The role of knowledge management capabilities in the performance of Botswana water utilities corporation

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Abstract

The research article provides an insight into the role of knowledge management capabilities in the performance of Botswana Water Utilities Corporation. In this research paper, organizational performance is measured under the following: - (a) Quality of service (b) Employee attraction and retention (c) Customer satisfaction. The researchers used mixed methods in investigating the research problem which revolves around the role of knowledge management capabilities and the performance of the organization. The research findings confirm that the recognition of knowledge management capabilities if well managed and utilized will increase the organizational performance in respect of quality of service, employee attraction and retention, and customer satisfaction. The research went further to discuss current challenges facing the organization and in the same vein offered possible solutions on how to minimize the identified challenges.

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Introduction

1.1 Background

In recent times, there is a general dictum among the public that water is the most valuable and fastest depleting natural resource and that it is indispensable in every facet of life. The view has contributed greatly to the current streams of research on water management (e.g., Guvernator and Landaeta, 2020; Chiu and Chen, 2016; Donate and Pablo, 2014). It is in this perspective that this research attempts to explore the role of knowledge management capabilities (KMC) in the performance of Botswana Water Utilities Corporation (WUC).

In general terms, water is required in food production, sanitation, drinking, electricity generation and for industrial use. The need to achieve universal water security is reflected in the United Nations (UN)'s sixth Sustainable Development Goal (SDG). The Goal aims to "Ensure availability and sustainable management of water and sanitation for all" by 2030 in a report by the United Nation (UN, 2020). The report indicated that, as of 2017, 2.2 billion people lacked safely managed drinking water while 4.2 billion (more than 50% of the world population) lacked safely managed sanitation and that water scarcity is threatening to displace 700 million people by 2030 (UN, 2020). In the UN report, it was reported that 3 billion people (approximately 38% of the world population) lacked basic hand washing facilities at home. The statistics echo the urgent need for water service providers to efficiently and sustainably manage the water provisioning and sanitation services as well as for consumers to use water sustainably.

According to UN (2020) and Mvulirwenande et al. (2016), water operators in developing countries face serious performance challenges which lead to poor service delivery. These challenges include low levels of service coverage, financial constraints, high rates of non-revenue water (NRW), intermittent supplies, poor water quality, governance problems, and lack of appropriate knowledge as well as capacities. Globally, some developing countries experience funding gaps of approximately 61% which hinder them from reaching their water and sanitation targets (UN, 2020). Sandelin, Hukka and Katko (2019) observed that water utilities operators need to manage their knowledge assets in order to be

efficient and sustainably perform at their optimum level. According to Bratianu and Orzea (2010:42), KM comprises of "initiatives, processes and strategies and system that sustain and enhance the creation, storage, analysis, sharing and reuse of knowledge". Muthuveloo, Shanmugam and Teoh (2017) affirmed the view and stated that, KM is increasingly becoming a source of competitive advantage for organizations by assisting firms to reach optimum operational efficiency levels.

Over the years, intergovernmental organizations and non-governmental organizations (NGOs) have spearheaded global efforts to assist water sectors in developing countries to combat some of the aforementioned challenges. In March 2017, the World Bank approved a $145.5 million loan to Botswana for the Emergency Water Security and Efficiency Project (World Bank, 2017). The aim of the Project was to "improve the availability of water supply in drought vulnerable areas, strengthen wastewater management in selected systems and improve the operational efficiency of the Water Utilities Corporation". Furthermore, Nyandoro (2018) argued that the key reason for water supply challenges in Botswana is persistent drought. The observation is supported by the 33 years data from 1980 to 2013 which reveals that, approximately 18 of these years were drought years (Nyandoro, 2018). During the drought years, dam levels dropped significantly, thus, affecting the water supply of the country.

In the 2015-2016 drought year, water supply challenges were attributed to El-Nino related occurrences. As a result, the overall dam levels dropped below a fifth of their capacity and ground water sources in several water supply catchment areas either dried up or became saline (World Bank, 2017). It can be argued that drought is a natural disaster that challenged water supplies and cannot be attributed to inefficiencies in water operations. However, Nyandoro, (2018) argues that KM was lacking in the management of water operations in a country that is prone to drought. Furthermore, other contributing factors such as institutional overlap in implementing water policy, misleading cultural interpretations about water, high rates of water losses and wastages, escalating demand driven by a growing population, *inter alia*, can be attributed to Knowledge Management (KM) rather than solely on natural disasters.

Therefore, this study intends to explore the Knowledge Management Capability (KMC) problems affecting the Botswana water sector as argued by Setlhogile and Harvey (2015:2); they observed that, "there is a great deal of ignorance about the state of water resources in Botswana compounded by shortages of scientific data and ineffective monitoring". Nyandoro (2018) affirmed that, the lack of KMC and strategies in Botswana's water sector as well as research in KM maybe a greater threat to the country's water section than the occurrence of natural disasters such as droughts and changes in climate. In another study, Nyandoro (2018) proposed the establishment of a research think tank that should focus on generating knowledge on strategic natural resources such as water.

