THE CULTURE AND SKILLS CHALLENGES ASSOCIATED WITH SERVITIZATION: A SOUTH AFRICAN PERSPECTIVE

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The boundaries between the manufacturing of products and the provision of service are increasingly breaking down and becoming blurred as institutions implement servitization strategies. It is suggested that there are, however, two very pertinent hurdles that need to be overcome in implementing such a strategy, namely culture transformation and the development of a new set of skills required for dealing with service provision. These challenges confronting management were analysed on the basis of a multidisciplinary literature research and the findings emanating from the study are briefly dealt with in this paper. A particularly important finding relates to the fact that in addition to manufacturing technological skills, a far wider range of multidisciplinary skills are required and these within a South African context are not always readily available. In addition it was found that traditional management paradigms of culture transformation may not be all that effect in dealing with a very complex servitization contextual setting. These findings and the insights gained from the research study could be of value to executives and managers of South African manufacturing institutions who are considering implementing a servitization strategy.

Key phrases: Servitization; services economy; services science, organisational culture; T-shaped people skills; complexity theory.

INTRODUCTION

> *"Management literature is almost unanimous in suggesting to manufacturers that they should integrate services into their core product offering. The literature, however, is surprisingly sparse in describing to what extent services should be integrated, how this integration should be carried out or in detailing the challenges inherent in the transition to services"*
>
> (Oliva and Kallenberg 2003:160)

A review of a number of countries whose services sector comprises more than 60% of their GDP, based on the GDP economic sector results for the 133 countries included in the World Economic Forum's (2009:55) competitiveness report for 2009-2010, reveals that a significant 40.6% of the counties involved have a services sector GDP of over 60%. Even more pertinent is the finding that just on 70% of the 133 countries listed have a services sector GDP of over 50%. This suggests that more than two thirds of these countries have a services dominant economy. South Africa is no exception in this regard and services account for 66% of the country's GDP (World Economic Forum 2009:55). Buera and Kaboski (2009:1) in terms of their research findings very pertinently claim that two of the most salient trends in the United States economy have been the "*rising importance of the services sector and the growth in the premium to skill despite a large expansion in the relative supply of high-skilled workers*". Oliva and Kallenberg's (2003:160) introductory statement needs to be seen within this context, namely of services becoming the predominant sector of the global economy and the importance attributed to the availability of

appropriate skills to deal therewith. Quite notable as well in this regard is the IfM and IBM assertion in their white paper that "*businesses find it difficult to transform from a product to a service business model".* It apparently in effect entails a rather significant change in management mindsets, as to how business is conducted and consequently the culture of the institution itself. With this in mind the focus in this paper will be on gaining an insight into the concept "organisational culture" and the skills implications involved in managing what has become known as the servitization process. The research study is primarily based on a literature review and analysis.

It would appear that Vandermerwe & Rada (1988:314) were the first researchers to have coined the term the term "servitization" with there statement that "*modern corporations are increasingly offering fuller market packages or "bundles" of customer-focussed combinations of goods, services, support, self-service, and knowledge. But services are beginning to dominate. This movement is termed the 'servitization of business*'. It is a term that seems to have gained increasing relevance in light of the global trend of a shift from a manufacturing to a services dominant economy. For the purpose of this paper "servitization" is therefore defined as the transition from a manufacturing to a services dominant operational environment. It does not imply that manufacturing is no longer important, but merely that services have now also assumed their rightful place in the management of a contemporary manufacturing and business institution.

In the ensuing sections of this paper the concept of "servitization" will be briefly analysed from a process perspective; the concept "organisational culture and its influence on the servitization process will be explored, as well as the question of how the culture transformation can be facilitated; and in the final instance the skills related implications of managing servitization will be analysed, with specific reference to the prevailing South African skills situation.

SERVITIZATION: A SYSTEMS PERSPECTIVE

Oliva and Kallenberg's (2003:161) claim that the "*transitioning from product manufacturer into service provider constitutes a major managerial challenge*". Underpinning this contention, according to the researchers, is the fact that services require organizational principles, structures and process that are relatively outside manufacturers' traditional frame of thinking (Oliva & Kallenberg 2003:161). What is suggested in paper is that at an operational level the integration of services and manufacturing, as well as the inherent characteristic differences associated with products and services need to be taken into consideration, as they have definite process and management implications. A typical example of this is the active

