Evaluating the South African Software Industry as a Key Component for Economic Development using an Irish Framework

Kehinde Dehinbo
dehinboho@tut.ac.za
Department of Informatics

Johnson Dehinbo
dehinbooj@tut.ac.za
Department of Web & Multimedia Computing

Tshwane University of Technology
Soshanguve, Pretoria, 0152, South Africa

Abstract

This study takes a critical look at how the South African (SA) software industry can be successful in serving as a key component for economic development. The conceptual framework used by Heavin et al. (2003) in investigating the emergence and evolution of the Irish software industry is used as a guide to investigate the South African software industry. Firstly, we investigate how positive changes can be stimulated with IT applications, how previous studies have been bridging the IT adoption gap and the role that can be played by the use of Open-Source software (OSS) in enhancing the South African software industry. Then, the study investigates the impact of the SA geographic environment, endogenous and exogenous factors on the SA software industry. A key trend emerging is the need for building a culture of diligence, improving education, creativity and flexibility. The study also looks at the need for improving quality of products of the SA software industry. The study has shown that the South African software industry could learn a lot from the Irish software industry. A strong barrier to this vision of enhanced software industry is ignorance. Education is therefore a key towards removing this ignorance and opening eyes to the significant amount of opportunities for excellence in the society. Finally, the study proffers recommendations on the way forward for the SA software industry towards being successful in serving as a key component for economic development.

Keywords: Software development, IT industries, Economic development, Open Source Software, Endogenous and exogenous factors

1. INTRODUCTION AND BACKGROUND

Introduction

The overall goal of this study is to take a critical look at the South African software industry as a key component for economic development. The role and impact of software embodied in hardware forming usable information technology systems in today's organization cannot be over-emphasized. Huge investments in the use of information systems (IS) by corporations suggests the use if IS for gaining competitive advantage in current economy where competition is now global. The competitive global economy implies that organizations need to distinguish themselves in order to win

customers and retain them. According to Leonard (2009), ways of achieving this include innovative products and services, operational excellence leadership and intimate customer relationships. Software comes handy in these innovative products and services. Bharati and Berg (2003) note that improvement in IS has a positive correlation to the quality of service.

Aside from this direct impact, it is also noted that quality IS will lead to quality information which is of strategic importance in running organizations. Moreover, the ease with which IS can be used by customer service representative to service customers better enhances possibility of profits. But furthermore, in this global digital economy where users directly access e-services such as e-commerce, online banking, etc, the possible impact of IS's software industry to economic development cannot be over-emphasized.

In the light of such importance of IS to global economic development, an important question that could be asked then is that: Is the South African economy in line with the global economy that considers possible impact of IS as critical to economic development? The answer to that question is likely to be "Yes" given the ubiquitous use of IS in various parts of the SA economy. Even if not exactly so, the desired direction of the economy highlights the possible impact of IS as critical to economic development.

Research Question and Objectives

In line with the above, the research question for this study is: How can the South African software industry be successful in serving as a key component for economic development? In order to investigate and come up with answers to the research question, the objectives of the study are therefore given as follows:

a.) To investigate how positive changes can be stimulated with IT applications for bridging the IT adoption gap
b.) To investigate the role that can be played by the use of Open-Source software (OSS) in enhancing the South African Software industry
c.) To investigate the impact of the SA geographic environment factors on the SA software industry
d.) To investigate the impact of endogenous and exogenous factors on the SA software industry
e.) To investigate ways of improving quality of products of the SA software industry
f.) To proffer recommendations for the SA software industry to be successful in serving as a key component of economic development.

Importance and Contribution of Study

This study contributes towards understanding what could be done to promote the desired change in the South African software industry. This could further facilitate the development of competences and strategies for making the best of opportunities that abound.

Outline of the Rest of the Study

Section 2 discusses the literature review and the theoretical underpinning of the research. This is followed by the research and methodological approach, the analysis and discussions. Finally, we conclude the study with recommendations.

2. LITERATURE REVIEW

Literature review relates one's study to the larger ongoing dialogue in the literature about a topic, filling in gaps and extending prior studies. The more one knows about perspectives related to one's topic, the more effectively one can tackle one's research problem (Creswell, 2003). The literature review is therefore presented here.

