Knowledge Management Basic Infrastructure as Correlate of Knowledge Management Success: Case Study of University of Botswana

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Abstract
Knowledge Management (KM) is today considered as a strategic management tool in all types of organizations. Effective KM is particularly vital for universities due to their research-intensive and knowledge-generating nature. An appropriate basic infrastructure is also essential to implement KM within a university. This paper is based on a study (Jain, 2014), carried out to explore the knowledge management practices at the University of Botswana. The paper investigates the correlation between knowledge management basic infrastructure (KMBI) and successful knowledge management implementation (SKMI). Forty-two valid responses were collected from the population of 76 very senior academic staff targeted in four of the seven faculties in the university, and regression modelling was used to test the hypotheses of the study. The findings reveal that the KMBI variables (KM strategy, information technology, leadership support, organizational structure) had significant correlation with successful execution of KM, and predicted 22.1% of SKMI. A key conclusion of the study is that there should be commitment of top management towards SKMI. The empirical findings will assist both researchers and practitioners in thriving knowledge management.

Keywords: Knowledge management implementation, Knowledge management strategy, Information Technology, Leadership support, Organizational structure.

Introduction
The emergence of the knowledge management discipline and practice has transformed information management in organizations, with higher education institutions including universities not left behind. “Higher education institutions are places where creation and transfer of knowledge occurs dynamically between students and lecturers as well as among other academicians. The role of universities and higher education institutions in providing knowledge and learning in various disciplines may put them as knowledge based organizations” (Ali, Sulaiman and Cob (2014: 59). Being research intensive organizations, universities are inherently knowledge generating environments, where knowledge is created and disseminated through research in the form of journal articles, books, conference papers and students’ theses and dissertations. Hence, academic institutions, particularly universities are seen as ‘knowledge hubs’ because of diverse activities for the generation, diffusion and application of knowledge. Teachers, students and researchers all are engaged in the above activities (Hoq and Akter, 2012) and their role has been always recognized as “poles for new scientific and technological development” (Oosterlinck and Leuven, 1999: 5).

Universities as knowledge creation, diffusion and using centres in society require effective knowledge management in their activities in order to be able efficiently acquire, use, produce, share and disseminate information to various stakeholders within and outside their organizational boundaries in the right formats and at the right places and times. Efficient KM will facilitate proper utilization of information and knowledge to solve their research problems at hand to yield effective results. The knowledge also needs to be managed for the present and future usage. Knowledge management is defined in various ways by different KM academics, practitioners, promoters and other stakeholders. It is defined as “a mix of fluid experiences, values, contextual information and intuition” (Davenport and Prusak, 1998:5); or as “a process of knowledge creation, validation, presentation, distribution, and application” (Bhatt, 2001:58).

According to Frost (2012), knowledge management is “the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical and strategic
Successful knowledge management implementation (SKMI) in an organization requires knowledge management basic infrastructure (KMBI) as a crucial factor, comprising such variables as appropriate KM strategy, information technologies, organization structure, leadership, organizational culture, KM ownership, knowledge managers, etc. This paper focuses only on the first four factors, namely KM strategy, information technologies, organization structure, and leadership. Knowledge management is a coordinated process requiring participation from several parties involved. KM literature review reveals that limited studies have identified relationship among crucial factors of KM. Martin et al. (2004) examined the effect of ICT on economic-financial variables and its complementarity with knowledge. However, it is not how the relationship between IT and knowledge works. According to Lorenz et al. (2009), empirical studies in this area are lacking. As a result of constant changes in the global economy, organizations are required to take a more active role in developing knowledge management and learning organization initiatives (Alipour et al., 2011; Alaei et al., 2012). Therefore, the objective of this study is to develop a better understanding of the correlation between KMBI and SKMI in four selected faculties at the University of Botswana with the aid of a conceptual framework.