Nyandoro (2018) further argued that "knowledge generation and skills capacity of institutions that deal with water should be developed with a long-term focus" through events such as annual symposiums or conventions on water. Such platforms may offer the Botswana water sector and its stakeholders an opportunity to learn new management and innovative practices; analyse and review alternative policy responses in order to understand how water sectors in countries with similar climatic conditions as Botswana are managed. Several studies on KM have shown that KM has a positive impact on the performance of organizations (Abusweilem and Abualoush, 2019; Muthuveloo et al., 2017; Chiu and Chen, 2016).

As a result, there is growing interest in KM in the water sector of Botswana. Sayyadi (2019) and Sadeghi and Rad (2017) found that knowledge-based firms in advanced economies who have incorporated KM principles in their operations are more effective and profitable compared to those that have not incorporated knowledge management practices in their operations. Donate and De Pablo (2014) explained that the knowledge-based view of the firm (KBV) postulates that knowledge (specifically innovative knowledge) is what a company requires to outperform its competitors in a particular industry. The theory considers a firm to be a "distributed knowledge system" composed of knowledge holding employees and the firm's role is to coordinate the work of those knowledge holding employees to create knowledge and value for the firm (Donate and De Pablo, 2014:364).

In light of the above discussion, this paper attempts to explore the role of KMC on the performance of the Water Utilities Corporation (WUC) of Botswana. In this research paper, organization performance

shall be measured under the following (a) quality of service, (b) employee attraction, (c) customer satisfaction, and (d) employee retention.

1.2 Problem statement

Botswana is faced with serious water challenges which threaten the socio-economic development of the country. The country is challenged by the limited supply of water in the phase of increasing water demand. With respect to supply, the country is considered to be a drought-endemic country and receives variable and low average annual rainfall of approximately 450 mm (Nyandoro, 2013). During drought years, dam levels drop significantly thus affecting the water supply of the country. Moreover, on the demand side, due to Botswana's growing economy and infrastructural development, the national demand for water continues to grow at an increased pace (WUC, 2020). Setlhogile and Harvey (2015) explain that the country's population increase, economic growth and improved living standards have increased water demand and consumption, putting pressure on available water resources.

Acute water shortages are mostly experienced in the areas of Masunga, Ghanzi, Tsabong, Tswapong South, Gumare, Goodhope Cluster, Mmathethe, Lotlhakane East, Hukuntsi and Molepolole, with short-term mitigations implemented through water bowsing (WUC, 2020). In recognition of the severity of the water situation in Botswana, in 2017, the World Bank approved a $145.5 million loan to Botswana for the Emergency Water Security and Efficiency Project (World Bank, 2017). The funds were earmarked for improving water supply in drought-prone communities, strengthening wastewater management in selected systems and improving the operational efficiency of the WUC.

The Corporation is heavily dependent on groundwater to meet its customers' demand. According to WUC (2018), groundwater accounts for about 60% of total water supply in Botswana. However, WUC continues to face challenges in groundwater due to natural factors such as high salinity, low rates of replenishment due to low rainfall and the deep-seated nature of the country's aquifers (WUC, 2018). Other challenges facing groundwater resources are old borehole infrastructure and high leakages, vandalism and theft of equipment, illegal abstraction, and uncoordinated developments in the well fields leading to groundwater pollution and over-abstraction (WUC, 2018). Other challenges such as declining borehole water levels and high leakages due to dilapidated infrastructure continue to pose a challenge (WUC, 2018).

As pointed out earlier, besides the aforementioned supply and demand factors, there are also KM related factors that are exacerbating the country's water supply challenges. Unlike drought and the adverse climatic conditions which are beyond human control, KM related factors can be controlled. The KM issues identified by WUC (2020), Nyandoro (2018) and United Nations Development Programme (2012), among others, include a lack of expert skills, poor management of human resources, and lack of adaptive strategy for managing knowledge. For instance, the 2015 Botswana Water Accounts Report submitted that system water losses averaged 19–26% which was approximated at US$1.01 million (Centre for Applied Research and Department of Water Affairs, 2015). According to the World Bank (2017), WUC's NRW increased from about 11% of production in 2008 to about 40% in 2017. Poor maintenance of existing infrastructure was identified as the chief contributing factor to water losses (Centre for Applied Research and Department of Water Affairs, 2015). The costly water losses are highly likely linked to the above-mentioned KM problems at the WUC, and this highlights the need for KM strategy in the water sector of Botswana.

The significance of KM in the water sector is further pointed out by Guvernator and Landaeta (2020) and Sandelin et al. (2019) who emphasised the need to guard against knowledge drain. The researchers explained that the operational workforce of municipal utility organizations has developed throughout the years a technical knowledge base related to the operation, troubleshooting, and maintenance of water systems. When this operational workforce leaves the organization due to retirement, death, chronic illness or transfers, the knowledge capabilities of the water utility organization are negatively affected thereby putting its sustainability at great risk (Guvernator and Landaeta, 2020). It then becomes important for organizations such as WUC to have an effective KM strategy to ensure knowledge retention and that knowledge is successfully transferred to the younger generation joining the workforce of the water utility.