Previous Studies Aimed at Stimulating Changes with IT Applications

To encourage in-house software applications development, Dehinbo (2007) highlights the need for in-house software applications development as motivated by the low adoption and use of IT applications in developing countries and low in-house developed IT applications. Sadik in Dehinbo (2007) observes that "technological progress diminishes differences within the group of countries that adopt technologies but increases the gap between those countries and the rest of the world". While the developed countries are utilizing the opportunities provided by software on the Internet, developing countries seem to be lagging behind. Thus, the gap between the situation of social exclusion in developing countries and the social inclusion in developed countries constitute a "digital divide".

Many studies have been conducted to bridge the digital divide in various forms. Most of these however focus on the provision of infrastructure and facilities to bridge the digital divide. An

adverse effect is that this approach turns developing countries into merely consumer nations. The dumping of products into developing countries has made developed countries to become more hardworking and intelligent as they have a ready market for their products. However, it made developing countries to become more dependent and less hard working and less intelligent as they wait for innovation and ideas from developed countries. Ultimately, future generations of developing countries pay for this in sweats.

As in the case of technologies such as cars, computers *etc,* there has been wide adoption but at the cost of huge amount of money in foreign reserves from the efforts and sweats in the production and sale of barrels of oil or ounces of gold (Dehinbo, 2007).

Dehinbo (2007) further asks the question:

> Even if developing countries are still far from the capabilities and "know-how" knowledge for manufacturing (not just assembling) cars and computers and other infrastructures, what of the capabilities that mainly involve human resources such as software development?

The above is despite lots of computers that are sitting on workers' desks in different parts of developing countries and lots of students passing through institutions graduating in one IT specialization or another. Yet, software application systems are not being developed and used locally. Worse still, many IT graduates are unemployed and many would prefer to be selling computers as computer vendors make more money. This situation is made worse by the "brain-drain" into developed countries, as well as outsourcing. Mayasandra *et al* in Trauth and Howcroft (2006) argues that from the perspective of postcolonial theory, global outsourcing phenomenon can be seen as the latest manifestation of colonialism. Ordinary people and small scale businesses could find it difficult to purchase produced software some of which could be products of efforts of their brain-drained or out-sourced personnel.

The situation, according to Dehinbo (2007), becomes like the "ugly" situation of the mineral resources in Africa. Nigeria for example is a large producer of crude oil in the world. Yet, by the time the crude is exported to be refined in developed countries and re-imported back to Nigeria, ordinary people there find it difficult to afford petrol for their cars. Also, much as Ivory Coast is a large producer of cocoa which is exported for the manufacture of coffee and chocolates, an ordinary Ivorian can hardly afford a tin of coffee. Furthermore, South Africa is also a large producer of gold and yet we don't see much South Africans wearing gold ornamels.

To avoid the above scenario, Dehinbo (2007) quoted an indigenous African proverb that says:

> "If you give me a fish, I would be grateful, but I may ask again when I'm hungry. But if you teach me how to fish, then I would be eternally grateful as I may not need to ask again once I'm self-sufficient and sustainable".

Dehinbo (2007) infers that the use of locally developed IT applications would have the desired effect of motivating a production rather than a consuming economy. This could thereby serve as a reference point for putting developing countries into the mood for in-house application development rather than the continued purchase of off-the-shelf packages that would have significant strain of their limited budget.

Studies involved with the Bridging the IT adoption gap

Towards bridging the IT adoption gap for small physician practices, Davidson and Heslinga (2007) aim to achieve inclusion for small physician practices by encouraging them to use Electronic Health Record System in their daily tasks. In the pursuit of a strategy for patient safety and error reduction, Mekhjian et al (2004) reports that the Ohio State University Health System developed and implemented a standardized, user-friendly, context-sensitive voluntary event reporting system. On e-government, Sturges and Sharma (2007) argue that although ICT tools alone cannot enhance the way the poor access public services, the tools are at least a catalyst, and possibly a great deal more.

The Use of Open Source Software in the IT Industry

Towards achieving enhanced use of the open source platforms for the development of software, Trauth and Howcroft (2006) highlight the use of open source software for organizational and societal collaboration and community bootstrapping. TUT iKnow Portal (2006) reports on the Brazilian President's instruction to government ministries and companies to gradually switch from costly

software systems to free "open-source" systems and platforms. This is expected to save millions of dollars in licensing fees. The SA government and various other governments in other countries made similar calls. Jin, Robey & Boudreau (2007) highlight the importance of open source software user communities in the development of information systems.