participative role played by clients in the service delivery process, whereas in the manufacturing of products the client rarely becomes involved in the manufacturing process. Desmet, Van Dierdonck and Van Looy (2003b:41,45) describe adapting to the dual role of the client, as both customer and co-producer, as representing a serious management challenge, one which they claim requires a fundamentally mindset change. The intangible nature of services is deemed to be one of the most often cited characteristics that differentiate it from products (Desmet, Van Looy & Van Dierdonck 2003a:12; Fitzsimmons & Fitzsimmons 2008:20). Whereas products are tangible and produced, services are acts that are performed and are therefore not able to be stored, they are simultaneously produced and consumed (Desmet et al 2003a:12,14; Fitzsimmons & Fitzsimmons 2008:19; Vandermerwe & Rada 1988:315). This fundamental distinction has many services management implications that require a different mindset from that of product manufacturing and marketing.

Adding to the complexity of the mind shift change required in the servitization process is the extent to which service and product manufacturing, from an operational perspective, have become interwoven. Vandermerwe & Rada (1988:316) claim that firms now tend to offer clients bundles consisting of customer-focused combinations of products, services, support, self-service and knowledge. Implied but not specifically mentioned is the notion of information that is inherently captured in the latter cited knowledge component. Information provision and consequently the management thereof is rapidly becoming a very important characteristic of services management, particularly when seen in a contemporary era of web-based service delivery. The boundary lines between product manufacturing and service provision are in effect becoming increasing blurred, fuzzy and certainly complex in nature. While product standardization so as to realise economies of scale has become common practice, services are not all that easy to standardize. The services required by clients at a micro level can be quite different and consequently require customised solutions. Any servitization efforts will soon be confronted with this reality, in particular the need for developing strong relationships with each and every client. Vandermerwe & Rada (1988:318) confirm that previously the focus was on meeting client product needs, whereas this has now also incorporated a new dimension of management, namely the development and maintenance of sound client relationships. Oliva and Kallenberg (2003:168) also emphasis that servitization incorporates a mind set change from being “transaction- to relationship-based”.

Oliva and Kallenberg (2003:168) mention that “*relationship-based services centered around the product normally take the form of maintenance contracts*”. Increasingly, with the technological sophistication of so many products, clients require after sales maintenance and repair services and providing these on some form of contract basis

increases an institution's revenue stream. It has also become a means whereby institutions are able to differentiate their products from that of competitors, namely in terms of the services that they are able to offer. The move towards services maintenance contracts is also, as suggested by Oliva and Kallenberg (2003:168), often triggered by a desire to make better use of the institution's installed service capacity, as once the service infrastructure is in place, it becomes a fixed cost and the main driver of profitability is capacity utilization. While products can be stored to even out the fluctuation between demand and supply, this is clearly not an option when it comes to services and, capacity and queuing management assumes a far greater relevance (Fitzsimmons & Fitzsimmons 2008:294). It is suggested that these are important concerns when it comes to service rendering and relationship management, as they play an important role in gaining a competitive advantage in a very competitive global and South African marketplace. The economics of "waiting" entails a management mindset change when it comes to servitization. Clients can be lost if management get capacity and queuing planning wrong and client relationships can be seriously damaged.

It is contended by Quinn, Doorley and Paquette (1990:60), that once owning the largest manufacturing resource and research laboratories were seen as being a means for gaining a competitive advantage, while today they are easily bypassed or reverse engineered and instead a maintainable advantaged may best be derived from services capabilities, such as vested in outstanding people skills, logistical capabilities and knowledge. It is very pertinently suggested by Quinn et al (1990:60) that services related strengths are far more difficult to replicate by competitors. The implied emphasis is therefore one of servitization requiring a different mindset orientation when it come to gaining a competitive advantage from less tangible factors, such as people skills and knowledge resources.

It is suggested in this paper that the convergence of product manufacturing and services related processes or as termed to be servitization, inherently necessitates the need for a very fundamental change in traditional manufacturing paradigms, as services in terms of the very nature thereof introduce nuance differences that are not accommodated within a manufacturing operational setting. Baines et al (2007:1546) would seem to support this suggestion in claiming that traditionally management viewed products and services as constituting different entities of management, yet the convergence trend implies that they need to be considered as an entity with nuance differences taken into consideration. The convergence or evolution as it is termed and described by Baines et al (2007:1546) can take place from a product or services perspective, the end result, however, being an integrated product service system. The researchers also stress that the institution's competitive edge is

enhanced by the services provided, that in practice are not all that easily copied (Baines et al 2007:1548). Of particular pertinence, however, from this paper's perspective is the researchers contention that there is a need for the institution to move from a product mindset to "systems thinking", namely an integrated manufacturing and services system paradigm of management. It is argued that such a paradigm needs to factor in the nuance differences that exist between service and manufacturing from a systems or process perspective.

