THE SCIENCE OF SERVICE MANAGEMENT AND ENGINEERING: AN ANALYSIS FROM WITHIN AN AFRICAN CONTEXT

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The Science of Service Management and Engineering (SSME), as an emergent discipline, has its roots embedded within the fertile grown of a global services economy. In this paper an attempt is made to gain clarity as to the "SSME" concept and the implications thereof within an African context, with specific reference to the role of academic institutions as innovative thought leaders.

Key words: Services management, science of services management and engineering, SSME, global services econom, information and computer technology, SSME in Southern Africa, ICT skills

INTRODUCTION

A literature review reveals that the Science of Service Management and Engineering (SSME) is a relatively new and emergent field of study that has yet to find its way into African academic journals and research publications. It would appear to have had its genesis in a research paper entitled "Steps Towards a Science of Service Systems" published at the IBM Almaden Research Centre by a team of researchers who it may well be argued may be deemed to be the thought leaders behind the research initiative. The researchers concerned, namely Jim Spohrer, Paul P. Maglio, John Baily and Dan Gruhl, define SSME as: "the application of scientific management and engineering disciplines to tasks that one organization beneficially performs for and with another (i.e., "service")" (Spohrer et al. 2006). The importance attributed to service management it would appear stems from the contention that services account for more than 80 % of the United States of America's (USA) gross domestic product and clearly, this reality will have significant relevance in terms of the nature of skills that business institutions will in future require within the USA. Wölfl (2005:3) concurs that the service sector has become quantitatively the most important sector in all OECD economies. With this in mind it is interesting to note that Lohr (2006) argues that education, research and policy needs to reflect this reality, as more than 75% of American employees are employed within the services sector of the economy. Bitner et al. (2006) also view services science as an emerging discipline with its origins vested in the explosive growth of services in economies worldwide with vast consequential implications in terms of business practice, education and academic knowledge creation. Seen within this context it is important to take cognisance of the fact that several universities have introduced courses and research initiatives within this emergent field that in essence is inter-disciplinary in nature.

The question consequently posed is one of the relevance of SSME within an African context and what implication this may have for the South African academic and business community in particular. If deemed to be of relevance it will without doubt embody a significant mindset realignment that focuses on the customer's experience of the services rendered. Nowhere is this more pertinent, than within the public sector where it would seem that the rendering of services to the community has assumed renewed significance, in the light of extensive criticism within the media. The apparent inability of public sector agencies to deal with many of the service related challenges facing South Africa is clear evidence as to the need for thought leadership in establishing a service economy that will enable South Africa to compete on a global basis. The same it would seem holds true for Africa as a whole, yet as far as could be ascertained in the research for this paper, there is no South African university currently offering SSME courses or conducting research within this field. Aspects thereof are, however, dealt with under various fields of study particularly within business schools were the concept service has not gone unnoticed. A holistic approach integrating the various domains of relevance, such as technology, the human aspects involved, as well as that of management still needs to be established as a fully fledged science. This attests to the importance of gaining an understanding of service innovation, as it applies to doing business within the global economy, in order to gain a significant unique economic advantage for Africa. The 2010 Fifa World Cup to be held in South Africa will embody many service related challenges that could well serve as a catalyst for introducing SSME thought leadership and research at South African Universities. A central tenet of many of these challenges will relate to the use of technology in innovative service delivery.

Thomas Friedman in researching the globalized world of the twenty-first centaury proclaims that the "World is Flat" (Friedman 2006:5), the underpinning rationale being the convergence of technologies that enables world wide collaboration in providing services on an innovative basis. The latter, one would assume, serves as a differentiator in gaining a competitive advantage in the global knowledge or information economy. Seen from a SSME perspective the technology convergence is but one key aspect of consideration, as an emphasis is placed on also integrating management, legal, social, cultural and similar skills required in a services-driven economy. By implication it is questionable if a large part of the African continent has joined the "Flat World" collaborative business environment. India and China, without doubt have made significant strides in this regard and Africa as a developing economy will need to review its position if it is to joint what may be termed to be the "Flat World Economy" or global service economy. It is suggested that the Science of Service Management and Engineering would need to form an important aspect of

this review as it holds the potential, from a skills aspect in particular, to serve as a source of reference for managing the transformation processes involved.

An attempt is made in this paper to gain an insight into the SSME and its implications from a business and an academic perspective, with reference to the African contextual situation.

