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SUSTAINABLY DEVELOPING E-SKILLS IN AFRICA- A CASE WITH ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM

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Abstract
Companies in Africa have historically been slower off the mark in using IT to automate business processes, they are fast catching up and those still relying on manual systems are no longer commonplace. Now, having automated their accounting processes, many are looking at fully integrated enterprise resource planning (ERP) solutions to improve efficiencies and profits. ERP systems are total business solutions used around the world, and gaining in popularity due to improved accessibility and affordability of cloud computing. This leads to an increase in the demand for e-skills, already far exceeding the supply particularly in Africa. This paper present a developed e-skills program in Africa to sustainably improve e-skills and enhance the employability of graduates of higher education and training institutions and to provide the labour market with employees skilled in the field of enterprise resource planning (ERP) in African countries. To achieve these objectives a marketable curriculum and learning/teaching program has been adapted to the needs and environments of African higher education and training institutions, thereby enhancing the IT and business resource pool in Africa in a way that quickly becomes self-sustaining. Train of trainers' method is used where universities and colleges in Africa are enrolled into the program and are trained to train students in real business erp system.

Keywords: ERP, enterprise, resource, business, information

Business Information Systems started as reactive recording of business transactions, with "silo" systems and duplication/multiple capturing. The need for accurate real-time information led to the evolution of proactive systems, culminating in Enterprise Resource Planning (ERP), facilitating the flow of information among all business functions inside an organization, and managing contact to outside stakeholders. The rationale therefore is to educate and train upcoming graduates using an ERP system to bridge the gap of ICT deficit in Africa business demands and to enhance the employability not just to be employed in Africa but globally as well.

PROBLEM STATEMENT

For years, universities have serviced their customers (companies) with graduates which most time declare not qualify for the job by the companies. This fact remains and will continue to be a problem in Africa education if universities do not embrace the change and the demand of business ICT skills graduates. Today many foreign businesses or companies sometimes battle to find the necessary technical support for implementations, maintenance and customisations of their business systems. Therefore, academic universities need to introduce ERP teaching in classrooms, especially when ERP systems have become more widely adopted by African businesses.

Addressing ICT skills shortages and human capital gaps in Africa (the urgent need for qualified personnel) are one of the biggest challenges facing African higher education institutions. Information and communications technologies (ICT) are key enablers of today's development agenda and an important element in government efforts to foster knowledge-based economies and information societies.

Investment in human resources, especially ICT skills, is crucial for the achievement of these national policies and development strategies.

Consequently African countries have developed comprehensive national policies and strategies to transform their nations into knowledge-based economies and societies, in which the expansion of human capacity, especially in ICT, is critical. African governments are also increasingly aware of the need to employ multi-disciplinary and multi-sector strategies and tactics to put their countries onto an accelerated development path.

Sub-Saharan countries, especially resource-scarce landlocked nations, appear to be among the worst African performers while there also appears to be a significant digital divide between African countries as a whole and the emerging nations on the Asian and South American continents.

As a result of the IT skills deficit, companies have to outsource, recruit abroad and inflate salaries in order to obtain the required skills. When companies import skills or outsource functions, human capital development is undermined, creating dependency on international service providers, and weakening the company's competitiveness.

The IT skills shortage is perpetuated by insufficient capacity and know-how at institutions of higher education, and limited access to ICT resources. This restrains growth and income generation, reducing the tax base, which in turn limits governments' scope to invest in higher education.

It is a vicious circle - the demand for ICT skills increasingly exceeds supply, and African countries face an uphill struggle to train the workforce in order to sustain and develop their economies, and to become more competitive.

Even in South Africa, ICT skills shortage is a burden on the economy. South African IT companies have to outsource, inflate salaries, and recruit abroad as the country continues to suffer from a serious lack of specialist skills. When companies either import skills, or outsource functions, human capital development is undermined, and the industry ends up being populated by non-South Africans (isiAfrica 2012).

The World Bank uses a knowledge economy indicator (KEI) composed of ICT, education and innovation parameters, which shows that Africa's knowledge economy indicator lags behind the Middle East, Latin America, East Asia, the Pacific and Western Europe. Sub-Saharan countries, especially resource-scarce landlocked countries, are among the worst African performers (KAM, 2012).

SAP Africa, a subsidiary of SAP AG, and the World Bank move forward with plans to collaborate on skills development in Africa. The move comes shortly after the launch of SAP's Skills for Africa program, through which the company will train many students in developing IT skills to boost access to education and support for entrepreneurs, and marks the latest SAP investment in the region. SAP Africa CEO- Serima further mentioned that, they recognizes that promoting education and training is one of the best ways to improve the problem of chronic youth unemployment, an issue affecting the technology industry as a whole (Mazzoni, 2013).

In addition to the ICT skills deficit, the populations of many African nations also suffer from a lack of access to knowledge base services. For example about 80 per cent of Ghanaian adults do not have access to any financial services such as savings, loans and insurance investment, a survey conducted by the Ministry of Finance and Economic Planning (MoFEP 2013). And in this context it is worth noting that there is a direct link between education and training and socio-economic improvement.