The University of Botswana

The University of Botswana (UB) is a public university, which is fully funded by the Government of Botswana. It was established on 1st July 1982 by an Act of Parliament. The Vision of University of Botswana is to be “a leading academic centre of excellence in Africa and the world” and the Mission of the University of Botswana is “to improve economic and social conditions for the Nation while advancing itself as a distinctively African university with a regional and international outlook”. There are seven faculties at the University of Botswana: Business, Humanities, Science and Social Science, Education, Engineering and Technology and Health Sciences. Being the national university of Botswana, it fulfills an important purpose of advancing knowledge in the country and through it improving economic and social conditions of the nation.

The University ranked at number 23 among the top 100 colleges and universities of Africa according to 2014 University Web Rankings (4icu.org University Web Ranking 2014). The University academic staff comprise deans, deputy deans, full professors, associate professors, senior lecturers and lecturers. Currently, the university has an enrolment of 18,717 students (17,025 undergraduate and 1,692 postgraduate) and the staff establishment comprises 2,794 (32% academic, 53% support and 15% Industrial) (University of Botswana 2014). University has a University of Botswana Research, Innovation and Scholarship Archive (UBRISA) the digital repository that showcases its research outputs (UBRISA Website Home Page, n.d.). University of Botswana has deployed modern technologies to facilitate knowledge management. It has a modern library equipped with all modern technologies and facilities such as, Online Public Access Catalogue, Full Text Online Journals A to Z, e-books, and learning commons to facilitate teaching, learning and research and search engines (UB Library 2012). University of Botswana has Blackboard and Moodle for e-learning, students’ administration system (Peoplesoft Enterprise) and Resource Management (ERP) system. This study sought to investigate KM practices at the University of Botswana (UB) within this context.
Literature review
Egbu et al. (2001) defined KM as a process, by which knowledge is created, acquired, communicated, shared, applied and effectively utilised and managed with the aid of an Information Technology (IT). The main role of IT here is to help people locate each other and communicate so as to achieve complex knowledge transfer. As mentioned earlier, the present study focused mainly on four major components of knowledge management basic infrastructure (KMBIO), which are briefly discussed in this section.

KM Strategy
Successful KM can be influenced by various factors, among which a good KM strategy is key, as well as the primary step in the initiation of a knowledge management program (Centre for African Family Studies, 2009; Albers, 2009; Rehman et al., 2010; Ansari, Youshanlouei & Mood, 2012). KM should be done in the context of an agreed strategy. A strategy facilitates an organization’s efforts to generate, codify, store, use, reuse, share, and disseminate knowledge inside and outside organization. This will lead to time and resource use efficiencies and improved performance, and also enable staff to share best practices and lessons learned resulting in improved programs and services (Centre for African Family Studies, 2009). Thus, a basic element to succeed in KM implementation is “to form an official strategy of knowledge management throughout the organization as well as plans to learn from the best practices and develop modern knowledge management” (Ansari, Youshanlouei and Mood, 2012).

According to Skyrme (1998) there are two major thrusts behind KM strategy. Firstly, to make better use of the knowledge that already exists within the company rather than re-invent wheel while the knowledge they need is somewhere in the company but not known or accessible to employees. Secondly, the thrust of KM strategy is innovation, the creation of new knowledge and turning ideas into valuable products and services. This thrust of strategy is difficult, yet ultimately has the best potential for improved company performance. The main aim of any corporate KM program is to support the strategic business objectives of an organisation. Therefore, the starting point for KM is to understand the organization’s business strategies. Organisations need to perform a knowledge-based SWOT analysis to better understand their strengths and weaknesses. After mapping the firm’s competitive position, a gap analysis is essential in order to determine the gap between what an organisation must do to compete and what the organisation is currently doing. This represents a strategic gap. The gap between what a firm must know and what the firm does know is the knowledge gap. Thus, KM strategy is the first critical requirement for any knowledge management initiative.

