providers/ Veterinary services)

- Telecommunication companies
- Traders in the sector
- ICT industry
- Suppliers or providers of service or materials
- Financial Institutions
- Agricultural Insurance companies

Selected key Tertiary stakeholders

- Third sector alliances (NGOs, Co-operatives, CBOs etc.)
- Regulators Development Agencies
- Intellectual Property Rights Organizations
- Standards Authorities
- Consumer organizations
- Policy makers (Government/ Local authorities)
- Government and related organizations e.g. Parastatals

Selected key Partners

- Incubators
- Accelerators
- Hubs

The summarised stakeholder analysis is presented in figure 4.

Key Stakeholder/ partner	Main Interest in the hub	Key function/ responsibility/roles	Key engagement strategy
The primary stakeholders e.g. the innovators and start ups	To perfect their innovations	To adhere to the rules of the hub	Invites for joining hubs under a criteria. conclude innovation contracts with them
The secondary stakeholders e.g. farmers, learning institutions	To get appropriate farming technology and innovations To test their appropriate curricula	Provide needs to be addressed by hub e.g. farmer needs, training needs	Engage them with needs assessment surveys Engage them to provide relevant data for use in the hub
The tertiary stakeholders e.g. government, regulatory bodies	To achieve institutional objectives To achieve developmental goals	To develop conducive policies To incentivize incubation	Lobby them for favourable policies
Key partners e.g. incubators, hubs, accelerators	To rival the hub	To provide competition (which should be taken positively by hub)	Develop business alliance programmes with them

Fig. 4: A summarized stakeholder analysis for A-TICHUBS

Full stakeholder analyses which individual hubs can use for customization are presented in the appendices.

5.3 GUIDING PRINCIPLES ON FUNCTIONALITY AND ADMINISTRATION OF THE A-Tic HUBS

We propose that the A-TiChubs will be administered on a continental level with an apex advisory committee reporting directly to AU-IBAR and executing key functions as shown in the general management organization structure of figure 5.

Every region will have its own hub hosted at an appropriate institution which should preferably be an agricultural and technology oriented university. The choice of an agricultural university is here proposed based on the fact that the hubs are in the livestock sector. The hubs will focus on technology and innovation hence the choice of a technology oriented university. Technology oriented universities are known to have their own technology transfer offices (TTOs). One of the objectives of the A-TiChubs is to commercialize innovations hence the choice for universities as lead institutions. The term lead is used here to mean that the university should partner with other institutions including research and development institutions, private sector organizations and even line ministries and department who will require coordination.

The relationship between the partners in the A-TiChub should be on needs basis. This means that what should be avoided would be a consortium route where partners form and register companies as was the case with the Universities, Business and Research in Agricultural Innovation (UniBRAIN) model which required participating partners to form consortia. A 2017 UniBRAIN Lessons Learned Study says in part, "The tripartite rationale of bringing universities, research organizations and private businesses together to jointly operate business incubators has the potential to facilitate cross-sectorial collaboration on value addition and commercialization of new technologies, but the co-ownership governance model has also shown to be a challenging form of organization that requires substantial time and establishment of mutual trust to develop successfully". The principle of needs basis here means that the lead institution should be free to engage relevant partners on an "as and when" basis.

It was recommended in the meeting that, within the administrative structure (Figure 5) that AU-IBAR should act as the governing body supported by the African technology and innovations incubators advisory committee (ATIIAC). The proposed committee will undertake the following functions; overseeing of incubatees selection, ensuring quality assurance, technical backstopping, mentorship and knowledge management. In addition, co-ordination of the A-TiCHUB activities such as mentorship and vetting of incubates should be supported by the African TiChub working group (ATWIG). ATWIG should purpose to function as the think tank for the A-TiChub activities and mentorship program..

The A-TiChubs should be managed on a general incubation model where a robust pre-incubation selection criterion admits incubatees who undergo incubation but look forward to a post incubation era as shown in figure 6.