Knowledge is a key resource to organizations as it is the foundation for executing tasks and learning. Therefore, water utility organizations require a suitably knowledgeable workforce to oversee their daily

operations and maintenance in order to provide continuous reliable service 24 hours for each of the 365 days in a year. It is in light of the above issues that this research attempts to examine and develop a conceptual framework that would promote KM for WUC in order to achieve a better organizational performance. The promotion of KM at WUC and in the water sector in general will be instrumental in helping the country to find the path to long term water security.

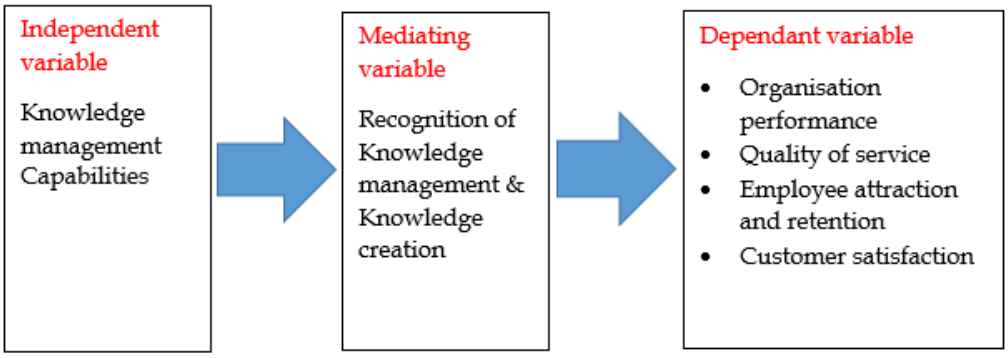

Figure 1: Proposed conceptual framework for the study:

In terms of the above problem statement, the proposed conceptual framework to be investigated in this research paper is illustrated in Figure 1 in respect of the independent, dependent and possible intervening variable.

1.3 Objectives of the study

The objectives of this study are as follows:

To investigate and analyse how the implementation of KMC can promote the general performance of WUC.

To investigate the relationship between KMC and the quality of customer service.

To investigate the relationship between KMC and employee attraction.

To investigate the relationship between KMC and customer levels of satisfaction.

To examine the relationship between KMC and employee retention.

To examine the influence of the Recognition of KM and Knowledge Creation as intervening variable on the performance of WUC.

To provide recommendations to Botswana's WUC on how they can leverage KMC to enhance organizational performance.

1.4 Research questions

The research questions are aligned to the following research objectives as follows:

How does KMC promote the general performance of WUC?

Does the implementation of KMC enhance customer level of satisfaction?

In what ways does KMC influence employee retention?

How does KMC influence the quality of customer service?

How does the recognition of KMC influence Knowledge creation and the performance of WUC?

The rest of this paper is organised as follows: Section 2 of this paper provides a brief review of relevant literature; Section 3 discusses the research methodology; Section 4 presents the research findings; Section 5 analyses the research findings; and Section 6 points out the limitations of the study and also suggests directions of related future studies.

Literature Review

2.1 Knowledge management capabilities

Knowledge management capabilities is a concept pioneered by Gold, Malhotra and Segars (2001) who proposed that it is made up of knowledge infrastructure capabilities (KIC) and knowledge process capabilities (KPC). Knowledge infrastructure capabilities can be measured through an organization structural infrastructure (physical layout and organization hierarchy), technical infrastructure (e.g.,

information technology, business intelligence, distributed learning) and cultural infrastructure (set of values, beliefs, behaviours, and symbols) (Gold et al., 2001). The three constructs of KIC affect knowledge management in an organization (Chiu and Chen, 2016). Knowledge process capabilities consists of organizational capabilities that manipulate knowledge stored in the form of standard operating procedures and routines throughout the organization (Gold et al., 2001). It is made up of four stages, namely acquisition (creating new knowledge using existing knowledge), transformation (conversion of knowledge from different forms for profitable utilisation within the organization), application (storage, retrieval, application, contribution and sharing of knowledge), and protection (preventing illegal or inappropriate use or theft of organizational knowledge) (Chiu and Chen, 2016; Gold et al., 2001). Similar to KIC, KPC also influences an organization's ability to effectively initiate and maintain programs of KM. Gold et al. (2001) empirically showed that infrastructural and process capabilities are prerequisites for effective knowledge management which in turn contributes to organizational effectiveness (or performance). The aforementioned KMC definition by Gold et al. (2001) is followed in this study.

