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ASSESSING THE FEASIBILITY OF A KNOWLEDGE MANAGEMENT MODEL FOR RESEARCH KNOWLEDGE RETENTION AT A UNIVERSITY OF TECHNOLOGY

Mrs Mpho Mbeo
Faculty of Engineering and Information Technology
Central University of Technology
Private Bag X20539, Bloemfontein, South Africa
Phone: +27 (0) 51 507 3081
Fax: +27 (0) 86 543 4057
E-mail: mmbeo@cut.ac.za

Dr Patient Rambe
Department of Business Support Studies
Faculty of Management Sciences
Central University of Technology
Private Bag X20539, Bloemfontein, South Africa
Phone: +27 (0) 51 507 4064
Fax: +27 (0) 51 507 3869
E-mail: prambe@cut.ac.za

ABSTRACT

Although the main mandate of higher education institutions (HEIs) is knowledge transmission, these institutions are increasingly called upon to be custodians of knowledge creation, sharing, transfer, storage, dissemination, reuse and learning. In view of the challenge of retaining the research knowledge of the aging, highly experienced professoriate at Universities of Technology, institutions with a limited tradition and culture of scholarly research, this paper assesses the feasibility of a knowledge management model for attracting and retaining the tacit research knowledge of the senior academics. Since digital trails of established-novice researcher interactions are left whenever they interact with online learning platforms, an examination of such online interactions can provide 'windows' into the tacit knowledge and hard-to-communicate research repertoires of senior academics that should be transferred for knowledge transfer to junior researchers. Drawing on an instance of an emerging technology, SharePoint, this study proposes that a knowledge management model can emerge from an in-depth examination of the knowledge production process in a networked community of and interactions among senior academics, novice researchers, an enabling, low threshold technology and usable context relevant content. Some insights from this study are relevant to the knowledge creation and retention among research knowledge-constrained academic institutions plagued by the attrition of senior academic staff and blockages in knowledge transfer process.

INTRODUCTION

In the twenty-first-century, success can be achieved by continuously using existing knowledge and creating new ones, in response to a rapid changing society (Baban, 2007: 104). Knowledge is the most important strategic resource to a firm and it has enormous effects on organizations' competitive advantage (Kang, Rhee and Kang, 2010: 1). In essence, knowledge can be distinguished into two categories – explicit and tacit. Explicit knowledge is the knowledge that can be written down or articulated through formal language, such as within manuals, procedures, guidelines or reports, whereas tacit knowledge is the knowledge that cannot be written down, which is difficult to articulate through formal language and which is embedded in an individual's experiences as well as their values or emotions (Rai, 2011: 779). Notwithstanding such variations in definition, both types of knowledge are essential to the growth of any organization (Ngai and Chan, 2005: 890). Explicit and tacit knowledge are important as they provide the framework through which knowledge can be transferred, Rowe and Widener (2011); Rhodes, Hung, Lok, Lien and Wu (2008) and Chen (2004) emphasise how

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distinguishing between the two categories and even transcending this distinction can allow an organisation to be innovative, efficient, competitive and enduring.

According to Kumpirarusk (2012: 3), knowledge management and competency approaches have become critical for universities mainly due to the fact that universities' ultimate goals are the production and diffusion of knowledge, and their important investments are in research and human resources (Elena, 2004). In essence, universities are knowledge producers—their most important output is knowledge, which is incorporated into their research results, publications, educated students and productive relationships with their stakeholders. Among their most valuable resources are professors, researchers, managers and students with their organisational processes and networks of relationship (Warden, 2004). Despite this understanding, the enduring question is how emerging researchers and academics can tap into research knowledge of the senior academics to ensure knowledge retention at university upon the retirement, transfer and lapsing /termination of tenure of these senior academics.

Literature suggests emerging technologies (ETs) may be the way out of the knowledge management woes that South African Higher educational institutions are entrapped in, since the adoption of ETs is on the rise in the higher education sector worldwide (Bozalek, Ng'ambi and Gachago, 2013: 3). For this reason, this study explores the following research question: How can an emerging technology-supported model for research knowledge management be constituted to promote knowledge production and retention at the Central University of Technology?

