

A framework for creating an ICT knowledge hub in Zimbabwe: A holistic approach in fostering economic growth

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DOI: 10.20470/jsi.v9i1.327

Abstract: *ICT knowledge hubs are important resources for a country to grow towards an innovative economy. Their growth has been viewed as a node point for techno-prenuership development and economic sustainability by many countries. The purpose of this study was to establish how Zimbabwe as a developing country should move towards the creation of an ICT knowledge hub that will promote economic growth in line with the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) economic blueprint crafted in 2013. A qualitative research design was used whereby literature was conducted to establish models for ICT Knowledge hub creation while two focus group discussions were held with academia, research agents and software developers to achieve face validity and in-depth interviews were held with officials from The Ministry of ICT Postal and Courier services. The consensus was reached on the need for creating a focal point which will act as a cyber-port where ICT driven solutions can be obtained based on the industry needs. The focus group discussions settled for four components in creating an ICT knowledge hub. These are planning function, development function, management function and co-ordinating function. The research also established that the Ministry of ICT and Courier services in Zimbabwe has set up an innovation fund to encourage and reward innovation and craftsmanship in Zimbabwe mainly targeted at the youths. The government acquired the high-performance computing facility which is stationed at the University of Zimbabwe. The ICT hub should be used to facilitate access and use of this resource. Every country should therefore strive to create its own centre of innovation which enables it to gain maximum utility from its indigenous people in order to fully utilise ICTs for industry development and spearhead economic growth. The study recommends that there is need for establishing an ICT Knowledge hub in the country.*

Key words: Framework, ICT, knowledge hub, ICT hub, holistic approach, economic growth

1. Introduction

Fostering economic growth in developing countries has become a contemporary issue for the 21st century in Africa. Many contemporary debates that have been held to discuss economic development in Africa has regularly pointed to Information and Communication Technologies (ICTs) as a canal for economic growth (Bilbao et al. 2013). Several summits have been held to deliberate about Africa's rising economic prosperity and whether it can be sustainable and deeply rooted in ICTs. Governments view ICTs as a key enabler for economic development towards the implementation of the post-2015 development agenda. This has seen ICTs taking over as the major conduit for economic growth in developing economies.

ICTs are now regarded as the vectors of economic transformation (Nath 2014). There has been a significant evidence on the role played by ICTs in economic growth in Africa. Countries like Kenya, Nigeria and Rwanda have witness an increase in their economic growth due to massive ICT investments. This shows that there is a positive cause effect of ICT on economic growth. In fact, many studies on economic sustainability in developing countries have established that there is a strong link between ICTs and economic prosperity (Hameed 2007; Langmia 2005; Economics 2012). By supporting industry processe, improving access to services and products, enhancing connectivity, creating new industries and employment opportunities, ICTs can really act a s a tool for economic turn around. Thus, ICTs enable countries to achieve economic gains.

According to Vu (2004), ICTs have become a strategic asset for economic growth. It has bee argued that economic advancement and prosperity has been largely dependent on the proficiencies of (ICTs). ICTs have been widely acknowledged as a cardinal point for economic growth and recovery world-wide (USAID, 2004; Langmia, 2005; Hameed 2007; Kramer, Jenkins & Katz, 2007; Andrianaivo &

Kpodar, 2011; World Economic Forum, 2011). Their adoption and application have driven the evolution of world economies. As a key driver for change, modernisation and innovation, ICTs have presented various opportunities for many countries to create new industries and markets (Tsokota & Solms, 2013).

ICTs are now at the cutting edge of development and their applications offer momentous opportunities for development (Dzidonu 2010). They present the developing countries with enormous benefits for quickening their development. It also presents the developing countries with a unique opportunity to leap-frog onto a higher level of development. In fact, some developing countries have made substantial steps in embracing and accessing the opportunities of the ICTs.

In addition, ICTs also offer greater connectivity which is an important aspect for market penetration. Using ICTs, a number of countries are now able to enter market segments that have been difficult to access (Sekabira et al. 2012). Furthermore, the rapid improvements in ICT solutions have changed the operational landscape in many sectors of economy. These include reduction in production or service costs, increased productivity, better supply chain management, etc. (Kushwaha, 2011). ICTs have permitted many sectors of economy to embrace the digital revolution in order to operate in a cost effective manner. They enhance competitive advantage by supporting industrial value chain.