Top on the list of various benefits and reasons that can be said to be responsible for the rapid uptake of OSS is economical costs. Low cost remains the main driver and primary motive for the use and adoption of OSS (Cerri & Fuggetta, 2007; Reijswoud & Mulo, 2006). GITOC (2003) attribute the value of the low cost of OSS to the fact that OSS are usually not sold and with no licensing fees. Thus, only downloading, distributing and duplicating costs are borne by the recipient. Moreover, less equipment replacement is needed as OSS often performs satisfactorily on older equipment which often cannot run latest version of proprietary software. GITOC (2003) further enumerate broader economic values such as reducing imports of software, increasing significant investment in the local software industry, stimulating development of software by local Small and Medium Enterprises (SMMEs), thereby supporting the "Proudly South African Campaign" that promotes the use of locally produced goods and services.

Furthermore, GITOC (2003) indicates the value of OSS in enhancing educational value and public access to information. Being able to study the inner workings of an Open Source Software could lead to improvement in the skills base and proficiency in software development and maintenance. Reijswoud and Mulo (2006) also indicate that increasing self-reliance and software development expertise is very important in bridging digital divide.

Involving a large number of contributors in OSS development (Krogh & Spaeth, 2007) facilitates knowledge sharing (Sowe et al, 2008). Such knowledge sharing is a key to the development of software development skills in the country. Such skills are useful to tailor or customize open source software, since its license permits that free of charge and the source code is readily available (Ven & Mannaert, 2007).

In summarizing the benefits of OSS therefore, GITOC (2003) indicates that OSS is a useful tool that could allow developing countries to leapfrog into the information age due to various benefits it offers. This provides the potentials to stimulate affordable opportunities in IT.

3. RESEARCH DESIGN AND METHODOLOGY

Research Design

An interpretive research approach which is qualitative in nature is adopted. Towards seeking possible answers to unanswered questions, or finding better answers to incompletely answered questions, Hofstee (2006, p.3) notes that academic researchers are in the business of explaining the unexplained, coming up with theories and solutions to make sense of the world around us. Ngwenyama and Lee (1997) note that interpretive approach focus on the development of sound explanations and understandings of research phenomenon of interest.

However, the research orientation of this topic assumes that the reality for different situations could differ. But by and large, detail context could enable the application of this study in other contexts. Thus, qualitative research design that provides rich qualitative context is deemed appropriate for understanding this phenomenon.

Methodology

The research methods involve elements of document analysis supported by detailed literature study to search the literature and other established bodies of knowledge to actualize the objectives. These are presented using descriptions that are less structured and more responsive to the need for understanding.

Also, a conceptual framework is used for the investigations in the study. This framework is described below.

Conceptual Framework for Theoretical Underpinning of the Study

The use of the conceptual framework serving as the theoretical underpinning of the study could allow us to see certain things clearly while obstructing the vision of certain other things (Roode, 2007). The conceptual framework used by Heavin et al. (2003) in investigating the emergence and evolution of the Irish software industry is used as a guide to investigate the South African software industry.

Heavin et al. (2003) indicate that the Irish economy is a small economy like those of Israel, Singapore, New Zealand etc. Ein-Dor et al

quoted in Heavin et al. (2003) note that in the current global digital economy, "small economies previously considered at a disadvantage now seem to be perceived as having the ability to compete with competitors in high technology sectors with mass markets. This is found to be due to two reasons. Firstly, value is no longer created primarily from industrial production. Information Technology sector for example, creates value in problem analysis and other problem solving tasks which basically involve identifying a problem, analyzing the problem and proffering solutions. Secondly, the improvement in telecommunications has diminished the impact of geographical locations as excellent communication can be established between the team responsible for research and development in one country and the team for production in another country.

In analyzing the Irish software industry, Heavin et al. (2003) examined endogenous factors (that is, national, enterprise and individual) against exogenous factors. Following is a brief summary of Heavin's analysis of the Irish software industry as being used as a framework.

Endogenous factors are those that can be developed, controlled and used in strategic IT industrial development (p.240). Nationally, the Irish government policy plays an important role in promoting the development of the Irish software industry. Such promotion policies include those that grant tax breaks to the software industry. This encouraged the presence of various multinationals such as IBM. The multinationals created many jobs and developed the skills of many people. Eventually, many of the workers employed and developed later started their own companies. As part of the national endogenous level, the location of Ireland serve as a bonus by being close to the strong economies of Europe such as United Kingdom, Germany, France *etc* while still at reasonable distance to the United States of America, thereby making it easy to trade with such countries. Also, communications in Ireland is excellent and comparable to those of other developed countries.