Underpinning most production systems thinking has been the notion of increasing production and reducing cost, while improving the quality of the product. Central to such systemic thinking is the emergence of concepts such as "total quality management" (TQM), based on the thought leadership of people such as Philip Crosby, Joseph Juran and Edward Demming (Cronje, Hugo, Neuland & Van Reenen 1994:306; Oakland & Sohal 1996:3) and "business process reengineering" (Hammmer & Champy 1993:2). The golden thread running through concepts such as these is the mechanistic philosophy of scientific management (Martin 1995:17). The overarching management philosophy of the manufacturing era has become ingrained in management thinking and incorporating a services "relationship" philosophy of management generally necessitates a very fundamental reorientation in the mental models of management thought. The complex nature of services science as a field of management also introduces the need for a complex adaptive systems (CAS) approach in dealing with the challenges concerned, which undoubtedly further necessitates a rather fundamental change in the way services operations are conducted. It is substantiated in the IfM and IBM (2008:6) white paper that "*what has changed is the scale and complexity of service systems".* It is also claimed that "*the rise in complexity is partly due to the expansion of our values in social, ecological and political dimensions*".

The IfM and IBM (2008:8) white paper defines a service system as "a dynamic configuration of resources (people, technology, organisations and shared information) that creates and delivers value between the provider and the customer through service". It is further claimed that "a service system is a complex system in that configurations of resources interact in a non-linear way" and "primary interactions take place at the interface between the provider and the customer", which as seen in the preceding discussion places an emphasis on relationship management. It may therefore be concluded that adopting a CAS approach in dealing with services management is a definite departure from the more scientific management approach assumed in dealing with manufacturing systems. With this in mind it is important to note that it is very pertinently stated in the IfM and IBM (2008:9) document that "the vision of Service Science, therefore, is to discover the

underlying principles of complex service systems (and the value propositions that interconnect them)". As alluded to in the introduction, the accent in this paper will be to focus on two elements of the services system, namely organisational culture and skills transformation, both of which it would seem need to be considered from a CAS perspective.

AN ANALYSIS OF THE CONCEPT ORGANIZATIONAL CULTURE: A SERVITIZATION FRAME OF REFERENCE

Schermerhorn, Hunt & Osborn (2008:364) describe organizational culture as a "*system of shared actions, values and beliefs that develops within an organization and guides the behaviour of its members*". Of specific relevance in this definition is the reference to culture as a system of shared cultural attributes that serve as a behavioural determinant. As such it can be expected to have an impact on the implementation of the servitization process. Another often cited definition of organizational culture within the management literature (Leidner, Alavi, Kayworth 2006:19; Bates, Amundson, Schroeder & Morris 1995:1568; Newman 1996:17; Weeks 2008:126) is that of Edgar Schein, namely: a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and therefore to be taught to new members as the correct way to perceive, think and feel in relation to those problems. Of significance in the cited definition is the notion of culture "emerging" from a process of group learning in problem solving, as group members interact.

More plainly stated by Trompenaars and Prud'Homme (2004:14,15) as well as Tromp (1998:32) is the contention that organisational culture is *"the way we do things around here*" or "*the way the organisation does its business*". Trompenaars and Prud'Homme (2004:15) claim it is a popular definition among consultants who "promise a quick fix" solution. Having defined the concept Tromp (1998:32) goes on to claim that "*as manager, your personal style and behaviour exerts a major influence within your organisation unit. If you wish to change the culture, start with yourself*". The two points made here that need to be considered are that culture, as a behavioural determinant, plays a very fundamental role in how institutional business activities are conducted and secondly that the management of the institution is instrumental in shaping the culture of the institution. Cleary implied in the statement therefore is the traditional view that management can in fact reengineer or change the culture of an institution by merely changing their own behaviour or leading by example. If this contention is valid then a key role to be played by management in the

servitization process, or in changing the way things are done within the institution, would be to merely change their own behaviour patterns. It is a contention that in a sense resonates with Schein's definition, which implies that employees through a process of learning can acquire a new set of cultural attributes and consequently move from a manufacturing to a service driven cultural setting. In terms of Tromp's (1998:32) assertion it would be a process that is management determined and lead. This traditional view of the concept "culture" is in line with scientific management thinking and it is without doubt challenged when the concept is analysed from a complex adaptive systems perspective.

