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Knowledge management as a change enabler in academic libraries in the digital age

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Background: South African academic libraries are facing radical changes due to a paradigm shift in their parent universities associated with the digital age linked to the Fourth Industrial Revolution (4IR). The rationale for this study was to enable library management, employees and change leaders of libraries to understand that knowledge management (KM) is a potential solution for managing change in academic libraries in this digital age.

Objectives: The central argument of this research is that KM as a management discipline is a solution to manage change in the academic libraries in the digital age. The present research gap is the role of KM as a change enabler in academic libraries. The purpose of this study was to explore the potential of KM as a change enabler in the academic libraries in the digital age.

Method: This study applied the exploratory method to gather more empirical evidence on KM as a potential solution in managing change in the library. Interview and questionnaire were used as data collection methods after purposively selecting the respondents from the population in a non-probability sampling technique. The reliability of the questionnaire was tested that showed a high Cronbach's alpha score.

Results: Amongst other results, the empirical evidence shows that employees resist change when their comfort zone is threatened; what they know is becoming threatened because the new initiative or change tends not to be aligned with their current knowledge and skills. Lack of knowing what is going to happen after change may lead to resistance; then it proves and validates that KM could be a potential solution.

Conclusion: This study has identified a positive relationship between KM and management of change in the academic libraries. The libraries should ensure that their knowledge gets managed so that it can be easily and timely shared and disseminated to the decision makers during change.

Keywords: knowledge management; academic libraries; change enabler; change management; digital age.

Introduction

This article explores the role of knowledge management (KM) as a change enabler in academic libraries. Academic libraries, as many other organisations, require organisational agility in order to adopt and adapt to changing internal and external environments (El Nsour 2021:153; Li & Li 2021:485). The main function of KM is to benefit the organisation through information sharing by making sure that all processes and systems are in place so that required tacit and explicit knowledge can be accessed when needed (Crawford 2003; Rezaei, Khalilzadeh & Soleimani 2021). A KM system or platform can assist library employees physically and virtually to share insights and information for the benefit of the library. Knowledge management is the process of creation, communication and coordination of both tacit and explicit knowledge that adds value to business processes and supports the strategic decision-making process.

Knowledge management ensures that advances in human capital, information technology platforms, network communication and collaboration processes develop so that change leaders can easily collaborate and communicate with employees on any change plans (Du Plessis & Mabunda 2016; Rezaei et al. 2021). It ensures that the culture of support and teamwork is encouraged in the workplace and brings everyone together. It builds trust and relationships amongst different departments within the organisation. Knowledge management ensures that an organisation such as the academic library has an organisational culture that encourages sharing and communication amongst the employees for the sake of the library's development and performance (Goudarzvandchigini 2011:379).

The central argument presented in this article is that KM as a management discipline is a solution to manage change in academic libraries in the digital age. The present research gap is the role of KM as a change enabler in academic libraries. The purpose of this study was to explore the potential of KM as a change enabler in academic libraries in the digital age. The structure of the article begins with a statement of the research problem, literature review, research methodology, analysis and discussion of research findings. The limitation of the study is mentioned, followed by conclusion and recommendation relevant to academic libraries.

Problem statement

During the 1990s, it came as a surprise when the western countries realised that knowledge is an important resource for competitiveness (Bratianu 2015:8). Academic libraries should prepare themselves for not being surprised when they realise that other successful academic libraries and their parent universities are using KM as their strategic tool to manage change. Ishikawa and Nakagawa (2013:13) asserted that for organisations to be relevant today and in the future, they need to monitor the changing environment, adapt and learn to utilise the available knowledge and individual talents.

Bruhn (2004:132) and Eden (2015:ix), argued that employees embrace change only when they think it will benefit them. However, Magano and Thomas (2017:1) perceived that managers and leaders tend to neglect the human element when initiating change by focusing on organisational outcomes and not giving attention to the impact the change will have on the employees.

Previous research shows that academic libraries have to change in order to continuously meet the changing needs of the university community, but some of the change initiatives tend to fail or have a low success rate because of lack of KM activities being practised and implemented (Du Plessis & Mabunda 2016). The purpose of this study is to explore the potential of KM as a change enabler in the academic libraries in the digital age, which is associated with change. Given the research purpose, this article will address the research question: To what extent does KM facilitate change in academic libraries?

Addressing the research question will enable academic libraries to see the benefits of KM during change seasons, whereby employees and top management are in-line with the proposed change and initiatives that promote buy-in into the vision of the library. Knowledge management can play a significant role in ensuring that collaboration, communication, sharing of relevant information is evident and employees' views are also taken into consideration (Ehlers & Lazenby 2007:218). The following literature review section presents the theoretical grounding of the role of KM linked to change management.

Literature review

Literatures have addressed issues on KM in fostering innovation; however, the literature is lacking in terms of KM as an intervention during change in academic libraries. This section of the article defines KM, presents KM maturity as theoretical grounding, explores appreciative inquiry as KM activity and describes the three Cs that enables change.

