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An Empirical Analysis of the Knowledge Management Challenges and the Performance of the Botswana Water Utilities Corporation

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ABSTRACT:- *The purpose of this research is to analyse the endemic Challenges facing Botswana Water Utilities Corporation. In analysing these challenges, we used mixed methods (quantitative and qualitative) techniques. The challenges are analysed in respect of how they affect the quality of service, employee attraction, and customer satisfaction and employee retention. The research findings demonstrate that knowledge management (KM) challenges adversely affect organisational performance negatively such that the more challenges the less employee retention and the quality of service rendered by the Water Utilities Corporation. The researcher recommends that for the Water Utilities Corporation (WUC) minimise the identified challenges, it needs to establish a flexible and receptive structures within the organisation. These structures must be built on its own knowledge base that is useful to the organisation.*

Keywords:- Knowledge Management, Challenges, performance, Botswana, Water Utilities Corporation.

I.   INTRODUCTION

1.1   Background

The Department of Water Affairs (now called the Department of Water and Sanitation) was formed in the then Bechuanaland Protectorate in 1948. During this period only one sector was formed i.e., Borehole section (Ground water Division). By 1973 there was a Water Branch under the Ministry of Commerce, Industry and Water Affairs. The Water Branch became a Department of Water Affairs at the beginning of 1969. By 1973 the Department of Water Affairs was under the Ministry of Mineral Resources and Water Affairs. The water Branch became a Department of Water Affairs at the beginning of 1969. By 1973 the Department of Water Affairs was under the Ministry of Mineral Resources and Water Affairs. The Department was formed to enable water development supply and maintenance.

During the 90's, the Department of Water Affairs (DWA) was composed of five major technical divisions. The technical divisions were Design and Construction; Electro-mechanical, Groundwater, Hydrology and Operations and Maintenance. The Water sector then undertook a restructuring exercise which started in 2008 and was completed in 2013. It was during this period that DWA further evolved into three major technical divisions of Horology. Groundwater; and Water Quality and Conservation. The reforms resulted in transfer of Water and Sanitation services from Department of Water Affairs (DWA) and Local Authorities (LA) to Water Utilities Corporation (WUC) in six phases leaving Water resources management with DWA.

The WUC is a parastatal organisation wholly owned by the Government of Botswana which was established under the WUC Act of 1970(Laws of Botswana CAP 74:02). It's original responsibility was for the supply and distribution of water within the Shashe Development Area. Powers were also conferred upon it to develop Water resources (WUC 2020) However, the mandate was extended to assume responsibility as the Water authority for cities and townships which have been declared waterworks areas under the Declaration of Waterworks Area Order, 1970. Any deemed centre can be declared a "waterwork" areas under the Waterworks Act and, by the terms the WUC Act. Under the Waterworks Act also specified financial principles and methods of charging for Water to ensure that: (i) WUC runs on commercial principles; and (ii) the cost of water supply services are recovered. Having given a brief historical background of the WUC, an attempt will be made to discuss briefly the problem statement of this research paper.

1.2. Problem statement:

The United Nations Development Programme (UNDP) (2012) is of the opinion that the provision of clean drinking water has contributed to Botswana's economic success and it has rapidly improved the quality of life. In recent times access to drinking water in urban and rural areas had reached 99.5% and 84.1%, respectively (UNDP, 2012). Botswana, today is faced with an ever challenging water industry chich includes threats to the sustainability of supply and access to water. WUC managed to record a 1% growth in its customer base, bringing the number of customers to 440,000 in the 2019/20 financial year (WUC,2020). One of the notable milestones in the same financial year was the improved access to potable water infrastructure from 84% in FY 18/19 to 85% owing to additional connections and the securing of water sources.

WUC's commitment to ensuring water security improving water transmission and supply, and improvements to services provisioning is reflected in its continued pursuance's of major potable and Wastewater management projects. The success of the WUC had positive impacts on health and Sanitation thus contributing to the other MDGs, especially on gender equality and Child mortality (UNDP, 2012).