In developing countries, ICTs also present a great potential in eliminating economic barriers such as geographic isolation, high cost of production among many (Kramer et al., 2007). These technologies, which encompasses all the communication devices and applications are playing a significant role in transforming the economic status and improving the well-being of both developed and developing countries (Dzidonu, 2010). The influence that the ICTs have in creating an information and knowledge economy has seen most of the industries world-wide moving towards automated applications in the 21st century (Ogunsola & Aboyade, 2005).

However, in spite of the numerous potentials that the ICTs have demonstrated towards economic growth and industry sustainability. Their perceived benefits have not been fully utilised because of a number of challenges such as the lack of the coordinated centralised repository for knowledge production and sharing among others (Qureshi et al., 2007). In many countries, knowledge production and sharing is done in a fragmented manner which has made it to be difficult to find when needed (Damuri, 2012). There is no collaboration or cooperation by those who are responsible for producing industry driven ICT solutions and those that should provide support. As such, the development and adoption of ICT solutions have failed to happen because of these varying reasons.

1.1 Background Study

ICT knowledge hubs are important resources for a country to grow towards an innovative economy. They provide a centre of excellence for innovative solutions needed by various sectors of economy. Their growth have been viewed as a node point for economic sustainability and techno-prenuership development by many countries (Gathege & Moraa, 2013). In addition, these innovation platforms act as a promoter for industry development through the creation of technology that is driven by entrepreneurs. Although, some countries have taken up the initiatives to develop their own ICT knowledge hubs to ensure that knowledge is harnessed, packaged and shared among the neediest areas, some are still relying on outsourced ICT solutions from developed countries which are even created by their own people.

In order to foster economic growth through ICT knowledge hubs and harness local skills and solutions that are relevant to local industries, a number of conferences have been held by different nations and regions. The first being the Bali conference of 2012, whereby policy makers and practitioners from about forty (40) countries converged in Bali, in Indonesia between 10 and 12 July 2012 to pioneer the fundamentals of creating knowledge hubs (Choesni & Schulz, 2012). Since then, several countries and regions have moved towards the development of ICT knowledge hubs in order to lead their economies. These countries include, but not limited to Brazil, China, Indonesia, Mexico, Singapore, South Africa, Kenya, Cameroon. These countries have demonstrated the pliability to scale up their capacities to exchange proven solutions with peers and partners in an effective way by building ICT knowledge hubs from scratch.

The world over, many countries have been utilising their human resource to the fullest potential. Japan is one country which does not have much to offer in terms of natural resources but the country has turned to its human resource in order to develop. The digital technosavy generation often called the netzens are the predominant amongst the population in the contemporary Zimbabwe (Musungwini et

al. 2014). ICT Knowledge hubs provides an opportunity for these netizens talents to be harnessed and developed into ICT engineers. A very good example is the Silicon Valley in the United States of America which is nurturing and churning out prominent Technopreneurs like Logan Green who hatched his dial a ride business which is now valued to the tune of US\$3 billion dollars (<https://www.youtube.com/watch?v=2YS1GI2e3kg>).

In 2013 the government of Zimbabwe crafted the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) which is an economic blueprint to guide the development agenda of the country 2013 to 2018. The ZimAsset placed ICT at the epicentre of all the development initiatives in the country. This coincided with the Sustainable Development Goals (SDGs) which is the United Nations post 2015 development agenda. The SDGs are premised on ICTs to achieve all the 17 SDG goals and 169 targets. These researchers believe that ICT should be given primacy in all development issues hence the idea of a an ICT knowledge hub was muted. There are 12 Universities in the Zimbabwe and 10 Polytechnical colleges and each given year these institutions enrol students into different ICT programmes and churn out thousands of graduates. Students enrolled in these ICT programmes are required by their department to develop computer system solutions which is a requirement for in most institutions for someone doing ICT to graduate. Zimbabwe is endowed with some of the brightest brains in the world as evidenced by the number of outstanding ICT professionals holding fort in the developed world economies like UK, Australlia and South Africa hence it is critical for the country to harness and focus this precious resource. The creation of a Knowledge hub provides an opportunity for that.

