ICT Innovations Propel Local Development: Where are Zimbabwean ICT Technopreneurs?

Servious Mbiza

Abstract- One blueprint after another have been presented to the Zimbabwean nation, and ICTs have been singled out as a driving force to achieve the set goals but until now there is not much technological innovations to exhibit. We have fallen for software applications developed from other countries hook-sink and line. What is more concerning is that these software products are designed in foreign capitals to address socio-economic challenges in those communities, and we cannot pretend that these products are also a best fit for our situation in Zimbabwe. Zimbabwe is well known in Africa for its high literacy rate, and one wonders why this effort has not yet manifested in the development of local computer systems that solve our problems and align with our goals. This study attempts to investigate how ICT technopreneurs are being promoted in Zimbabwe, how the Zimbabwean universities are involved and how easy it is to register ICT innovations in Zimbabwe. A quantitative methodology was used. It was found that there is inadequate support by universities and government to promote software development. The necessary resources for the appropriate teaching of software development were lacking. Lack of motivation among lecturers and brain drain were other challenges. The study recommends that new ways of promoting technopreneurship among learners should be vigorously pursued by government in all areas of study.

Index Terms— ICT hubs, software development, software registration, software patents, technopreneurs

I. INTRODUCTION

Economic and techno-scientific development in Africa faces the challenge of underdeveloped scientific, technological and innovation capabilities [1]. Many of the African initiatives lack coherent strategies to either build or to attract the best global talent [1]. Today there is a clear opportunity to bridge the gap between Africa and the rest of the world by being seriously involved, as players, in the information and digital revolutions that are taking place. As Zimbabweans, we have continued to rush to adopt ICTs designed by other countries for their economies. We have fallen for technology developed by other countries hook-sink and line. Software products designed and developed in other capitals are solutions to challenges addressed from their point of view. We cannot pretend that these products are also a best fit for our problems here in Zimbabwe. When these ICTs are designed and developed, they have certain goals and objectives which they must achieve. The techniques to

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achieve these objectives must be grounded and be in rhythm with the country's strategic goals. In Zimbabwe, we seem to have relegated ourselves to perennial consumers of finished software products. Adopting the various ICTs and start using them as they are do not help us grow. There are a lot of questions as to why it has taken such a long time for Zimbabweans to start viable and visible software development projects in the country. We seem to have forgotten that the economic development of any country is underpinned by its entrepreneurs. Technopreneurs can make this happen faster. In its National Development Strategy 1 (NDS 1) 2021-2025, the Zimbabwean government is clear on what she wants to achieve through the deployment of ICTs [2]. Their wish to create smart programmes such as smart Government systems, smart agriculture, smart health and smart transport and safe cities will remain a pipe dream until local technopreneurs take charge to develop the necessary software products needed to achieve this. As cited in [1], Mkandawire argued that Africa can no longer afford to leave the thinking, planning, experimenting, and therefore learning, to foreign institutions.

While development of ICT software products is not capital intensive, we still do not have much to show in software development in Zimbabwe. This study investigates why technopreneurs in software development are barely visible in Zimbabwe. Technologists and scientists should not delegate such research to third parties. Besides designing solutions and models to address actual problems, technologists should also tackle social issues that affect their trade. The study targeted university students and ICT practitioners. The students indicated that there was lack of support from their institutes of learning and government. ICT practitioners cited lack of resources and lack of motivation among lecturers as challenges to software development.

II. REVIEW OF RELATED LITERATURE

A. ICTs and Development

It is argued that without a skilled manpower base, proposed mega techno-scientific projects are likely to turn into white elephants [3]. Silicon Valley, the home for technological innovations in the USA has influenced the development of its replicas all over the world. In Europe there is the Paris-Saclay in France, Skolkovo in Russia, and Tech City in the United Kingdom. In Malaysia they have Cyberjaya, and in Chile they have Chilecon Valley. Nearer home in Africa,

there are currently over 200 tech hubs or innovation labs. We have Nairobi's Ihub, Kigali's KLab, Liberia's ILab, Nigeria's Co-Creation Hub and FabLabs in Nairobi and Namibia. Similar initiatives are Biopolis in Singapore, Software Technology Parks in India, Israel's Silicon Wadi, Hsinchu Science Park in Taiwan, and Tsukuba Science City in Japan [4]. In Zimbabwe we have the Muzinda Hub but very few people really feel attached to it.

