THE IMPORTANCE AND USE OF KEY PERFORMANCE INDICATORS OF KNOWLEDGE MANAGEMENT IN QUANTITY SURVEYING FIRMS IN NIGERIA.

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ABSTRACT

Quantity surveying firms in Nigeria are performing poorly and Knowledge Management (KM) has been identified as crucial to the survival of organisations, so measuring the KM of a firm is fundamental to the success of KM and the firm at large. Therefore, the study aims to assess the Key Performance Indicators (KPIs) for measuring KM in Quantity Surveying Firms (QSFs) with a view to ascertain the KPI important and used by QSFs in Nigeria. The study adopted the survey research design where quantitative data was collected through the use of a structured questionnaire on a 5 Likert scale. Descriptive and inferential statistics were used to analyse the data collected and the result discussed. A total of 86 questionnaires were retrieved out of the 134 distributed making the response rate 64% and all were deemed fit for analysis. The reliability of the questionnaire was tested and the Cronbach Alpha test gave a value of 0.888 which makes the data fit for analysis. Mean Item Score (MIS) was used to rank the factors while quadrant analysis was used to compare the rate of importance with the rate of use of the identified KPI. Findings indicate that both usefulness of stored knowledge and knowledge exchange that led to innovation was the most important and used performance indicators in QSFs while distributed incentives, classifications in databases, and other contributions are the least important and used by QSFs. This implies that QSFs reuse the knowledge stored in their databases as they find the knowledge stored very useful. Also, the firms make use of the knowledge they acquire from each other to develop innovations within the organisation.

Keywords: Knowledge, Knowledge Management, Nigeria, Performance Indicators, Quantity Surveying Firms

1. INTRODUCTION

The construction industry is a unique sector that is crucial to the survival of other industries as it supports the environment under which all other industries function (Kolawole, 2002; Ogunsemi, 2015). Knowledge management has been described to have enormous benefits on organisational performance as reported in many studies (Kim, 2014; Nnabuife, Onwuka & Ojukwu, 2015; Abu Bakar, Yusof, Tufail & Virgiyanti, 2016). It is established that organisations across the world are turning to knowledge management due to its numerous benefits among which is enhanced organisational performance (Bousa & Venkitachalam, 2013). According to Idris et al., (2015), knowledge management, however, is still novel to developing countries and it is a changing practice for the construction industries in developing countries like Nigeria.

One of the main purposes of knowledge management in organisations is to create value which in turn should improve the organisation and increase their competitive advantage over their counterparts. Despite understanding the advantages of knowledge management, knowledge management still fails and the rate of failure is increasing (Frost, 2014). Frost (2014) and Hajric (2018) noted that lack of performance indicators are casual failure factors in the implementation of knowledge management which can lead to other resultant failure factors if not adequately attended to. Currently, no known study has identified and assessed the performance indicators fundamental to the success of KM in small firms such as quantity surveying firms. Therefore, organisations that want to succeed and continue to enjoy all the rewards of managing knowledge need to measure the performance of their knowledge management (Ragab & Arisha, 2013). Construction organisations are known to be knowledge-

intensive in nature in that they make use of human skill, knowledge and expertise. Oyediran (2011) posited that within the construction industry, Quantity Surveying Firms (QSFs) are one of such knowledge-intensive organisations which depend mainly on the knowledge, skill and expertise of their employees to grow. The study however seeks to assess the key performance indicators of knowledge management in quantity surveying firms in Nigeria.

2. LITERATURE REVIEW

2.1 Knowledge and the different classifications

O'Dell and Hubert (2011) simply described knowledge in a practical context as "information in action" while in a business context, knowledge is what is known about customers, products, processes, successes and mistakes which can either be explicit or tacit in nature. Botha, Kourie and Snyman (2008) asserted that both tacit and explicit knowledge element are the combination that forms knowledge as a whole. According to Omotayo (2015), Lee and Wong (2015), Hajric (2018), the two most common classification of knowledge in literature are explicit knowledge and Tacit knowledge. Bennet and Bennet (2014) described explicit knowledge as that knowledge which can be retrieved from memory and well reported when expressed or visualised in such a way that other persons can understand the knowledge exchanged. This is therefore the type of knowledge that can be easily accessed, distributed and communicated. It can be stored by various means such as reports, images, videos, audios, printed manuals or the internet (Lee & Wong, 2015). Tacit on the other hand is described as the relationship among thoughts that cannot be expressed in words or clearly voiced in a way that other persons could understand, reorganise and then recreate that knowledge (Bennet & Bennet, 2014). Tacit knowledge most times resides only within individuals and it is difficult to express. This type of knowledge includes the know-how, expertise and gimmicks of a trade or business (Polanyi, 1966).