1.2 Statement of the Problem

ICT knowledge hubs are important resources for a country to grow towards an innovative economy in order to benefit its industry. Although, many countries have taken up the initiatives to develop their own ICT knowledge hubs to ensure that knowledge is harnessed, packaged and shared among the neediest areas. Some countries, especially in the developing world are still lagging behind in this respect (Chandra, 2012), with Zimbabwe included, despite having the potential of creating own local proven solutions. This has been triggered by the lack of clear guidelines (framework) which has seen many countries becoming hesitant to enter the race for ICT leadership; thereby relying other countries. As a result, the substantial reliance on foreign ICT innovations has seen the ICT intensive countries like India, USA, UK, South Africa, Kenya etc., determining how ICT solutions on industrial developments should be generated and packaged. This has denied the indigenous people the prospect to open their intellectual corridors to demonstrate their capabilities as techno-prenuers. This is a result of a lack of coordination of ICT activities like research and development of ICT applications in Zimbabwe.

By the year 2013, only seven (7) countries in Africa out of 54 have developed their own ICT knowledge hubs (Gathege & Moraa, 2013). Most of the countries are still relying on outsourced ICT products or solutions from developed countries which are even created by their own people who are resident there (developed countries). The substantial reliance on foreign ICT innovations has seen the ICT intensive countries like India, USA, UK, South Africa, Kenya etc., determining how knowledge on industrial developments should be generated and packaged. This has denied the indigenous people the prospect to open their intellectual corridors to demonstrate their capabilities as tech-prenuers. Therefore, each country should strive to create its own centre of innovation (ICT knowledge hub) by gaining maximum utility from its indigenous people in order to fully utilise ICTs for industry development and spearhead economic growth.

1.3 Purpose of the Study

The purpose of this study was to establish how Zimbabwe as a developing country should move towards the creation of an ICT knowledge hub that will promote economic growth. Since the development of the hub cannot be elucidated by a single aspect, a holistic approach is needed to provide both theoretical and practical guidelines to several stakeholders who may include policy makers, funding agencies, industry, researchers and software developers. This will ensure that ICT solutions, products and experts can be accessed from a central point by those who need them. Apart from providing a central point for accessibility, the hub will also enable participants to collaborate in generating incubate ideas that drive enhancements and raise their individual and organisational profiles. Zimbabwe has a number of ICT professionals and experts that are performing well in South Africa, Kenya and other ICT intensive countries (Tsokota, 2012). Above all, the hub will provide a

global connectivity with the Zimbabweans who reside in developed countries in a cost-effective manner in order to drive innovation back home by sharing experiences gained there (developed/ ICT innovative countries).

2. Literature Review

This literature review is being done to try and understand the background of ICT Knowledge hubs and their impact on the development agenda of the adopting economy. We are now in the digital era and other countries are turning to ICT to develop and grow their economies. In 2011 the Ugandan government set up a USD 600, 000 Information Communication and Technologies (ICT) incubation centre to help ICT businesses seek markets believing that the centre will enable those involved and young talents to penetrate regional and international markets (Moraa & Murage 2012).

2.1 ICT Knowledge Hub

An ICT knowledge hub can be seen as a platform that possess needed infrastructure to deliver generic services like tele-centres, desktop publishing, business support, application development, training and information services to the community (Jacobs & Herselman, 2009). It provides a structure, which enables communities to manage their own development and focus on sharing of experiences and models in the area of ICT only. It also allows participants to conduct data visualization, exploring the data, create, edit and export data by acting as a peer confluence. The platform run on a web browser for it to be accessible from anywhere, thus being location independent. It can be built at a national level, but allowing people or experts from various thematic areas to participate and discover valuable knowledge from different locations.