It should be noted that projects in Europe and other developed regions have the advantages of more developed scientific infrastructure that include larger pools of Science, Technology, Engineering, and Mathematics (STEM) graduates and higher public and private sector funding [1]. Such advantages are lacking from the private sector in Zimbabwe. Other countries can attract the best local and international talent through scholarships. The suppressed economy in Zimbabwe does not give enough room for local universities to run attractive scholarship programmes to lure international talent.

B. ICT status in Zimbabwe

The country's Medium-Term Plan (MTP) 2011-2015 acknowledged that ICTs were to play a major role in the attainment of the projected average annual growth rates of 7 percent over the stipulated four-year period. The NDS1 (2021-2025) notes that "(ICTs) are key enablers of economic development, and hence their entrenchment across all national development strategies is indispensable [2]." During the NDS 1 (2021-2025), government want to implement smart programmes such as smart Government systems, smart agriculture, smart health and smart transport and safe cities through deployment of ICTs. They view that kind of growth as necessary to propel Zimbabwe into a knowledge society. The NDS 1 (2021-2025) identified underutilization of ICT infrastructure, slow pace in embracing ICTs in service delivery in e-government, low investment in both hardware and software as well as shortage of critical ICT skills as challenges that must be tackled. The country's development blue prints clearly recognize the importance of ICTs in achieving the intended goals.

The total number of active mobile subscriptions reached 13 191708 by 2020 [4] which is slightly above the country's population which stood at 12 023 785 as at 2012 census [5]. The mobile penetration rate reached 90.5% by 2020 [4]. This shows that there is significant progress in infrastructure development in Zimbabwe. The missing link seem to point to lack of technopreneurs to drive innovation.

In Zimbabwe, the fight for literacy and academic qualifications has been won with accolades, as evidenced by thousands of graduates coming out of university every year. However, this mass of learned citizens seem not to have evolved into technopreneurs. This casts a very dark cloud over the efficiency of our education system. Our methods and priorities from government to academic institutions to families might be misplaced.

Obote noted that if Africa is not going to compete aggressively for global talent, including Africa's own talent, it is unlikely that many of the planned techno-cities and innovation clusters will succeed [1]. The poor quality of the training of technical personnel is as much of a constraint as the limited numbers of professional and technical labour [3].

C. How are Zimbabwean universities involved in developing home-grown software products?

The Ministry of Higher and Tertiary Education has made it mandatory for universities to adopt Education 5.0. This is a curriculum which prescribes that research and innovation in in institutes of higher education should drive industrial development. Industrial development will directly lead to job creation and other benefits. Innovations in the financial sector should be augmented by innovations in the other sectors of the economy if the country is to optimize on the benefits of this IT revolution. Africa, and Zimbabwe in particular, should never have comfort in being integrated into the global information economy as a mere consumer of software products and services. The country should strive to produce its own software products and services and thus save the much-needed foreign currency. This is not a wild expectation since all the universities and polytechnics in Zimbabwe offer Information Technology related degrees and diplomas.

It should be noted that technology diffusion and adoption alone cannot ensure development of a country. ICT diffusion makes Zimbabweans mere consumers of these technologies. It may lead to subjugation of local talent, and subsequent dependency on foreign software products. Foreign products may in turn lead to repatriation of profits generated in the country to home countries of those countries that have created the software. In Zimbabwe, such innovations as Ecocash, Telecash and OneMoney are quite encouraging because they are mainly owned by local telecommunications companies meaning that the revenue and profits are used and retained in the country. Reference [6] moans that Africa is still primarily a user, rather than a producer or creator of ICTs, and this thin integration into the global economy does not fundamentally alter the continent's dependent position.

How ease is it to register an ICT innovation in Zimbabwe?

Intellectual property rights allow those who create innovations to get patents or copyrights to enjoy their creations economically or otherwise. Such recognition can play a critical role in the development of new technology. Although the Zimbabwean patenting system (ZIPO) does not accept software patents, software can still be recognized through copyrights. In the case of a computer program the rights include publishing an adaptation of the program, directly or indirectly selling, or letting for hire a copy of the program, exposing a copy for sale or hire [7]. There is dearth of information on publication of software products in the Zimbabwean public domain. The Organisation for Economic Co-operation and Development (OECD) argues that issues related to diffusion, access and dissemination are as

important for the business community as they are for other stakeholders [8]. However, the business of software development seems to be hidden from public scrutiny in Zimbabwe. Africans are not passive recipients of technology because some exciting and innovative mobile services were created in Africa. Ratti [11] argued that local talented individuals are building all manner of solutions to all manner of problems in Africa.