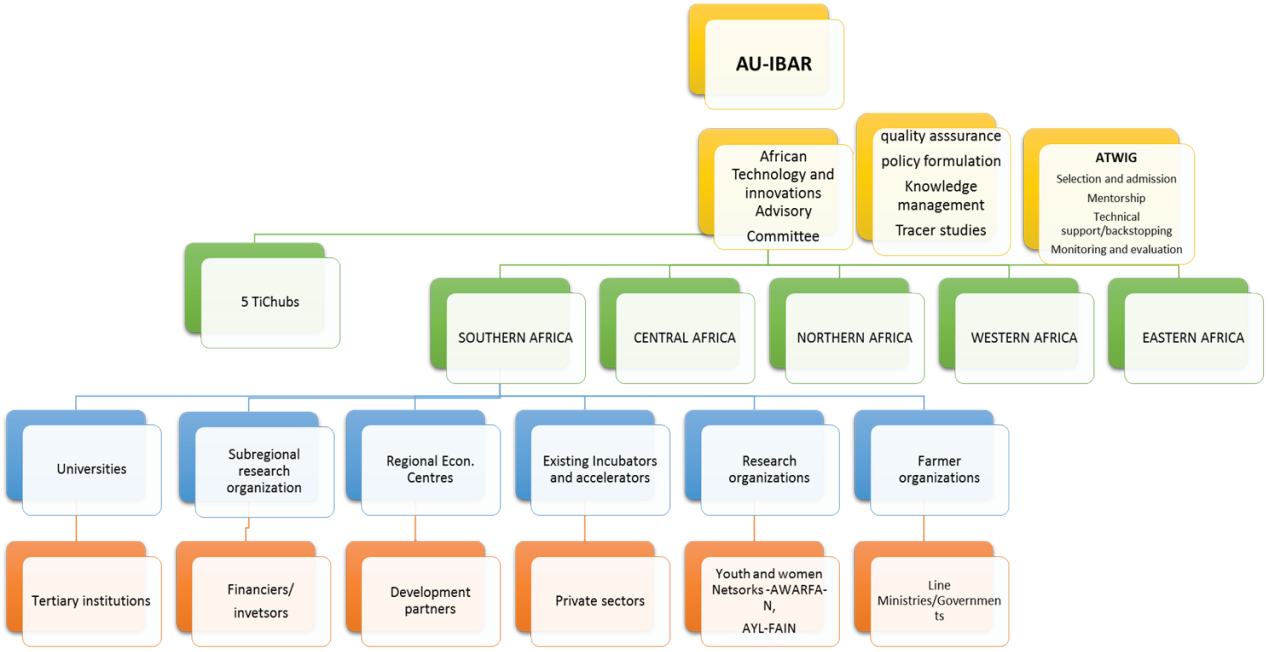

Fig. 5: General organization structure

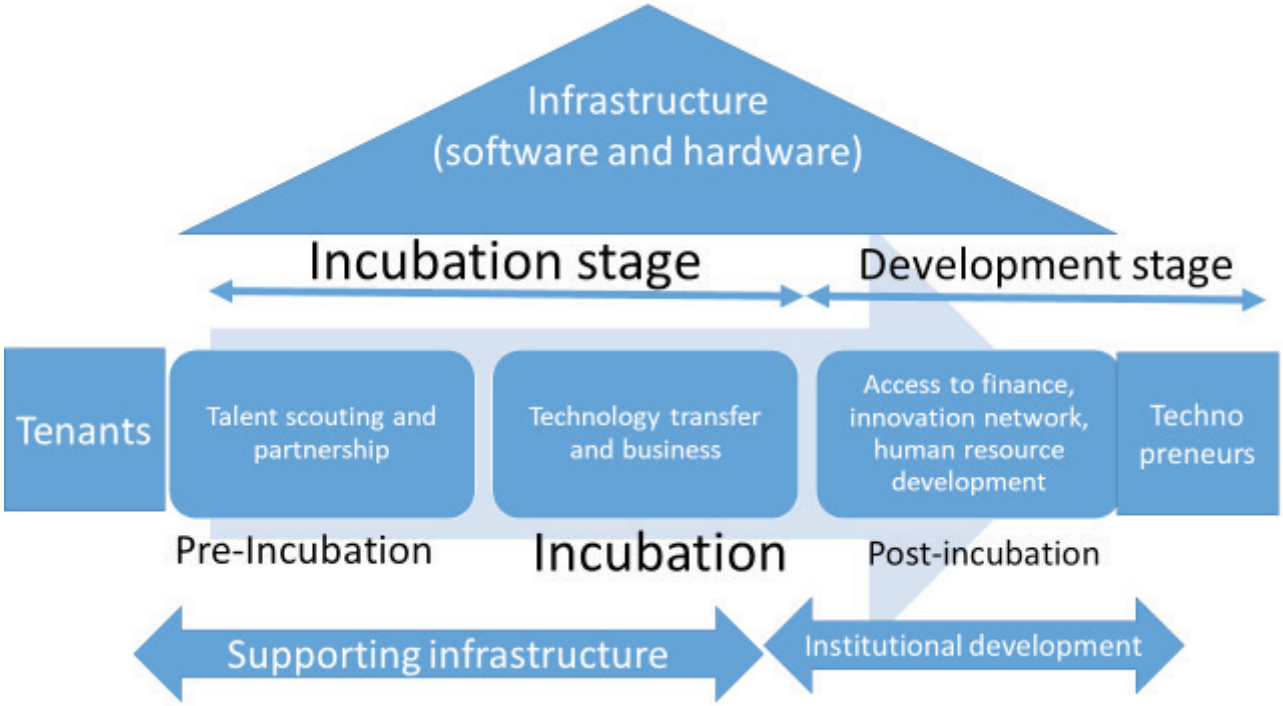

Figure 6: general incubation process.

5.4 CRITERIA FOR IDENTIFICATION OF INNOVATIVE START-UPS

Definition of a start-up

It must have been purposeful that the designers of the A-TiChubs thought of start-ups and for that matter innovative start-ups and not just small businesses. Therefore, before we dive into the criteria for identifying innovative start-ups let us define the start-up

It is very often to apply the term "start-up" to any small business and also to tech companies of all sizes and stages. But there's a vast ideological (and organizational) difference between a start-up and small business.

A start-up is a repeatable and scalable business. In the context of the tech industry (and this report) a start-up should be short for "scalable start-up."

Being scalable means that unlike general small businesses, start-ups are started with the objective of being scaled to become large companies and make a big impact.

Start-ups key characteristics;

1. Is Disruptive

A scalable start-up founder doesn't just want to be her/his own boss; she/he wants to take over the universe. From day one the intent is to grow her/his start-up into a large, disruptive company. A tech and innovation hub will be ideal for such a founder.

2. Starts with a Small Market

When it comes to successful start-ups, there is very often talk about the importance of having a huge market. True, a start-up must eventually reach a large market in order to turn into a large company. But at the beginning it is actually best to start with a small but defined market.

3. Focussed

Related to starting with a small market, another characteristic of successful start-ups is focus. When starting a company from the ground up, especially with a very small team, it's easy to be tempted to take on too many projects and get spread too thin. Unfortunately, this can kill a start-up.

4. Provides an Amazing User Experience

By definition, start-ups are new companies. They can't rely on brand loyalty built up over years or decades like their big, entrenched competitor can do. This is one reason why providing a useful product that's easy yet delightful to use is so important to the business's long-term success.

5. Has an Innovative Product

By definition an innovative product is one that has relative advantage over the existing

6. Has customer Knowledge

Know your customers and what they want. Don't try to sell them something they don't need or want.

7. Has clear strategy to execute

An active plan for the future, one that encompasses growth and important goals, is vital to a company surviving its beginning. However, knowing how to carry out that strategy is also key to longevity. This is where being able to motivate and effectively communicate to your team comes into play.

8. Has a killer team

A start-up doesn't just need a team who has the knowledge base to get stuff done. It needs people who actively get involved in making sure the startup is a success. People who are hard-workers, who take initiative, and who take on your vision and make it their own are people who will help you carry the many burdens that come with starting a new company or launching a new product.

9. Has a Product-Market Fit

Selling a product or service customers actually want is important. The market must be willing and able to pay for what you're selling. Seems straightforward, and obvious, yet many start-ups struggle with defining their product-market fit.

10. They Build Engaged Communities

Finally, the most successful start-ups think beyond customer acquisition and work toward community building. Unable to rely on decades of brand loyalty, like their established counterparts, they roll-up their sleeves and engage their target markets.

In table 1, we summarize the checklist for identifying innovative start-ups for the A-TICHUBS

Table 1: *Checklist for identifying innovative start ups*

	Criterion	YES	NO
1	Does it have a growth oriented goal?		
2	Does it have a defined market?		
3	Has it got a defined product?		
4	Has the product potential to excite users?		
5	Is the product innovative?		
6	Is it customer centric?		
7	Has it got a clear strategy to execute?		
8	Has it got a relevant team in relation to its product?		
9	Does the product have potential to be compatible with the market?		
10	Does it have a community/societal objective?		
	Total YES and total NO Cut off = 6 YES		

5.6 STEP-WISE STRATEGIC OPTIONS TO GUIDE COMMERCIALIZATION AND SKILL TRANSFER OF NOVEL TECHNOLOGIES FOR THE LIVESTOCK SECTOR

Simply stated commercialization or commercialisation is the process of introducing a new product or production method into commerce—making it available on the market. The process goes through some stages. Below we present one such a process which we propose the A-TiChubs could adopt

Stage 1: Preliminary Assessment

KEY ACTIVITIES WITHIN STAGE 1

Assess the current state of field where solution is intended to be applied

Check for cost, size, effectiveness, etc for new solutions to replace current alternatives

Assess market potential including number of prospective end-users of the technology

REQUIREMENTS FOR EXITING STAGE 1

Validation of some identifiable and specific economic and/or technical advantages over known competing alternatives and an actionable market opportunity with reasonable probability for capture of commercial value within the scope and during the lifetime of prospectively available proprietary protection.

Stage 2: Patentability Assessment

KEY ACTIVITIES WITHIN STAGE 2

Analyse:

availability of statutory subject matter within the scope of the invention which can be incorporated into an enforceable patent application.

Prior art in the field and defensible arguments for statutory requirements for Novelty and Non-obviousness of commercially relevant claimable elements of the invention.

Level of available information related to statutory requirements for Utility, Written Description, and Enablement of commercially relevant claimable elements of the invention.

REQUIREMENTS FOR EXITING STAGE 2

Claimable elements which are defensively novel and non-obvious over known prior art and for which sufficient detail is available to satisfy utility, written description, and enablement requirements. A general strategy for patent prosecution which has a reasonable probability of issuing claims of commercially relevant breadth.