In a research study undertaken by Weeks and Lessing (1993:29) it was found that organisational culture traditionally tended to be defined in terms of what could be described as being a set of cultural attributes, namely expectations, norms, philosophies, assumptions, values and beliefs, which employees of the organisation come to share through a group learning process and that are manifest in organisational symbolism. It was further determined that the symbolic construction served as a means for organizational conceptualisation and as a means for deciphering the organisation's culture, as well as achieving cultural change via symbolic manipulation (Weeks & Lessing 1993:29). In terms of this traditional view management behaviour as a change mechanism, as previously alluded to, could be deemed to assume a symbolic connotation. It is also a view that assumes that organisational culture can be actively managed to ensure that a so termed desired culture is manifest in the institution. Trompenaars and Prud'Homme (2004:34) state that institutions that had bought into the notion that culture can be actively managed have spent significant financial resources on consultants brought in to assist them to "roll-out" a new desired culture. The researchers also claim that this is generally followed by a sense of frustration that has left management and staff of these institutions rather cynical (Trompenaars and Prud'Homme, 2004:34).

Bennet and Bennet (2004:10) note that culture transformation constitutes a very fundamental barrier that institutions face as they attempt to become "world class", so as to gain a competitive advantage in a very competitive marketplace. They confirm that many theories and process exist in relation to culture change, most however, offer no guaranteed solutions (Bennet & Bennet 2004:10). It is noted by the researchers that before an organisation can adopt new practices to significantly change the way it conducts its business it must be willing to admit that current practices are inadequate, which in essence requires a paradigm shift (Bennet & Bennet 2004:11). They also claim that resistance to this mindset change is usually high and could even go unrecognized by management. Apparently the risk associated with changing the ingrained thinking is deemed to be so large that the

"learning" of a new way of doing things becomes a major challenge (Bennet & Bennet 2004:11). Servitization entails a very fundamental change in thinking at all levels within an institution as to the way that things have traditionally been done and following this line of thought would seem to suggest that significant resistance can be expected. Munck (2002:23) concurs that transforming an organisation's culture constitutes one of the most fundamental, challenges confronting an institution, as people's natural inclination is to hold on to whatever feels familiar, even if confronted with better alternatives. Munck (2002:29,30) also suggests that the problem is one of getting people to truly want the change in the first place.

It is concluded by Brown (1995:xi) that the traditional mechanistic view is one of organisations being rationalistic entities that require managers to follow what is deemed to be "good practice". The more contemporary view, according to Brown (1995:xi) is that organisations are often irrational and highly political in nature and the interest in organisational culture stems from this realisation and it is suggested that the accent in dealing with organisational culture aught to be on gaining an understanding of dealing with this unpredictable nature of institutions. Citing Taylor, one of the first anthropologists who introduced the term "culture", Brown (1995:3,4) refers to it as a "complex" system of cultural attributes that are acquired, endowing the concept with a form of social reality. The social connotation and its associated complexity, it is claimed by Brown (1995:5) are reflected in the politics of negotiation that takes place within institutions. Social systems are inherently complex in nature and Cilliers (1998:3) characterises such living (human social) systems as sets of non-linear relationships, which in effect implies a sense of unpredictability. Implied therefore in adopting a CAS approach in dealing with culture is the notion of not being able to specifically predict the outcome of culture intervention strategies. It is suggested that it is this reality that often engenders the frustrations that Trompenaars Prud'Homme (2004:34) claims executives experience in attempting to transform the culture of the institutions concerned.

Axelrod and Cohen (1999:11,14,30) attest to the difficulty of prediction in designing strategic interventions, but also claim that it does not make the situation hopeless, it merely entails a different way thinking about managing change. The focus would seem to be on the interaction that takes place between people, or in terms of complexity theory agents, that give rise to a new "emergent" organisational cultural identity that shapes behaviour patterns and influence people's perceptions of reality within institutions. Richard Seel (2000:2) is a researcher who very specifically supports the view of culture as an emergent property, in stating that it "*is the result of all the daily conversations and negotiations between the members of an organisation*". By implication nurturing a culture supportive of "servitization" will

necessitate a need for executives and managers to become active participants in all these conversations. Seen within this context it is suggested that note also be taken of Seel's (2000:2) assertion that "*changing conversations is not the focus of most change programmes, which tend to concentrate on organisational structures or reward systems or other large-scale interventions*", all of which he claims have limited success. Seel (2000:2) in contrast claims that most change in complex systems is emergent; that is to say it comes about as a result of the interactions between the 'agents' in the system.