Defining knowledge management

Knowledge management is the discipline of 'leveraging knowledge to adapt to change in order to survive and grow the organisation'. It deals with managing knowledge in a particular organisation as a valuable asset that can convert the organisation into a learning organisation so that it can adapt in a volatile environment (Botha, Kourie & Snyman 2008:33). Suresh and Mahesh (2006:51) viewed KM as a process that causes change or changes in the organisation in order to ensure that knowledge is well managed. They further explained that KM's role is to 'facilitate effective transfer of knowledge to others who have a need for the knowledge in carrying out their responsibilities in the organisation' (Suresh & Mahesh 2006:51).

Knowledge management in academic libraries

Academic library employees can transmit and share accumulated experience and knowledge amongst themselves in order to come up with insights that will lead to new knowledge essential for supporting change initiation and change decision-making processes (Shohan & Perry 2009:241). Knowledge management is a process that uses both tacit and explicit knowledge to mobilise people to share and process data and information with the presence of available technology to bring value to their organisation. It ensures that organisations create value and intelligence from its intellectual or intangible assets (Mohamed & Pillutia 2014:360).

Agwu and Ekere (2017:2) asserted that academic libraries tend to use user statistics or collection usage statistics for strategic planning and decision making, with the idea that they are having knowledge of the clients. The researcher believed that more study should be done to ensure that decision makers received well informed and relevant information and knowledge sourced from different platforms. Islam, Agarwal and Ikeda (2017:269) clarified that knowledge of the clients is not only obtained through the analysis of usage statistics and patterns but also from the suggestions and ideas that clients share with the library employees on suggestion box, social media and other platforms.

Knowledge and skills of librarians who work in the digital environment have changed to be more literate with the latest technologies and applications that can be of benefit to university students, researchers and academics. Knowledge management ensures intellectual capital stimulation in academic libraries through the sharing of knowledge and

experiences of employees and peer training. Knowledge sharing, communication and collaboration can enable academic libraries to manage change during a paradigm shift so that all the stakeholders buy-in into the new paradigm (Raju 2014:163; Shupe & Pung 2011:409).

Knowledge management maturity as a guiding theoretical grounding

The ever changing market environment has awakened organisations to recognise knowledge assets as the most valuable assets to strive, compete and to enhance agility and competitiveness (El Nsour 2021:154). Jiankang et al. (2011:606) asserted that KM has been seen as an important practise to achieve competitive intelligence. The successful organisations are those that are constantly improving their processes, services and projects and solving problems in order to achieve the maturity levels (Lin, Wu & Yen 2012:10). A maturity model is a structured approach to guide project implementation. Knowledge management maturity models stipulate the developmental stages to be followed and reached when developing KM in organisations (Jiankang et al. 2011:607). This is done through observing that any change initiative must be implemented through stages until each stage is fully matured. In following the principles of the KM maturity model developed by Lin et al (2012), no stages or levels should be skipped. Figure 1 illustrates the five levels of KM maturity adopted by this study.

Figure 1 illustrates the five levels of movement or development an organisation must observe at each stage in the process of reaching KM maturity. The first level is the chaotic stage of knowledge, second level is the conscientious stage of knowledge, followed by the knowledge focus stage, the fourth level is the advanced stage and the last level is integration of knowledge (Lin et al. 2012). Knowledge management maturity observes knowledge that passes all stages of the model from conversion and creation until integration when it gets incorporated with an agile organisation's dynamic capabilities (Oliva et al. 2019). Agility is essential in the digital age, for example, organisations need to have the KM maturity model in place to measure their dynamic knowledge capabilities and knowledge assets to determine their preparedness for change in the Fourth Industrial Revolution (4IR). With KM maturity in place, organisations have an evaluative and comparative instrument or practice that judges the current maturity level of an organisation in order to have early warning signs for improvement (Ngosi, Helfert & Braganza 2011:303).
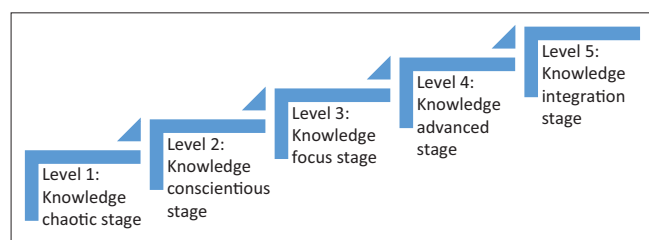
Source: Lin, C., Wu, J.C. & Yen, D.C., 2012, 'Exploring barriers to knowledge flow at different knowledge management maturity stages', *Information and Management* 49, 10–23.

FIGURE 1: Knowledge management maturity model.

According to Lin et al (2012:10), 'knowledge allows organisations to predict the nature and commercial potential of changes in the environment'. Knowledge management maturity applies in the academic library that can collect, store and disseminate knowledge to relevant individuals, for example, leadership will be able to make quality decisions that go hand in hand with the changes in the micro, macro and market environment.