Stage 3: Market Opportunity Assessment

KEY ACTIVITIES WITHIN STAGE 3

Analysis of scale and nature of specifically actionable market opportunities presented by the technology. Review will include assessment of competing alternatives as well as sector dynamics such as distribution channels, barriers to platform conversion, regulatory issues etc.

REQUIREMENTS FOR EXITING STAGE 3

Actionable and validated market opportunity that is of sufficient scale to justify investment of further effort and financial resources for proprietary protection.

Stage 4: Commercialization Strategy and Plan Development

KEY ACTIVITIES WITHIN STAGE 4

Development of actionable development plan including critical technical and business de-risking activities and prospective funding sources related to such activities.

REQUIREMENTS FOR EXITING STAGE 4

Identification of key milestones toward commercial development including technical and business de-risking activities as well as direct customer and strategic partner cultivation targets

Stage 5: Proprietary Protection Planning and Implementation

KEY ACTIVITIES WITHIN STAGE 5

Collection of experimental data and clear summary of all known prior art.

Development of proprietary protection plan including a patent filing strategy.

Patent application preparation and filing through external counsel.

REQUIREMENTS FOR EXITING STAGE 5

Viable commercialization plan from Stage 4 and clear written description covering all commercially relevant aspects of the invention with sufficient experimental and other support to satisfy all statutory requirements for patentability.

Stage 6: Commercialization Plan Implementation

KEY ACTIVITIES WITHIN STAGE 6

Execution of commercialization as developed in Stage 4 and as revised based on experience in follow-on technical and business development.

Preparation of applications for funding technical and business de-risking activities

Engagement with prospective customers, licensees, and strategic partners.

Continued laboratory work to validate technology and produce data necessary for promotion of technology.

REQUIREMENTS FOR EXITING STAGE 6

Recruitment of sufficient developmental resources to result in formal establishment and commercial momentum of Start-up Company or recruitment of strategic development partner to move technology formally into the marketplace.

Stage 7: License

KEY ACTIVITIES WITHIN STAGE 7

Negotiation of license terms and development of follow-on business relationship in continued research and development or technology improvements etc.

REQUIREMENTS FOR EXITING STAGE 7

Executed license agreement with commercial milestones.

For effective commercialization It is envisaged that the hubs will eventually be self-sustaining to generate revenues. That would mean that they will require to be guided by a process similar to the one displayed in figure 7.

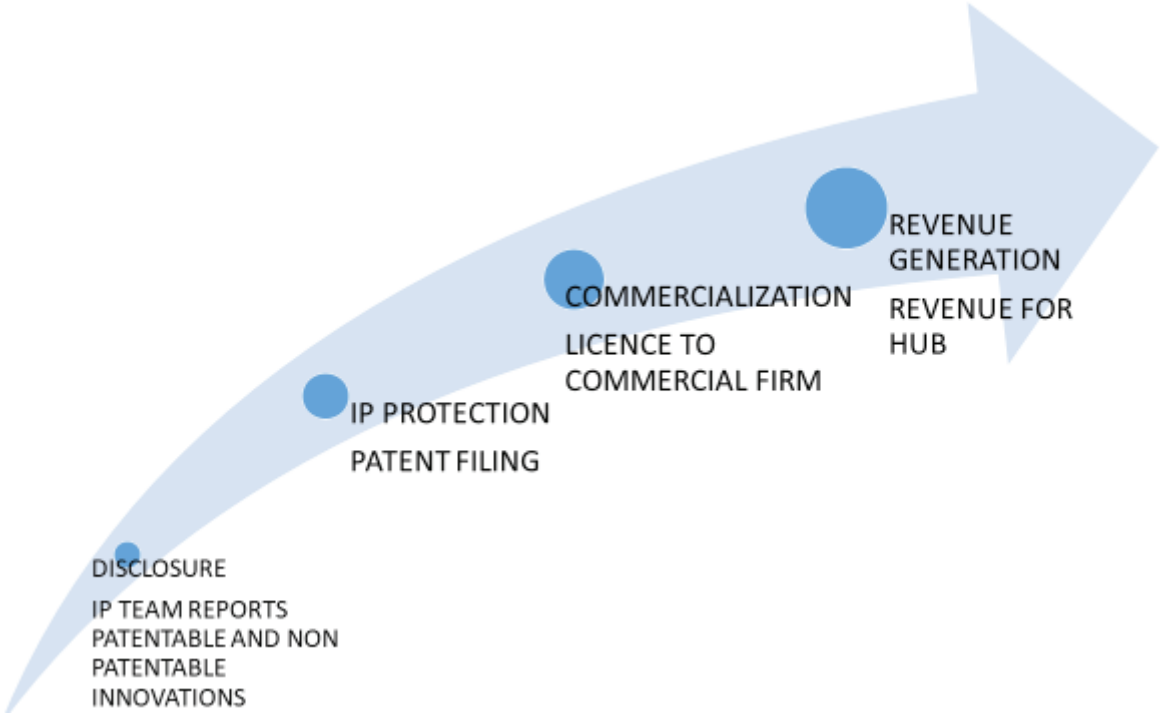

Figure 7: envisaged process for revenue generation by the A-TiChubs

To be able to accomplish the revenue generation objective every hub should have a Technology Transfer Office (TTO) for linkages with industry as shown in figure 8.

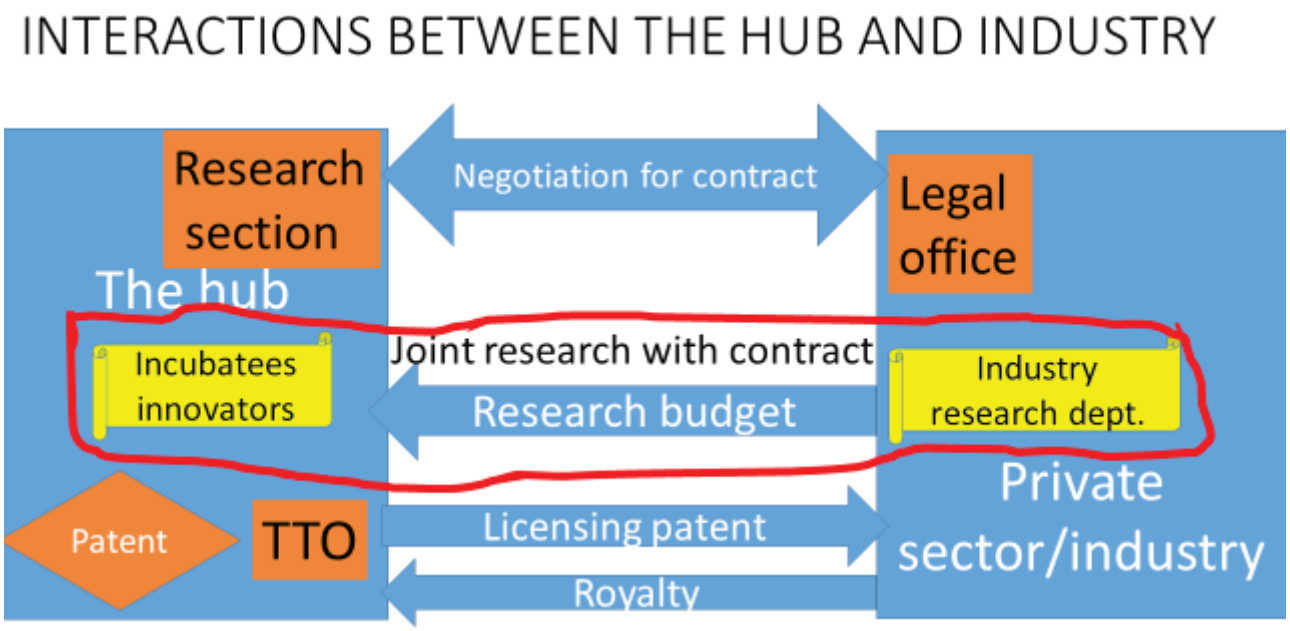

Figure 8: interactions between the hubs and industry

Figure 9 shows the hub-industry linkages via the Technology transfer officer (TTO)