Information Technology
Information technology (IT) is one of the key enablers of knowledge management. IT facilitates knowledge generation, storage and dissemination and connects people with people and with knowledge contents (Davenport, Long and Beers, 1998; Albers, 2009; Gelard et al., 2013; Becerra-Fernandez and Sabherwal, 2010; Ali, Suleiman, and Cob, 2014). According to Ansari, Youshanlouei and Mood (2012: 216), “the role of IT for knowledge management is to backup knowledge repositories, increase access and transmission of knowledge and facilitate knowledge environment”. Several studies such as, Egbu et al., 2002; Ali, Suleiman, and Cob (2014) have examined the information technology role in knowledge management. Egbu and Botterill (2002) examined the usage and effectiveness of information technology in knowledge management. The findings revealed that conventional technologies, such as the telephone, are used more frequently to manage knowledge, than more radical IT, such as groupware or video-conferencing. Similarly, López, Peón., and Ordás (2009) carried out an empirical analysis of information technology as an enabler of knowledge management and found out that IT competency had a direct influence on knowledge management process, knowledge generation, knowledge transfer, knowledge codification and knowledge storage. Additionally, Lopez-Nicholas and Soto-Acosta (2010) investigated the impact of the adoption and use of information and communication technology (ICT) on organizational learning. The findings revealed that that ICT had a significant positive influence on the four processes of knowledge creation, i.e. socialization, externalization, combination and internalization. ICT-oriented communication and workflow produces a significant positive impact on knowledge creation.
processes. Ali, Suleimana, and Cob (2014) examined the role of information communication technology (ICT) by identifying the current information technologies or infrastructure that can contribute to knowledge management in higher education institutions. The study revealed that ICT use enables organizations to manage their intellectual assets, as well as to have proper planning for successful KMS. Thus, it is critical to have adequate technological infrastructure and expertise (Davenport, Long and Beers, 1998; Mesb and Smith, 2000, Krub and Krub, 2011). The main function of IT in this respect is to help process, organize and store any type of knowledge whether explicit and tacit, and enable its dissemination to the right users in right format at right time.

**Leadership Support**

Effective leadership is vital for the success of KM initiatives in an organization. Without strategic leadership knowledge management is doomed to fail (Edwards, 2011). “Leaders execute business strategies for survival and success in current dynamic environments. They also determine the vision and adapt to align KM with business strategies” (Ansari, Youshanlouei & Mood, 2012: 217). Organizations are in need of leaders who are capable of turning the dream of an organization to reality by working hard in setting a template to support and enhance organization objectives especially knowledge management. Gelard et al. (2014) examined the relationship between transformational leadership and knowledge management and established a correlation coefficient between the transformational leadership style and knowledge management of 0.784, which is very high. They also asserted that “one of the key features of transformational behaviours is an insistence on the application of knowledge in the organizational environment and hence soothing the way for creating an innovative organization which can be done through offering some awards” (p. 32).

Bailey and Clarke (2000:235) highlighted the disconnection in how leadership has not kept pace with the need to understand the role of knowledge, “for some reason many managers have yet to grasp the clear personal relevance, utility, and organizational significance of knowledge management”. They further reported that many leaders felt that knowledge management was more fad than reality, or struggled to both conceptualize and practice knowledge management. Nguyen and Mohamed (2011) strongly believe that leaders are highly influential in KM practices. Mohsenabad and Azadhehdel (2016) studied the impact of knowledge-oriented leadership on innovation performance of manufacturing and commercial companies of Guilan province. The findings show that knowledge-oriented leadership has an effect on knowledge creation and the application of knowledge, which also has effect on innovation performance. Also, knowledge-oriented leadership has direct effect on innovation performance. A recent study by Mirheidari and Samiee (2016) evaluated the relationship between leadership style and knowledge management regarding mediating role of organizational structure. The study revealed that there was a significant correlation between leadership style and knowledge management, and that there was also strong relationship between leadership style and organizational structure. Effective leadership is a significant requirement in any organization where the knowledge worker is essential in developing, as well as unlocking the sources and potentials for sustainable competitive advantage in the knowledge economy.