ICT hubs are also viewed as institutions or networks that enable countries to learn systematically by sharing and exchanging development experiences among various sectors locally or internationally (Choesni & Schulz, 2012). When a country creates a platform for sharing ICT innovations, such a platform can be referred to as an ICT knowledge hub. ICT knowledge hubs can also be viewed as localities with knowledge architecture of high internal and external networking and knowledge sharing capabilities (Evers, 2008). Its presence can be measured by the number of knowledge workers and their products such as patents and software. This paradigm has the potential to facilitate collaboration among peers of same interest and other stakeholders who are thirsting for ICT knowledge through online linkages (Dale, 2011). It is a public outline that is versed in many search engines which can allow users from various sectors to access what is relevant to their needs from other researchers and experts (Kirschenbaum, 2014). Thus, an ICT hub can be defined as an organization, or part of it, dedicated to sharing development experiences and models with partners from other countries (Ghoneim & Brown, 2011).

Since innovation is critical for the development of any country, ICT knowledge hubs have come in strongly as platforms for nurturing local technological firms and facilitating knowledge transfer between experts and users (Winden, 2012). They provide a medium to share research ideas that bring up innovation through internet forums and conferences with the view to create shared value. They bring together interested people from various sectors to share their expertise. The knowledge hub facilitates easy and quick connectivity with colleagues throughout the sectors and beyond. Producers and users are closely connected and, while spatial proximity is important, they do not have to be physically co-located (Turpin & Garrett-jones, 2002). Thus, in order to transmit knowledge to both domestic and international partners, ICT knowledge hubs are needed so that people can share experiences without the limits of location.

2.2 ICT Knowledge Hub Development

Dale (2011) proposed a structure for an ICT knowledge hub, having the hub as the central systems and connected to various partners and stakeholders. The structure of the hub follows some kind of a star network topology format. This structure indicated that several areas can be incorporated in one hub, which may include professional networks, knowledge hub groups, social networks, and training, views from other peers. In professional networks, one can include various areas of specialisation like ICT, engineering, hard sciences, social sciences.

The basic operation of an ICT knowledge hub is to create, transmit and apply knowledge usable for innovation. A review from users of global knowledge hubs indicates that these systems generally help them to:

- Connect with peers and colleagues

- Share and retain knowledge
- Acquire essential new skills
- Make better use of time and resources
- Find real solutions
- Develop a professional reputation
- Inspire innovation and new ideas

3. Methodology

A qualitative research design was used based on three methods for data collection. First, an extensive literature review to establish the key elements in creating an ICT knowledge hub from existing models and other theories. Secondly, two focus group discussion comprising of participants from academia, research agents and software developers in order to evaluate the proposed framework. Focus group research is a qualitative research method which seeks to collect information beyond the scope of quantitative research surveys (Tuff 1985). The focus group discussion was chosen in this study because of its suitability in areas where there is need for face validity of the results and no statistical projections are required. Purposive sampling was employed in this research because in qualitative research participants are purposefully selected. According to Patton, M. Q. (Qualitative research and evaluation methods 3rd Edition, p 45-6) research participants are purposefully selected because they meet the criteria required and there is no number determined.

The researchers organised two focus group discussions, one at the beginning and one at the end. The purpose of the focus group at the beginning was to gather intelligence and ideas after the researchers had done some literature review of the subject domain in question and this group A was called the innovators. This group was made up of 10 technocrats of various ICT expertise from industry who were at the time MSc Information Systems Management at Midlands State University.

The second focus group discussion was made up of 8 people and these included 3 academics, 2 ICT industry experts, 2 students and an administrator and this group B was called reviewers. The focus group discussions were held at Trust Academy in Harare. The first FGD lasted 1hour 10 minutes while the second lasted about 55 minutes.

“The purpose of using a focus group in research is to acquire as much information as possible from a group of experts on a given topic. This is accomplished by prompting the group with pre-specified topics and open-ended questions, allowing the discussion to evolve around these open-ended questions, and facilitating interaction among the participants.”(Sutton & Arnold 2013, p. 82).

The number of FGD are determined by the researchers and once they reach saturation level they can be stopped (Sutton & Arnold 2013). Thus, the researchers having done literature review realised that the 2 FGDs were enough. Conducting FGDs is costly as participants require transportation and food allowances. The researchers had to offer lunch to all participants of the two-focus group discussion.

The researchers also conducted in-depth interviews with two Ministry of ICT Postal and Courier Services at the Ministry's offices. This was a result of the request for inclusion of their input by the Ministry officials after the presentation at the symposium. The interviews provided very insightful contributions to the quality of this paper.