Natarajan (2005:21), and Buheji and Al-Zayer (2010:68), asserted that the KM maturity model serves as an enabler and roadmap when implementing the KM function in an organisation. The KM maturity model when applied in academic libraries will leverage the evaluation of the library's reactive and proactive change proficiency. Leverage is linked to maturity, which ensures that KM performance is monitored and evaluated to determine whether the intellectual resources are utilised and applied effectively to achieve the organisation's objectives (Buheji & Al-Zayer 2010; Oliva et al. 2019; Rezaei et al. 2021). Furthermore, Lemon and Sahota (2004:484) and Calabrese (2015:214) posited that due to the social nature of KM, people, organisation culture and organisational structure should not be neglected in the KM maturity of organisations, for example, academic libraries must harness the power of KM activities such as appreciative inquiry.

The power of appreciative inquiry as a knowledge management activity

Storytelling is a form of appreciative inquiry aimed at creating a narrative on the successful practices that took place in the library. Storytelling tends to generate new knowledge that leverages future change projects (Calabrese 2015:214). Change leaders need to apply appreciative inquiry methods of getting information from employees about the successful initiatives that took place, which will motivate the workforce and energise them for future change initiatives through referring to the past event successes (Calabrese 2015:214). For example, the discovery of the past successful activities reminds employees about their capacity, skills and strength to succeed and overcome the challenges from the external environment through proper change management. Appreciative inquiry enables employees to learn and generate new knowledge through learning from the past activities and experiences of other employees (Calabrese 2015:215; Van Wyk 2015:22).

Barrett and Fry (2005:25) defined appreciative inquiry as a 'strength-based, capacity building approach to transforming human systems toward a shared image of their most positive potential by first discovering the very best in their shared experience'. Van Wyk (2015:20) believed that appreciative inquiry should be part of a change management process when introducing change in the library, because it is a process by which the best potential and capability is identified and developed. Appreciative inquiry is the process that energises and inspires employees when the future is planned and anticipated through thinking, communication and sharing knowledge. Future planning requires KM maturity in the digital age.

The importance of knowledge management in the digital age

The digital age is most prominent in the preference of technologies associated with the 4IR, such as vast repositories of digital information, machine learning, big data and analytics (Fu 2021). In the digital age driven by knowledge economy, knowledge is power because it is an asset for the libraries' competitive advantage through innovation and knowledgeable employees (Du Plessis & Mabunda 2016). In academic libraries where employees are well informed and have knowledge about the micro- and macro-environment, it becomes easy for employees to embrace any change that is proposed by the top management in moving the library forward. Library employees tend to resist change, especially when they do not have a full understanding about the reason why they should change (Botha et al. 2008:32). The digital age presents multitude opportunities to change and requires new learning from academic library employees (Fu 2021).

Knowledge management ensures that new learning takes place amongst employees and enables library employees to improve the quality of their decisions through timely access to relevant knowledge (Botha et al. 2008:44). Jantarajaturapath, Imsuwan and Wongsin (2016:43) argued that KM ensures that there is a system in place in the library to ensure that library employees learn from one another, which puts the library in a better position than its competitors through fast learning and innovation. Ceptureanu et al. (2017:2) posited that learning plays a significant role in increasing the level of readiness to change because stakeholders are aware of the right intellectual capacity to initiate change. Socialisation during each of the five levels of the KM maturity model illustrated in Figure 1 enables not only knowledge sharing to take place but also learning amongst library employees. Knowledge management maturity gives library management an aid to leverage the three Cs that enable change.

Knowledge management Cs that enable change

Knowledge management gives library management an aid to continuously monitor issues, such as being informed on the current global library trends, actively take actions and tract how a change initiative is improving their organisational performance (Balague, Duren & Saarti 2016:191). Communication, coordination and collaboration are the three prominent enablers of change in libraries as described by scholars in information science:

- **Communication**: Effective communication between library management and employees enables everyone in the academic library to understand the rationale behind change and change is more likely to be embraced (Botha et al. 2008:185). Furthermore, effective communication entails management reliability, approachability, timing, honesty and consistent message on the rationale for change. This may develop trust between management and employees and motivate knowledge flow (Magano & Thomas 2017:2; Valtakoski & Jarvi 2016:364).
- **Coordination**: Information and knowledge about change initiative need to be coordinated in such a way that is

easily stored, shared and disseminated to the relevant stakeholders of the library (Botha et al. 2008:185).
- **Collaboration**: KM platforms should be in place in the academic libraries for library employees to collaborate and share ideas with each other in a timely manner during the times of uncertainty and anxiety (Botha et al. 2008:185). Botha (2007:7), and Valtakoski and Jarvi 2016:364), collectively argued that through collaboration, KM enables the academic library to unlock knowledge from its employees, which enhances employee creativity towards certain change projects. KM focuses more on the use of available knowledge resources in a timely and effective manner for the library's advantage. Virtual collaboration has been an efficient and cost-effective way for bringing knowledge together from different employees, experts and decision makers working on a particular change project based in different geographical locations (Fu 2021).

Communication, coordination and collaboration save travelling cost and time, especially in the digital age (Botha et al. 2008; Fu 2021; Lee et al. 2006). Figure 2 illustrates the three Cs for managing change as a KM theoretical framework for change developed for this study.