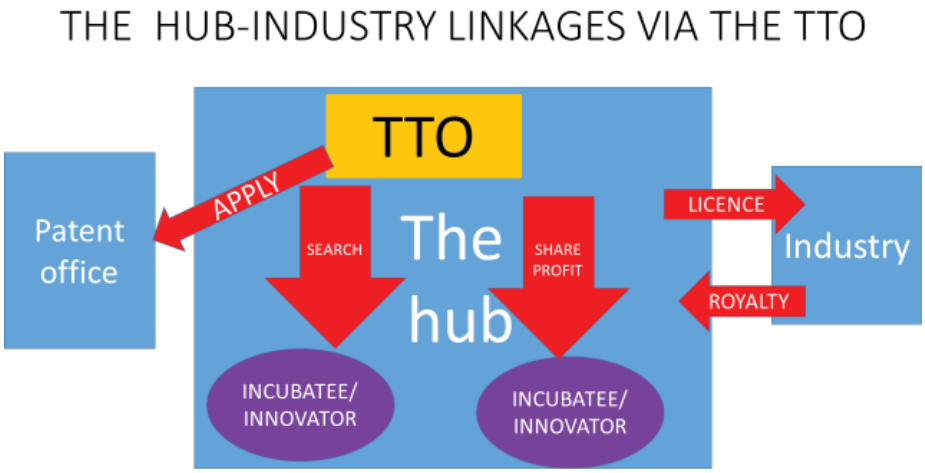

Figure 9: Hub-industry linkages via the Technology transfer officer (TTO)

Figure 10 shows key specific function of the Technology transfer officer (TTO)

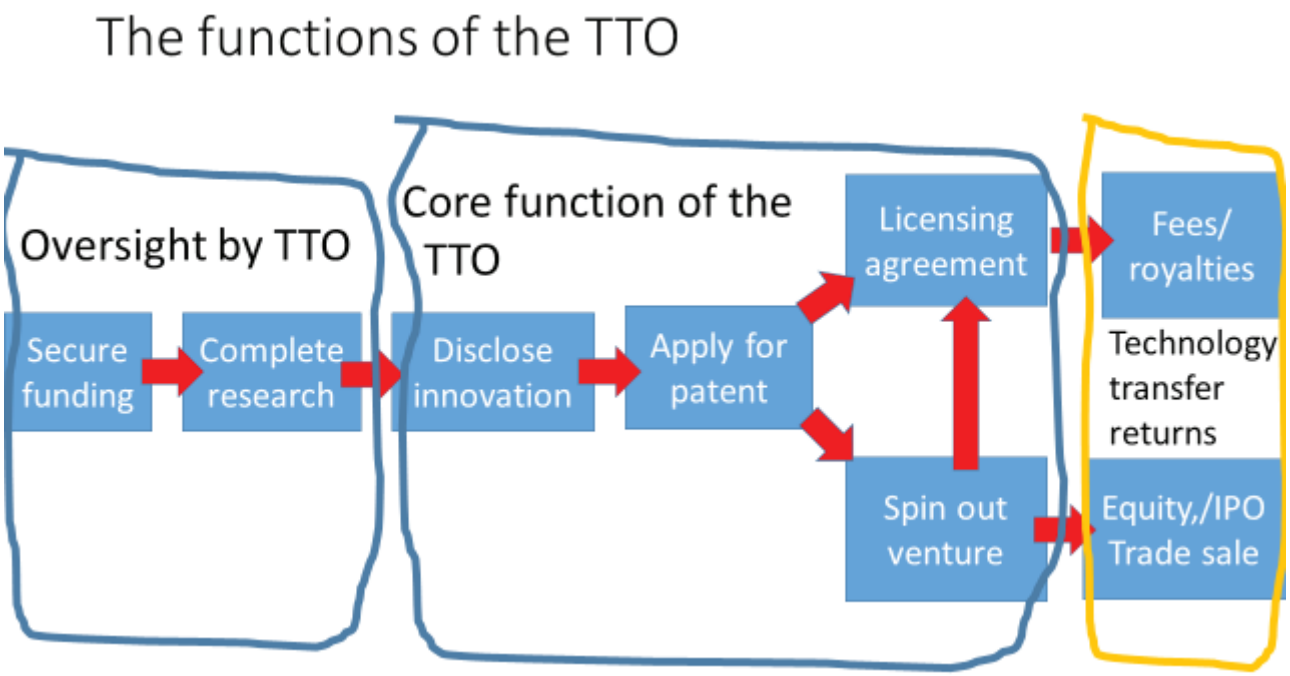

Figure 10; Key functions of the TTO

5.7 BUSINESS MODEL FOR THE A-TICHUBS

Business incubation has now taken root in Africa. There are specialized public sector incubators such as university incubators and there are private sector incubators. There are non-profit oriented incubators and for-profit incubators. There are incubators within walls and virtual incubators. There are incubators (organizations that assist start-ups) and accelerators (organizations that help existing companies to grow). Each type of incubator and accelerator has its pros and cons.

The proposed A-Tichubs will therefore be hybrid in nature. This means that they will implement various distinct value creation processes with the integration of the advantages of non-for-profit and for-profit incubators. They will have both virtual and physical elements and will be managed by teams from the public and private sector. Finally, they will function as incubators and as accelerators.

The justification for a hybrid model is that the model is designed to tap into the pros of the various existing incubator models and minimize their cons. In figure 11 we propose a hybrid business model that was developed from the various writeshop outputs.

Key partners	**Key activities**	**Value proposition**	**Customer relations**	**Customer segments**
1. Existing incubators and hubs 2. Farmers coops and associations 3. Learning institutions 4. Government agencies 5. Regulatory authorities 6. Third sector organizations (e.g. NGOs) 7. International organizations	1. IPR acquisition 2. Training 3. Networking 4. branding **Key resources** 1. office space 2. technical experts 3. M&E systems 4. IT resources	1. IPR support 2. Practical training 3. Legal/financial advising 4. Peer networking 5. Industry linkages	1. Constant and interactive communication 2. Regular updates 3. Client shareholding **Channels** 1. Media 2. Face to face 3. Referrals 4. Workshops 5. Trade fairs 6. Mailing lists 7. websites	1. Student community 2. Start ups 3. Agro-innovators 4. Incubators 5. accelerators
Cost structure Fixed costs (buildings, furniture, rent) Variable costs (personnel, material, communication)			**Revenue streams** 1. subscription 2. royalties 3. equity 4. consultancies	

Fig. 11 A hybrid canvas business model generated from four models developed at the writeshop (the full list of components of every block expounded in tables 2-10)

Table 2: Customer segments

Customer segments are the community of customers or star-ups that the hubs aim to sell or offer their product or services to. This is one of the most important building blocks in the business model canvas for the hubs, so getting this building block right is key to the success of the hubs. Put another way customers of the hubs are those who will come to the hubs to acquire services of the hub. Being a technology and innovation hubs only those with existing or potential technologies and in innovations relevant to the livestock subsector of the agricultural sector will be given priority. They may be along the entire livestock value chain. Some robust criteria will be used to select the customers. The envisaged key customers of the hubs are given in the table below.