2.2. Knowledge creation

Knowledge creation is one of the four mainly recognised KM practices which include knowledge storage, knowledge application and knowledge transfer (Abusweilem and Abualoush, 2019; Donate and Pablo, 2014; Zack, McKeen and Singh, 2009). According to Alavi and Leidner (2001), knowledge creation involves developing new knowledge content or replacing existing content in the organization's explicit or tacit knowledge pool. Abusweilem and Abualoush (2019) state that knowledge creation includes all processes through which the organization seeks to produce and acquire knowledge, whether it is between implicit knowledge and explicit knowledge. Nonaka and Toyama (2007) postulate that knowledge generation includes four processes, namely socialisation, externalisation, combination and internalisation; thus, making up what is famously known as the SECI model. Socialisation refers to the conversion of implicit knowledge to a new implicit knowledge while externalisation represents the transformation of implicit knowledge into explicit knowledge. Combination is a process of creating new network structures of explicit knowledge by integrating pieces of explicit knowledge into new integral structures. Internalisation is the process of embodying explicit knowledge as tacit knowledge (Nonaka and Toyama, 2007). This study focuses on knowledge creation since it is the first step in KM. It will be used as indication of the recognition by organizations that KM is important in performance.

2.3 Organizational performance

According to Zack et al. (2009), today's dynamic and highly competitive business environment has left businesses with no option but to focus on organizational performance so as to ensure competitiveness and sustainability. In one way or the other, organizational performance provides a reflection of the way an organization exploits its tangible and intangible resources to achieve its goals. Abusweilem and Abualoush (2019), Sayyadi (2019), Muthuveloo et al. (2017) explained that organizational performance comprises of both financial and non-financial performances; where the former refers to tangible or the monetary benefits such as the return of investment, revenue, and profit margins, while the latter refers to elements such as customer satisfaction, employee retention, service quality and other intangible benefits. Abusweilem and Abualoush (2019) posit that performance is the core activity in organizations as it determines the long-term survival of the organization. As a result, organizations require prudent management of money, energy and time so as to optimise the return on investment. In this research paper, organization performance is measured in terms of the following non-financial aspects: (a) quality of service, (b) employee attraction, (c) customer satisfaction, and (d) employee retention.

2.4 Empirical studies on KMC and/or KM and Performance.

Due to the growing emphasis on the importance of KM to the performance of organizations, there has been proliferation of studies on the nexus between KM and organizational performance in the past two decades. A few of those studies are briefly reviewed here. Abusweilem and Abualoush (2019) set out to examine the relationship between business intelligence systems (BIS) and knowledge management processes at Housing Bank for Trade in Irbid in Jordan using a survey study. Results showed that organizations with effective KM can significantly affect the organization's activities, relationship to the market and its innovations which leads to superior performance. In a survey study, Chiu and Chen (2016)

examined the effect of KMC on organizational effectiveness with organizational commitment as a mediating variable at the Taipei Water Department in Taiwan. Their findings confirmed that KMC is not solely sufficient to drive organizational effectiveness and that organizations also need to encourage organizational commitment. Only KPC was found to be having a significant relationship with organizational effectiveness thus contradicting results from a study by Gold et al. (2001). In a study exploring learning organization theory and the potential to retain knowledge workers, Lee-Kelley, Blackman and Hurst (2007) showed that organizations need to implement KM strategies in order to increase employee retention, especially that of knowledge workers.

Using a case study protocol and semi-structured interviews, Guvernator and Landaeta (2020) assessed how municipal utility organizations in Southeastern Virginia transferred their operational knowledge in order to enhance organizational performance. Results showed that knowledge retention and organizational learning which are important in organizational performance can be facilitated through the use of programs that help to identify, recognize, and support internal coaches, teachers and mentors. Zack et al. (2009) explored how KM influences overall organizational performance and financial performance using a sample of 88 firms in Canada, USA and Australia. In their survey study, results showed that KM has a significant positive impact on overall organizational performance but no significant impact on financial performance. However, results showed that organizational performance mediates in the relationship between KM and financial performance. Muthuveloo et al. (2017) also examined the impact of tacit KM on organizational performance by surveying managers, senior managers and directors of manufacturing organizations both local and foreign companies located in Malaysia and listed in Federation of Malaysian Manufacturers. Results showed that KM generally impacts organizational performance. This revealed the importance of knowledge creation and management for optimal organizational performance and also highlighted the key benefits that an organizational could gain from knowledgeable workers.

The studies largely support the notion that KM or KMC contribute positively to the overall performance of organizations. From the literature review, the following hypotheses which are aligned to the research problem and the questions of the research were developed.

Hypothesis one:

Null hypothesis: Knowledge Management Capabilities do not affect organizational performance.
Alternative hypothesis: Knowledge Management capabilities do affect organizational performance.

Hypothesis two:

Null hypothesis: Knowledge Management capabilities do not affect customer satisfaction.
Alternative hypothesis: Knowledge Management capabilities do affect customer satisfaction

Hypothesis three:

Null hypothesis: Knowledge management capabilities do not affect employee attraction and retention.
Alternative hypothesis: Knowledge management capabilities do affect employee attraction and retention.