It is expedient to argue that while the success of the WUC in water provisioning, managing Wastewater and Sanitation is remarkable, the Corporation faces challenges which need immediate attention. In most organisations, the issue of how best to manage knowledge (Managing Knowledge) is one of the major Challenges facing most organisation's including the WUC which will be examined in this paper. According to the Sandelin et al. (2019) and Dewah and Mutula (2016) they are of the view the barriers to KM can be Classified as: (1) individual (2) Cultural, (3) Technological; and (4) organisational. Disterer (2001) further classified the individual barriers into four categories, namely a loss of power, revelation, uncertainty and motivation. Individuals who possess knowledge have some influence towards the organisation and feel that they might have their privilege, advantage respect and job security that they have if they share the knowledge (especially tacit knowledge) that they possess (Sandelin et al. 2019). To these individuals, knowledge is a source of power. Moreover, specific knowledge that has value and exclusivity might be advantageously proclaimed by others to highlight their proficiency and in the process and is advantaging the originators by that knowledge (Distrever, 2001)

In view of the above analysis, this paper is premised on attempts to examine and critically discuss the challenges facing the water sector in Botswana. In the same perspective, the opportunities created by the water sector in respect of job creation through various industries, also contribute to societal and ecological wellbeing, especially food security, tourism, health and Sanitation will be examined in this paper.

1.3. Objectives of the Study.
To investigate how the current challenges facing the WUC affect the organisational performance.
To examine how knowledge management and the recent challenges of the organisation affect its performance.
To investigate how knowledge management and the challenges of the organisation affect customer satisfaction.
To investigate how Knowledge Management and the challenges facing the organisation affect employee attraction and retention to critically examine the nature of prosperity to be derived from the organisation.

1.4. Research Question.
How does Knowledge Management and organisation challenges affect its performance?
How does Knowledge Management organisation challenges affect customer satisfaction?
How does Knowledge Management and organisation challenges affect employee attraction and retention?
How does the organisation promote prosperity for the Botswana Economy?
The 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 analysis the research findings; and section 6 points out the limitations of the study and also suggests directions for the further research

II. LITERATURE REVIEW
2.1 The Concept of Knowledge Management and its Theoretical Consideration:

Liyange, Elhag, Ballas and Li (2009), opined that knowledge is a critical resource that enables individuals and organisations to meet their tasks and direct their activities to achieve their goals efficiently. Thus, minimizing their challenges. Viewed in this perspective, knowledge becomes a basis for the advancement and success of organisations. Abusweilen and Abualousch (2019) further argue that knowledge, in addition to human resources and capital? Has become one of the most valuable assets in modern organisations. They postulate that knowledge is the main engine of economic growth and the catalyst for technological progress and productivity due to its ability to generate creativity and transform it into products and processes.

A number of classifications of knowledge theoretical exist in literature, but the one posited by Polanyi (1958) is more dominant. Polanyi (1958) distinguished between tacit and explicit knowledge by observing that people can know more than they can tell. He can now examine the above classification.

2.1.2. Tacit knowledge:

The term tacit knowledge was first propounded by Polanyi (1958), referring to knowledge hidden even from the knower. He used the phrase "We know more than we can tell". Hence this is inexpressible knowledge. According to Nonaka and Takeuchi; (1955) tacit knowledge that cannot be easily expressed in words, sentences, numbers or formulas due to its context specific nature. Tacit knowledge includes cognitive skills such as beliefs, images, institution and mental models as well as technical knowledge is mostly personal and hard to formalize, making it difficult to communicate with others (Polanyi;1958). This type of knowledge is non-verbalised, intuitive and unarticulated knowledge (Polanyi; 1966). In other words, this type of knowledge resides in the human brain and cannot be easily captured or codified (Nonaka and Takeuchi, 1991). Tacit knowledge is, therefore, difficult and sometimes impossible to capture and diffuse. (Visscher et.al; 2006) Liyanage et.al (2009) Argue that tacit knowledge adds more value to the organisation then compared to explicit knowledge. Nonaka (1991) stated that tacit knowledge is largely transferred among individuals through the sharing of experiences, observation and imitation.

Nonaka (1991) contender- The major insight from Figure 2.10 is that knowledge is transferred beyond organisational boundaries, and knowledge from different organisations interacts to create new knowledge. Through dynamic interaction, knowledge created by the organisation can trigger the mobilisation of knowledge possessed by outside constituents such as consumers, affiliated companies, Universities, or distributors (Nonaka et al., 2000:13). For instance, an innovative new manufacturing process may bring about changes in the suppliers' manufacturing process, which in turn triggers a new round of product and process innovation at the organisation.