3.1 Data Analysis

The FDG data was collected by means of annotating the key points as participants were discussing them. According to Stringer (1999) there are basic principles of carrying out research and there are three basic stages through which research must follow. These stages are;

- Look**—This involves the building of a visual and the assembling of information. The researcher evaluates by defining and describing the problem under investigation and the natural setting in which it is set up.
- Think** –This stage involves the interpretation and explanation of data. Researchers evaluate the data by analysing and interpreting the situation at hand. The researchers reflected on what research participants have raised during the FGD and also their field work experiences. We looked at areas of success and any deficiencies, issues or problems.
- Act** – This is the final step which involve resolving of the concerns raised and the problems that comes up. In the evaluation process the researchers are required to evaluate the merit,

efficacy, suitability, and conclusion of those activities. Researchers are required to act to formulate solutions to address any problems.

The data was analysed using constant comparison analysis (CCA) technique. The technique follows 3 major steps in the analysis process. In the first step, open coding was applied, during this step the researchers lumped data items into small units and attached a description to each and every lumped unit. The second step which is called axial coding the lumped units were then grouped into sub-categories. The third and final step is the selective coding, the researchers developed themes that represent the content of each category of code (Onwuegbuzie 2009).

4. Zimbabwe's Approach Towards ICT Innovation

The government of Zimbabwe has made two major efforts towards ICT innovations. These are ICT innovation fund and the Zim-India ICT skills collaboration training. The two approaches are discussed below.

4.1 I.C.T Innovation fund

The Postal and Regulatory Authority of Zimbabwe which is an arm of the Ministry of ICT, Postal and Courier Services was mandated by the government through their parent Ministry to establish a universal fund. This fund is levied on all Telecommunication operators in Zimbabwe. This fund is supposed to be used for putting in place Telecommunication Infrastructure in remote areas where operators feel that it is not economically viable to erect infrastructure. This is meant to ensure that all the areas have access to Telecommunication services in Zimbabwe.

The researchers found out that the Ministry of ICT, Postal and Courier Services has established an innovation fund from the universal fund in order to avail financial resources to support Tech start-ups. The innovation fund was motivated by the demographic characteristic of the population which is heavily skewed towards youth (Agency 2012). A number of youths have come up with innovations that have been very interesting. This prompted the Ministry to set up the ICT Achievers award annual event which have seen a number of youth showcasing their innovations. Some of these youths who showcased their innovative products have gone on to get lucrative contracts from big companies. The Ministry is targeting mainly the youths to come up with innovations which will see some pocketing up to US\$50 000-00 for an accepted innovation. The Ministry is actually encouraging all who can come up with innovations that will impact people's lives in Zimbabwe regardless of their age. The major purpose of the funds is to identify, harvest, support and capacitate young ICT innovators and their innovations around Zimbabwe to develop their ideas into bankable solutions for Zimbabwe and the global market. Thus, the innovative fund provides a great opportunity for the development of an ICT hub since funding is one of the major drivers for the success of the envisaged hub.

Although the Ministry of ICT have been encouraging for the uptake of the ICT innovative fund, there has been serious underutilisation of this fund. Up to date only \$2 million funds have allocated against the total contribution of \$25 million. This has been necessitated by the stringent policies on the application of the fund. Therefore, it is essential that the policy for fund application is revised.

4.2 Zim-India ICT skills collaboration training

Through establishing cordial relations with Asian and other first world governments, the Ministry has send hundreds of engineers to India, China and Belgium to get technical training on the latest technologies affecting development in different sectors of economy in Zimbabwe. This has been necessitated by the realisation of the government on the need for ICT skills found in India and other Asian countries. Although the idea has contributed immensely towards the fulfilment of the vision of the ZIMASSET, skills gained from Indian have not been fully utilised for the development of ICT driven solutions for various sectors and industries. The country still relies on ICT products and solutions that are developed from other countries mainly South Africa and Kenya. Thus, ICT training from reputable countries cannot guarantee that the country will drive ICT innovations back home. Hence, a collaborative effort is necessary to harness and share the skills gained through Zim-India initiative.