PROBLEM INVESTIGATED

Academic institutions, particularly higher educational institutions like universities are seen as 'knowledge hubs', where diverse activities are carried out for the generation, preservation, diffusion and application of knowledge (Hoq and Akter, 2012: 95). According to Baban (2007: 104) higher education institutions should develop appropriate strategies and policies in order to achieve an effective management of their knowledge through:

1. Developing mechanisms to acquire, select, organise and retrieve knowledge, both within and beyond the institution, and especially knowledge that considerably contribute to the differentiation of the organization,
2. Developing management practices to transfer knowledge across the organisation, paying special attention to the management of tacit knowledge, which is more difficult to understand and transfer; and
3. Developing the ability to apply and continuously create new knowledge.

Almost a decade into the South African abolition of Apartheid, strong signs of valuing the production and retention of research knowledge had already begun to emerge in the higher education landscape. For instance, by the early 2000s research and development had already become the mainstay of higher education in South Africa (Waghid and Le Grange 2003: 5). Pressure to secure research grants, obtaining rating from the National Research Foundation and the need to be promoted has prompted many academics in South Africa to place more emphasis on research than teaching and community service (Le Grange, 2003: 129). Furthermore, the South African Government's funding formula for higher education tends to be biased towards research. The number of scholarly publications produced by academics and the number of postgraduate students are some of the fundamental criteria used to measure the research output of institutions of higher learning in South Africa (Ngulube, 2005: 40). The survival of this agile system fundamentally depends on the flexibility and the sustainability of the research knowledge production and transfer system including the building of a research culture founded on the capacity of emerging researchers to tap into the tacit research knowledge and research repertoires of senior academics upon their exiting of higher education.

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In view of Universities of Technology such as the Central University of Technology, Free State (CUT) currently plagued by the dilemmas and contradictions of a nascent research culture on one hand (emerging from the recent termination of decades of Technikon identity that focused on training staff for professional placements rather than becoming seasoned academics), and an ageing senior academic workforce and retirements, transfers and resignations on the other, the issue of developing a knowledge management model cannot be overemphasised. Although CUT has been on a mission to build a new generation of leading researchers that can contribute significantly to new knowledge generation and innovation, improve research practices, implement new programs and resolve specific problems (CUT's Vision 2020), there seems to be no clear strategy for retaining and transferring the tacit knowledge of senior academics to junior researchers upon the former' retirement, resignation and transfer.

PROBLEM STATEMENT

Knowledge management research has highlighted the need for knowledge generation, transfer and retention and proactive measures need to be instituted to address the potential acute shortages of research leadership in higher education in general and South Africa in particular (McNair *et al*., 2011; Carman, Leland, and Wilson, 2010; Robison *et al*., 2010 and Levine, 2008). According to Thomas (2009: 1) the paucity of higher educational leadership (such as professors and senior academic staff) shortage could be a consequence of early retirement or outsourcing leading to persistent research knowledge retention gaps. Furthermore, the potential gap between current leaders (senior academic staff) who are retiring and qualified leaders to filling vacated positions is very disturbing (Linder and Wald, 2011 and Joshi *et al*., 2010) in the South African higher education context, notwithstanding on this sector's dependence on foreign academics' expertise.

Universities of technology came into being as part of the major reconfiguration of the higher education landscape, which took place from 2004 onwards. Through a process of mergers and re-designations, South Africa's 36 higher education institutions (21 traditional universities and 15 technikons) were trimmed down to 23 – comprising 11 traditional (some of which were merged with others), 6 comprehensive universities (arising out of mergers between a traditional university and a technikon), and 6 universities of technology (created from 11 and unmerged technikons) (Du Pre, 2010:1). While some of the knowledge management challenges are a consequence of the merging of differentiated educational systems with different research production capacities, practices, research ethos and varying resource constraints, other challenges arose from the paucity of tacit research knowledge production and retention strategies of individual institutions especially those from tradition that did not emphasise scholarly research (e.g. former technikons now called Universities of Technology).