**Organizational Structure**

In the past one decade, management literature has been paying much attention to the organizational structure as a key factor in strategies to enhance global competitiveness in the 21st century. Previous studies have established the relevance of organizational structure in successful knowledge management implementation (SKMI). For instance, Santoro and Gopalakrishnan (2000) observed that people work within the organizational structure that supports organizational processes to achieve the overall business strategy. While organizational structure and corporate culture are related, both have been identified as necessary components for knowledge management initiative success. Gelard et al. (2013) investigated knowledge management from the organizational structure perspective. The findings revealed that organizational structure affects knowledge management processes; thus, improving knowledge management requires creating organizational structures that facilitate knowledge creation and sharing. Wahba (2015) examined the impact of organizational structure on knowledge management processes in the Egyptian context. The findings showed that there was a stronger direct relationship between organizational structure and knowledge management in the
service sector than the product sector. However, Alawamleh and Kloub (2013) examined the impact of organizational structure on knowledge management and its component activities (knowledge acquisition, knowledge storage, dissemination of knowledge, use of knowledge use). The findings revealed that there was no statistically significant relationship between the organizational structure and knowledge management components. This study’s findings are clearly different from those of most other studies.

**Statement of Research Problem**

Key to successful knowledge management implementation is the availability of knowledge management basic infrastructure (KMBI). As discussed above, the importance of knowledge management basic infrastructure has been widely discussed in academic literature. However, very limited empirical studies examined the interaction between these dimensions. Thus, how the relationships among the critical factors influence each other to facilitate knowledge management success remains unclear. This study was an attempt to remedy the knowledge gap. Hence, this study empirically investigated the relationship between knowledge management basic infrastructure (KMBI) and successful knowledge management implementation (SKMI).

**Research Model and Hypotheses**

This section presents a new theoretical framework to describe the combination between Knowledge Management Basic Infrastructure (KMBI) and Successful Knowledge Management Implementation (SKMI). KMBI, which could also be referred to as critical success factors and consists of information technology, organizational structure, leadership/top management support, and knowledge management strategy as independent variables, while SKMI is the dependent variable. KMBI is usually considered a crucial factor for SKMI; but the interdependencies between the two variables can result in synergistic benefits in a university context, with both contributing to a build strong base for research, teaching and learning. This study sought to explore the interrelationship of KMBI and SKMI at University of Botswana, as a case study. The theoretical framework of the research is shown in Figure 1. The variables and research hypotheses of the study are derived from the framework as follow:

**Variables**

- **Information Technology (IT):** Tools that are required for the knowledge management practices in the organization which includes computer, teleconferencing, e-mail, face-book etc.
- **Organizational Structure (OS):** Hierarchy in an organization that indicates each job, its function and channels of reporting within the organization.
- **Leadership Support (LS):** Activities of the organizational leaders that give support to successful knowledge management.
- **Knowledge Management Strategy (KMS):** An operating framework or plan that explains how an organization operates knowledge management.
Research Hypotheses

Main hypothesis: There is a significant relationship between knowledge management infrastructure and successful implementation knowledge management.

Sub-hypotheses:
1. There is a significant relationship between KM strategy (KMS) and SKMI in University of Botswana.
2. There is a significant relationship between Information Technology (Info.Tech) and SKMI in University of Botswana.
3. There is a significant relationship between leadership support (LS) and SKMI in University of Botswana.
4. There is a significant relationship between organizational structure(OS) and SKMI in University of Botswana

Methodology

For the purpose of testing the hypotheses formulated above, an empirical study was carried out at the University of Botswana, Gaborone. Due to time constraints, this study was limited to only four of the university’s seven faculties (Business, Humanities, Science, and Social Science) and targeted only the population of deans, deputy deans, head of the departments and full professors listed in the university’s telephone directory (UB Internal Telephone Directory, 2014). The total population was 136, comprising seven deans, seven deputy deans, 67 heads of departments and 55 full professors. Using a convenience sampling procedure, the study was able to survey 76 of targeted academic staff comprising deans (4); deputy deans (4), heads of the departments (28), and full professors (40), which represented 55.8% of the total population.