III. RESEARCH METHODOLOGY

In this research, a quantitative methodology was used. The instruments selected for this research are questionnaires which were presented on a Likert scale. The questionnaire was used to collect data from students and practitioners in the IT industry. The results of the questionnaires were quickly and easily quantified using Google forms. The study was limited to a small cross section of respondents in the academia and industry. These were the people expected to be involved in ICT innovations. The researcher distributed questionnaires to five students from each of the three universities. A random selection method was used to select 5 participants from each university. Only those students in their fourth year of learning were asked to participate. These students were in their fourth and final year for graduation. These students had gone through a year of industrial attachment in their third year and were expected to be looking beyond the lecture rooms since they were due for graduation in a few months. A Likert scale was used to measure the intensity of opinions that students have about certain statements on software development. Likert scale is a five-point scale which is used to allow the individual to express how much they agree or disagree with a particular statement. Students and ICT practitioners were asked to respond to a different set of statements. They were supposed to indicate whether they agree, strongly agree, disagree, strongly disagree or they were neutral to statements given on the questionnaire.

IV. DATA PRESENTATION AND ANALYSIS

A. Opinions of Students

Opinions of 15 students were sought using the Likert scale. The students' opinions on statements are presented below.

There is poor training in programming languages
50% of students agreed that training of programming languages was poor. 25% strongly agreed. This means that most students see poor training in programing languages as a challenge in software development. Fig. 1 below shows how training is rated by students.
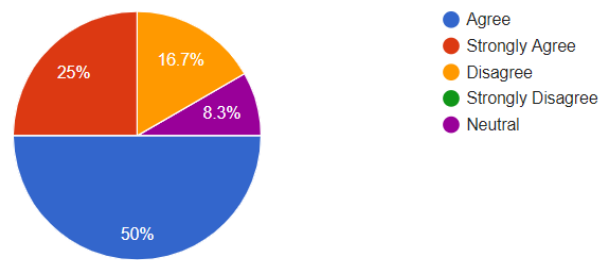

Fig 1: There is poor training in programming languages

There are no takers of software products developed by budding software developers

Students were asked about their opinion concerning the market for software products from startup programmers. More than 66% agreed that there was no market for software developed by budding software developers. This percentage includes 50% who strongly agreed. Only 25% disagreed with this opinion. The remaining number was neutral.

There are challenges faced in registering software products in Zimbabwe

Opinion was greatly divided on whether there were challenges in registering new software products or not. Fig. 2 below shows how students viewed the issue of registration. These responses may mirror the scarcity of information in the country concerning software copyrights and registration.
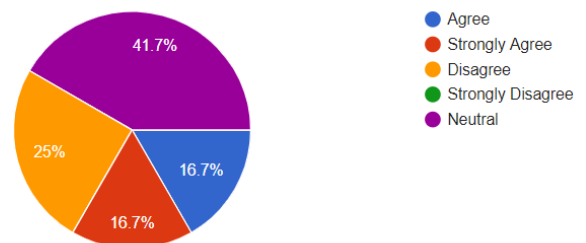
There is lack of role models to emulate in Zimbabwe
Most students agreed that there was lake of role models in Zimbabwe. There is little publicity, if any, concerning technopreneurs. Success stories for technopreneurs are rare. There seem to be no platforms where successful technopreneurs talk to aspiring ones or mentor them.

There is no assistance by universities and government to promote software development
Most students felt that there was not enough assistance by universities in assisting them to register new software products. 75% felt that government was not promoting them either. This is contrary to what literature depicts. Reviewed literature show a direct relationship between government support and success in technopreneurs. India, Kenya, and Rwanda's success stories are anchored on their governments' support.

B. Opinions of Practitioners

The study also sought the opinions of those already in the software development field. The opinion of those in industry are important because they are the ones involved in the pushing and pulling to make things happen in their sector. They are therefore very aware of what is hindering them or enabling them to succeed.