In South African context, the Universities of technology (UoTs) sector, over the past 15 -20 years had to primarily overcome two historical burdens which are; the burden of being financially disadvantaged because of apartheid policies and the burden of a paradigm that did not associate these institutions with a culture of research (Badat, 2010: 13). While the Central University of Technology (CUT), Free State has introduced multiple initiatives to advance research such as the Research and Development Plan 2014-2020, Scholarship of Teaching and Learning and the Graduate Attributes Programme, CUT is yet to overcome the death of a tradition of scholarly research. Just like other UoTs, CUT is still confronted with the burden of bridging the knowledge-gap between a handful of senior highly experienced experts and their cadres of young novice academics. The challenge of promoting the capacity of young generation of researchers is acute in the social sciences where evidence of intense collaboration on research activities is almost non-existent. Currently, there are no clear systems or strategies in place to deal with the potential knowledge loss and to ensure the knowledge retention of retiring experts at CUT.

ISBN: 978-0-620-71797-7

PURPOSE OF THE STUDY

The purpose of this study is to contribute to the knowledge management discourse through assessing the feasibility of an emerging technology supported Knowledge Management (KM) model for the generation and transfer of research knowledge from the senior experienced researchers to the junior academics at Central University of Technology, Free State (CUT). Apart from the risk of losing expert knowledge about technical issues, there is also the risk of losing personal social networks which are needed for gathering information or networking with colleagues. If deemed effective, this tool can be rolled out at other South African higher education institutions (HEIs), which are confronted with similar challenges in view of the absence of strong mechanisms and interventions for preserving tacit knowledge upon the departure of senior academics.

METHODOLOGY

The study adopts a theoretical approach. According to George State University (2015), a theoretical research is "based on the observation of others" and "runs no analytical procedures due to absence of empirical data." In view of the inevitable loss of tacit research knowledge upon the transfer, retirement, and the exiting of the few, highly trained professoriate at Universities of Technology, this study draws on mainstream knowledge management literature and the authors' observations on use of emerging technologies at CUT to assess the feasibility of a knowledge management model for attracting and retaining the tacit research knowledge of these senior academics. The authors draw on SharePoint, a widely adopted emerging technology in the Faculty of Engineering and Information Technology at CUT, to demonstrate the feasibility of this knowledge management model. The main argument is that an in-depth examination of the knowledge production processes in a networked community of and interactions among senior academics and novice researchers using a ubiquitous, low threshold technology can provide a "window" into how this model can be developed.

LITERATURE REVIEW

Knowledge Management

The field of knowledge management is of great importance in the academic and commercial world partly because technological economies are increasingly knowledge-based (Wallis, 2003: 140). Knowledge management also assists HE managers in their managerial and administrative efforts of facilitating the acquisition, creation, storage, sharing, diffusion, development, and deployment of knowledge by individuals and groups (Zheng *et al*., 2010: 764).

Knowledge Management and Research Outputs

Nawaz and Gomes (2014: 71) states that knowledge management is a well-defined system to assist the learning process, innovation process and the sharing of knowledge to achieve the knowledge strategic goals of an organisation. In addition to that, the core of knowledge management is to transform individual knowledge into organisational knowledge through acquiring, sharing, storage, disseminating, exploitation and innovation of knowledge. It ensures that the organisation shows the best performance and stand in good competitive position with their competitors. Most of the companies have accepted knowledge management and identified it as a resource.

As one of the primary assignments of an institution, research production is the medium for knowledge creation and knowledge diffusion. The Higher Education Institutions deploy teaching, learning and research provide knowledge to the students, manage and archive the existing knowledge for future reference. Motivating and encouraging the academic community including faculty members, staff, students and parents etc. In essence, the key enabler for a successful knowledge management in the higher learning institutions is sharing and contributing explicit and tacit knowledge. Technology also plays an important role in knowledge transfer; it facilitates effective distribution of the tacit and explicit knowledge (Nawaz and Gomes, 2014: 74).

ISBN: 978-0-620-71797-7

Although knowledge may be considered to be a property of an organisation once it is institutionalised, it originates as an inextricably personal property before it is institutionalised. Given the importance of knowledge in organisation's competitiveness; organisations are looking for processes by which the knowledge of the well-seasoned employees can be transferred to the inexperienced (Bussard, 2013: 4). In fact, the quicker an individual can be trained to be a productive and proficient member of the department, the better the company, the co-workers and the individual are served. Unfortunately, organisations lack good information about where their critical and tacit knowledge is and therefore, have difficulty in getting it and making use of it (Davenport *et al*., 2000: 40).

Knowledge management requires technologies to support the new strategies, processes, methods, and techniques to better create, disseminate, share, and apply the best knowledge, anytime at anyplace, across the team, across the organisation especially its customers and other key stakeholders (Kumpirarusk, 2012: 54).