It can be projected that socialisation and combination are processes of knowledge transfer in a social context, while externalisation and Internalisation are processes of knowledge conversion at the individual level. Organisational knowledge creation is a continuous process moving upward on the knowledge spiral, where the horizontal field of forces is generated by the epistemological nature of the individual learning process, and the vertical field of forces is generated by the ontological nature of the organisation. Knowledge creation originates within the individual employee and is developing through social interaction from individuals to teams, and then from teams to the whole organisation. The SECI model has been famously used by Nonaka and Takeuchi (1995:5) to explain how Japanese companies create the dynamics of innovation and build up vital competitive advantage.

2.3.1.3 Ba: The foundation for knowledge creation

The onus of the grain of the Nonaka's knowledge dynamics model is the concept of *Ba*. According to Nonaka and Konno (1998:42), the concept of *ba* was originally proposed by Kitaro Nishida, a Japanese philosopher and was further developed by Shimizu. The word roughly means "place" in Japanese, but it is hard to be translated in other languages. From a knowledge creation standpoint, Nonaka and Konno (1998:43) perceived ba as a shared space for emerging relationships. Such a space affords a platform for advancing individual and/or collective knowledge. The space can take three forms, namely physical (e.g. office or dispersed business space); virtual (e.g. e-mail, or teleconference); mental (e.g. shared experiences. ideas. ideals); or any combination of them. According to Nonaka and Toyama (2007:383),

"*The essence of Ba is the contexts and the meanings that are shared and created through interactions which occur at a specific time and in a specific space, rather than a space itself. Ba also means relationships of those who are at the specific time and the specific space*".

All the processes in the SECI need a specific context of meanings and a framework of same thinking patterns in order to be operational. This context is considered to be *Ba* (Nonaka et al., 2000:14). Figure 2.11 provides some visual aid of this context.
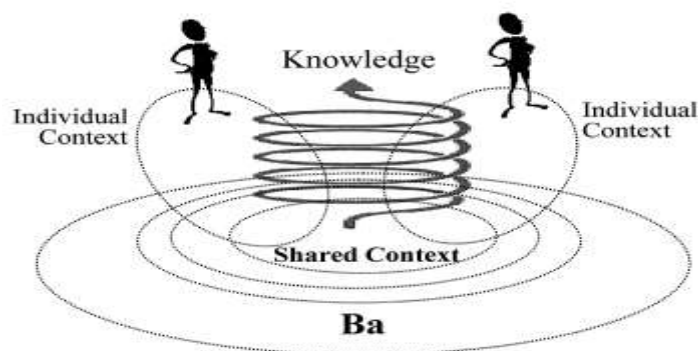

Figure 2.11: Ba as shared context in motion
Source: **Nonaka et al. (2000:14).**

Therefore, *Ba* can simultaneously be a physical and a non-physical space where social interchange occurs, and knowledge is generated. It can also be a context for an individual, a team or even an organisation. *Ba* is a shared context in motion, since it is constantly under changing forces. It is a conceptual working space where individual subjectivity meets the others objectivity and through social interaction knowledge is generated (Bratianu and Orzea, 2010:51). Making use of *Ba*, Nonaka and his co-workers also developed the two-dimensional diagram shown in Figure 2.12 for knowledge transformation from individuals to groups and organisation, according to the epistemological and ontological dimension.
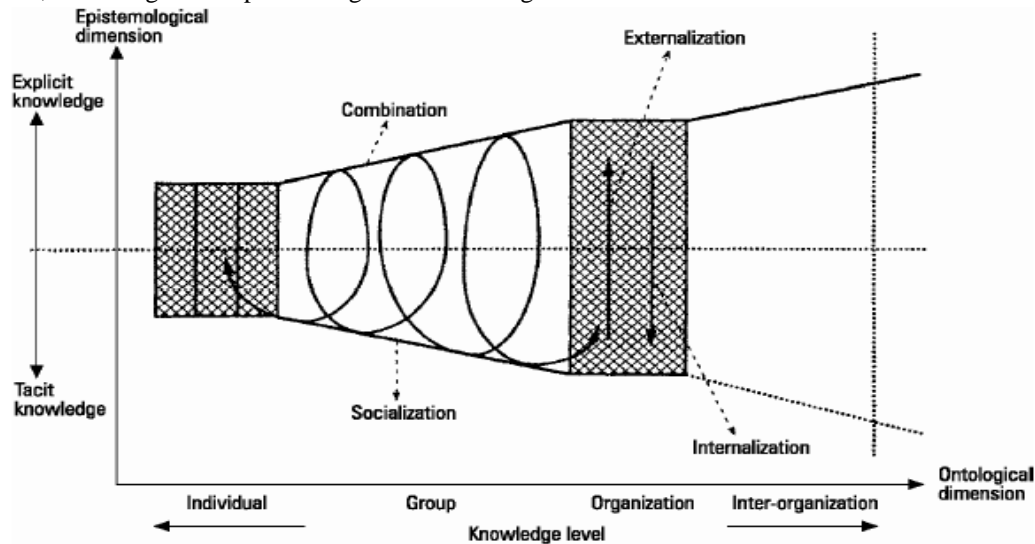