CLARITY AS TO THE CONCEPT "SCIENCE OF SERVICE MANAGEMENT AND ENGINEERING"

The emergence of SSME as an academic discipline and field of study embodies: complex human related aspects of consideration, technology with a broad frame of reference that incorporates communication, knowledge and information systems, business processes, and social sciences. It will be seen that a multi-faculty or integrated approach cutting across traditional established fields of study forms a central tenet of the SSME methodology. To gain an understanding of services as a rapidly growing component of most countries economy, within a global business environment, there is a need to borrow concepts, processes, practices, perspectives, views and insights gained from diverse fields of study. It is contended that such a holistic integrated approach enriches our understanding of services and the role it plays in the transformation of the economy. While the rationale underpinning such an approach is hardly new within an academic research environment, what is of relevance is the fact that service systems as integrated value-creation networks within a global economy has to date received limited attention within Africa's academia. The belated recognition that services now constitute a major and rapidly growing sector of the South African and global economy highlights the need for local academics to gain clarity as to the SSME and the need for research in regard thereto.

Service systems, according to Maglio et al. (2006:81), are value-creation networks composed of people, technology and organisations. The researchers contend that formal representation and modelling of service systems is complex in that a host of interacting elements are inherent to the system (Maglio et al. 2006:81). This by implication would suggest that complexity theory could serve to inform service science as a field of study. Significant improvements in manufacturing and agriculture resulting from technology improvements have taken place and we have seen improvements in service delivery as well, but improvements in services tend to be restricted by the skills and the people aspects involved. People and their behaviour are inherently complex in nature. It could thus be argued that services tend to be a function of interacting human attributes and variables that are brought together in the

use of technology in service provision and it is this reality that adds to the complexity of coming to grips with “service” as a science in its own right.

Computer technology plays a fundamental role in what Rust and Miu (2006:51) term the “service revolution” by facilitating communication, storage and processing of information, all of which in terms of gaining a competitive advantage in a service industry are critical aspects of consideration. It is suggested by Rust and Miu (2006:50) that significant advances in technology underpin cutting edge developments emanating from service research initiatives. It would appear therefore that the importance of technology couldn’t be over emphasized in any SSME analysis. A fundamental difficulty all to often encountered, however, is that the interaction that takes place between technology and the business processes involved in service delivery is not that well articulated or understood. Add to this the complexity of the human dynamics involved and it is not all that difficult to motivate the need for SSME as an emergent field of research.

Science in a broad sense tends to encompass our knowledge and understanding of a phenomenon by means of scientifically based methods of enquiry that allows independent verification. As such it is objective in nature and allows us to predict the outcomes from the various interactions that take place. This is essentially done by means of reductionist systems of enquiry that tend to simplify the problem investigated. It is assumed that the underlying relationships between cause and effect in human interactions during service provision are capable of discovery and empirical verification. If, as has been suggested in the preceding discussion, service inherently embodies attributes of complexity theory this by implication would imply that a scientific approach would be difficult to execute in practice. In nature complex systems are not deterministic in nature and it would be difficult if not impossible to predict the outcomes emanating from an interaction of a host of variables in the provision of a service, particularly if the human related variables are taken into consideration. The outcomes within such a context would tend to be emergent in nature and in all reality unpredictable. Self-organization for instance is deemed to be an inherent attribute of complex systems. In reality, it is also true that within a more ordered context many of the technology and systemic variables can be researched on a scientific basis. In this regard it is interesting to note that Bitner and Brown (2006:74) contend that a defining characteristic of the field is its multiple mythologies, which reflects the belief that the most appropriate method is the one that best fits the research problem in question.

If the “science” terminology is therefore seen in a very broad context of acquiring knowledge and understanding of the theory and practice of services this could be

accommodated. In so doing, however, it needs to be noted that in instances where complex systems are involved scientific methodologies of enquiry will not be appropriate. The context of the research question will therefore be a determining factor as to the appropriate method of enquiry. According to Henery Chesbrough, of the UC Berkley' Haas School of business, the field of study should not yet be termed a science, as it has yet to develop the taxonomies and common features that sciences require (Paulson 2006). This tends to support the preceding contention.