EVOLUTION OF ERP

Business Information Systems started off as being simply the (reactive) recording of business transactions, with no direct link between financial accounting, cost accounting, and fixed asset registers, therefore with separate systems (silo's) and duplication/multiple capturing.

The increasing need for accurate real-time information and proper planning then led to the following evolution of (proactive) systems in sequence: Material Requirements Planning (MRP), Material Resource Planning (MRPII), Distribution Resource Planning (DRP), and finally Enterprise Resource Planning (ERP).

Wikipedia explains "Enterprise resource planning (ERP) systems integrate internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate this activity with an integrated software application. Their purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders."

So ERP systems facilitate the managing and steering of all the following business processes in a fully integrated, real time system: Financial Accounting, Management Accounting, Logistics, Material Planning, Manufacturing, Lifecycle Data Management, Enterprise Asset Management, Customer Relations Management, Supplier Relations Management, Programme and Project Management, and Human Capital Management.

In short, ERP systems are total business solutions in widespread use around the world, and gaining in popularity thanks to improved accessibility and affordability (cloud computing), as well as globalization-led competition. This of course leads to an increase in the demand for information and communications technologies (ICT) skills, already far exceeding the supply, particularly in Africa.

THE CHALLENGE IN AFRICA

Enterprise Resource Planning (ERP) skills are especially important to development because ERP systems are total business solutions, which support all major business functions. There is a skills and investment gap that needs to be bridged.

Business and development policy have a common interest in structuring political, legal and social framework conditions, which promote development in emerging countries. It is therefore also important to produce well-rounded professionals who are ready to support the implementation of ERP applications in sectors that are of critical importance to Africa's development (such as manufacturing, oil & gas, financial services and the public sector). ***Paul Marketos (2010), Managing Director at Bluekey Software Solutions, mentioned "*****just seven years ago it was not uncommon to find large companies in countries such as Kenya with turnovers in excess of R60-million still using manual ledgers".*** Pfungwa Serima (2014), CEO of SAP Africa, writes in an opinion piece: "Africans have embraced technology faster than many thought possible. This is particularly the case with mobile technology. Similarly, Africans have taken to the Internet at an astounding clip – five times that of the world average.

Africa has sprinted toward technology, yet it has been slower to inspire and invest in its talent. *People want jobs but lack skills; businesses have jobs but cannot find the skilled talent to fill them.* Africa must create skills programs that lead directly and quickly to jobs that are open today and in the immediate future." Serima goes on

to describe how SAP is addressing these challenges with a scholarship program in ICT that leads directly to the jobs market.

Recent research shows that ERP technology faces additional challenges in developing countries related to economic, cultural, and basic infrastructure issues (Molla & Bella, 2006). Therefore, a commercial approach alone is not effective. Rather, there is a strong case for a private public partnership to build skills, with the support of an agency that understands the issues and challenges of Africa.

In Africa, SAP University Alliances has a particularly important role as SAP has first-hand awareness and knowledge of the consequences of ICT skills shortage. In order to make progress, African countries (and foreign companies investing in Africa) currently have to import talent from abroad. This means Africa takes a "double hit" - first, the cost of importing talent is expensive, and second, the import of talent further inhibits the development of local African talent.

Unlocking the potential: breaking the circle - as part of the programme's aim to improve ICT skills and graduate employability in Sub-Saharan Africa, CPUT is training students in the field of enterprise resource planning (ERP). ERP skills are especially important to development in ICT because ERP systems are total business solutions - they integrate internal and external information and enable information flow within and between all of the business functions and departments of an entire organisation. Because ERP systems are in widespread use around the world, they therefore also have particular significance for companies that have worldwide trading links.

THE WAY FORWARD

The governments of South Africa and most other African countries have identified human resources development as a key area of intervention. This programme does not address the deficiencies in basic education, but aims at improving the capabilities at a bottleneck in higher education. It is in line with global development goals and the objectives of the BMZ 2013 ("Verantwortliche für morgen ausbilden"). It contributes to United Nations MDG 8 (F) as it fosters the application and utilization of ICT in close cooperation with the private sector.

As a direct impact, the programme should result in the graduation of a significant number of students that have improved their ICT skills, and especially their ERP capabilities according to market requirements. These graduates thereby improve their employability and should find employment according to their qualification (indirect impact).

As a result, companies and public institutions can fill vacant positions with qualified staff, thereby improving growth prospects and productivity (indirect impact). At an aggregated level, this measure enhances economic growth in and integration of African economies into international markets and networks. Capacities are being developed and strengthened for higher education institutions to participate in a global network, and to actively co-develop and deliver a state of the art curriculum.

COLLABORATION

Cape Peninsula University of Technology (CPUT), Faculty of Business, Keizersgracht, Cape Town, ZA.
As a key stakeholder in the programme, the Cape Peninsula University of Technology is motivated by its vision to be at the heart of technology education and innovation in Africa and its mission to create and apply knowledge that contributes to development. There is also a distinct business case for its participation: CPUT expects to benefit from being the focal point of erp4school in Africa because of the associated reputation, additional international contacts within the network and consequently increasing enrolment numbers and growth.