Research Methodology

The study adopted a mixed method approach which is the concurrent application of both the quantitative and qualitative approaches. This increases the overall strength of the study since the weaknesses in each one of designs is compensated for by the other design. A survey strategy was adopted in line with previous empirical studies and data was collected from eight of the sixteen water supply Management Centres (MCs) in Botswana which were selected at random. Random selection ensured that each MC had an equal probability of being included in the study. The target population of 1 231 comprised of all the employees from the selected MCs, customers, contractors, suppliers, KM practitioners and academic experts in KM. A sample size of 278 was determined using Krejcie and Morgan (1970) formula and stratified random sampling was used to identify respondents of each group or stratum as shown in Table 1. The general advantage of stratified sampling is that it helps to minimize the element of biasness in the selection of the respondents from each stratum.

Table 1: Selection of the respondents using stratified sampling techniques

The Eight Management Water Supply Centres selected	Total Number of Employees in each Centre	% Total of employees in each centre	Percentage (%) of the Sample size (278) in each Centre.
1. Each Centre			
Francistown	220	18	50
Lobatse	200	16	45
Kanye	85	7	19
Mahalapye	160	13	36
Mochudi	150	12	33
Palapye	168	14	39
Letlhakane	120	9	25
Ghanzi	88	7	19
2. Knowledge Management Practitioners.	20	2	6
3. Academic Experts in the area of KM	20	2	6
Total	**1 231**	**100**	**278**

A questionnaire with both closed and open-ended questions was used to collect data since it allowed collection of quantitative data (closed-ended questions on a Five-point Likert scale) and qualitative data (open-ended questions). The reliability (correctness or accuracy) of the questionnaire was tested using Pearson Cronbach's alpha while validity was ensured through consultation with academic experts in KM research and also a pilot study. The statistical software for social sciences (SPSS) was used to analyse quantitative data and test the hypotheses. Qualitative data was analysed through content analysis which entails extracting according to entails a systematic analysis of the occurrence of words, phrases, and concepts (Creswell, 2009).

Research Findings

A Pearson Cronbach's alpha of 0.89 was calculated. According to Chiu and Chen (2016), an alpha value greater than 0.7 shows that the data collection instrument is reliable, stable and internally consistency. The results will be discussed according the three hypotheses.

Hypothesis one:

Null hypothesis: Knowledge Management Capabilities do not affect Organizational Performance.

Alternative hypothesis: Knowledge Management Capabilities do affect Organizational Performance.

In testing the above hypothesis, a regression model was fitted for the KMC on the mediating variable, which is recognition of the importance of KMC, and the Table 2 below illustrates the result.

Table 2: Recognition versus Performance

Obs	parameters	RMSE		R-Sq	f	Prob.
182	4	0.599		0.352	32.217	0.000
Variable	coeff	Std Error	t	Prob	Lower Limit	Upper Limit
KM Capabilities	0.234	0.069	3.39	0.001	.098	0.370

In the case of organizational performance, the Table 2 shows that the fitted regression model (F=33.217, prob. =0.000) is significant. The R-square is 0.352 which means that the model explains 35.2% of the variation of the recognition variable. It indicated that KMC with the following values: t = 3.39, prob. = 0.001<0.01) is significant. The analysis also confirms that KMC affect the recognition of the importance of KM positively. Since the above regression results have indicated that there is a relationship between KMC and the mediating variable, this implies that "Recognition" explains the nature of the relationships between KMC and Organizational Performance, and this then encouraged the researcher to go ahead to

test these mediating effects. In this case, the dependent variable is Organizational Performance and KMC is the independent variable.

Table 3: First Performance Regression Model

Obs	parameters	RMSE	R-Sq	F	Prob.
185	4	.937	.182	13.453	0.000
Variable	Coeff	Std Error	**t**	Prob	Lower Limit	Upper Limit
KM Capabilities	.178	.108	-1.65	0.100	-391	.035

Table 3 above illustrates a situation where Recognition of KMC was not considered while Table 4 below illustrates a situation where it was considered and included as the independent variable. In Table 4, Recognition of KMC is now considered as an independent variable and the result of the analysis indicates that KMC (t=1.84, prob. = 0.068<1), which was not statistically significant before, became significant.

Table 4: Regression model with Recognition of KMC

Obs	Parameters	RMSE	R-Sq	F	Prob.	
182	5	.938	.191	10.411	0.00	
Variable	Coeff.	Std Error	**T**	Prob	Lower limit	Upper limit
KM Capabilities	-205	.112	-1.84	0.068	-425	.015
Recognition of KM Capabilities	.126	.117	1.07	0.286	-106	.357

The R-square also increased from 0.182 to 0.191. The implication is that recognition mediates the effects of knowledge management capabilities on organizational performance.

Hypothesis two:

Null hypothesis: Knowledge Management capabilities do not affect Customer Satisfaction.