Alluded to above, and as summarized by Spohrer et al. (2006) "a service system can be understood as a system composed of people and technologies that adaptively computes and adjusts to the changing value of knowledge in the system". The statement incorporates some very fundamental aspects of consideration. The changing knowledge element incorporated within the statement would for instance seem to imply an element of experiential learning and experimentation. Oxton (2005) claims that an adaptive organization is a "knowledge-enabled network of people and interactions". The people component incorporates not only the service providers but also a complete value chain that ends with the client as an important component. The relationships that develop and the interactions that take place between the networks of role players introduce a social connotation and the culture of the business institutions involved assumes relevance as a behavioural determinant in service provision. Technologies introduce a further set of considerations within the SSME frame of reference. The need for strategic alignment between the technology and the business' services strategy is clearly of importance, as the fit will influence the operational outcomes of services. Central to the business strategy are issues relating to internal business processes and people skills, while the technology alignment will introduce the aspect of architectures and ICT (information and communication technology) related issues. It is claimed by Paulson (2006:20) that services science in effect melds technology with an understanding of business processes.

In identifying and defining fields in SSME Siegel et al. (2006) conclude that it embodies an extensive set of existing disciplines as well as the spanning of new fields of academic inquiry. Current SSME fields of enquiry identified by Siegel et al. (2006) include: Behavioral and Social Sciences (Anthropology, Economics, Marketing, Industrial and Organizational Psychology); Computer Science and Engineering; Design; Information Systems; Knowledge discovery/Data Mining; Operations Research; Security of Information and Technology; and Systems & Software Engineering. The more recent trans-disciplinary and inter-disciplinary fields cited in their research are Computation, Organizations and Society; Electronic Business Technology; Engineering and Public Policy; Human-Computer Interaction; Information Networking; Information Security, Knowledge Discovery, Software

Engineering; and Very Large Information Systems (Siegel et al. 2006). The extensive scope of the fields identified provides an insight into the skills that will be required within a service economy.

According to Maglio et al. (2006:83) the challenge confronting both practioners and researchers alike lies not simply in formally modeling the technology and organizational interactions, but modeling the people and their roles as knowledge workers in the system. Associated with the accent placed on attaining an ideal fit between technology and the human interactions involved is the notion of innovation. Kurokawa (2005) believes that the problem with the notion is its ambiguity and the false expectation that SSME engenders as a magic wand that will give rise to an innovative service that exceeds client expectations.

These briefly alluded to SSME fields and some aspects relating thereto that require consideration are certainly not comprehensively dealt with in scope or content, but the discussion serves to highlight the extensive and multi-faceted nature of the concept. Of importance, as well, is the fact that the interactions involved tend to introduce complexity theory considerations that need to be taken into consideration.

SSME SEEN FROM WITHIN AN AFRICAN CONTEXT

Within an academic environment SSME research would undoubtedly bridge existing faculty boundaries. This in itself would not constitute a major problem as South African academics from various faculties have in the past worked together on research projects. These projects often involved academics from different universities working together as a team and in many instances even on an international basis. The real problem stems from the available of human intellectual capacity to undertake SSME related research. A report for Higher Education South Africa (HESA) attest to the fact that academics “are overburdened with graduate teaching duties and administration” and consequently “do not have time for research and innovation activities” (Pouris 2006). It is a reality confirmed in discussions held with members of the academic community. In a Department of Trade and Industries (DTI) report it is also asserted that academic researchers at higher education institutions are only able to devote 37% if their time to research and development, the rest needing to be devoted to tuition and administration (Human Sciences Research Council 2005:4). Notably, within South Africa, higher education is only responsible for 21.1 % of all Research and Development (R&D) expenditure covering all fields of research (Human Sciences Research Council 2005:4) and this would seem to support the contention that there is a very limited capacity for research within South African universities. The Trade and Industries (DTI) report, previously referred to,

also contends that 72.78% of all lecturer vacancies are among higher-level skills qualifications, the very sector one would expect SSME research to be undertaken by (South Africa Department of Trade and Industry 2005:22). Clarifying the concept SSME brought home the extensive scope of the fields of research that would need to be covered by the African academic community, if it was to become a fully-fledged discipline within our academic institutions. If an SSME curricula were also to be introduced it would pose an additional resources challenge on academic institutions. It is thus almost certain that if additional resources are not made available it is difficult to see how the current academics would be able to undertake such an extensive initiative. It is a reality supported by Bitner and Brown (2005:73) who, from their observations, assert that the resources business schools in the USA devote to service management have not been commensurate with the economic importance thereof.