Figure 2 combines the three Cs for managing change, namely communication, coordination and collaboration that are necessary for academic libraries responding to the paradigm shift. The digital age paradigm means that academic libraries worldwide are experiencing pressure from the micro- and macro-environment such as changes in expectations from the library users, scholarly communication, information resources subscription model and rapid technological advancements. The given literature review presents a framework for investigating KM as a change enabler in academic libraries. The following section discusses about the research methodology for exploring KM as a solution to manage change in academic libraries in the digital age.
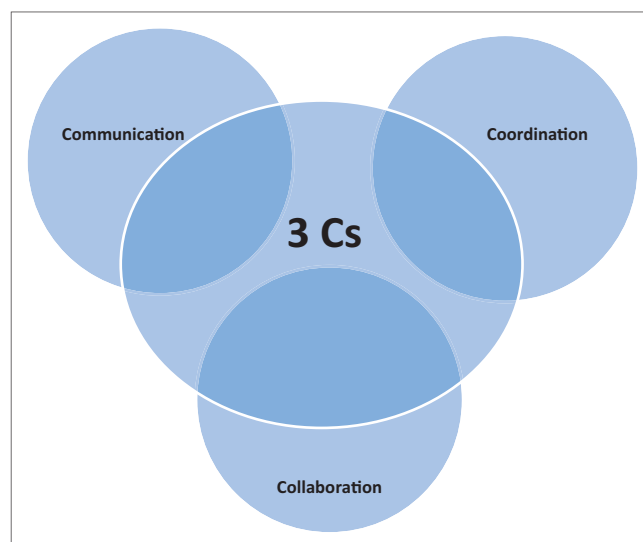

FIGURE 2: Knowledge management's three Cs for managing change.

Research methodology

The empirical data collection for this study took place in South Africa, in the academic library of a Higher Education Institution (HEI) that has recently reviewed its vision and strategies to get prepared for the 4IR. The study adopted a research paradigm to guide the researchers on a worldview related to the subject of the study (Tashakkori & Teddlie 2008:7). Pragmatism research paradigm guided the researchers in interpreting the world of academic libraries whilst focusing on multiple realities during the HEI's alignment with 4IR objectives.

The research design used mixed methods to collect and explore data in both qualitative and quantitative approaches. This was done to ensure that the research questions were answered using multiple methods to collect reliable and relevant data, as described by Saunders, Lewis and Thornhill (2012:130). In pragmatism, some of the research objectives or research questions may be either qualitative or quantitative; it is important to design the research as a mixed method (Bryman 2011:87; Cooper & Schindler 2011:182; Ngulube & Ngulube 2015:2).

The research strategy was case study because the study collected empirical data on cases of a decentralised academic library in which four campus libraries within a particular HEI participated. As the purpose of the study was to explore KM as a potential solution during change in academic libraries, case study research strategy allowed for the triangulation of two sources of primary data collected on four campus libraries. In view of the nature of this study, semi-structured interview and questionnaire were used as data collection instruments. Prior to data collection, the questionnaire was sent to four library staff members as a pilot testing and the interview pilot testing was done with two staff members to test the reliability of the questions.

Sampling techniques assist in reducing the data to be collected by considering data only from sub-groups rather than all individuals in groups. Purposive sampling was used in this study as part of the non-probability sampling in order to decide which participants to select for the study based on their role and experience in the library and information service profession. In non-probability sampling, subjective judgement is necessary to decide on which participants and respondents would be able to supply relevant data to answer the research questions (Creswell & Plano Clark 2011:173; Kumar 2005:179; Saunders et al. 2012:287). In this research, library employees who experienced change activities and KM were selected. As the report by the Committee of Higher Education Libraries of South Africa (CHELSA 2016) stated, South African academic libraries have been adapting to change, but not at the same pace. The case study explored the University of Johannesburg (UJ) library. The UJ was purposefully selected for this study because it has also been preparing for the 4IR in accordance with the UJ strategic vision (University of Johannesburg 2018:1). In purposive sampling, research participants are selected with the aim to represent a particular type of people (Cassell 2015:33; Lee & Lings 2008:213; Mavondza & Ngulube 2011:17). Figure 3 illustrates the sample for data collection.

As displayed in the Figure 3, 12 managers or directors and nine faculty libraries were sampled to be interviewed face-to-face, after being purposefully selected based on their knowledge and experience on change execution and KM within the academic library environment. The online questionnaire was sent to all UJ information librarians and selected staff who have experienced change at their respective campus libraries; in total, 65 was the size of the research population.

Prior to data collection, the researcher obtained permission to conduct the research from the library executive director of UJ Library, overseeing all four campus libraries in which permission was granted. The common research interview protocol was applied and used in all interview sessions. The letter of informed consent and interview schedule was sent to the participants via email prior to the interview session. The participants were consulted and they had been promised that their responses would be kept anonymous and that the data would be used for the benefit of the research only to achieve the research objectives. The purpose of the research was mentioned to all the participants before the interview sessions began. The participants understood that the phenomenon studied was KM as a strategic tool in academic libraries reacting to environmental changes in the shift from Library 2.0 to Library 3.0 to Library 4.0 and beyond.