Emerging Technologies and Research Outputs

Emerging technologies (ETs), are defined as those new or evolving technologies that can be used to enhancing teaching, learning, research and creative inquiry, which consequently results in the generation of knowledge (Johnson *et al*., 2011: 3). Emerging technologies serves as a platform for the dissemination and management of information, which range from day to day activities, and information if properly constituted and well document gives birth to knowledge. In addition, when considering tacit knowledge from the perspective of this study, ETs provide opportunities for generating personalized knowledge and skills as they render formal and informal personalized environments for the transacting of personal knowledge. Since the majority of these technologies (e.g. social media) were invented long after the boomers (those aged between 50 and 70) had already taken up their professions, their negative perceptions may undermine the uptake, appropriation and implementation of these technologies (Burch and Strawderman, 2014: 70-71). That said, the knowledge bridge that proves indispensable even for boomers is academia sites (such as; Research-gate, Academia.edu, Linked-in) and application software (SharePoint), which act as collaboration suites for different people sharing and working on the same project in HEI.

Responding to the challenge posed by knowledge losses in HEIs, emerging technologies (ETs) seems to be the way out, as the use of ETs is on the rise in the higher education sector worldwide (Bozalek *et al*. 2013:3). According to Johnson *et al*., (2011:6), ETs are technologies which enhance teaching, learning, research or creative inquiry on university campus within the next five years. The importance of ETs such as SharePoint in knowledge retention lies in the fact that they grow the institutional memory of the organisation. In this manner, employees can learn from past successes and failures to ensure positive results. Learning from others could help avoid going down the wrong paths or reinventing the wheel (Liebowitz, 2008: 3).

Research Outputs

Knowledge Management in research and development does have a different flavour. Instead of aiming primarily to multiply the use and value of existing knowledge, it adds a strong element of the discovery of new knowledge for value creation (Ibrahim, Mohammad, Ramayah, and Saad, 2006: 19). For academic institutions such as CUT, the research outputs to that any research knowledge production and retention model should emphasise inter alia the following research outputs: research publications such as peer-reviewed DHET articles and conference proceedings, research patents, postgraduate theses and increased internationalisation of the research of these institutions.

While there is increasing recognition of the potential loss of talent at South African universities, the challenge, however, is the clear lack of sound strategy for mitigating or eliminating the extent of academic damage emanating from such inevitable loss. CUT has developed a couple of interventions for dealing with the transfer of knowledge from senior academics to junior academics such as

ISBN: 978-0-620-71797-7

mentorship programmes, Scholarship of Teaching and Learning (SoTL), Stars of Academe and Research (SoAR), and Talent Management Strategy. However, these interventions do not necessarily address the issue of knowledge attrition, thus, additional interventions such as the incorporation of emerging technology as a mediator for leveraging, transferring and retaining expert research knowledge need to be pursued.