The importance of SSME to Africa in terms of a knowledge based services economy leaves little room for doubt, if it is to achieve acceptable levels of economic growth to alleviate poverty. The current economic growth of 4.5% of GDP has not been strong enough to significantly reduce South Africa's high unemployment rate, and unemployment remains a problem. The need to compete in the global services economy remains a vital imperative for the creation of new business opportunities and the achievement sustainable economic growth in the region. It would appear that sectors such as tourism, telecommunications, finance and banking, construction, transport, logistics, education and training, information services, and healthcare, are some of the fastest-growing components of the international economy. It could be argued that services are in effect becoming the largest productive sector in many economies, and their very nature is critical to the welfare of society as a whole. Consequently it is suggested that as services constitute a vital component in most international markets African business enterprises need to ensure that they are effectively positioned to compete within this growing international market place. This would imply a need for appropriate research and skills development to support an initiative to compete within the global services economy.

Technology plays a very significant role in the underpinning of a South African services economy and this by implication implies an increasing need for information and communication technology and engineering skills. Yet from discussions with members of the academic community it would appear that the number of students registering for an engineering or computer technology related degree has decreased over the past few years. This trend is confirmed by means of an analysis of the ICT skills audit recently undertaken by the Department of Trade and Industry (DTI), where it is pertinently stated that “the negative trend in the registration of graduate and post-

diploma students is disconcerting" (Department of Trade and Industry South Africa, 2005:44). The impact of the decreasing availability of relevant ICT related skills within an African context would act as a constraint on its ability to compete within a global knowledge based service economy. The actual skills required within a service industry would also seem to suggest that existing curricula would need to be reviewed, as the gap that exists between business and ICT required skills remains a constraint in adopting a SSME approach within the African business world. In terms of the DTI skills audit referred to above only 11.81% of ICT training in South Africa incorporates business related skills (Department of Trade and Industry South Africa 2005:41). The fact that business skills apparently rarely form part of ICT courses is of serious concern if seen within an SSME context. The challenge presented by the multidisciplinary nature of the concept and the need for curricula that cut across these diverse fields of study is a further challenge that needs to be addressed. Africa is not alone in having to address the curriculum challenge, however, as may be seen from the comment by Siegel et al. (2005) that the "development of the needed globally available curriculum to support all aspects of SSME is a huge undertaking for any one institution of higher education". It is a comment that cannot be overstressed within the African context, with its limited academic resources.

The developed countries of the world on average spend 2.5 percent of their gross domestic product on R&D while South Africa, according to a recent press release issued by the Department of Science and Technology, spent 0.87% of its GDP on research and experimental development in 2003/04. (http://www.dst.gov.za/media/press_releases.php? id=44&print=1). The press release indicates that most of the South African R&D is performed in the major research fields of engineering sciences (comprising 23.9% of total R&D), followed by the natural sciences (20.8%) and the medical and health sciences (14.8%). What is not clear is what percentage of the research funding is directed at technology supporting a service based economic agenda. It is also interesting to note that higher education institutions undertakes only 21.1% of national R&D and that is across all faculties. From this it would become evident that universities would require substantial additional financial and human resources if they were to undertake SSME research on any meaningful basis. Such funding requirements would need to compete with other research initiatives such as HIV/AIDS, malaria, and tuberculosis which collectively claim the lives of thousands of Africans each day. South Africa is essentially the primary research centre in sub-Saharan Africa and it is therefore not difficult to see that SSME as an emergent research field, in an African context, would need to gain a far greater awareness as to its importance in terms of a services economy perspective, before any substantial research funding would be allocated specifically therefore.

As far as could be ascertained there currently there are no academic institutions in sub-Saharan Africa who are undertaking SSME research. At best there are islands of related or cross disciplinary research taking place on aspects that could be of relevance within an SSME field of study. There are also no centres similar to the MIT Centre for Engineering System Fundamentals that spans 7 departments as well as the Sloan School of Management that would provide an ideal infrastructure for SSME research. The need for such a centre to conduct SSME research from within and African context it would seem is of vital importance if the service economy is to make any impact on the African Continent. Many public sector institutions, such as those within local government, have a service related mission and all to frequently the services rendered are far from satisfactory. The difficulties encountered by local authorities in certain cases to provide residents with accurate financial statements and deal with account queries are in effect a reflection of the need for a service directed culture with an appropriate management and technological support infrastructure to be established within these institutions. This in turn assumes that the required skills are available therefore, an assumption that clearly does not hold water in the light of the preceding discussion. An important aspect of transformation in moving to a service economy is the accent placed on people skills and knowledge as opposed to natural resources within a manufacturing economy. One of the difficulties that the call centre industry faces in South Africa is the availability of people with the appropriate technical and business skills as well as the supporting values required for competing in this global market, where the focus is on value add at the lowest cost.