Alternative hypothesis: Knowledge Management capabilities do affect Customer Satisfaction

Table 5: Recognition of Knowledge Management Capabilities and Customer Satisfaction

Obs	Parameters	RMSE	R-Sq	F	Prob.	
181	4	0.627	0.292	24.282	0.00	
Variable	Coeff.	Std Error	**T**	Prob	Lower limit	Upper limit
KM Capabilities	0.135	0.077	1.75	0.082	-017	0.287

Table 6: First Regression Model

obs	Parameters	RMSE	R-Sq	F	Prob.	
182	4	0.954	0.051	3.198	0.025	
Variable	Coeff.	Std Error	**T**	Prob	Lower limit	Upper limit
KM Capabilities	0.184	0.116	1.58	0.117	-0.46	0.413

Table 7: Second Regression Model

obs	Parameters	RMSE	R-Sq	F	Prob.	
180	5	0.939	0.077	3.632	0.007	
Variable	Coeff.	Std Error	**T**	Prob	Lower limit	Upper limit
KM Capabilities	-230	0.117	-1.97	0.050	0.000	-460
Recognition of KM Capabilities	-242	0.113	-2.15	0.033	-465	0.020

Since the regression results have indicated that there is a relationship between KMC and the mediating variables, this implies that "Recognition" explains the nature of the relationship between KMC and Customer Satisfaction. The results also encouraged the researchers to go ahead and test this mediating effect. Consumer Satisfaction was proxied by the use of the variable "current relationship between the organization and customers", which corresponded to the question, "How do you rate the current relationship between your organization and the customers" and was not measured directly. In this case, the dependent variable is Customer Satisfaction, and the independent variable is the KMC. Table 6 shows that the fitted regression Model (F=3.198, Prob. = 0.025) is significant. The R-square is 0.051 which means that the Model explains 5.1% of the variation of Consumer Satisfaction.

According to Table 7, when the recognition variable was included in the regression model, there was an increase in the KMC (t = 1.95, Prob. = 0.050), which was not statistically significant before, became significant. In the same perspective, R-square also increased from 0.057 to 0.077. The implication is that Recognition meditates the effects of KMC on Consumer Satisfaction by increasing the satisfaction.

Hypothesis three:

Null hypothesis: Knowledge Management Capabilities do not affect Employee Attraction and retention.
Alternative hypothesis: Knowledge Management Capabilities do affect Employee Attraction and Retention.

Table 8: Recognition versus Employee Attraction and Retention

Obs	Parameters	RMSE	R-Sq	F	Prob.	
178	4	.596	.358	32.34	0.000	
Variable	Coeff.	Std Error	**t**	Prob	Lower limit	Upper limit
KM Capabilities	-.037	.049	-0.76	0.451	-1.133	.059

Table 8 shows that the fitted regression model between Employee Attraction and Retention and KMC is highly significant (F= 32.34, Prob. = 0.000). The R-square is 0.358 which means that the model explains 35.8% of the variation of the Recognition variable. The result means that KMC affects the Recognition of the importance of Knowledge Management positively. The result further encouraged the researcher to test the issue of recognition as the mediating factor and its effects.

Employee Attraction and Retention was proxied by the use of the variable "Relationship between Management and employees", which corresponded to the question, "How do you rate the relationship between Management and other employees in the organization?" and it was not measured directly. In this case, the dependent variable is Employee Attraction and Retention, and the independent variable is KMC. This relationship is illustrated in the first regression model below shown in Table 9. The fitted regression model (F = 7.309, prob= 0.000) is significant. The R-square is 0.114 which means that the model explains 11.4% of the variation of Employee Attraction and Retention. It also indicated the values of KMC (t = 0.050, Prob. = .099 <1) is significant.

The results mean in practical terms that Knowledge Management capabilities affect employee attraction and retention positively, and this therefore means that the more knowledge management capability the more attraction and retention. However, the effect of Recognition as a mediation variable when included in the study, further buttressed the importance or significance of KM Capabilities and this is illustrated in Table 10.

Table 9: First Regression Model

obs	Parameters	RMSE	R-Sq	F	Prob.	
175	4	.918	.114	7.309	0.000	
Variable	Coeff.	Std Error	**t**	Prob	Lower limit	Upper limit
KM Capabilities	-.083	.050	0.050	0.099	-0.16	.181

Table 10 shows that when the recognition variable was included in the regression model, the model gained more explanatory power, for R-square increased from 0.114 to 0.130. In addition to this, KMC became more significant. This result indicates that Recognition mediates the relationship between Knowledge Management capability (t=2.43, Prob. =0.016<.05) and employee attraction and retention.

Table 10: Second regression Model

obs	Parameters	RMSE	R-Sq	F	Prob.	
173	5	0.911	0.130	6.264	0.000	
Variable	Coeff.	Std Error	**t**	Prob	Lower limit	Upper limit
KM Capabilities	0.186	0.076	2.43	0.016	0.035	0.337

All the three hypotheses confirmed the importance of KMC in improving the performance of the organization with particular reference to customer satisfaction and employee attraction and retention in the WUC of Botswana.