5. The Propositions of the Two Approaches

Although the concept of innovation funds is seen as a noble idea, the researchers had an opinion that this issue of the funds will probable work well with the idea of the ICT knowledge hub. The hub will also consolidate all ICT knowledge creating activities in the country. This will result in the elimination of duplication of knowledge creation and therefore wastage of time and resources. There will be more

complementary and collaboration of knowledge creation processes. The hub will also enable those out of school to get access and a chance to participate in the innovation process. The hub can also facilitate contests among university students and lecturers and this results in state of the art innovations with high impact on livelihoods.

Overall, participants from the two focus group discussions agreed that there is a need for creating a focal point which will act a cyber-port where ICT driven solutions can be obtained based on the industry needs. A consensus was reached on the need for Zimbabwe as a developing country to have a comprehensive framework for creating an ICT knowledge hub. The focus group discussions settled for four components in creating an ICT knowledge hub. These are:

5.1 Planning function

This function is concerned with formulating policies that facilitate ICT knowledge hub creation. The policy should create an enabling and welcoming environment that will promote innovation within the Zimbabwean context. Apart from creating a welcoming environment, the policy should compel other sectors of the economy to support the development function. This can be done by specifying thematic needs for consideration in the development cycle. In addition, the identification of relevant ICT infrastructure & solutions can be achieved once the needs of thematic areas are known. However, it should be noted that need areas should be chosen based on their impact in fostering economic growth. Those with less impact should not be prioritised. Subsequently, the planning function should establish the physical location of the hub and create a robust ICT infrastructure in order to function as a cyber-port.

5.2 Development function

This involves the creation of database driven website, defining and establishing access points/links in order to create a cyber-port. The cyber-port should facilitate internet connectivity, open interactions and knowledge sharing among peers and users in a standard way. This will enable knowledge to traverse around the ICT hub and support knowledge transfer from various stakeholders. As a result, a tier system will be achieved whereby members participating in the hub can learn from each other.

5.3 Management function

The management function is mainly responsible for quality control, packaging and cataloguing of solutions and reviewing and evaluating feedback from users of the ICT solutions. The purpose of quality control is to ensure that ICT solutions and products produced local are in tandem with the international standards of software engineering. This will ensure that the local products get buy-in from the local and international industries. Therefore, the aspect of quality is important in this regard since it has been assumed that local products especially ICT are not accepted by the industry because of poor quality. On the other hand, packaging and cataloguing is essential to meet the needs of thematic areas of economy. The purpose of review and evaluate is to check whether the hub is serving its purpose or not in order to determine areas of improvement. In addition, the review process will complement the monitoring and evaluation mechanisms so as to provide a feedback loop.

5.4 Co-ordinating function

This function is responsible for marketing indigenous ICT products by carrying out vigorous awareness campaign. This will ensure that the availability of the ICT knowledge hub is known to the indigenous people. The function should also ensure that R and D programmes towards ICT knowledge hub creation are adequately funded and talent is also nurture to meet developmental goals. In addition, the function should also oversee the incentive structure for those who are dedicated towards the creation of the ICT knowledge hub. This will act as a motivational factor in providing innovative solutions. Furthermore, the function should provide feedback that can be used by the other three functions presented above.