Figure 2.12: Organisational knowledge creation
Source: Nonaka and Takeuchi (1995:11).

In fact, in the knowledge-based theory of the firm, the whole organisation is interpreted "as an organic configuration of multi-layered Ba" (Bratianu and Orzea, 2010:52). The meaning is that one has to look into not only the formal organisational structure of the firm, but also the meanings that are created at *Ba,* and the relationship among them.

The SECI map of dynamic interactions can be superimposed on a *Ba* field, and the following components may be identified: originated *Ba* – the context where socialisation face-to-face take place; dialoguing *Ba* – the context where externalisation takes place and peer-to-peer knowledge sharing develops; systemizing *Ba* – the context where combination takes place through social collaboration, and explicit knowledge can be disseminated; exercising *Ba* – the context where Internalisation can be realized (Nonaka, Toyama, Byosiere, 2001:498).

2.2 summarises the different types of ba.

Table 2.2: Summary of four types of Ba or knowledge conversion modes

Type of Ba Characteristics Knowledge	Type of Ba Characteristics Knowledge	Type of Ba Characteristics Knowledge
Originating Ba	"Where individuals share feelings, emotions, experiences and mental models, through direct experience".	Socialisation: Tacit to Tacit
Interacting Ba	"Where individual's mental models and skills are converted into common terms and concepts, through dialogue".	Externalisation: Tacit to Explicit
Systemising Ba	"Where new explicit knowledge is combined with existing information and systematised to diffuse throughout the organisation".	Combination: Explicit to Explicit
Exercising Ba	"Where internalisation process is facilitated through focused training with senior mentors and colleagues, insisting on active participation and on the job training".	Internalisation: Explicit to Tacit

These four types of Ba correspond to the four stages of the SECI model.

In this paper an attempt will be made to examine which of the classification of type of knowledge can be used by the Botswana Water Utility Corporation in minimizing its current challenges as identified in this paper. In light of the above discussion this paper attempts to examine how knowledge management can be used to minimize the challenges facing WUC in respect of organisation performance, quality of service, employee attraction and retention and Customer Satisfaction and the general prosperity of the organisation.

Figure 1: proposed conceptual framework for the study.

From the literature review and the above proposed conceptual framework (figure 1), the researcher now developed the following hypotheses which will be investigated. It should also be noted that the identified hypotheses are aligned with the problem statement, the objectives of the study and the research questions.

Hypothesis one:

Hypothesis: There is no positive relationship between the challenges facing WUC and the performance of the organisation.

Alternative hypothesis: The challenges of WUC affect the performance of the organisation.

Hypothesis Two:

Null hypothesis: There is no positive relationship between the challenges facing WUC and customer Satisfaction.

Alternative hypothesis: the challenges facing WUC affects customer satisfaction.

Hypothesis Three:

Null hypothesis: There's no positive relationship between the challenges facing WUC the employee attraction and retention in the organisation.

Alternative hypothesis: the challenges facing WUC affect employee attraction and retention in the organisation.

III.   RESEARCH METHODOLOGY

This research adopted a mixed method approach which is the concurrent application of both the quantitative and qualitative approaches. The main rational for using the mixed method approach is that it 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 past studies. Data was collected from eight of the sixteen water supply Management Centers (MCs) in Botswana which were selected by a systematic random technique. This systematic random selection ensured that each MC had an equal probability of being included in the study. The target population of 1231 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 respondent of each group or stratum as shown in table 1. The main rational of using stratified sampling is that it helps to minimize the element of biasness in the selection of the respondent from each stratum.