In the qualitative data analysis, the researcher began with coding the data and dividing the text into small units, assigning a label to each unit and lastly grouping these codes into themes (Creswell & Plano Clark 2011:208). The computer aided qualitative data analysis software (CAQDAS) called Atlas.ti was used to analyse the data collected by interviews (Saunders et al. 2012:54).

Quantitative analysis software called Statistical Package for Social Science (SPSS) was used to establish statistical relationships between variables and to do calculations and visual representations. The quantitative data were interpreted using statistical tables and visual representations, with the objective of addressing the research question and objectives (Creswell & Plano Clark 2011:207; Saunders et al. 2012:472). The researchers examined the stability and consistency of the scale of measuring variables. A reliability test was performed
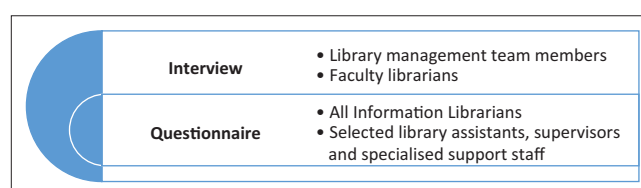

Interview	• Library management team members • Faculty librarians
Questionnaire	• All Information Librarians • Selected library assistants, supervisors and specialised support staff

FIGURE 3: Sample for data collection.

to determine reliability and to maintain consistency in scores from the respondents (Creswell & Plano Clark 2011:211). Cronbach's alpha was used to estimate the internal consistency of the questionnaire without any error in the scale. The result is measured by a number from 0.00 to 1.00; in which a number that is 0.70 and above is considered high in reliability (Johnson 2018:1416). Table 1 shows the reliability statistics.

From Table 1, Cronbach's alpha for all considered variables in the data set is 0.887, indicating a strong reliability value. The combination of qualitative and quantitative research methods, as described here, is considered a research strength, according to Bryman (2011:88), the mixed methods approach leads to greater validity by triangulating findings that are mutually corroborated. The credibility of the findings was checked to assess reliability. In quantitative data, reliability of data were measured or evaluated by testing for both consistency and stability. Convergent validity was used to validate both the quantitative data and qualitative data where possible through the 'correlation between two different sources responding to the same measure' (Sekaran & Bougie 2013:295). Category reliability was used in qualitative data whereby the researcher used category definitions to classify the qualitative data. The categories formulated were presented in the correct definition of categories to easily determine which items of a certain population belong in a category or do not belong (Sekaran & Bougie 2013:351).

The following section reports the research findings and analysis.

Research findings and analysis

This section begins by reporting the interview findings followed by the questionnaire findings. Maxwell (2010:478) supported the use of quasi-statistics in qualitative data analysis for simple counting of activities or things such as majority, most, some and few. To achieve reporting coherence, this article presents data in the form of charts and graphs followed by an interpretation of the findings.

Findings from the interview

The researchers identified the frequency of coded words on the interview transcripts, which made it easy for the numbers to be exported to an MS Excel spreadsheet for creating charts and graphs. The researchers utilised Atlas.ti, mentioned in the methodology section, to develop categories, group codes based on a certain category. The frequency count was performed on the codes based on the categories and themes. The results were as follows:

**TABLE 1:** Reliability statistics.

Cronbach's alpha	Cronbach's alpha based on standardised items	No. of items
0.877	0.882	36

Theme: Knowledge management facilitate change in academic libraries

Categories: Knowledge management practice: Figure 4 illustrates that most participants (50%), said that KM is not used during the change period in their respective campus libraries. Some participants (37%), believed that KM is applied during the change period, but it is applied unconsciously and informally. For example, participants referred to library stakeholders performing some of the elements of KM during change but not realising that what they were doing is KM, such as succession planning, top management sharing their experiences, leadership sharing their vision to staff, peer learning and group knowledge sharing. Some participants (13%) were not sure if KM is practiced during change.

Theme: Knowledge management initiatives and activities as change enablers in academic libraries

Categories: Knowledge management initiatives needed during change: Figure 5 illustrates that the majority of the participants suggested that communication (15%), workshops (13%), training and re-skilling of employees (13%) are the most probable change enablers. They emphasised that with communication there should be open conversation between employees and management to clarify issues and to raise awareness about the possible expectations. The category, management support (11%), indicates that participants emphasised that management staff give support to the employees throughout the change process and promote group synergy. Some participants believed that consultative platforms (9%), and the process of change management (6%),
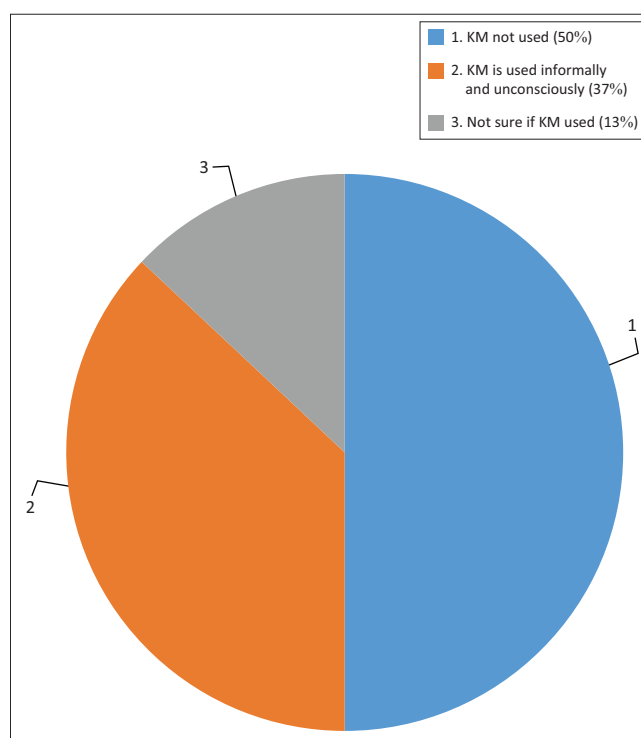
KM, knowledge management.