To confirm the above statistical findings the content analysis of the qualitative data was done using the Likert scale and the aggregated results are shown in Table 11. Of the 193 respondents, 90% indicate that a full understanding and the utilization of knowledge capability in their organization can lead to better performance of the organization. According to the respondents, in order for this to be achieved the following are the most important ways or methods that can be used: (a) Training of staff and sharing knowledge, (b) Change of culture by inculcating a high performance culture in all employees, (c) Reduce favouritism and hire as par qualification, (d) Listening to employees and considering their work experience is important, (e) Monitor capability through surveys for knowledge reliability, and (f) Include knowledge management capabilities in the organization strategic plan. It was also observed that respondents are of the opinion that the ability of the organization to have and maintain good knowledge management capability will enhance the quality of service of the organization by: (a) Creating knowledge which will make the organization more efficient. "Quality service requires advanced knowledge ", a respondent said. Thirty-seven of the respondents mentioned this point; (b) Increasing customer satisfaction through self-service management of customer contracts. Customers will easily access organizational information on products and services; and (c) Making informed decisions where employees will be well informed of the organization which will enable them to help customers with relevant information.

The results of the qualitative data support the research findings of the quantitative data in respect of the test of the three hypotheses, and it confirms the importance of KMC in improving the performance of an organization. Both results (qualitative and quantitative) indicated that KMC will influence

organizational performance of WUC in respect of customer satisfaction, quality of customer service and employee attraction and retention.

Table 11: Knowledge Management Capabilities and Organizational Performance

	Strongly agree (1)	Agree (2)	Don't know (3)	Disagree (4)	Strongly disagree (5)
Do you think a full understanding and utilisation of knowledge capabilities can lead to better performance in your organization?	54.75	35.26	7.89	1.05	1.05
Do you agree to the fact that the ability of your organization to have and maintain good knowledge management capability will enhance the quality of customers services	50.54	33.33	12.9	3.23	0
Do you agree to the fact that the ability of your organization to have and maintain good knowledge management capability will enhance employee attraction and retention in your organization?	44.44	31.22	17.46	6.88	0
Do you agree to the fact that the ability of your organization to have and maintain good knowledge management capability will enhance customer satisfaction of its services?	19.05	47.09	27.51	5.82	0.53

The study also confirms the work of Chiu and Chen (2016) who perceived KMC as the empowerment and development of both tacit and explicit knowledge assets of an organization to increase its performance and achieve it'd organizational goals. In their research it was further argued that KM should incorporate KM capabilities for the organization to increase and improve its performance and in the same vein gain a competitive advantage, and this will enhance organization performance, if firms manage their knowledge so that they can attain a competitive edge.

Furthermore, they buttressed the fact that organizations that are skilled in KM consider knowledge to be human capital and have developed organizational rules and values to support knowledge production and sharing (Chiu and Chen 2016; Barachini, 2009). These scholars are of the opinion that KMC is an organizational mechanism which continually and intentionally create knowledge in organizations. In addition, Gold et.al (2001) proposed KM infrastructural capabilities and processes as direct determinants of organizational effectiveness. They argued that an organization must leverage its existing KM capabilities to sustain competitiveness.

Discussion and conclusions

The study confirms the three hypotheses investigated in this research; namely: (a) there is a positive relationship between KMC and organizational performance (b) there is a positive relationship between KMC and customer satisfaction (c) there is a positive relationship between KMC and Employees Attraction and Retention. It was observed in the course of this research that the ability of the WUC to have and maintain good KMC and enhance the quality of service of the organization and promote organizational performance will happen mainly by creating knowledge which will make the organization more efficient; effecting customer self-service and management of customers contacts, customers being able to access organizational information on products and services easily; employees being aware of their shortfalls and capabilities with respect to knowledge; and all employees being involved in any KM strategies taking place in the organization even if they are implemented at different levels. All these will result in KMC promoting performance at the WUC.

Furthermore, the different ways in which KMC can influence organizational performance of the WUC in respect of quality of service, customer satisfaction and employee retention and attraction is to include: creativity and innovation which would help to improve effective organization capabilities, and a more effective workforce; building timely organizational capabilities which can be achieved by training and work shopping staff or induction where ideas can be shared; sharing information and transparency as

soon as changes are implemented; giving feedback and allowing initiatives from all staff and assessing them to avoid mistakes; keeping up with the ever-changing business environment, customers' needs, and changing technology; and embracing cultural and human knowledge capabilities.

Conclusively, for the WUC of Botswana to enhance customer satisfaction, the following are to be considered. In the first place, there is a need for sharing knowledge across the organization so as to increase its performance and achieve the goals and objectives of the organization. Secondly, there is a need for learning new technologies and quicker problem-solving strategies to enhance customer trust. Thirdly, there is need for keeping records of customers and replying to their comments and update them on their issues timely. Coupled with this, is the need for more training of employees to give customers an efficient service. Finally, the WUC should be more innovative and develop dynamic capabilities by allowing for definitive customer change management, render satisfaction of needs and wants; encourage time management; minimise business processes by developing adequate an efficient skilled manpower programmes for the employees.