Furthermore, on the national endogenous level, according to Heavin et al. (2003, p.240), the Irish government in 1991 established the Center for Software Engineering (CSE) as a support service for the Software Engineering community. This is to promote the development of software and to help companies improve in areas of quality control and productivity by implementing Software Engineering best practices. CSE also offers advice on company strategy and provides training. Also established by the Irish government is the National Software Directorate (NSD) to align industry with education and for creating value from relevant research. In addition, the NSD established a state sponsored venture capital for financing. At the same time, the government financed many upcoming entrepreneurs. But most importantly, the Irish government provided quality education which started with free secondary education since 1968 and as indicated by Heavin et al. (2003, p.240), "the education system provided the seeds to grow".

At the enterprise level, enterprise strategy and management tactics is evident in the statement that:

> "companies are increasing their focus on choosing a niche product and market in order to avoid competing with Microsoft-type companies (Heavin et al, 2003, p.240)".

This is similar to the approaches which have favored other countries such as Israel, New Zealand, Australia, etc. For example, Israel software houses focus on the development of special-purpose computer system management, data compression, encryption, virus detection and control. Heavin et al. (2003, p.240) also indicate that multitasking within organizations contributed to the development of the Irish software industry. As highlighted earlier the multinationals at enterprise level created many jobs and developed many people and eventually, many of the workers employed and developed later started their own companies.

Individual level of endogenous factors involves peoples' attitude to work, quality of their work, creativity and the likes. Irish are very creative, hardworking and focus on quality (Heavin et al., 2003).

Exogenous factors involve factors that may not change in the short run. These are closely tied to the individual level of the endogenous factors, and according to Heavin et al. (2003, p.240) include culture, language, literacy level, attitude to education and religion. Heavin et al. (2003, p.240) note that the English language, literacy level and attitude to education in Ireland result in benefits in doing business with the lucrative US market and bringing investments from USA.

Interviewees' responses in Heavin et al. (2003, p.240) indicate that flexibility and creativity are individual contributions to the development of the Irish software industry. These are enabled and enhanced by the good education available.

An application of the above framework for the Irish software industry in analyzing the South African software industry is the principal goal of this study. This is presented in section 4. The analysis of data is in the form of reasoning into the findings on the document analysis. This is presented in the next section.

4. LOGICAL DEVELOPMENT AND ANALYSIS

A thorough discussion on this study is presented using the conceptual framework by Heavin et al (2003) as a guide. It involves argument development, justification, strategic follow-through presented as follows. It also involves identifying, analyzing and understanding the driving forces of change within the South African society in general as they relate to Political, Economic, Social Technological and Environmental factors that could promote the South African software industry.

The Impact of the South Africa Environment on the SA Software Industry

The South African geographic expanse and population make it a medium-sized country, relatively larger than Ireland but smaller than the USA. Geographically, South Africa is the southern gateway to Africa. It has grown to become the general technological gateway to Africa and in good position to provide IT services to neighboring countries. It can be assumed that unlike most other parts of Africa, the historic residence of white settlers in South Africa as well as the end of the apartheid government enhanced the trade with the United Kingdom, USA and other developed economies. Also, with the discovery of natural resources like Gold, Platinum *etc*, business has been booming resulting in Foreign Direct Investments (FDI). These same reasons could explain the presence of multinational enterprises such as IBM, Microsoft, Oracle *etc*.

Telecommunications facilities in South Africa are relatively developed. Certain limitations include the low internet bandwidth generally available and the electricity shortage in 2008. However, with the proposed broadband link via the Indian ocean and another one via the Atlantic ocean, as well as the plan by the National Electricity Company (ESKOM) to tackle the electricity problem head on, the telecommunication infrastructures seem destined for greater heights. The various 2010 World cup investments have also led to infrastructural developments, especially in the road, speed rail and airports infrastructures.

Furthermore, South Africa is active in the current global digital economy, as evidenced by the online banking systems of many banks and the online shopping facilities at major retailers as well as the increased Internet subscriptions. Therefore, South Africa, despite being a developing economy previously considered at a disadvantage, can now seem to be perceived as having the ability to compete with competitors in high technology sectors despite with mass markets.

The Impact of Endogenous Factors on the SA Software Industry

The South African endogenous factors (that is, national, enterprise and individual) seem favorable to promote the South African software industry. Nationally, the SA government policy plays an important role in promoting the development of the SA software industry. These include such policies as the establishment of the annual President's meeting with the IT industry, the Open-Source Software (OSS) policy, *etc*. Politically, the government of the Republic of South Africa (RSA), like their counterparts in Brazil and China has endorsed the use of OSS as evident in the OSS policy (OSS for govt, 2008).