FIGURE 4: Knowledge management practice.

need to be followed before change begins so that it can be embraced and employees understand why they must change. The organisation needs to be ready before embarking on a change, engage and involve employees to voice their opinions and take some leading role and responsibility of the change projects so that they feel being part of the change. A few of the participants voiced that for the employees to contribute and share their ideas and frustrations freely, the sessions and meetings need to be mostly informal (4%) rather than being formal. Similarly, conferences (4%) are regarded as KM initiative needed to facilitate change. Change readiness assessment (4%) and employees should run the change (4%) were identified as categories of KM initiatives needed during change in academic libraries.

Interpretation of interview data

Communication is the most probable change enabler. Participants contributed that if KM is applied in an academic library, change processes can be enhanced and facilitate re-skilling initiatives. One participant said that 'knowledgeable staff is equal to informed decision making', meaning that when employees have knowledge about their surroundings or about the vision of their library and the university, they are more likely to make good decisions about change without fear of the unknown. The contribution of knowledge amongst colleagues enhances a better view of change, because employees tend to misinterpret information conveyed and so collaboration amongst them leverages clarity. Resistance to change is caused by not knowing, it means KM would solve this matter of lack of knowledge.

Findings from the questionnaire

This article is a discussion of one component of the findings of a larger study, in other words this section only presents the findings linked to KM as change enabler in academic libraries in the digital age. The questionnaire was sent to 65 respondents, the response rate was 77% (50 respondents), consisting of female respondents (66%) and male respondents (34%). Respondents' role representation was library supervisors (12%), library specialised support staff (16%), library assistants (26%) and information librarians (46%). This section reports the results of questions aimed at determining whether KM applied during a period of change, KM functions applicable during change and technologies associated with knowledge creation and sharing.

Figure 6 illustrates most of the respondents (32%), on a scale of 1 to 10, rated that KM is applied during a period of change 8 out of 10 times.

Figure 7 illustrates the KM functions that may be of benefit to the library during a period of change.

Figure 7 shows that respondents mostly recommended knowledge sharing (14.5%), followed by knowledge transfer (12.9%) and communication (9.7%). Respondents recommended KM functions linked to cognition, knowledge accessibility, retrieval, storage, use, management support, and organisational learning (3.2%), and externalisation, intermediation, internalisation and knowledge creation
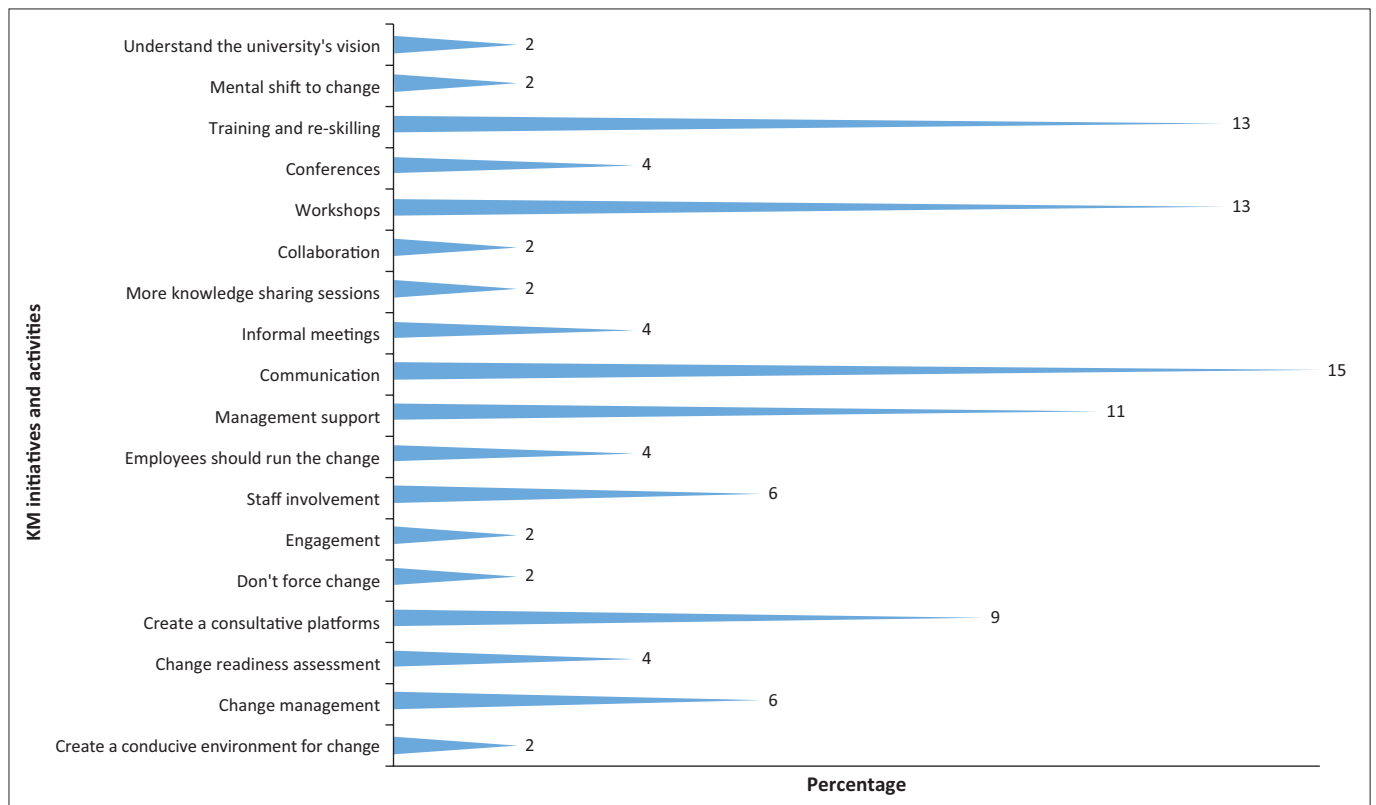
KM, knowledge management.