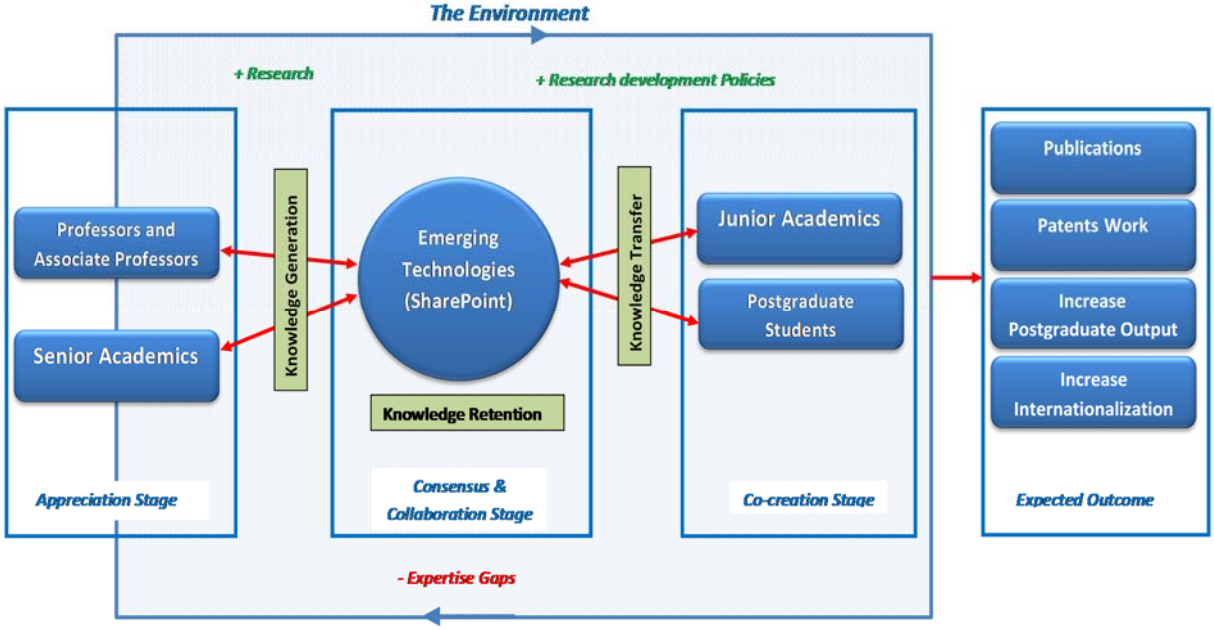
According to Kumpirarusk (2012: 14), research and postgraduate universities: play important roles in the development of academic excellence through producing scholarly and post-doctoral research, which is aimed at generating a new body of knowledge and technologies that can address global demands and national needs.

CONCEPTUAL FRAMEWORK

This theoretical research paper strives to investigate the feasibility of Knowledge Management (KM) model for the generation and retention of tacit research knowledge to enhance transfer research knowledge to junior academics and researchers and to enhance research outputs at Central University of Technology, Free State (CUT). CUT is faced with the threat of losing the knowledge of the aging workforce who are hard to replace for demographic or skill shortage reasons. The approach/ model in Figure 1 illustrates the environment (academe world), where senior academics interact with the junior academics and postgraduates. In this environment, knowledge is firstly generated and afterwards transferred, notwithstanding the various obstacles that stand in the way of knowledge transfer. This obstacle in the environment can be addressed with the introduction of the emerging technologies platforms. Overall, the activities in the environment which involve; knowledge generation, retention and transfer is expected to yield various outcomes already indicated in the previous subsections of this study. Knowledge generation consist of the creation of knowledge by knowledge producers (Hemsley-Brown and Sharp, 2003: 449). In education, knowledge could be generated from various sources including university research communities, professional associations, ministries and government agencies, transfer and innovation centres, and communities of practice. Knowledge retention is determining what critical knowledge is most at risk of being lost (Phaladi, 2011: 26). The challenges of knowledge retention are being driven by two forces that are shaping today's workforce, namely an aging population and the increasing complexity of knowledge needed in technologically advanced societies. These two forces together cause an acute skills shortage (Johnston, 2005: 3). Knowledge transfer is a major concern in improving educational practices (Willmott 1994: 105) because contemporary managers and professional experts work in a rapidly changing technical and scientific environment – where they gain experiential knowledge, very little of which is formally documented and shared (Johnston, 2005: 2).

ISBN: 978-0-620-71797-7

FIGURE 1
ET ENHANCED MODEL FOR KNOWLEDGE GENERATION, TRANSFER AND RETENTION



OBSERVATION AND DISCUSSION

According to Mouton (2014: 11), the biggest risk at CUT is the fact that it has not, over the past seven years, managed to expand the active human capital base at the institution. Between 2005 and 2012, the headcount of permanent staff at CUT increased from 203 to 274. At the same time, the number of actively publishing staff only increased from 31 to 39. This is a very unsatisfactory and constitutes a high-risk state of affairs. Even though there is a small numbers of very productive staff at the university, the university will – in the long run – not be able to improve its research profile significantly. CUT should make every effort to incentivize and reward new emerging scholars whilst nourishing its productive staff if it wishes to become an academic research force to reckon with in the research landscape in South Africa.