Innovation in effect is a human attribute, one that provides an enterprise with a competitive advantage in a highly competitive business environment. Innovation requires a team culture, open to experimentation and calculated risk. Bureaucracies so often encountered in the public sector are hardly conducive to innovation. Managing the culture transition in an enterprise is no easy task and it takes a very special blend of management skills. It is questionable if these skills are prevalent in the African public service sector where hierarchical control tends to be the dominant culture. Innovation requires employees, customers, competitors, and diverse community, views to be taken cognisance of in an open non-threatening environment.

The African philosophy of “Ubuntu” has a rich cultural underpinning value system that embodies participative, consultative, and mutual respect values, which inherently would support an SSME initiative. Ubuntu is an Nguni word that reflects an African philosophy of life which serves as a determinant for what is deemed to be acceptable social conduct. It views the universe as a composite entity with an emphasis on group solidarity over individual interests. As a philosophy or way of life it highlights

the essential unity of humanity placing an accent on empathy, mutual respect and cooperation, all cultural attributes that play a vital role in eliciting innovative ideas within a community or by insinuation an institution The bureaucratic cultures that have evolved in may business institutions are not a natural outflow of the inherent African Ubuntu value system and will need to be challenged as a barrier to innovation and consequently SSME implementation. Bureaucracies stand in stark contrast to the Ubuntu philosophy, as it tends to reflect a centralised power system with a vested interest that is not open to innovation and renewal, but rather maintaining the status quo. The cultural transformation required is therefore essential for eliciting new ideas and enabling the institutions concerned to draw on the collective skills, talents and knowledge of a diverse workforce of engineers, ICT technologists, managers, human resources practitioners and staff with varying professional backgrounds. In this sense it may also be construed to apply to academics from diverse disciplines and academic backgrounds. From the discussion it may be concluded that the social science disciples within South African universities have a significant research role to play in researching and gaining an understanding of how the Ubuntu cultural determinants can be re-inculcated within the world of business and the academia.

SSME research findings need to find their way into African academic journals, which will enrich our understanding of the multiplicity and complexity of the challenges facing us in gaining a competitive position in the global service economy. Most of the current journals and the literature tend to reflect a discipline centric approach, as opposed what may be termed an integrated multi-disciplinary approach. Maula (2005) provides a good description of such an integrated approach, namely one where the boundaries between different disciplines may be blurred but they do not completely disappear. In contrast, to cite Chesbrough and Spohrer (2006:36), the reality would appear to be that “service subfields are emerging in separate, siloed academic areas such as management, engineering and computer science schools, but precious few attempts to integrate them have been taken”. It would seem that South Africa is no exception to the rule in this regard. The need for academic journals that will reflect an integrated multi-disciplinary research approach would be imperative if SSME were to become a discipline in the full sense of the word. Conferences, workshops and colloquiums that engender an understanding and awareness of SSME and its role in positioning Africa within a global service industry will provide suitable content for the journals in question. A further provider of content for such journals would be the research findings emanating from the academic community.

Currently within an African context there is a dearth of SSME based research and consequently the associated report findings are also for all practical purposes

nonexistent. This certainly acts as a constraint in terms of establishing a dedicated academic journal for SSME. A point of departure for the SSME journey on the African continent would be one of engendering an awareness of the emergent discipline within the academic and research community. The focus needs to be on attaining broad interdisciplinary co-operation in conducting the research in question. Virtual networks of researchers could be conceived to be interacting to find answers to many of the service problems confronting us in Africa. These problems could provide common purpose for network-based interactive research initiatives, the findings of which in turn would provide direction in terms of what it will take for Africa to successfully compete on the global services playing fields.