Respondents were asked to give their opinion on whether there is lack of resources in universities in Zimbabwe to facilitate proper teaching of software development. They all agreed that there was lack of resources. They only differed on the intensity of agreement as shown on Fig. 3 below.
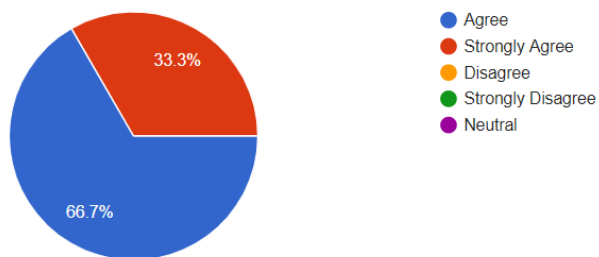
Fig 3: There is lack of resources in universities in Zimbabwe to facilitate proper teaching of software development

There is lack of government programmes/policy in Zimbabwe to promote software development

Most of the practitioners agreed that there was not enough policy or programmes to promote software development in the country. Only 16.7% were neutral on this issue. Fig. 4 below shows opinions regarding this issue.
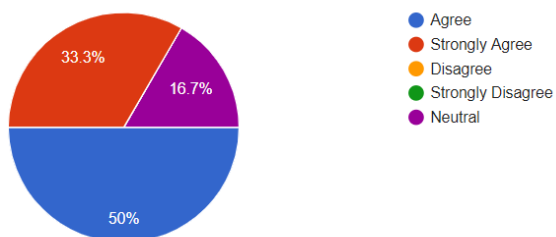
Fig 4: There is lack of government rogrammes or policy in Zimbabwe to promote software development

Brain drain to other countries is a serious challenge
Most of the practitioners agree that brain drain is a challenge in Zimbabwe. Fig 5 below shows their views on brain drain.
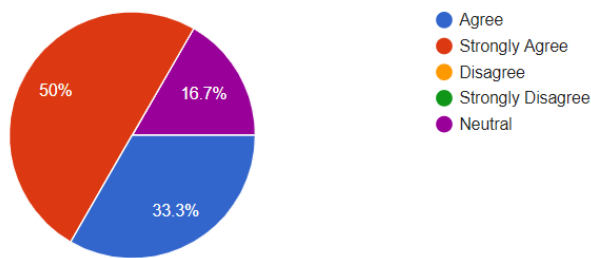
Fig 5: Brain drain to other countries is a serious challenge

There is lack of motivation among students
Practitioners totally disagreed that lack of motivation among students is one of the challenges faced in software development. Most of them, instead, agreed that lack of motivation among lecturers is a challenge. Fig. 6 and Fig. 7 below shows these contrasting views. Lecturers could have been demotivated by the depressed salaries because of the depressed economy in Zimbabwe. There were disagreements between what the lecturers were demanding as salaries and what the government could afford to pay.
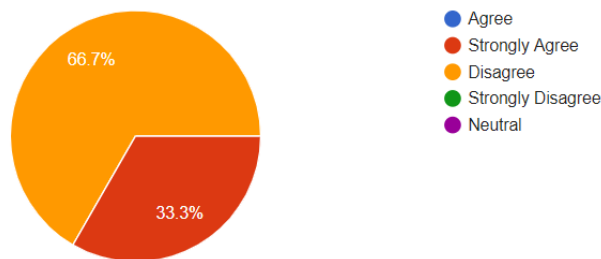
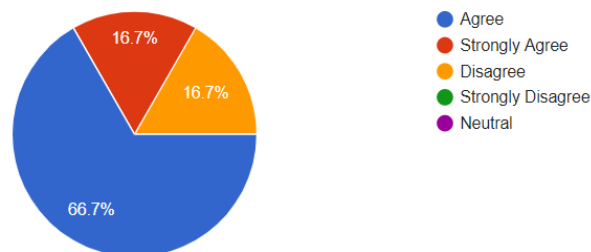Fig 6: There is lack of motivation among students

Fig 7: There is lack of motivation among lecturers

V. CONCLUSION

The findings show that there is lack of drive from universities and government to motivate and usher learners into software development mode. Registration of new software products is not a challenge although the market for the software is lacking. There should be direct intervention by government and industry to nurture software development talent among students and graduates.

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