According to Lategan (2014: 8), the CUT recognises the important role of industry, business, government and social communities in doing research. The university's research objectives are viewed through three core activities: knowledge generation (research), knowledge transmission (teaching) and knowledge application (engagement through technology transfer, innovation and incubation). Successful Knowledge Management (KM) depends on processes that enhance individual and organisational ability, motivations, and opportunities to learn, gain knowledge and perform in a manner that delivers positive results. Organisational processes that focus on these three attributes will lead to an effective management of knowledge because the old days of continuous improvement were approached leisurely (Laal, 2011: 548). Emerging researchers should engage with the improvement of qualifications and participation in research training; and experienced professoriate should be committed to the creation of new knowledge that can enhance the Vision 2020 Statement of CUT and also engage with all activities associated with research participation and productivity (Lategan, 2014: 27).

ISBN: 978-0-620-71797-7

STUDY CONTRIBUTION

This work in progress seeks to contribute to the knowledge management discourse by arguing that emerging technologies (such as SharePoint) can contribute to the externalisation of tacit research processes between senior experienced researchers and emerging researchers. The mining of artefacts of these interactants' engagement in digital spaces (SharePoint) can contribute to the in-depth understanding of not only the types of knowledge shared but also the different research practices, repertoires, and activities that give effect to research knowledge production and retention processes. Emerging Technologies such as SharePoint are considered to be consistent with the cultural goals of CUT of knowledge sharing, research collaboration, showcasing research and transferring it the academic community, and therefore, can be implemented immediately rather waiting until the "best" technology can be found and rolled out. SharePoint is also a low cost, inexpensive, low threshold technology, which is easily accessible to CUT academic community's (lecturers and students) resource constrained contexts. It is a technology, which academics and some students in the Faculty of Engineering and Information Technology are already using, so familiarity, accessibility and ease of use will improve the academic community's buy in as far as its sustained use is concerned. According to Ibrahim *et al*. (2006: 19) a culture that promotes open sharing of knowledge can be realised if leaders clearly articulate the value of the knowledge management initiative, attract support at all levels, reward proper behavior, and encourage employee interaction.

Literature review has shown the use of ETs as a lever for educational purposes as much as it is an engagement medium for senior academics, emerging researchers land their students. These successes, however, are not without shortcomings. Furthermore, according to the literature review, there are various factors which may influence the acceptance of this model (ET model). Thus, considering the scope of this study and the major key players involved; which are the boomers (the senior academia between age 50 and 70) and the gamers (the fresher academia), there is a higher risk that the boomers may not be using much of emerging technologies for research. That said, as a University of Technology that is mandated to champion and be a prime trailblazer in the adoption and effective utilisation for the business of teaching, learning and research, we envisage that even if boomers are conceived to be technology laggards, they use an action research approach to this technology oriented investigation may improve the intention to and ultimate uptake of emerging technologies for research.

FUTURE RESEARCH AND CONCLUDING REMARKS

This paper revealed that knowledge management is recognized as one of the management tools to drive university performance through elevating organisational competencies (Kumpirarusk, 2012: 152). According to Mohayidin et al. (2007: 311) knowledge is the most important asset to a university. The ability to adeptly manage the diverse types of knowledge used by both academics and non-academics, in particular decision makers, is crucial for the sustainable performance of the university as a whole. Talent management is another approach to dealing with people with a high potential, who are not easy to recruit and retain with the organisation and our model can be conceived as falling in this category. Some universities are faced with the uphill battle of capturing and retaining the knowledge of such talented individuals after they moved to other jobs. Knowledge management is a practical means for capturing, documenting and transferring individual knowledge to organisational knowledge to the benefit of young academics who lack the experience in research. However, to the extent that talent management can be a supplementary approach to addressing this kind of problem (Kumpirarusk, 2012: 148), we local our model in the domain of knowledge management for advancing talent retention. According to Kumpirarusk (2012: 149) talented people tend to work harder and more efficiently, they tend to be self-governing and result-oriented; therefore, they usually expect recognition and fast-track promotion. Agreed succession plans with clear milestones can be used as a mechanism to drive and retain talented individuals.

In conclusion, universities are expected not only to generate, but also to retain and transfer knowledge to society. Their ability to communicate, share and innovate is critical in order to meet the challenges

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of the knowledge society. There is a need for meaningful change in the governance and leadership of the universities not only at the level of discourse but also of practice, if they want to survive the present competitive and fast changing environment. Addressing the technologic, social and economic challenges demands universities to not only transform their knowledge production approaches to meet the demands of the knowledge society but rather to consider knowledge transfer and retention processes if they are to survive in this complex knowledge-based society.

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