Oberstufenzentrum Bürowirtschaft und Dienstleistungen (OSZ), Mandelstraße 6-8, Berlin, DE.
It was at this vocational school that the erp4school scenario was developed by Jochen Scholz, and the OSZ has offered CPUT the license to use the curriculum developed for erp4school also in Africa.

Systeme, Anwendungen, Produkte in der Datenverarbeitung Aktiengesellschaft (SAP) AG, Dietmar-Hopp-Allee 16, Walldorf, DE.

SAP's support includes the integration of erp4school Africa into the global SAP University Alliances network, and the delivery and funding of the software platform at no cost, first as a learning platform and eventually as a development platform.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Dag-Hammarskjöld-Weg 1 – 5, Eschborn, DE.
GIZ, operating on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), has directly supported the setup and operation of a competence centre at the CPUT. This has ensured a sound and appropriate structure with which to introduce erp4school, together with the capacity to grow the programme quickly both in and beyond South Africa.

THE SOLUTION

In order to provide graduates with the relevant skills, CPUT and its collaborators have worked to create a marketable curriculum and learning/teaching programme adapted to the needs and environments of African higher education and training institutions. This will enhance the IT and business resource pool in Africa in a way that should become self-sustaining. The programme started in South Africa and it has already been expanded to four other countries - Botswana, Ghana, Kenya, and Nigeria.

The erp4school network in Africa is open to higher education institutions from other African countries. As the content and teaching methods of the erp4school programme are new to most African higher education

institutions, a training of trainers/teachers programme (ToT) is being offered to give trainers and teachers the capability to deliver the complex curriculum in their institutions.

The purpose of the erp4school programme is to transfer marketable skills to African higher education and training institutions.

The curriculum is built around the erp4school software platform, which is closely linked to, and an aligned version of the applications provided through the SAP University Alliance (SAP UA) programme to universities around the world.

This programme utilises blended learning (a time- and cost-effective mix of presence learning and web-based training). Students learn how companies use SAP and other software to run their ERP processes. erp4school is based on the latest applications and runs on a platform provided by the University Competence Centre (UCC) organization at the Otto von Guericke University in Magdeburg, Germany.

Students are the chief beneficiaries of the erp4school programme as they receive exposure to basic ERP skills, giving them increased and varied opportunities for employment and entrepreneurship, contributing to their own advancement and to their countries' economic growth.

The approach of erp4school has two main features - Process orientation, and Integration of ERP software into curricula. And through this approach students are taught business content, process knowledge, ERP knowledge, as well as soft skills.

The erp4school is implemented using the SAP ERP application. Integrating software from the market leader, SAP, ensures that the programme teaches global standards based on the latest applications. The goal is to implement and learn a process-oriented way of working using an Enterprise Resources Planning (ERP) system. Centred on a virtual company, students learn how complex processes run in different parts of the organization. As a result, graduates of this training receive certification and improve their career opportunities.

RESULTS

The impact of erp4school in Sub-Saharan countries will be significant, although the process is requiring significantly more time than anticipated. To identify the right decision-maker and "champion" at an education institution remains a challenge, and the implementation is often hampered by having to compete for resources with many other projects run at such institutions.

The successful implementation of the programme will on the one hand result in the graduation of a significant number of students with improved ICT skills, and in particular with ERP capabilities that have been developed in accordance with market requirements. On the other hand it will develop and strengthen the ability of African higher education institutions to participate in a global network and to co-develop and deliver a state-of-the-art curriculum.

The programme has been successfully adopted and implemented in South Africa, and has also already been applied in other African nations. Up to this point 22 higher education institutions have joined as members of this programme, including universities, colleges, and some schools.

Since the start of the programme in April 2011, a number of training workshops were held in South Africa – three in Cape Town, three in Johannesburg, and one in East London. Workshops were also held in Gaborone (Botswana), Nairobi (Kenya), Ile-Ife (Nigeria), and Kumasi (Ghana). At CPUT the programme has been integrated into the curricula of five Business Faculty courses, with more to follow. And student interest and awareness of the value of the training is increasing steadily.

CONCLUSION

The implementation team at CPUT is pleased with the progress made up to this point, although a faster implementation will clearly require significantly more resources. Feedback from lecturers and other teaching staff about the training workshops is, without exception, very positive.

Academics attending the training workshops all agree that this programme presents a great opportunity to empower students, and prepare them for the changing needs of the business world.

This programme has the potential to deliver a significant contribution to addressing the ICT skills shortage, but this can only be realised through more rapid expansion of the programme to other education institutions in Sub-Saharan Africa.

There is no doubt in the minds of the implementation team at CPUT, or for that matter any of the academics who were trained in any of the training workshops, that this programme is relevant for the business world.

So, what remains to be done is simply to expand the programme, reach more higher education institutions, and empower more and more students.

In addition CPUT has to delegate some of the responsibility of running the programme, eg by creating one "Hub" each in East-Africa and West Africa.

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