The picture that materialises from the above discussion is one of traditional management practice tending to view culture change as an intentionally managed transformation process, one with a clearly determined end or desired state in mind (Brown 1995:130-131; Newman 1996:64,68; Weeks & Lessing 1993:40). Kilmann (2001:14) describes this trend as being "Cartesian-Newtonian" in nature, thereby insinuating a reference to its rational, logical and ordered origins. The very term "transformation" used within a context of culture change, that implies a change from an existing to a desired state, may in fact be unfortunate, as it resonates with well entrenched management practice that emerged in an era of deterministic thinking and which in effect correlates with Kilmann's (2001:14) Cartesian-Newtonian description thereof. This would seem to stand in contrast to a CAS view where change is emergent; that is to say it comes about as a result of the interactions between the 'agents' or people in the system (Seel 2000:2). Seen in the context of this paper where servitization entails a very definite socio-cultural construct it could be argued that executives and managers need to nurture a climate of trust, mutual respect and above all enablement, where traditional values, beliefs, norms, assumptions, practices and ways of doing things can be questioned in order to nurture a services orientated culture. Implied therein is the notion of emergence or evolution through a process of narrative exchange or negotiation and interaction that takes place at all levels within the organisation.

It has been stressed that servitization in essence entails a very fundamental change in mindset, which underscores the cultural emphasis and its importance as a behavioural determinant. Pfeffer (2005:125) concurs that organisational interventions and management practices relies on some implicit or explicit model of human behaviour and in order to change the management practices concerned a change in mindsets or mental models is imperative. Changing how people think it is claimed by Pfeffer (2005:125) is difficult, as their mental representations or mindsets are often deeply embedded below the surface of conscious thought. The mental representations constitute assumptions, values and beliefs that could in effect be conceptualised in terms of what Brown (1995:21) deems to be the cognitive sub-

structure of organisational culture. Surfacing these cultural determinants would appear to be important in gaining an understanding of the prevailing culture of the institution and also in facilitating a change in culture. Pfeffer (2005:125) in fact advocates that in spite of the apparent complexity and difficulty involved, changing the way people think is the most powerful means to ultimately change behaviour, which in terms of servitization is deemed to be of vital importance. Seen in this context, it is therefore quite comprehensible that Baines et al (2007:1549) could assert that servitization brings with it significant cultural challenges.

Magnusson and Stratton (2000:33) identify key cultural attributes that services driven institutions emphasis, namely innovation, flexibility, customization and variety, which they claim run counter to that of manufacturing enterprises, where the emphasis is deemed to be on standardisation, economies of scale and efficiency. To this list could certainly be added the need for being able to nurture sound relationships with all stakeholders involved in the activities of services orientated enterprises, in particular with clients (De Wulf 2003:58; Magnusson & Stratton 2000:33). The cultural accent would in effect entail a shift from a manufacturing or product transactional mindset, to a services relationship cultural orientation (Oliva & Kallenberg 2003:166). Magnusson and Stratton (2000:63) concluded from their research findings that traditional manufacturers normally did not have the culture to internally anchor services development, implying a lack of mental models, paradigms or mental representations for conceptualising services. McCarthy (1998:157) also draws a correlation between people's cognitive maps and the underlying cultural representations on which they are based.

It is concluded from this discussion that within a servitization frame of reference, a CAS's perspective of culture change, as an emergent property of group negotiation, discussion and interaction, could well be appropriate for nurturing a relationship based services culture. Snowden (2002:4) for instance pertinently states that "we cannot engineer culture" and in a complex system the focus is on attempting to facilitate a shift in the patterns of meaning that exist between people. It is proposed that culture transformation during the servitization process needs to be an evolutionary as opposed to a revolutionary process. It is further contended that a narrative based CAS approach aught to be considered.

Browining and Boudès (2005:32) define "*narrative" as "a type of communication that happens in conversation, is composed of discourse, appears in a sequence, and is interpreted retrospectively*". The researchers emphasise three characteristics of complex systems, namely non-linerar relationships, emergence and unexpected outcomes (Browining & Boudès 2005:32). They then question how these concepts

come together and claim that the two most well-known and comprehensively developed models using narrative analysis for dealing with complex constructs, such as culture transformation, are that of Weick and Snowden (Browining & Boudès 2005:32). Apparently both Weick and Snowden claim that contextual complexity are best understood when narrative, including the richness of metaphor and flexibility of storey, are invoked (Browining & Boudès 2005:33). Accordingly, institutions become interpretation systems of participants who provide meaning for each other via their everyday interactions (Browining & Boudès 2005:32).