A Euro or American centric service model tends to assume a technology aware client base that has access to a pervasive technological support infrastructure. In a service industry the customer forms an integral component of the service value chain and client perceptions are influenced by how their expectations are meet in practice. Communication technologies play an important role in shaping these expectations and the service business model is far more directed at individual clients as opposed to a mass market as is the case in a manufacturing industry. Understanding the individual client implies a need for information about clients, their perceptions and expectations. Client databases assume an important role in such a service industry. The level of technology awareness and the use thereof within an African context tends to reflect a first world and what may be termed a so-called “third” world component that form at opposite ends of a continuum. The first world component’s technology understanding and access to Internet, communication and information systems are equal to that of the Euro, North American centric contexts. The other end of the continuum is represented by a very large often rural population whose exposure and access to service based technologies is far more restricted. The most pervasive communication technology within the third world scenario is that of cellular phones. Access to the Internet is still limited and relatively expensive when seen from a third world context. The predominant business model in serving the third world component tends to still be structured around a manufacturing and mass-marketing mindset that emphasised economies of scale by means of standardisation as opposed to an individual service directed business model. To succeed within a global service centred marketplace implies that African business institutions need to embrace a different mindset from that which has become part of doing business in a more traditional industrial context. There is also a need to bring the third world component to the opposite end of the continuum discussed, namely a technology and service aware client base that is technology enabled. The need for this is centred in having to compete within a global service economy, where competition is tough to say the least.

Engendering a mindset change within the traditional African business environment will be no small endeavour, as it entails a change in established and entrenched ways of doing things. People tend to become entrenched in comfort zones and the changes required will mean that they need to abandon traditional values, norms, beliefs, practices and related behavioural attributes that collectively define the way things are done around here. The accent needs to move towards a service centric culture and business practice that treats customers not as a commodity but a unique person with a specific set of service expectations and perceptions. This will by implication imply a need for acquiring a new set of skills that embrace technology and service management as a fundamental basis. The adoption of a service directed business model to be able to compete within the global market place will thus be seen to have skills related consequences that would need to be addressed in a traditional African agricultural and manufacturing based economy. Academic institutions will need to ensure that these skills become available for business and industry as they adapt to meet the challenges associated with a service directed business model and this in turn will have curricula implications. As the manufacturing sector of the economy makes way for an emergent services sector the technology support infrastructure will also become a priority. Small to medium business enterprises in rural arrears in particular will need to gain access to the associated information and communication technologies required.

Sam Palmisano's vision of a globally integrated enterprise that is not restricted by international or national boarders has certainly spread far beyond the IBM Corporation. Location is no longer an issue in this highly networked enterprise that has as its central focus a service directed motivation that is supported by its value system. Clients worldwide are invited to participate in an innovation research study to determine the most important drivers shaping the future and in effect thereby the strategies of the corporation. Africa is to apparently feature as an important component of the Global Innovation Outlook three studies to be undertaken during 2007. This stems from the need to also gain an insight into the environmental and market forces that are interacting in shaping the African continent's future context. Already the IBM Corporation has established a call centre in Johannesburg that provides services to clients in Europe, thereby creating a large number of jobs so desperately needed to deal with South Africa's unemployment situation. As more and more business institutions operating in the global market place include Africa as part of their operations, the opportunity exists for significant economic growth with an associated job creation element.

Africa needs to compete with other developing nations to gain a share of this largely services related business and factors that play a key role in this highly competitive

context is the availability of the appropriate skills required, level of management expertise, the existence of an ICT support infrastructure, and a service directed mindset, to but name a few. Corporations setting up offshore facilities to service a global market have many geographical regions to choice from and Africa, if it is to capitalise on the opportunities presented, needs to ensure it is in the race. This means that SSME needs to gain far greater prominence in its preparation for what could be termed the services Olympics. Many developing nations will be taking part and if Africa is to win some of the events serious consideration needs to be paid to the SSME framework. It serves as a source of reference for preparing African nations for the Services Olympics.