6. Proposed Framework

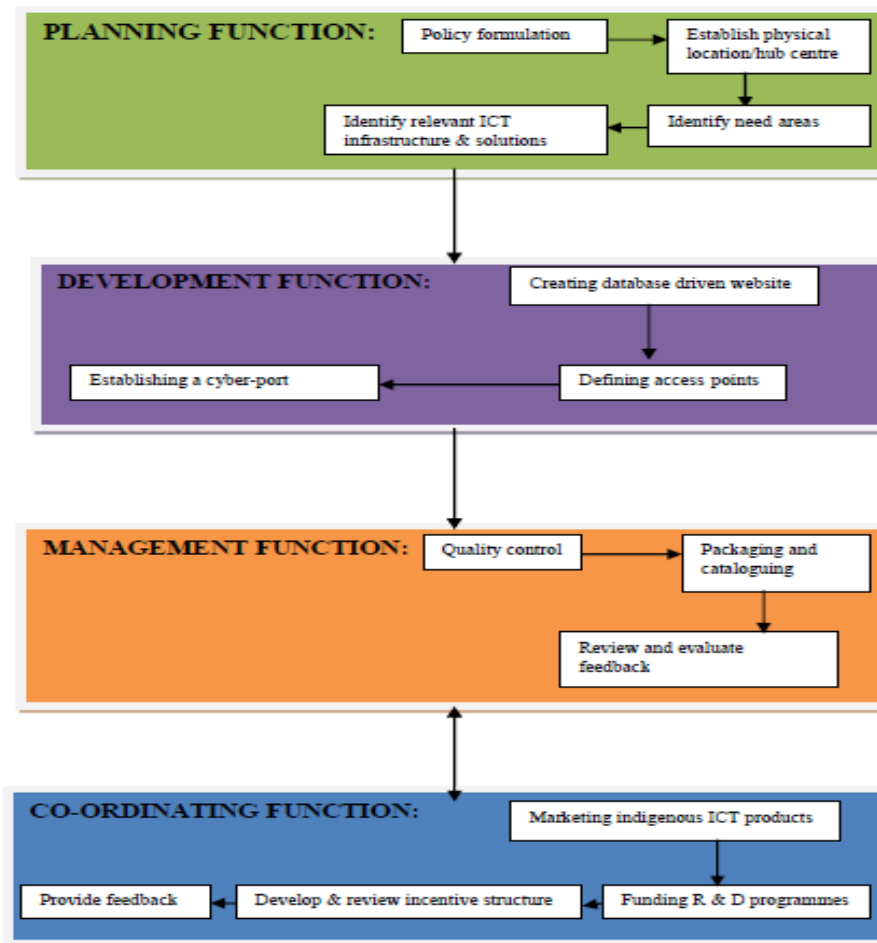


Fig 2: ICT knowledge hub development framework (Source: Own construction)

7. The Feasibility of the Proposed Framework Using SWOT Analysis

Strength

- ICT policy and a national ICT strategy that focus on diffusing ICT in the broader economy.
- Adequate ICT infrastructure and connectivity

Weaknesses

- Un attractive salaries and lack of incentives to retain ICT professionals and experts
- Defragmented ICT research centers
- Over reliance on ICT intensive countries
- Unwillingness by the industry to take up local ICT solutions

Opportunities

- \$25m ICT Innovation fund. The \$25 million is a lot of money in Zimbabwe especially for early stage investment because it can fund at least 800 start-ups. If Zimbabwe, as a result of this fund, produces start-ups that can build technologies & apps that attract usage beyond Zimbabwe's borders, the fortunes of the country can be turned around.
- ICT knowledge from Zimbabweans who are working in ICT intensive countries like South Africa, Kenya etc.
- Availability of graduates from college and universities in the field of ICT
- Software development capabilities
- Collaboration with ICT experts abroad

Threats

- Competition for ICT products from countries like South Africa and Kenya.

- Emergence of other ICT knowledge and education hubs in the region.
- Brain drain of high-level human resources from the field of ICT.
- Salaries of similar professionals outside the Sector are much more attractive.

8. Conclusion

Technology is taking a leading role in fostering economic growth in the 21st century. However, it should be noted that a mere presence of ICTs and skills do not guarantee economic growth and sustainability. Zimbabwe need to take advantage of the opportunities presented earlier on. The proposed framework is highly feasible because of the abundance of opportunities. We must not stand aside and look while we wait for outsiders to come and solve our problems. Since innovation is critical for the development of any country, ICT knowledge hubs have come in strongly as platforms for nurturing local technological firms and facilitating knowledge transfer between experts and users. Therefore, each country should strive to create its own center of innovation (ICT knowledge hub) by gaining maximum utility from its indigenous people in order to fully utilise ICTs for industry development and spearhead economic growth.

Acknowledgements

The researchers would like to thank the research participants who took part at the organised focus group discussions from various institutions, research agents and software developers for their insightful and information they provided to the success of this study. Their valuable contributions made the advancement of this work possible and this place these researchers in the research participants' debt.

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JEL Classification: A12, M15

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