Patrick Lambe (2005:1) very specifically suggests that organizational culture is represented by common themes and resonances that are replayed and reinforced in narrative. It is also contended by Lambe (2005:1) that archetypes are characterizations of people abstracted from real experiences, but expressed at the level of culture as a whole and can therefore be surfaced through a sample of the stories that a culture tells about itself. Insinuated therefore is the notion that by identifying and capturing the archetypes, by means of narrative enquiry, the culture of an institution can be analysed. The process enables a shared awareness as to the cultural archetypes embedded within institutional paradigms that shape members behavioural patterns. Within a servitization context such awareness and an understanding of the dysfunctional behavioural consequences of the prevailing culture, in a services orientated operational setting, can facilitate and direct the cultural discourse that takes place within the institution. It is suggested that this discussion will be instrumental in shaping the emergence of a new cultural identity that will be more appropriate for dealing with the complexity of a manufacturing and services operational setting. The discourse is so deeply rooted in the institutional community experience that it takes time to evolve, but has a very definite outcome that is framed by the servitization process itself. It, however, needs to be emphasised that it is not possible to accurately predict the nature of the outcome itself, as it is an emergent property of a CAS.

Browining and Boudès (2005:32) claim that Snowden and Weick, in dealing with a CAS, see local behaviour and self-organisation as key responses to non-linear conditions, which as seen from the above discussion prevails within a servitization situation. They also place emphasis on participation and management by exception as concepts that provide an alternative to the traditional scientific paradigm or dominant model of management control (Browining & Boudès 2005:37). It is argued by Browining and Boudès, (2005:32) that Snowden and Weick's models direct management towards developing sufficient trust so as to empower people to participate in local complex conditions, including the right to respond instantly. Notably, within a services operational environment it is employees and not

management who are in direct contact with clients and who need to be able to respond to client service related requests and staff empowerment therefore particularly assumes relevance in any servitization process.

In summary it would seem that a CAS narrative based approach in dealing with culture transformation, as part of the servitization process, has relevance and aught to be considered by institutions who envisage implementing a servitization strategy. Organizational culture as a perceptual and behavioural determinant can definitely not be overlooked in formulating the strategy, as it could well derail the servitization process in implementation.

Skills development as a determinant in the servitization process

A common theme that Magnusson and Stratton (2000:52-52) encountered in interviewing managers who had undertaken a servitization process, was the stress placed on the need for additional services related skills to compliment an existing manufacturing skills base. Three principal employee skills participants apparently listed as being indispensable were an external focus, customer accessibility and solution orientated thinking (Magnusson & Stratton 2000:52-52). The entire panel of people interviewed, it is claimed by Magnusson and Stratton (2000:52), agreed that "*services require a different mind-set all together; the knowledge base is more 'intellectual' in nature and because of the higher interpersonal involvement, interaction skills gain weight and meaning*". It is a theme which would seem to be reflected in the IfM and IBM (2008:6) white paper, namely that "*the rising demand for service innovation has huge implications for skills and the knowledge base that underpins them*". It is argued in the document that the gaps in knowledge and skills needed to deal with complex service systems indicate a need for reassessing the prevailing situation as it relates to the profile of skills required and that available (IfM & IBM 2008:10). Advocated in the IfM and IBM (2008:19) white paper is the need for what is termed T-shaped professions "*who are deep problem solvers with expert thinking skills in their home discipline but also have complex communication skills to interact with specialists from a wide range of disciplines and functional areas*".