CUSTOMER SEGMENTS

- Early stage Start Ups in the animal value chains
- University student community
- agri-innovators (AgroTech developers)
- Start-ups,
- Incubators, Accelerators,
- Virtual entrepreneurs;
- Agricultural Extension Service Providers

Criteria for identifying customers to be admitted in the hub

1. Ability/degree for the segment to be analysed in detail.
2. Clarity of the tasks the customers is trying to accomplish

3. Clarity about the pains customers have including the challenges and risks they face
4. Clarity of the potential gains to accrue to the customers

Table 3: Value proposition

Value proposition reflects the collection of services, which the hubs must offer to meet the customer needs. Value proposition should clearly identify what advantages the customers will receive. These are supposed to be in line with defined wider purpose and main objectives of the hub. Value proposition further stands for a unique combination of the hubs' products and services which will result into a solution of the problem the customers face. It is expected that the customers will be heterogeneous in terms of their needs. The hubs should therefore be prepared to offer an array of values or solve an array of customer pains. This value proposition is therefore based on the identified "pains" of the ARVC customer. The following list may not be exhaustive.

VALUE PROPOSITION

- Offering subsidized space from development to commercialisation of technologies
- Support for the acquisition of IPR
- Providing targeted practical trainings
- Networking (connecting the incubatees with fellow innovators, clients and industry players) through networking forums and boot camps
- Linkages to industry players, customers and funders

Given the importance of patenting and technology commercialization in matters innovation the aspect of IPR will be the most important value proposition of the proposed A-Tichubs. Every effort will be made to assist the hub customers to patent and commercialize their innovations.

Criteria for selecting value proposition

We propose a three point criteria for value proposition: relevancy, quantified value, uniqueness.

- Does it explain how the services solve customers' problems or improves their situation (relevancy)?
- Does it deliver specific benefits (quantified value)?
- Does tell the ideal customer why they should come to the hub and not go to the competition (unique differentiation).

Table 4: Key activities

The Key activities of the hubs represent what the hubs will have to do to make the business model work i.e. to satisfy the customer. These activities may be for producing a product or providing a service, or a mix of both. Below we present a menu of activities the hubs may engage in

KEY ACTIVITIES

- Mentorship services
- IPR acquisition,
- Networking (linking with strategic partners and B2B events)
- Tailored (appropriate) Trainings

- Branding and marketing support;
- Building a database for technologies
- Organising and participating in Expo' and events
- Organizing open days, pitching events, innovation summits)
- Publications (e.g. newsletters)
- Run a reward and a recognition system to encourage good practice
- Match and link incubatees with relevant mentors

Criteria for selecting key activities for the hub

1. Degree to which the activity contributes to the value proposition
2. Degree to which the activity is compatible with the channels of the hub
3. Degree to which they contribute to the maintenance of customer relations
4. Degree to which they contribute to revenue streams

Table 5: Key Partners

The hubs may have to enter into key partnerships which may be networks of suppliers and other parties to make the model work. It is expected that the hubs will forge partnerships that optimize the business model, reduce risk, and/or acquire resources. It is envisaged that the hubs will enter into strategic alliances with both non-competitors like government agencies and competitors like other hubs. Below is an in-exhaustive list of possible partners

KEY PARTNERS

- Existing incubators and hubs
- Farmers (cooperatives, associations)
- Learning institutions (Secondary schools, TVETS etc)
- Universities and Research Institutions;
- Government agencies (line ministries)
- regulatory authorities (IP organisations, Standard bodies);
- Third sector organisations (NGOs, Co-operatives, CBOs etc.);
- International Institutions and development partners;
- Development Banks;
- Media actors.
- Consumer organizations
- Suppliers or providers of service or materials
- Agricultural Insurance companies
- professional networks
- venture capitalists
- research institutes
- Telecommunication companies.
- Regional institutions

Criteria for selecting partners

1. Partner must agree to right a partnership agreement
2. Partner must agree to establish shared expectations in the partnership
3. Partner should be able to fill the gap between the hubs' value proposition and the resources
4. Here must be a win-win situation i.e. visible gains on both ends.

Table 6: Customer relations

Customer relationships describes the type of relationship the hubs establish with specific customer segments. The hubs' customer relationships should be driven by customer acquisition and retention. Every hub should clarify the type of relationship it wants to establish with each Customer Segment. Relationships may be established through the hubs' different Channels. Relationships can range from personal to automated, from transactional to long-term, and can aim to acquire and retain customers. The type of Customer Relationships the hubs will put in place will influence the overall customer experience. Below is a list of possible customer relations for the proposed hubs

CUSTOMER RELATIONS

- Contractual party agreement;
- Constant and interactive communication
- Regular updates on new products and services;
- Continuous mentorship
- Constantly updating the benefits and incentives;
- Shareholding with the client e.g 51% shareholding with the client.
- Participatory holistic business relationship
- Quality of management systems
- Quality of mentorship systems

Criteria for selecting customer relations

1. Practicability of the relations
2. Sustainability of the relations
3. Cost element of the relations

Table 7: Channels

The Customer Channels is the building block that describes how the hubs will communicate with Customer Segments to deliver the Value Proposition. Any given channel has several marketing functions, including: 1. Raising awareness of the hub's products and services. 2. Helping customers evaluate the hub's value proposition. 3. Allow customers want to come to the hub. 4. Deliver value proposition to the customers and 5. Provide post incubation care and support. Such channels are listed below

CHANNELS

- Print media;
- Social media;
- Radios, TV;

- Websites;
- Workshops
- Face to face meetings
- Trade fairs
- Referrals from Universities and tertiary institutions
- Word of Mouth
- mailing list
- Personal communication with incubates Personal interaction with investors, mentors, trainers, etc.

Criteria for choosing channels

1. The number of customer segments or the size of target market.
2. Investment required by the distribution channel
3. Amount of control required over the distribution channel

Table 8: Cost structure

Cost structure describes the most important costs incurred while operating the business model. Creating and delivering value, maintaining Customer Relationships, and generating revenue all incur costs. Such costs can best be calculated after defining Key Resources, Key Activities, and Key Partnerships. Below is a generic structure of such costs

COST STRUCTURE

FIXED COSTS

- Buildings
- Furniture and fittings
- Rent

VARIABLE COSTS

- Rental space;
- Personnel costs;
- Materials and production costs;
- Communication costs;
- Capacity related costs;
- Technical experts' costs;
- Logistics costs;
- Research costs;
- Utilities
- Marketing and Public Relations costs
- Travels cost
- Consultancy
- Mentor/Training fees
- Seed funds

- Prototyping/development
- Utilities (electricity, transport waters, entertainment cost)
- Ecosystem building cost (networks, subscriptions, cost of events)

Criteria for selecting elements of cost structure

Ability to fit within the hubs'budget

Table 9: Key resources

Key Resources are the most important assets needed to make the business model work. Every business model requires them, and it is only through them that the model will generate the Value Propositions and Revenues. Key resources can be physical, financial, intellectual, or human. The list below shows these costs physical, intellectual, human and financial.