The study used cross-sectional survey approach and data were collected using a questionnaire validated using Cronbach Reliability Test method with the following alpha coefficients for the construct variables of the study: Information Technology (IT) (.770), Organizational Structure (OS) (.688), Leadership Support (LS) (.710), Knowledge Management Strategy (KMS) (.710), Successful Implementation Knowledge Management (SKMI) (.887). The methodology has the following main limitations. Due to time constraints, the study was restricted only to four faculties out of seven and included only deans, deputy deans, heads of the departments and full professors. The results and findings might therefore not be the true representation of the whole University of Botswana KM practice. Another major limitation of the study was that University of Botswana does not have a formally specified knowledge management strategy, so the KMS strategy referred to in the study pertains to the informal one perceived or practiced by the surveyed leaders in the university.

A draft of the questionnaire was pre tested on three professors (not included in the study’s sample) to identify and rectify its flaws prior to the actual research. According to Aina (2002: 193) ethics are “norms that are expected to be followed, and may also be referred to as principles of good behaviour”. This study adhered to the following ethics requirements: permission to conduct the study was sought from the Office of Research & Development at the University of Botswana (UB); participants were assured that identified information will not be made available to anyone; The study adhered to the principle of anonymity and the respondents were not required to indicate their names when completing the questionnaire; respondents were granted the right to freely decide whether to participate in the study and they had the right to withdraw from participating in the study at any time they wished.

At the end of the survey, 42 responses to the questionnaire were found usable for the data analyses. This represents 55% of the targeted sample. According to Rubin and Babbie (2011), a response rate of at least 50 percent is usually considered adequate for analysis and reporting. The 42 participants whose responses were found usable comprised two deans, two deputy deans, 13 heads of the departments, and 25 professors. Out of these, 38 were males and 4 were females, 15 were from the faculty of Science, 8 from Social Science, 18 from Humanities and one from Business. Thus, the majority of the participants were professors, male and from the Faculty of Humanities.
Results

Data analyses were performed using IBM SPSS version 22.0. Due to the ordinal level of measurement/collection of data on the variables (using Likert scales), Friedman non-parametric and Spearman correlation methods were used for the analyses.

The first analysis that was done is compare the four knowledge management basic infrastructure variables at the university of Botswana in terms of the relative Likert scale responses given to them by the respondents. The four variables are Knowledge Management Strategy (KMS), Information Technology (IT), Organization Strategy (OS) and Knowledge Management Strategy (KMS). The result of the Friedman non-parametric test that was used was shown in Table 1. The result shows that respondents gave comparatively highest scores to IT (tools & applications) deployment in the university (with an average rank of 21.73), followed very closely by organizational structure of the university (20.15). In comparison, both Leadership Structure (LS) in the university, and KM Strategy (KMS) in the university received much lower scores, as evidenced by their much lower average ranks.

Table 1: Friedman’s Test result

<table>
<thead>
<tr>
<th>Variables</th>
<th>Average rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology (IT)</td>
<td>21.7333</td>
</tr>
<tr>
<td>Organizational Structure (OS)</td>
<td>20.1515</td>
</tr>
<tr>
<td>Leadership Support (LS)</td>
<td>14.6053</td>
</tr>
<tr>
<td>KM Strategy (KMS)</td>
<td>14.6053</td>
</tr>
</tbody>
</table>

Next, the four research hypotheses of the study, stated in the null form, were tested using Spearman rank correlation method.

$H_01$: There is no significant relationship between knowledge management strategy (KMS) and Success of Knowledge Management Implementation (SKMI) in University of Botswana.