Other researchers who place emphasis on skills as a determinant in the servitization process are Mills, Neaga, Parry and Crute (2008:9) who suggest that there needs to be a recognition that much of the services strategy and "*plan will be about building importing and sustaining new skills*". The researchers also claim that the *scope of the knowledge and skills to be developed is wide* (Mills et al 2008:9). Clearly, their reference to the wide scope of skills required is in line with the previous IfM and IBM (2008:19) assertion that they need to be able to interact with specialists from a wide

range of disciplines. Implied is the need for "*people with both breadth of understanding and depth in service industry specific skills*" (IfM & IBM 2008:29). In a service driven global economy, gaining an advantage in the marketplace will imply a need for people who have the appropriate skills to meet the diverse services needs of clients, or as previously alluded to T-shaped people skills. The following statement by Tim Brown (2005) serves as a case in point:

> *"We look for people who are so inquisitive about the world that they're willing to try to do what you do. We call them "T-shaped people". They have a principal skill that describes the vertical leg of the T – they're mechanical engineers or industrial designers. But they are so empathetic that they can branch out into other skills, such as anthropology, and do them as well. They are able to explore insights from many different perspectives and recognize patterns of behavior that point to a universal human need. That's what you're after at this point − patterns that yield ideas."*

It may be indirectly inferred from the quotation that creativity and innovation in gaining an advantage within a highly competitive global marketplace requires a new mindset as well as a multi-disciplinary skills base. Underpinning the change is the development of a service paradigm of management, the traditional paradigm being largely manufacturing and technology biased, thereby limiting the applicability thereof within a services science context (Larsson & Bowen 1999:214; Stuart 1998:470). A case in point is the "*phenomenon of customers participating in the production of services*" (Larsson & Bowen 1999:214), a situation not easily accommodated within a traditional manufacturing setting, where the accent is on product standardization and not services customization to meet client needs in the services encounter. The multidisciplinary services related skills required to effectively function within a very competitive marketplace will therefore need to be acquired by the organisation in the implementation of its servitization strategy. This contention would seem to be supported by Camuti's (2006:1) assertion that "*preparing future engineers in the Age of Globalisation requires additional skill sets beyond traditional technical capabilities, skill sets drawn from the humanities, social sciences and above all foreign languages*".

Research conducted by the University of Pretoria's Graduate School of Technology Management (GSTM) in South Africa specifically revealed the need for services management related skills in order to assist government business and industry in there servitization efforts (Weeks 2009:5). Similar research undertaken by Mukhtar et al (2009:357) at the University of Kebangsaan in Malaysia also revealed that the university faced many challenges in equipping graduates with the right skills and attitudes, so as to ensure that they would be employable. The shift from a predominantly manufacturing to a services based economy, it is claimed by Mukhtar

et al (2009:357), typically reflects such a challenge. It apparently necessitated a need to re-examine the university's faculty of Information Science and Technology's current curriculum so as to ensure that future graduates would be suitable for the new economy. An important conclusion derived was that in the services economy graduates needed to work in teams made up of multidisciplinary members to deal with multifaceted complex problems and therefore required are, what the researchers termed to be, "adaptive innovators" (Mukhtar et al 2009:357). In this regard it is important to note that the IfM and IBM (2008:3,31) white paper draws a very definite correlation between adaptive innovators and so called T-shaped people skills. It is also asserted in the white paper that "*the increasing complexity of service systems, requires an extended role of education in the 21st century - universities must prepare people to be adaptive innovators"* (IfM & IBM 2008:3,31). Adaptive innovators it is once again accentuated are deeply educated in their home disciplines, yet also have the ability to think and act across multiple disciplines (IfM & IBM 2008:11). Mukhtar et al (2009:358), on the basis of their research, established a table reflecting the T-shaped skills and attitudes that they found to be of pertinence and these are presented in figure 1 below.

Figure 1: T-shaped skills

Type of skills	Description
Meta competence	• Experts in business communication and interpersonal competence • Creative and critical thinkers who are able to analyse and synthesise problems and situations • Can adapt their skills and knowledge to the problem at hand
Integrative skills	• Able to collaborate with people from different disciplines • Have leadership skills and are also able to manage a multidisciplinary team • Business and technology integration • Diversity orientation
Service mindset	• Implementing service strategies via an understanding of the concept of value co-creation • Conceptualize and developing service designs and new types of services • Analysing the service life cycle to ensure quality • Assessing and managing the supply and demand of services • Contextualize service science

Source: Mukhtar et al 2009:358

A Human Sciences and Research Council document entitled "WHY South Africa's universities are failing", specifically claims that South African Universities "are failing to produce graduates with the range of skills necessary to underpin South Africa's development" (HSRC 2009:1). It is contended in the document that "*a report in 2007 found that many of the country's graduates lacked communication skills, writing skills and the ability to think critically*" (HSRC 2009:1). The contention needs to be analysed in the light of the list depicted in figure 1 above, and the skills problem becomes quite apparent. Ziegler (2007) is another researcher who specifically stresses that it is critical for engineering students to enhance their basic communication skills. Ziegler (2007) also concurs that often engineering students are equipped with the technical knowledge they require in the workplace, but lack the so called soft or engineering management skills they also need. The South African National Advisory Council on Innovation (2003:30) more explicitly states that "*the available evidence indicates that there is indeed a significant demand for people with skills, which is not matched by their availability*".