KEY RESOURCES

- Office space
- Technical experts
- Personnel
- Training Resources
- Database of partners
- Media
- Communication
- M&E systems
- IT resources
- Testing facilities
- Infrastructure
- Finance resources

Criteria for selecting key resources

1. Contribution to cost structure
2. Contribution to revenue streams
3. Ability to contribute to sustainability

Table 10: Revenue streams

Traditionally incubators do not generate revenues. This then means that their sustainability has never been guaranteed. It has become fashionable to expect incubators to generate profits. It is today advisable to make incubators and hubs generate revenues by themselves (say by renting services and facilities, organizing events for customers or public or delivering services under contract to bigger customers such as corporates…) as they look unto revenues generated via third parties (such as public and private sponsorships or grants). Possible items of sources of revenues can be the following:

REVENUE STREAMS

- Subscription from potential clients (potential shareholders);
- Royalties from patented technologies;
- Equity holding that come up from the new incubators;
- Consultancies (for IP provision);
- Cooperate and institutional partnerships;
- Development partners (looking at it from the social impact side establishment costs);
- Rental costs when the incubation is not operating;
- Facility services e.g. guest centres;
- Training fees,
- Revenue sharing
- Grants/sponsorship
- Loans interest/dividend
- Events e.g. -paid Mentorships
- Organising promotion Business exhibition fairs

Criteria for selecting revenue streams

1. Ability for customers to contribute to it
2. Sustainability of the stream
3. Percentage contribution to the total streams

6.0 CONCLUSION AND KEY RECOMMENDATIONS

6.1 CONCLUSIONS

The writeshop generated very healthy debates around every block of the proposed business model. Writeshop participants were put into four groups with each generating a business model which was exhaustively discussed in plenary.

None of the four generated business models by the four groups would qualify to be a standalone model to be adopted. It was therefore agreed in the plenary that a hybrid be made out of the four for adoption.

The following recommendations are derived from the discussions by writeshop participants

6.1 KEY RECOMMENDATIONS

GENERAL ADMINISTRATIVE ISSUES

1. Develop a hybrid Business Model for the Establishment of Regional Technology and Innovation Incubation hubs in Africa (A-TiChubs). Hybrid here means a combination and/or merging of the elements of the four proposed models into one. This has been done in section 5.7. In figure 12 we envisage the operation of the model.

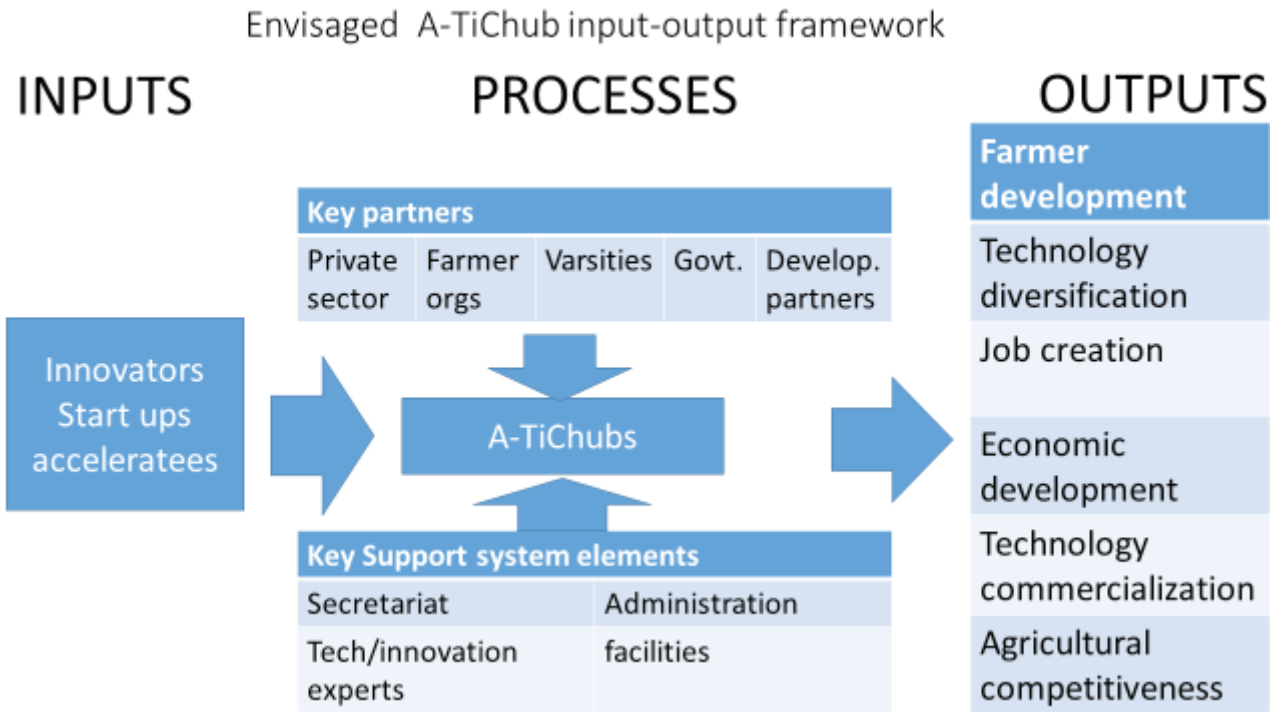

Figure 12: The envisaged input-output process of the proposed model

2. Establish an administrative structure with AU-IBAR as the governing body. This has been done in figure 5 in this report

3. Establish an African technology and innovations incubators advisory committee (ATIIAC) preferably with representatives from government, industry and academia to oversee the development of A-TiChubs. The ATIIAC to undertake the following key functions:

- overseeing of incubatees selection,
- ensuring quality assurance,
- technical backstopping,
- mentorship and knowledge management.

The committee should also:

- prioritise resource allocation,
- monitor research and development progress, and
- recommend initiatives to enhance and develop the regional A-TiChubs within the scope of the hybrid model.

4. Establish regional A-TiChubs to act as catalysts for the collective enhancement of production, agro-processing and marketing by farmers, scientists and innovators within the region. These are included in figure 5 in this report

5. An African TiChub working group (ATWIG) be formed to function as the think tank for the A-TiChub dynamic business model

VALUE PROPOSITION

6. The key value propositions for every regional hub be

- support for Intellectual property rights (IPR) acquisition,
- offer mentorship programs, pitching and business skills training, investor identification, partnership development amongst others.