Furthermore, on the national endogenous level, the government have set up bodies like the Meraka institute to propel Software development and the OSS campaign. Various South African organizations are also championing the OSS cause. Mark Shuttleworth, through the Shuttleworth Foundation and Canonical in conjunction with Meraka institute lunched the "Go Open Source campaign – GOSC" in 2004 as an R18 million South African wide campaign. Jason Hudson invented the "Freedom Toaster" as a self-service reliant computer kiosk put at various public places like universities and shopping malls. People can use the kiosk to browse and select OSS, insert blank CDs and copy the selected OSS (Gopalakrishnan, 2006).

In addition, the South African government established state sponsored venture capital for financing. These include the Center for Scientific and Industrial Research (CSIR) which funds IT research among others. The department of Trade and Industry funds various Small and

Medium Enterprises among which are IT companies. As in the Irish case, the SA government is moving towards free secondary education with the introduction of the "No fee schools" whose percentage is set to increase annually. Also the availability of the Students Financial Loan facility have been facilitating higher education to previously disadvantaged students and their policy of converting loans to bursaries for students who pass have been encouraging diligence among students. This is bound to enhance the software industry in the nearest future.

The SA government is championing increasing access to public information in electronic form such as through e-commerce, e-government, e-learning *etc*. The successful move to e-filling of Tax returns is a good indication.

However, in comparison to the Irish corporate tax rate of 12.5% (KPMG, 2012; PGH, 2012) which stimulates investments, the South African government has to make bold attempts to further reduce its current rate. From 1 April 2012, the corporate tax rate for a non-resident company is reduced to 28% (previously 33%). The corporate tax rate for resident companies remains at 28% with the effective corporate tax rate still at 34.55% due to the 10% Secondary Tax on Companies that applies to a company declaring a dividend. The secondary Tax on Companies at a rate of 10% has been abolished and replaced by a dividend withholding tax at a rate of 15%. This moves the dividend tax to a shareholder tax. This means that the effective corporate tax rate is now 28% going forward (KPMG, 2012).

In a comparison of global corporate tax rates, KPMG (2012) gives the percentages of 34 for Brazil, 25 for China, 16.5 for Hong Kong, 32.45 for India, 12.5 for Ireland, 25 for Israel, 15 for Kuwait, 15 for Mauritius, 30 for Nigeria, 16 for Qatar, 20 for Russia, 17 for Singapore, 24 for UK and 40 for USA. With an average corporate tax percentage of 20.5 for Europe, 23.12 for Asia, and 24.39 globally (KPMG, 2012), it would be vital for South Africa to gradually reduce its 28% corporate tax rates to encourage investments and align with her trading partners.

At the enterprise level, various enterprises are adhering to the affirmative action and Black Business Empowerment policies aimed at facilitating the mentoring, enablement and empowerment of black people who form the majority of the population. As highlighted earlier in the Irish situation, the multinationals at enterprise level created many jobs and developed many people and eventually, many of the workers employed and developed later started their own companies. However, a follow up study of a Pretoria-based software company indicates that quality of processes is not strictly enforced.

Individual level of endogenous factors involves peoples' attitude to work, quality of their work, creativity and the likes. These are not up to the desired level. Lots of previously disadvantaged people think it's their time to get things freely from government, rather than thinking on how to innovatively create benefits from the various opportunities existing.

The Impact of Exogenous Factors on the SA Software Industry

We now look at the exogenous factors that may not change in the short run and closely tied to the individual level of the endogenous factors, which and according to Heavin et al. (2003, p.240) include culture, language, literacy level, attitude to education and religion. As in the case of the individual level of endogenous factors involving peoples' attitude to work, quality of their work, creativity and the likes, these are not up to the desired level. Though the government adopts 11 official languages, there is a constant fight between Afrikaans, English and some local African languages to be the dominating medium of instruction. Literacy level is relatively low and attitude to education is yet to blossom. There is the need to get away from attitudes such as:

> "Government will build houses for us",
> "I only need a Diploma/degree to get 'fat salary' job because I'm black and previously disadvantaged" etc.

However, as the level of education increases, one can assume there would be improvement. Moreover, the enthusiasm of the youth to social networking tools such as Facebook is encouraging.

Summary of the Findings

The various forms of analysis presented point to the need for promoting the South African Software industry. Gopalakrishnan (2006) indicates that South Africa, like India have gate crashed into the hi-tech first world while leaving a large section of the population to languish in

the third world. Yet Gopalakrishnan (2006) estimates that South Africans spend a whopping R6 billion on software licensing every year. While the state of exogenous factors is not at the desirable state, the endogenous factors are encouraging. The government especially on the national level is trying much to enhance the state of the South African Software industry.