Table 1: Selection of the respondents using stratified sampling techniques.

The Eight Management Water supply centers selected	Total number of employees in each Centre	% Total of employees in each Centre	Percentage (%) of the sample size 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	1231	100	278

In Soliciting for the necessary information from the respondents, 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 like 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 coupled with a pilot study. The statistical software for social sciences (SPSS) was used to analyze quantitative data and test the hypothesis. Quantitative data was analyzed through content analysis which entails extracting according to entailed systematic analysis of the occurrence of words, phrases, and concepts (see Creswell, 2009).

IV.   RESEARCH FINDINGS

In this analysis, Pearson Cronbach's alpha of 0.89 was calculated. According to Chui and Chen(2016), an alpha value greater than 0.7 shows that the data collection instrument is reliable, stable, and integrally consistent. The results are discussed below in respect of the three (3) hypotheses.

Hypothesis one:

Null hypothesis: The challenges facing the WUC do not affect its performance.

Alternative hypothesis: The challenges facing the WUC do affect its performance.

In testing the above hypothesis, a regression model was fitted in respect of the challenges on the performance variable. Table 2 below illustrate the research findings (Results).

Table 2: Challenges Vs Performance

Obs	Parms	RMSE	R-SQ	F	Prob	
182	5	.911	0.130	6.264	0.000	
Variable	Coeff	Std Error T	Pros		Lower Limit	Upper Limit limit
KM Challenges	0.276	0.071	3.87	0.000	0.135	0.417

The above Table 2 shows that knowledge management (KM) Challenges affect the general performance of the organisation. This result means that KM Challenges affect organisational performance negatively, such that the more the challenges the organization has the less the organizational performance. The implication is that minimizing the current knowledge management Challenges will help to improve the performance of the organisation.

Hypothesis two: KM Challenges Vs Customer Satisfaction

Null hypothesis: KM challenges do not affect Customer Satisfaction

Alternative hypothesis: KM Challenges do affect Customer Satisfaction.

Table 3: KM Challenges Vs Customer Satisfaction

Obs	Parms	RMSE	R-SQ	F	Prob
181	4	0.627	0.292	24.282	0.000
Variable	Coeff	Std Error	T	Prob	Lower Upper limit limit
KM Challenges	0.011	0.048	-0.23	0.815	-107 0.084

The above Table 3 Shows that KM Challenges affect customer satisfaction. This result shows that Challenges affects customer satisfaction negatively, such that the more Challenges the organisation has, the less customer satisfaction will be for the organisation. Thus, the alternative hypothesis is accepted, and the null hypothesis is rejected.

Hypothesis three: KM Challenges Vs Employee Attraction and Retention.
Null hypothesis: KM Challenges do not affect Employee Attraction and Retention.
Alternative hypothesis: KM Challenges do affect Employee Attraction and Retention.

Table 4: The Relationship between KM Challenges and Employee Attraction and Retention.

Obs	Parms	RMSE	R-SQ	F	Prob	
175	5	0.911	0.130	6.264	0.000	
Variable	Coeff	Std Error	T	Prob	Lower limit	Upper limit
KM Challenges	0.276	0.71	3.87	0.000	0.135	0.417

The above regression analysis has shown that knowledge management challenges affect employee attraction and retention with the recognition of knowledge management and knowledge creation as a mediating factor. From the above statistical analysis, al the three hypothesises confirmed the alternative hypotheses which clearly states that KM Challenges affect organisational performance, Customer Satisfaction and employee attraction and retention in WUC of Botswana as shown in Table2-4.

To confirm the above statistical findings the researcher applied content analysis (qualitative data) by using the Likert scale. The results, of these findings are shown in Table 5 below

Table 5.1: KM Challenges and Organisational Performance.