South Africa has entered the race in the Manufacturing Olympics, but it remains to be questioned if it is ready to enter the Services Olympics. The playing fields for the Services Olympic games is hardly level and Chine and India have taken cognisance of many of the fundamentals embodied within the SSME model and are well positioned to win many of the events or business opportunities presented. It is interesting to note that even they have yet to adopt the holistic SSME model on a strategic basis. In essence they tend to focus on many of the components of the model that is not as comprehensive in nature as that envisaged in the integrated SSME approach. In these games knowledge assets will play a far greater role relative to physical and financial assets in the manufacturing sector of the economy (Rouse & Baba 2006:67). Changing the "nature of the game will require fundamental transformation of many enterprises" (Rouse & Baba 2006:68) in sub-Saharan Africa. "Business process improvement, or business process reengineering, will not be sufficient" (Rouse & Baba 2006:68). These methodologies are more in line with that applicable in a Manufacturing context. The issue according to Rouse and Baba (2006:68) is one of doing new things in new ways". Information and communication technology can be both drivers and enablers of transformation. Rouse and Baba (2006:69) cite knowledge management, collaboration technology, and increasingly identity management as examples of such transformation. At the core of the SSME model is the need to take multiple and often diverse perspectives in relation to the transformation process. If Africa is to win many of the opportunities presented in the services sector there need to be a move to gain an understanding of the role played by knowledge management, competitive intelligence, complexity management, collaboration technologies and similar considerations from within a SSME research approach.

It is contended by Hyland, Marceau and Sloan (2006:183) that "university researchers are often regarded as centres of excellence in exploring and delivering new knowledge" and if correct, it would seem to suggest that if SSME is to gain in

relevance within an Africa context, the academic community need to be seen as leading the thought leadership in this regard. In a study undertaken by the researchers in Australia (Hyland et al. 2006:188) it was found that the respondents involved "overwhelmingly used publicly funded services to source information, knowledge, skills, technology and other non-financial inputs to innovation". Examples of these services cited include "guides; summaries; analysis; reports; seminars or workshops published or promoted by publicly funded organizations or government; information published on websites; services and schemes delivered via public agencies offering subsidized or free consultancy, advice, training and awareness updates; and human-resources services" (Hyland et al. 2006:188). Notably, they went on to find that when asked to rate the importance of sources of such information 23% of the international and 30% of the local nationally competitive institutions viewed universities as very important sources of information and ideas (Hyland et al. 2006:188). In the absence of similar research within an Africa context that contradicts these findings it may be assumed that the role played by African higher education and research institutions would tend to be similar in nature. The dearth of SSME research and information within an African context previously alluded to means that it is entering the starting blocks of a highly competitive race in the Service Economy Olympics with a knowledge and experience deficit.

It is hardly surprising that one of the world's largest ICT corporations, namely IBM has teamed with a number of leading universities, known for their thought leadership and innovative research, in order to explore SSME as a means for competing in the global service economy. In this regard in aught to be noted that Carnegie Mellon has instituted a new course as from 2003 in managing service organisations (Iqbal 2005), the North Caroline State University proposes to create new service science programs (Hidaka 2005) and even in Japan the Advanced Institute of Science and Technology has launched a new course centred on service sciences (Hidaka 2005). Siegel et al. (2005) confirm that SSME is gaining visibility and attracting the attention of leading university researchers and that several universities in the United States are currently offering courses within this field of study. The importance attributed to partnering with academic institutions by IBM in conducting research and courses in services science stems to a large degree from the fact that services constitute a significant component of corporation's business operations. This would seem to suggest that if SSME is to become a meaningful field of study within African universities, there is a need for business institutions operating in the services economy to partner with and support the research efforts within these universities. Of equal importance is the need for these institutions to identify the skills that they will require and motivate the need for the development of curricula that will ensure that the required skills are available to African industry and business.

CONCLUDING SUMMARY

The significant economic growth scenario for the future is one of a transformation from a manufacturing to a service economy. It is a future where the use of innovative technology will play a fundamental role in changing the nature of the services provided. Services by implication embody a human domain of knowledge, experiential learning and a host of behavioural determinants that needs to be taken into consideration. Management of what may be termed a globally integrated chain of partnerships that collectively define the end-to-end value chain in service delivery entails a fundamental rethink in terms of traditional management practice. The science of service management and engineering is a blend of complimentary social, economic, cultural, information and communication technology and management aspects that interact in a complex pattern of relationships to provide clients with a service experience that exceeds their expectations. If Africa is to meet the challenges it is confronted with, serious consideration needs to be given to adopting an SSME approach by business institutions irrespective of size. SMMEs in particular ought to take cognisance of the opportunities resented within the global service economy and SSME as a means to compete in the Service Olympics. African Academic and research institutions can no longer afford to negate there though leadership role in supporting both the private and public sector to compete in these highly competitive Olympic events as the consequences for the continent are just far too great.