As shown in Table 2, the Spearman correlation for the test of this hypothesis is .239, which indicates a positive correlation relationship between KMS and SKMI. However, the significance of this correlation is .748, which is much beyond the set acceptable error or alpha level of 0.05. This implies that the states null hypothesis cannot be rejected, and should therefore be accepted. It is therefore concluded with 95% confidence there is no significant relationship between Knowledge Management Strategy (KMS) and Success of Knowledge Management Implementation (SKMI), despite the low negative correlation.

Table 2: Spearman correlation between KMS and SKMI

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation coefficient</th>
<th>Significant level</th>
<th>Error level (α)</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMS, SKMI</td>
<td>.239</td>
<td>.748</td>
<td>0.05</td>
<td>$H_01$ rejected</td>
</tr>
</tbody>
</table>

$H_02$: There is no significant relationship between Information Technology (IT) deployment and Success of Knowledge Management Implementation (SKMI) in University of Botswana.

The Spearman correlation for the test of this hypothesis is reported in Table 3 as a .470, which indicates a moderate positive relationship between SKMI and IT deployment. The significance of this correlation is .039, which is lower than the acceptable maximum error (alpha) level of 0.05. This implies that the stated null hypothesis should be rejected, and the implied alternative hypothesis should be accepted. Moreover, the correlation between IT and SKMI is moderate, going by Statstutor’s (2016) recommendation that absolute values of correlation coefficients in the ranges .0 - .19, .2 - .39, .4 - .59, .6 - .79, and .8 – 1.0 should be interpreted as very weak, weak, moderate, strong and very strong, respectively. It is concluded, therefore, that there is a moderate and significant linear relationship between information technology (IT) and successful knowledge management implementation (SKMI).
The significant level of significance is 0.05.

The regression analysis showed strong evidence of the potential causal nature of the link between KMBI variables and SKMI, with an associated R squared value of .221, which implies that the four KMBI variables have a joint explanatory power of 22.1% in explaining the variances in perceptions of SKMI by the respondents.

**Discussion**
The review of previous literature of this study highlighted the importance of knowledge management strategy (KMS), information technology deployment (IT), as well as supportive leadership style (LS) and organizational structure (OS) as potentially strong elements of knowledge management basic infrastructure (KMIB) which would, therefore, strongly determine, predict or correlate with successful knowledge management implementation (SKMI). However, in this study, it was only Information Technology deployment (IT) that had a significant positive linear relationship with SKMI, which was moderate (Spearman rho = .470), while the other three factors had weak and insignificant relationships with SKMI. Nevertheless, the exploratory regression analysis provided some evidence of the possible joint predictive relationship of the KMIB variables with SKMI.

**Conclusion and Recommendations**
KM has gained widespread recognition and popularity in recent organizational research and practice as a key driver of organisational performance and to gain and sustain competitive edge over the competitors. This study investigated the correlation and possible predictive relationships between...
Successful Knowledge Management Implementation (SKMI) and Knowledge Management Basic Infrastructure (KMBI) variables, specifically Knowledge Management Strategy (KMS), Information Technology (IT), Leadership Style (LS) and Organization Structure (OS). The data analyses were based on perceptions of these variables provided by sampled staff of the University of Botswana. The study established empirical correlation between SKMI and IT, and also between the SKMI and the KMBI variables working jointly. These findings provide basis upon which to grow new theories and policies on critical knowledge management factors that would help universities and their staff to achieve and realize success in knowledge management. In particular the findings of this study suggest that effective deployment of information technologies in the university would facilitate knowledge acquisition, processing, storage and dissemination, as well as promote and sustain personal knowledge access and sharing among university staff for improved personal and organizational productivities and efficiencies. This study is among the first studies to investigate the relationship between knowledge management basic infrastructure variables and successful knowledge management, at least in Botswana. As such, it has provided initial perspective on the topic, although much more research remains to be carried out in order to gain deeper understanding of the relationships among all the potential critical success factors of knowledge management.

References