	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
	1	2	3	4	5
Do you think the idea of minimizing the current KM Challenges will help to improve the performance of the organisation (WUC)	48.44	31.77	15.1	4.17	0.52
Do you agree that minimizing KM Challenges will enhance the quality of services in your organisation	21.93	49.2	23.53	5.35	0
Do you agree minimizing knowledge management challenges will enhance customer satisfaction in your organisation	49.19	30.27	16.76	2.16	1.52
Do you agree minimizing KM challenges will enhance the attraction and retention of the employees in your organisation.	41.05	38.95	13.68	5.26	1.05

In the above Table 5, over 75% of the respondents are of the view that minimizing KM challenged will increase the performance of the organisation, customer level of Satisfaction a d improve employee attraction and retention. In out oral discussion with the respondents the following issues were identified as challenges facing WUC. The first challenge identified by the respondent is lack of staff training and sharing knowledge. According to the respondent only senior managers are taken for training one of the respondent ls has this to say: "considering qualification alone can be a hindrance to encouraging knowledge management". This was one of the major Challenges listed by most of the respondents. Thirty six (36) respondents listed the challenges below.
•Lack of training on organizational strategy and changing technology.
•Lack of short refreshing course for employees.
•Lack of knowing how the organization links with the knowledge-based economy.
•Lack of knowledge on how to use new information and communication technologies.

•Lack of a strategy for imaginary knowledge within the organisation
•Lack of staff development plan

Apart from the above listed challenges, the respondents also highlighted another major Challenges which revolves around lack of communication which the organization. More than half of the respondents listed lack of communication as one of the major Challenges facing the WUC and the reasons for this are attributed to the following:
•Limited platform for communication.
•Limited technical interactions.
•Silo mentality and localized thinking.
•Unnecessary competition among departments or personnel.
•Unclear rules in respect of job description
•No competition spirit among employees and no incentives to share one's knowledge.
•There is no marked office or individual responsible for promoting and educating other on knowledge management issues.

The above qualitative results support the research findings of the qualitative data in respect of the test of the three hypotheses, and it confirms. The effects of the challenges on the general performance of the WUC in Botswana.

Both results (qualitative and quantitative indicates that KM Challenges affect the performance of WUC. in respect of Customer Satisfaction, employee attraction and retention and the quality of customer services.

V.   DISCUSSION AND CONCLUDING REMARKS:
This study affirms the work of Sandelin et al. (2019) and Dewah and Mutula (2016) which stated that barriers or challenges to KM can be Classified as (1) individual needs not meant (2) Critical issues, (3) Technological; and (4) organisational. On the other hand, Disterer (2001) discovered, that individual, Culture and organisational issues are barriers or challenges towards knowledge sharing. Disterer (2001) further Classified the individual challenges or barriers into four categories, namely a loss of power, revelation, uncertainty and motivation. Individuals who possess knowledge have some influence towards the organisation and feel that they might lose their privilege, advantage, resection and job security that they have if they share the knowledge (especially tacit knowledge) that they possess (Sandelin et al. 2019) To these individuals, knowledge is a source of power. However, WUC can minimize this tendency from occurring by establishing solid rules and policies, guiding the process of knowledge sharing within the organisation and thus minimizing the challenges that may arise in the KM process.

It is also interesting to note that this study confirms the research work of McQuade, Sjoer, Fabian, Carlos and Schroeder (2007) who investigated the potential loss of company knowledge and expertise as experienced and expert employees retire.

This study recommends that at company level, there is a need to develop training programmes that would help for knowledge and talent management, succession planning, in-company training and new employee induction. Many companies need to engage in management training and staff development.

In our qualitative analysis, the above issue was highlighted as one of the challenges facing the WUC. This study therefore confirms that this is and universal challenges that needs immediate attention.

VI.   CONCLUSION
Our submission here is that for WUC to minimize it current challenges, it needs to establish a flexible and receptive organisation builds on its own knowledge base to make the customer experience better and more satisfying services. This can help to save time for customer valuable and visible and servicing customer better. To enhance attraction and retention of the employees in WUC, there is an urgent need in capacitating and empowering employee to perform better if knowledge management is understood and practiced in WUC. There is a need to equip employee with knowledge and this will make them more useful to the organisation and be in a better position to face future challenges in the organisation.

VII.   LIMITATIONS AND DIRECTION OF FUTURE RESEARCH:

The main limitation of this study is that it only considered Botswana's WUC and only three (3) variables were used in the research analysis. There is an urgent need to extend this study to other water Department in the SADC region. Further studies in the field of KM Challenges in similar organisation in other Africa countries are essentially necessary for us to generalise our research findings.

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