HOSTING

7. Every regional A-TiChub to be hosted in an institution supported by key partners and stakeholders. The institutions to bid for the hosting via a comprehensive proposal. AU-IBAR to call for hosting proposals to select the winners. An irreducible minimum criteria be set up to select the winning host institutions. Elements of the criteria to include:

- Track record for dealing with livestock farmer related issues
- Appropriate infrastructure to host a technology and innovation hub
- Existing agricultural and in particular livestock programmes
- Existing (or potential) linkages with private sector and farmer organizations
- Ability to mainstream activities and programmes of A-TiChubs into its own programmes

REVENUE STREAMS OF THE MODEL

8. The model will be financed by seed money. However, it is expected that the model will eventually be sustainable. This then will require that A-TiChubs to run an incubation wing alongside an acceleration wing this making it unique. This arrangement will help A-TiChubs become sustainable (see figure 13)

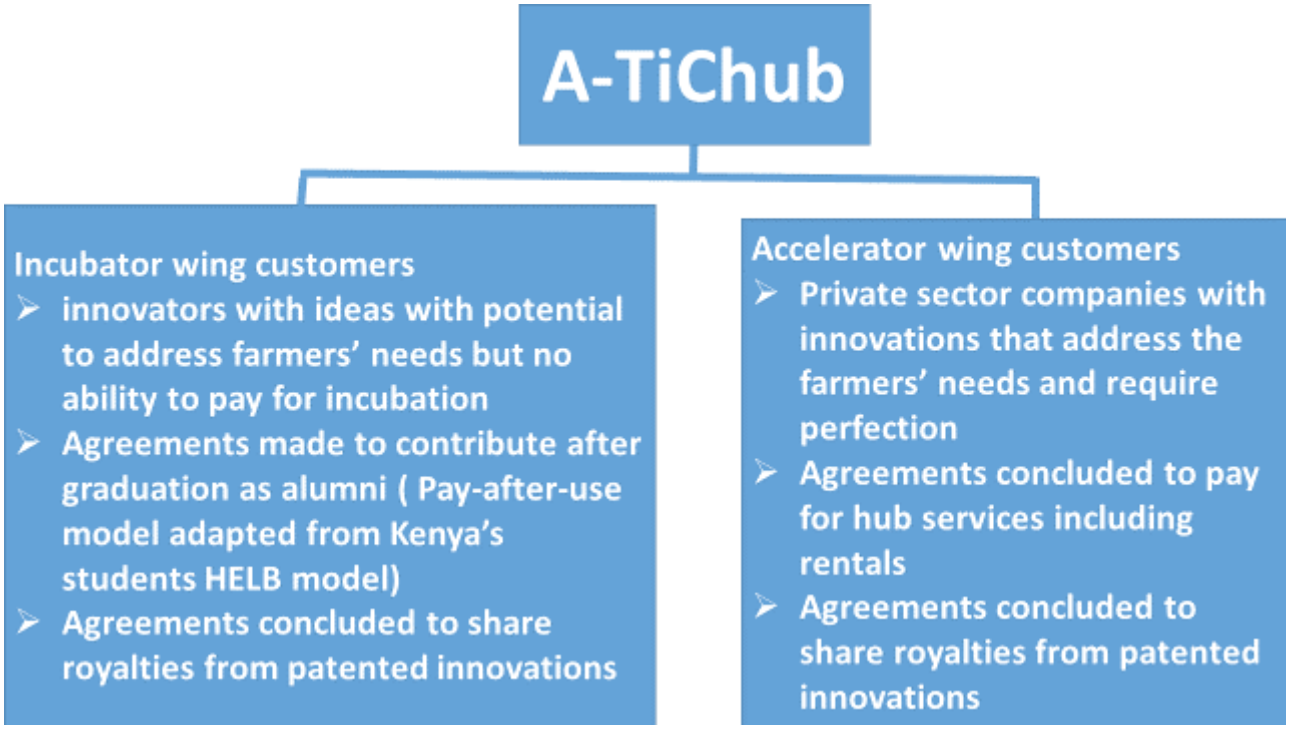

Figure 13: the twin wings of A-TiChubs

9. A revolving fund be established from revenues generated from the arrangements spelled out in recommendation 8.

SUSTAINABILITY OF THE MODEL

10. As part of sustainability measures the following recommendations are made

- The programmes of A-TiChubs be mainstreamed in the host's programmes as much as possible
- Run an unpaying incubator programme alongside a paying accelerator programme
- An A-TiChub alumni association be established to support the parent organization (in this case A-TiChubs) goals

EFFECTIVE FARMER AND PRIVATE SECTOR INVOLVEMENT

11. Farmers concerns are the main goal of the A-TiChubs. Their issues must therefore be clearly articulated. It is proposed that every regional hub establishes an intelligence section with two key function. One- carrying out Farmer Information Needs Assessments (FINAs). The section will be finding out key problems and opportunities which farmers face, and the types of technology and innovations they require. This will feed the A-TiChubs who will then customize their agendas to the needs of the farmer. FINA will be important because it will help: one - ensure demand driven innovations; two - gain farmers participation in the hubs; three - ensure proper targeting of incubation programmes; four - develop accountability of the hubs towards farmers. The other function will be linking the hubs with the private sector. One way of doing this will be establishing Technology Transfer Offices (TTOs) within the hubs. The main function of the TTOs will be s to translate new and innovative research at the hubs into commercially viable products or services. They will serve as liaisons between the hubs, industry partners, and investors.

MEASURES OF SUCCESS

12. A logical framework (logframe) be designed for the operation of the hubs. The logframe should act as the basic monitoring and evaluation tool for the hubs. A generic measure of success is shown in figure 14.

Figure 14: Key success measures of the hubs

Table: 11. *PROPOSED HOST INSTITUTIONS OF THE REGIONAL TiCHUBS*

APEX INSTITUTIONS	WEST	NORTH	EAST	CENTRAL	SOUTH
• AU-IBAR • BECA-ILRI • CIAT • ASARECA • African Centre for Technology Studies (ACTS) • AAIN • FARA • African Academy of Sciences (AAS) • CGIAR • Farm Africa • CORAF	**UNIVERSITIES** University Du Dakar, Senegal University of Cape Coast	**UNIVERSITIES** Kafrelsheikh University (Egypt) Cairo University (Egypt) **VETERINARY SCHOOLS IN** Tunisia Morocco Algeria **RESEARCH CENTERS** Centre of Research on Microelectronics and nanotechnology (CRMN) (Tunisia) NARS Agricultural Research Institute of Tunisia (INRAT) (Tunisia) Centre for Entrepreneurship and Executive Development (CEED) (Tunisia) **AGENCIES** Promotion of Agricultural Investment Agency (APIA) (Tunisia) Promotion of Innovative and Industry Agency (Tunisia) ANPR UMA	**GOVERNMENTS** Ministries of Live-stock 2. NARS Kenya Agriculture Livestock Research Organization TALIRI NARO **UNIVERSITIES** Makerere UON Collage of vet Sokoine university Jomo Kenyatta University Kenyatta University Egerton University Moi University Technical University of Kenya **COLLAGES** Bukala Collage **Innovation hubs** i-Hub (Kenya) TVETs in member states HIT Wambugu Farm (Nyeri) Secondary/High Schools Starehe Boys Centre Starehe Girls Centre INFORMAL ARTI-SANS PRIVATE SECTOR MAK-Holdings Ltd	**UNIVERSITIES** University of Kinshasa (UNIKIN) P.O.Box 127, Kinshasa, XI Email: sg.academique@unikin.ac.cd rectorat@unikin.ac.cd Tel: 243815091448 Dean Prof Dr Lepold Mulumba-Mfumu University of Gabon University of Omar Bongo (Gabon) University of Maria Nguabi (Congo-Brazaville) University of Ngaoundere, School and Faculty of Science and Veterinary Medicine	**UNIVERSITIES** Tshwane University of Technology Stellenbosch University