FIGURE 5: Knowledge management initiatives needed during change.

(4.8%). Almost all the respondents gave recommendation regarding KM functions, with the least number of respondents indicating 'I don't know' (1.6%). Respondents recommended KM functions, capturing of knowledge, consultation, knowledge conversion, knowledge acquisition and skills development (1.6%).

Lastly, respondents identified the technologies they associated with knowledge creation and sharing in the digital age. Table 2 represents the view 76.5% of respondents; 23.5% of respondents were not familiar with the library's use of these technologies.

Table 2 ranks technology in three categories: highly used (> 7), continually used (> 3) and commonly used (> 1). Technologies that are highly conducive for knowledge creation and sharing in the digital age are mobile smart devise and big data. Respondents continually used social media, library apps, smart computers, research data management, information screens and artificial intelligence for creating and sharing knowledge. Respondents commonly regarded the 24/7 interactive virtual librarian service,

Blackboard, creative spaces, data mining, digital interface for print books, groupware systems, iBeacons, intelligent automation, interoperable systems, open source technologies, podcasts, Skype, text analysis tools and virtual library tools as conducive for knowledge creation and sharing.

Synthesis and discussion

Literature review findings showed that people generally resist change. Knowledge management's three Cs have been identified for managing change: communication, collaboration and coordination (Figure 2). For example, when employees' comfort zone is threatened; what they know is becoming

TABLE 2: Technologies associated with knowledge creation and sharing (own source).

Category	Technology	%
Commonly used	24/7 interactive virtual librarian service	1.9
	Blackboard	1.9
	Creative spaces	1.9
	Data mining	1.9
	Digital interface for print books	1.9
	Groupware systems	1.9
	iBeacons	1.9
	Intelligent automation	1.9
	Interoperable systems	1.9
	Open source technologies	1.9
	Podcasts	1.9
	Skype	1.9
	Text analysis tools	1.9
	Virtual library tools	1.9
Continually used	Artificial intelligence	3.8
	Information screens	3.8
	Research data management	3.8
	Smart computers	3.8
	Library apps	5.8
	Social media	5.8
Highly used	Mobile smart devices	7.7
	Big data	11.5
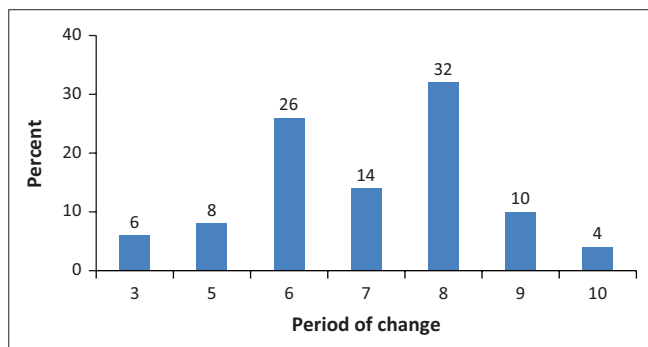
KM, knowledge management.