Mafole-Shoppe (2009) representing the Congress of the Peoples (COPE) Party's view at the 2009 Election debate on the South African Broadcasting Corporation Television programme coordinated by Tim Modise on 3 April 2009 mentioned the need to be globally competitive in order to get job even in one's own country. In this light, the next section looks at the recommendations emanating from this study.

5. RECOMMENDATIONS

In the light of the revelations unearthed in the study, our ultimate goal is to proffer recommendations. These are given below.

Encouraging Knowledge Sharing, OSS and Open Access Learning Environments

The emergence of the Internet has opened avenues to share knowledge and learning resources among students, faculty, and institutions. This also has led to the "open source initiatives" with potential to improve software industry. Reilly and Williams (2006) note that the open-content model is a natural outgrowth of the Open Source Software model. The sharing of knowledge presents potential to contribute to development and to organizational enhancement of competitive advantage. This would lead to organizational enhancement of competitive advantage when staff of an organization imbibes such collaborative and knowledge sharing culture.

Focusing on Improving the Quality of Processes and Products

There is the need for organizations to focus more on improving the quality of the processes involved in producing goods and services as well as that of their final products. McKinsey (2005) highlights the need for South African IT firms to strive to be at higher level of the Capability Maturity Model (CMM) scale which is a standard to measure the quality and productivity of the software development processes.

Focusing on Seizing Small Incremental Opportunities

It is important that people should not just sit and wait for big opportunities and sponsorships but rather make use of every little opportunity. The simple principle of "addition" could ensure that many small opportunities would one day be equal to great opportunities. That is probably why the bible says "Whatever your hand findeth to do, do it with all your might" (Ecclesiastes 9:10). A book well read one day, the cheap/free training attended next day, utilizing small opportunities such as OSS *etc* could one day lead to effective software development industry.

Challenging Individuals on Responsibility for Competence and Excellence

According to ACM (1992), excellence depends on individuals who take responsibility for acquiring and maintaining professional competence, and is perhaps the most important obligation of a professional. Mintzberg (1983) identifies technical skill as one of the basis of power in organizations. The development efforts in the software industry are often implemented by team which includes many junior programmers but however, were involved with steering important projects. This is in line with Weilbach (2007)'s statement that covert structure actually determines the performance of organizations.

According to Weilbach (2007), we as Information Systems professionals are the change agents and therefore ultimately responsible for the consequences of Information Systems adoption and use. Ricoeur in Stahl (2005) states that:

> "I am responsible because someone else counts on me; the starting point of the ascription and acceptance of responsibility".

Hirschheim and Klein (1989) presents the story of the "system analyst as emancipator" highlighting the fact that through Information System development, organizations can be changed positively. Dahlbom and Mathiassen (n.d.) supports their idea with the story of a programmer pursuing ethical justifications in IS by trying to modify the system to make it more human as he saw fit. He tried to sneak in a feature into the monitoring system being developed such that users will be aware that they are being monitored. While not saying this is a just or ethical act, it does highlight the importance of the IT in our society.

Further Governmental Assistance in Promoting Software Industries

It is vital that the South African government continues to seek ways of promoting the software development industries. Options include corporate tax breaks, reducing the corporate tax rate, specific scholarships for software application development trainings etc. It should be noted that a well-educated and entrepreneurial society would further provide enabling opportunities for more revenues and economic development for the country.

6. CONCLUSIONS

The Irish software industry is used as a guide in the evaluation of the South African software industry. The major idea is to use any country that South Africa can learn from while not using a very advanced country whose steps could be too big to emulate right away. Evaluation of other similar countries IT industry could be compared in a more comprehensive further study, especially including the BRICS group of countries i.e, Brazil, Russia, India, China and South Africa.

This study has shown that the South African software industry could learn a lot from the Irish software industry. Apart from the government's need to continually create enabling environment among other factors, an emerging need is for building a culture of diligence, flexibility and creativity. A strong barrier to this vision of enhanced software industry is ignorance. Education is therefore a key towards removing this ignorance and opening eyes to the significant amount of opportunities for excellence in the society. One of such opportunities is the possible impact of OSS to the enhancement of the SA software industry. This study is a step towards putting South Africa on the roadmap to excellence in the imminent globally competitive digital economy. Therefore, the South African software industry as a key component of economic development is not a pipedream but a possibility.

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