SELECTED REFERENCES

1. Fagerberg, J. (2009). Innovation: A guide to the literature. In J. Fagerberg & D. C. Mowery (Eds.), The Oxford handbook of innovation (pp. 1–33). Oxford: Oxford University Press.
2. Gathege, D., & Moraa, H. (2013). Draft report on comparative study on innovation Hubs across Africa. Retrieved May 30, 2017, from https://pdfs.semanticscholar.org/a585/e90094dbd5eee4b3f527642912b2d00a21c1.pdf
3. GSMA Mobile for Development. (2014). Digital entrepreneurship in Kenya. Retrieved May 30, 2017, from http://www.gsma.com/mobilefordevelopment/wpcontent/uploads/2014/02/Digital-Entrepreneurship-in-Kenya-2014.pdf
4. Hall, J., Matos, S., Sheehan, L., & Silvestre, B. (2012). Entrepreneurship and innovation at the base of the pyramid: A recipe for inclusive growth or social exclusion? Journal of Management Studies, 49(4), 785–812.
5. Kelly, T., & Firestone, R. (2016). How tech hubs are helping to drive economic growth in Africa. Background Paper for the World Development Report 2016: Digital Dividends. Retrieved May 30, 2017, http://documents.worldbank.org/curated/en/626981468195850883/How-tech-hubsare-helping-to-drive-economic-growth-in- Africa
6. UniBRAIN. https://www.researchgate.net/publication/322404331_Experiences_and_Lessons_Learned_from_the_UniBRAIN_Agribusiness_Incubation_Programme

SELECTED APPENDICES

Group 1 stakeholder analysis

Stakeholders	What is their stake/ interest in the TiChub	What is their impact on the TiChub?	What is the power of influence on the TiChub?	How do we engage them?
Primary stakeholders Start-ups and they include: Inventors; Ag-entrepreneurs; Tech developers; Accelerators (those with existing business); Virtual entrepreneurs; Interns (seconded by..);	The inventors transform ideas and knowledge into technologies Validation of the technology Scaling up of their technologies To learn and get ideas (subscription based by the institutions)	They are improving ecosystem of technologies and innovation within the hub.	They will be clarifying the needs of the technologies. They will give TiChubs strategic direction.	Through incentive structure e.g patenting their products and giving them IPRs.
Secondary stakeholders Secondary stakeholders Existing incubators and hubs Infrastructure companies (construction companies) Farmers Learning institutions (Secondary schools, TVETS etc) Universities and Research Institutions Government agencies and regulatory authorities (IP organisations, Standard bodies) Third sector alliances (NGOs, Co-operatives, CBOs etc.) International Institutions and development partners Venture Capital/Funds, Angel Investors Development Banks Business Development Support Organisations Media actors	Leverage their business agenda	They optimise resources and densify the ecosystem	Clarify the demand side for the TiChubs	Partnerships and collaborations (developing the micro-hubs)

Tertiary stakeholders Regulators General traders in the sector Actual market and market players ICT industry	Policy and regulatory support Improved products and services	Gives hub strategic direction	Source of innovation	Providing services that are relevant to their needs

Group 2 stakeholder analysis

Stakeholders	What is their stake/ interest in the TiChub	What is their impact on the TiChub?	What is the power of influence on the TiChub?	How do we engage them?
Primary stakeholders 1. Early stage Start Ups in the animal value chains 2. Agricultural Extension Service Providers 3. University students with ideas 4. NGOs and Private Sector Players 5. Learning Institutions	1. Business Skills development 2. Networking 3. Skills development 4. Resource mobilization 5. Enabling infrastructure	High	High	Public forum annuncement
Secondary stakeholders 1. Tertiary Institutions 2. Government 3. Farmers, farmers cooperatives and farmer associations	1. Markets 2. Profitability 3. Regularization Normalization	High	High	Buy-in
Tertiary stakeholders 1. Intellectual Property Rights Organizations 2. Standards Authorities 3. Consumer organizations 4. Suppliers or providers of service or materials 5. Peer incubators and industry players on entrepreneurship 6. Financial Institutions 7. Agricultural Insurance companies	1. Providing services 2. Reduce risks 3. Bench marking	Low	Low	1. By Invitation 2. Buy -in

GROUP 3 STAKEHOLDER ANALYSIS

Stakeholders	What is their stake/interest in the TiChub	What is their impact on the TiChub?	What is the power of influence on the TiChub?
Primary stakeholders (TiCHUBS CLIENTS) Start-ups and they include: Inventors; Ag-entrepreneurs; Tech developers; Accelerators (those with existing business); Virtual entrepreneurs; Interns (seconded by..); Mentors/Incubator managers	The inventors transform ideas and knowledge into technologies Validation of the technology Scaling up of their technologies To learn and get ideas (subscription based by the institutions)	They are improving ecosystem of technologies and innovation within the hub.	They will be clarifying the needs of the technologies. They will give TiChubs strategic direction.
Secondary stakeholders Existing incubators and hubs Infrastructure companies (construction companies) Farmers Learning institutions (Secondary schools, TVETS etc) Universities and Research Institutions Government agencies and regulatory authorities (IP organisations, Standard bodies) Third sector alliances (NGOs, Co-operatives, CBOs etc.) International Institutions and development partners Venture Capital/Funds, Angel Investors Development Banks Business Development Support Organisations Media actors	Leverage their business agenda	They optimise resources and densify the ecosystem	Clarify the demand side for the TiChubs
Tertiary stakeholders Regulators General traders in the sector Actual market and market players ICT industry	Policy and regulatory support Improved products and services	Gives hub strategic direction	Source of innovation

Group 4 stakeholder analysis

Stakeholders	What is their stake/ interest in the TiChub	What is their impact on the TiChub?	What is the power of influence on the TiChub?	How do we engage them?
Primary stakeholders Innovators/ entrepreneurs	**High** Support to nurture and grow their businesses	**High** Give Tichubs opportunity to execute their mandate which is to support their businesses and will help growth and create value to the hub.	**High**	Involve them in communication, Sensitization and in decision Making. Involve them in formulation of the business support needs (mentoring, training, coaching linkages and capacity building)
Secondary stakeholders 1. Institutions of higher learning 2.Research institutions 3.Farmers/ Farmer based associations 3.Industry players (Processors/ Manufacturers/ Markets/ inputs suppliers 4.Financial intuitions Private sector (service provider , Inputs services providers/ Veterinary services) 5. Development Agencies/NGOs 6.Telecommunication companies	**High** These stakeholders consume the product or services developed by the hubs clients, therefore increasing their The hubs client solves immediate issues for these stakeholders making their interest high High	**High** The provide markets as consumers of the products or services from the hubs client – making the interest impact	**High** They consumer behaviour highly influences the on-going of the hubs	Involve them in co-creation of product or services improvement process
Tertiary stakeholders 1.Policy makers (Government/ / Local authorities) 2. Media 3.Government (service providers) 4.Parastatals 5.Regional institutions	**Low** They may not be quite interested on idea/ business generation process – it does not influence their day to day operations	**High** They heavily inform structures and framework set out by the hub	**High** They heavily influence the growth and the image of the hub	Keep them updated and consults on matters pertains on the areas of interest.

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