BIBLIOGRAPHY

Bitner MJ., Brown SW., Goul M. & Urban S. 2006. Services science Journey: Foundations, progress challenges. Paper presented at Almaden conference on Education for the 21st century. Internet: http://www.almaden.ibm.com/asr/summit/papers/ asubitner.pdf

Friedman TL. 2006. The world is flat: The globalized world in the twenty-first century. London: Penguin.

Hidaka K. 2006. Trend in service sciences in Japan and abroad. Quarterly review 19:35-47. Internet: http://www.nistep.go.jp/achiev/ftx/eng/stfc/stt019e/qr19pdf/STTqr1903.pdf

Horn P. 2005. The new discipline of services science: It's melding of technology with an understanding of business processes and organization – and it's crucial to the economy's next wave. Business Week on Line, January.

Internet: http://www.businessweek.com/technology/content/jan2005/tc20050121_8020.htm

Human Sciences Research Council. 2005. National survey of research and experimental development: 2004/2005 fiscal year. Internet: http://www.hsrc.ac.za/RnDSurvey

Hyland PW., Marceau J. and Sloan TR. 2006. Sources of innovation and ideas in ICT firms in Australia. Creativity and innovation management, 15(2):182-194.

Iqbal M. 2005. Getting students excited about services: Providing a context for applying their newly acquired knowledge. Presentation at IBM Almaden Research Centre, (October).

Kurokawa T. 2005. Service Science – A Japanese perspective: Pitfalls and opportunities. Presentation at IBM Almaden Research Centre, (October).

Lohr S. 2006. Academia dissects the services sector: but is it a science? The New York Times, 18 April. Intenet: http://www.nytimes.com/2006/04/18/business/18services.
html?ex=1169874000&en=dee4341084b85982&ei=5070

Maglio PP., Srinivasan S., Kreulen JT. & Spohrer J. 2006. Service Systems, Service Scientists, SSME and Innovation. Communications of ACM, 49(7):81-85, July.

Maula M. 2005. Knowledge-intensive services, knowledge/information management, and dynamic complexity – An interdisciplinary approach to service science. Presentation at IBM Almaden Research Centre, (October).

Oxton G. 2005. An integrated approach to service innovation. Presentation at IBM Almaden Research Centre, (October).

Paulson LD. 2006. Services science a new field for today's economy. Internet:
http://www-304.ibm.com/jct09002c/university/scholars/skills/ssme/emergence.pdf

Pauw K., Oosthuizen M. & Van Der Westhuizen C. 2006. Graduate unemployment in the face of skills shortages: A labour market Paradox. Paper presented at the 2006 conference on accelerated and shared growth in South Africa: Determinants, constraints and opportunities. Johannesburg : Birchwood Hotel and conference centre, 18-20 October.

Pouris A. 2006. Technology transfer and diffusion: Capacity and potential in South Africa's public education sector. Research report for Higher Education South Africa.

Rouse WB. and Baba ML. 2006. Enterprise transformation: Fundamental enterprise changes begin looking at the challenges from technical, behavioural and social perspectives. Communication of the ACM, 49(7):67-72, July.

Rust RT. And Miu C. 2006. What academic research tells us about survival. Communications of ACM 49(7): 49-34, July.

South Africa. The Department of Trade and Industry. 2005. An analysis of the ICT skills audit for Dti and ISETT SETA. Research report prepared by Vukanikids.

Spohrer J. & Maglio PP. 2006. The emergence of service science: towards systemic service innovations to accelerate co-creation of value. IBM Almaden Research Center.
http://www-304.ibm.com/jct09002c/university/scholars/skills/ssme/emergence.pdf

Spohrer J., MaglioPP., Bailey J. & Gruhl D. 2006. Steps towards a science of service systems. IBM Research, Almaden Research Centre. http://www.almaden.ibm.com/asr

Siegel J., Hefley B., Evenson S. & Slaughter S. 2005. Legitimizing SSME in academia: Critical considerations and essential actions. Presentation at IBM Almaden Research Centre, (October). Internet:
http://www.almaden.ibm.com/asr/summit/papers/cmuhefley. pdf

Wölfl A. 2005. The service economy in OECD countries. Organisation for Economic Co-operation and Development, STI Working paper 2005/3 Statistical Analysis of Science, Technology and Industry. Internet: http://www.olis.oecd.org/olis/2005doc.nsf/43bb6130e
5e86e5fc12569fa005d004c/6583b6e114e5c0ccc1256fa50050c7e1/$FILE/JT00178454.PDF