FIGURE 6: Knowledge management applied during a period of change.
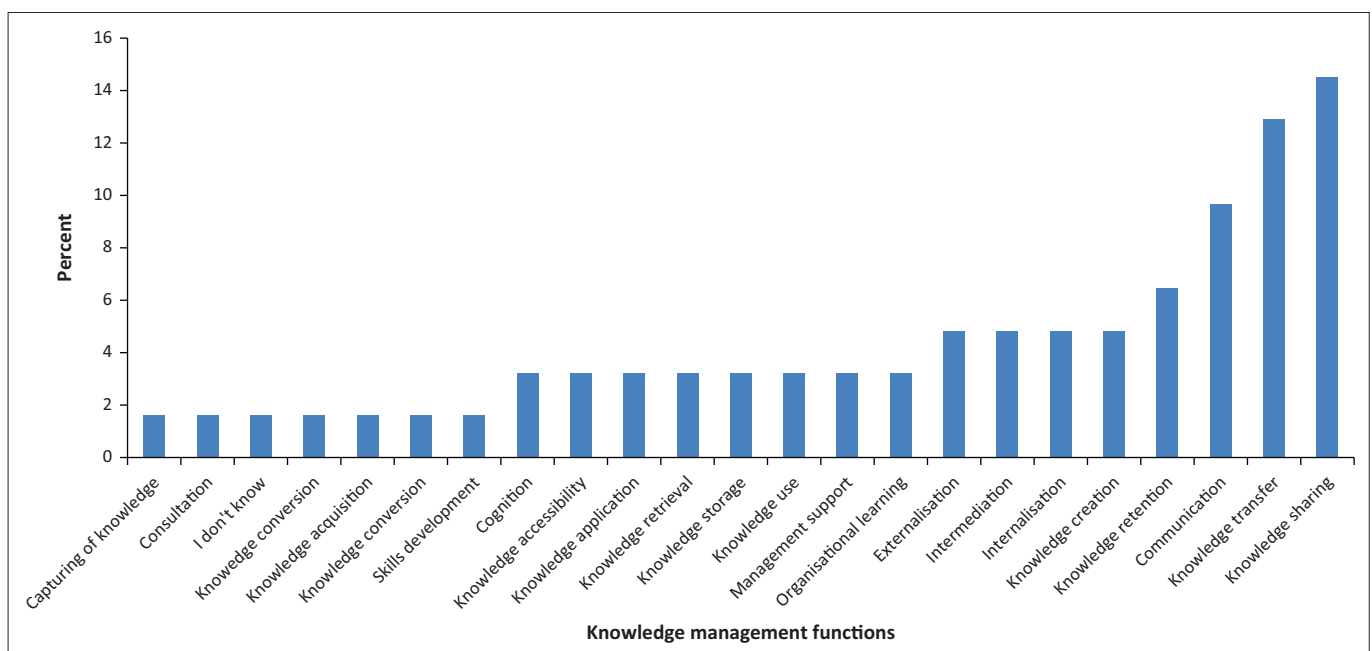
KM, knowledge management.

FIGURE 7: Knowledge management functions applicable during a period of change.

threatened because the new initiative or change tends not to be aligned with their current knowledge and skills. If lack of knowing what is going to happen after change may lead to resistance, then it validates that KM could be a potential solution. It is imperative that knowledge is created and shared amongst employees and relevant stakeholders to leverage collective understanding and change readiness that ensures that employees are prepared for the change before it begins.

The empirical findings address the gap found in the literature. Interview findings indicate a need for integrating KM practice as a change enabler in an academic library. Communication, workshops, training and re-skilling of employees are the most probable change enablers. Questionnaire findings indicate that KM does apply during a period of change. The KM functions most applicable during change are knowledge sharing, knowledge transfer and communication. Technologies conducive to knowledge creation and knowledge sharing in the digital age are clustered, for example, smart mobile devices are highly used, social media is continually used and 24/7 interactive virtual librarian service is commonly used.

Limitation of the study

Although Saunders et al. (2012:289) stated that data collected on a critical case or a unique contribution can lead to a logical generalisation, this study collected data from a single case institution, albeit from multiple campus libraries. To counter this limitation, data were collected from more than one source thereby enabling the researchers to generalise the findings. The study's interviews were limited to academic library directors, managers and faculty librarians and did not include all members of staff. Senior managers at campus libraries were selected as they have a bigger strategic role to play in the HEI's campus libraries ensuring the practice of KM. Also, the study used a mixed methods approach, which may not have been the best for a greater level of detail. However, the use of mixed methods allowed for the triangulation of data to check consistency of trends and findings.

Conclusion

Knowledge management plays a role in the academic libraries in the digital age. Knowledge management functions facilitate communication, collaboration and coordination by means of frequent application of technologies conducive to knowledge creation and knowledge sharing. Knowledge sharing facilitates change in an academic library. This study's empirical research findings show that if KM is applied in an academic library, change processes can be enhanced and facilitate re-skilling initiatives. Resistance to change is caused by not knowing; KM solves this matter of lack of knowledge. If lack of knowing what is going to happen after change may lead to resistance, then it indicates and validates that KM could be a potential solution and a change enabler.

The research findings are relevant to academic libraries that are going through a period of change or those that have not started with change. Knowledge management could bring a

context and platforms where library employees could engage and communicate the value of why change should take place or why it is taking place.

Recommendation is to view change as an important and unavoidable day-to-day practice and like any organisation, academic libraries must continuously develop strategies to keep themselves relevant. Future studies should focus on developing KM strategy for enabling change in the digital age, specifically linked to the categories of technologies associated with the 4IR.

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