Limitations and direction of future research

The main limitation of this study is that it only considered Botswana's WUC and that only five variables were used in the analysis. A need exists to extend this study to other water departments in the SADC region so as to generalise results to other developing countries. Further research in the field of KM in Botswana, SADC or in other developing countries should also consider the use of more or different independent, dependent and mediating variables so as to get more insights on the significance of KM in the water sector. As past empirical studies showed, there are many variables that can be used to study KM in the water sector such as business intelligence, information technology, knowledge transfer, organizational commitment and organizational effectiveness, among others.

References

Abusweilem, M. & Abualoush, S. (2019). The impact of knowledge management process and business intelligence on organizational performance. *Management Science Letters*, 9: 2143–2156.

Alavi, M. & Leidner, D. (2001). Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25: 107-136.

Barachini, F. (2009). Cultural and social issues for knowledge sharing. *Journal of Knowledge Management*, 13: 98-110.

Bratianu, C. & Orzea, I. (2010). Organizational knowledge creation. *Management, Marketing Challenges for Knowledge Society*, 5(3): 41-62.

Centre for Applied Research and Department of Water Affairs. (2013). *Environmental- Economic Accounting for Water in Botswana: Detailed accounts for 2010-11 and 2011-12 and General Trends 1993-2010*. Gaborone: WAVES.

Chiu, C. & Chen, H. (2016). The study of knowledge management capability and organizational effectiveness in Taiwanese public utility: the mediator role of organizational commitment. *SpringerPlus* 5: 1-34.

Creswell, J. (2009). *Research Design: Qualitative, Quantitative, and Mixed-Method Approaches*. 3rd edition. Thousand Oaks: Sage

Donate, M. & Pablo, J. (2014). The role of knowledge-oriented leadership in knowledge management practices and innovation. *Journal of Business Research*, 68: 360-370.

Gold, A., Malhotra, A. & Segars, A. (2001). Knowledge management: an organizational capabilities perspective. *Journal of Management Information Systems*, 18(1): 185–214.

Guvernator, G. & Landaeta, R. (2020). Knowledge transfer in municipal water and wastewater organizations. *Engineering Management Journal*, 1-11.

Krejcie, R.V. and Morgan, D.W. (1970). Determining sample size for research activities, *Educational and Psychological Measurement*, 30, pp. 607-10.

Lee-Kelley, L., Blackman, D. & Hurst, J. (2007). An exploration of the relationship between learning organizations and the retention of knowledge workers. *The Learning Organization*, (14)3: 204-221.

Muthuveloo, R., Shanmugam, N. & Teoh, A. (2017). The impact of tacit knowledge management on organizational performance: Evidence from Malaysia. *Asia Pacific Management Review*, 22(4): 192-201.

Mvulirwenande, S., Wehn, U., Netto, C., Johnson, M., Uwamariya, A. & Sanz, M. (2016). Knowledge Management of WOPping Water Operators: Case studies in Brazil, Uganda and Kenya. *Conference: International Forum on Knowledge Asset Dynamics*. Dresden.

Nonaka, I. & Toyama, R. (2007). Strategic Management as Distributed Practical Wisdom (Phronesis). *Industrial and Corporate Change*, 16: 371-394.

Nyandoro, M. (2013). *Water resource management perspectives in Botswana: A contrast between the colonial and the post-colonial periods up to 2010*. Accra: United Nations University Institute for Natural Resources in Africa.

Nyandoro, M. (2018). A State and Corporate Undertaking in Water Supply and Management in Botswana, 1966-2014. Botswana Notes and Records, 50: 97-111.

Sadeghi, A. & Rad, F. (2018). The role of knowledge-oriented leadership in knowledge management and innovation. *Management Science Letters*, 8: 151–160.

Sandelin, S., Hukka, J. & Katko, T. (2019). Importance of knowledge management at water. *Public Works Management & Policy*, 1–17.

Sayyadi, M. (2019). What an effective leadership of knowledge management impacts organizational performance. *Business Information Review*, 36(1): 30-38.

Setlhogile. T & Harvey. R. (2015). *Water Governance in Botswana*. South African Institute of International Affairs, Policy Briefing 144.

United Nations Development Programme. (2012). Water Policy Brief Reflecting on the Challenges of Attaining a Green Economy for Botswana.
New York: UNDP.

United Nations. (2020). Ensure availability and sustainable management of water and sanitation for all. [Online]. Available: https://sdgs.un.org/goals/goal6 [Accessed 17 April 2021].

Water Utilities Corporation. (2018). *2017/2018 Annual Report.* Gaborone: Water Utilities Corporation.

Water Utilities Corporation. (2020). *2019/2020 Annual Report.* Gaborone: Water Utilities Corporation.

World Bank. (2017). *Project appraisal document on a proposed loan in the amount of US$145.5 million to the Republic of Botswana for a Botswana emergency water security and efficiency project*. Washington: World Bank.

Zack, M., McKeen, J. & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. Journal of Knowledge Management, 13(6): 392-409.