It may be concluded from the preceding discussion that within a servitization framework, engineering and technological skills required are but one side of the skills coin, the other being the need for a wide ranging multidisciplinary skill set. It would appear to be a skills set that if not readily available could seriously impact on South African manufacturing institutions ability to implement a servitization strategy, which in terms of global economic and business trends could in turn seriously constrain the growth of the South African economy. Derek Hanekom (2008:1), the Deputy Minister of Science and Technology, in fact confirms that the skills shortage remains a very real challenge confronting South Africa, he unequivocally states that it is estimated that 7 000 science and technology professionals alone left the country between 1994 and 2001. Creamer (2008) following a similar trend states that "*South African executives identified the country's inadequately educated work force as being the single most problematic factor for doing business*". Seen within this context it is hardly surprising to find that the World Economic Forum (2009:282) report cites an inadequately educated workforce as the second most significant constraint confronting South African business institutions.

The apparent shortage of appropriate skills is further aggravated by what is termed to be a brain drain and the prevailing high incidence of HIV/AIDS, in that they play a fundamental role in depleting an already constrained skills recourse base required for servitization. Research undertaken at Cape Town University by Meyer, Brown and Kaplan (2000:2,19) confirm that the brain drain is not only real, but 3 times higher than that described in official statistics. A South African National Advisory Council on Innovation (2003:35,44) report similarly reveals that there is a surplus of unskilled

and semi-skilled people and a very definite shortage of higher-level skills that will facilitate economic growth and it is claimed in the report that any economic upturn is likely to be seriously compromised by the skills inadequacy. When it comes to HIV/AIDS, the 4th pillar of the South African global competitive index, health and primary education, reflects a rather dismal picture in that again South Africa assumes the very last ranking, namely 133rd position (World Economy Forum 2009:283). It is therefore not surprising to find, as previously alluded to in this discussion, that in terms of research conducted by SANACI (2003:30) it is concluded that there is indeed a significant demand for people with skills, which is not matched by their availability. It can therefore be expected that skills will undoubtedly be a factor that needs to be seriously considered in formulating and implementing the servitization strategy of South African manufacturing enterprises.

Magnusson & Stratton (2000:43) statement that as a manufacturer starts to offer more services that require higher customer contact, they need also to recognize the educational impact it brings about and train their customer contact personnel, certainly assumes relevance when seen in context of the prevailing South African skills situation. It is in fact argued quite convincingly by the researchers that employees form the backbone of any service-based organization and there is a very definite need to train these employees in managing customer relationships (Magnusson & Stratton 2000:74).

Concluding summary and comments

The literature research study undertaken would seem to suggest that organisational culture and skills development are undoubtedly two very pertinent aspects that need to be considered in developing and implementing an institution's servitization strategy. It would also appear to be a strategy that is increasingly assuming far greater relevance and significance with the emergence of the global and South African services dominant economy. The need for T-shaped people skills is an aspect that aught to feature quite prominently on the national skills development agenda. It would appear; however, that the lack of such an adequate and appropriate skills base, aggravated by the AIDS/HIV situation and the apparent brain drain of skilled professionals, will have a very negative impact on South African manufactures implementation of a servitization strategy. It will also appear to constrain their ability to effectively compete on the global stage of the services economy.

South African executives and managers in implementing a servitization strategy need to take cognisance of the complexities associated with culture transformation, as traditional theories based on a mechanistic and scientific management paradigm

would seem to be counter productive. A more contemporary approach to culture transformation would need to be considered, namely one based on complexity theory, which assumes an emergent and evolutionary outcome that cannot be predicted with any degree of certainty. Executives and managers therefore need to become actively involved in influencing and shaping the discussions, negotiations and interactions that take place during the implementation of the servitization process, in an attempt to influence the eventual outcome. As an evolutionary process of emergence it needs to be closely monitored to determine favourable patterns that can be facilitated and less favourable patterns that aught to be disrupted. A difficulty in this regard would most probably relate to management's limited understanding of the more contemporary approach, in view of the dearth of multidisciplinary skills that exist within many a manufacturing enterprise, where traditionally the accent has been on technology related considerations, such as total quality management and similar manufacturing management related issues.

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