2.2 Knowledge management

Knowledge management has been existing longer than the term has been used (Dalkir, 2013). Knowledge management techniques have been used by philosophers, librarians, and teachers for many decades before the phrase 'Knowledge Management' emerged. Not until the late 1980s, the term knowledge management began commonly used and seen in books and journals (Dalkir, 2005). According to Denning (2000), knowledge management had been in existence from ancient times as the elders, traditional healers, and midwives in the village have been existing repositories of experience within their communities. Knowledge management is the process of constructing, converting, sharing and using knowledge to create value from an organisation's knowledge assets (Amini, Ibrahim, Othman & Selamat, 2014). It is described as the method that recognises, manages, and distributes all knowledge assets of the organisation's which includes the experience of employees. On the other hand, Alauddin, Mamat and Shukor (2019), described knowledge management as organised and well-structured knowledge that is captured by various individuals within an organisation. For this study, Knowledge management is referred to as the creation, capturing, sharing, and use of information among the project team during and after the construction process for the success of a project.

2.3 Key performance indicators of knowledge management

The aim of performance measurement according to Patel and Malek, (2016) is to connect organisational goals with objectives in order to improve productivity. O'Brien (2013); Hoss and Schussel (2009), established the importance of knowledge management measurement and noted that knowledge management measurement aid in the identification of knowledge shortfalls, helps to determine the impact of these shortfalls on growth and performance, and helps to manage knowledge that is possessed by the organisation more efficiently. It was also opined that knowledge management assessment assists in identifying strategies and activities to fill the knowledge gaps and provide organisation with analytical tools to promote knowledge and approach the shortfalls.

The conventional methods of measuring the performance of knowledge management have been based on finance. Kald and Nilsson (2000) noted that measurements related to competence, technological development, employee satisfaction among others, are not used as often as measurements of financial areas like product efficiency, cost-effectiveness and distribution of sales. This is because metrics that are appropriate and suitable to qualitative areas have not yet been developed by organisations. Measurement in qualitative areas involves limited information and impaired judgments. The need, therefore, arises to develop performance indicators, that show if the knowledge

activity is progressing or otherwise but may not completely indicate an overall improvement in organisational performance. The position of a project will be easily concluded by identifying what and where has been satisfied and the activities necessary for improvement (Robertson, 2003).

Different approaches to measuring knowledge management performance have been proposed in the literature. Oufkir, Fredj and Kassou (2017), affirmed that previous studies described three phases that knowledge management performance measurement should follow. These are; describing the objective of knowledge management for which the performance will be measured; modeling the knowledge management component that will be measured and identifying the measures relevant for each component. Wong et al., (2015) classified performance measures into knowledge management processes, knowledge resources, and factors that affect knowledge management and further asserted that these are the common themes in which metrics are generated to measure knowledge management.

According to Shannak (2009), a performance indicator is a parameter, variable, statistical measure, and a sub-index among others and further described four methods to express a performance indicator as; an indicator that tells the number of times an event occurs, a ratio which indicates the number of times an event occurred compared to the number of times it may have occurred within a period. Also a percentage and an indicator that shows if it has been able to produce what it was supposed to produce or otherwise. Key Performance Indicators usually applies to processes, people and technology and are essentially quantifiable measurements about the level of performance of an entity (Robinson-Yu, 2020). Shannak (2009) noted that indicators may either be quantitative or qualitative. However, qualitative indicators show improvements that occur by measuring beliefs, attitudes, and culture while quantitative indicators indicate the number of participants or people using a database or number of communities. Measuring knowledge management performance is an important process that can be used in monitoring progress and learning from previous activities. The KPIs of knowledge management can be used to measure the overall effort of knowledge management within an organisation, including the knowledge management activities (knowledge-creating, using, sharing), knowledge management system (portals and search tools), and knowledge management projects (Stanfield & Mullan, 2008).

Shannak (2009), classified the KPI into three; Process which includes the quality of knowledge, efficiency due to new routines, incentives, knowledge contributors, and knowledge sharing attitude; Culture/People which includes knowledge sharing activities, the use, and participation in activities, awareness, active involvement, the culture of collaboration Communities of Practice (CoP), etc; Information technology which includes the structure of knowledge and usability, according to Hoss and Schlussel (2009), IT includes best practices management system and virtual collaboration while culture/people includes face to face meetings and knowledge officers.

Knowledge management can also be measured based on activity metrics such as number of users of databases, number of success stories contributed, frequency of use or updates, time saved, lessons learnt per month and best practices contributed (Kohn, 2019).

3. RESEARCH METHODOLOGY

The study adopted the survey research design method where quantitative data was collected through the use of a well-structured questionnaire on a 5 Likert scale. Out of the six geo-political zones in Nigeria, the study was carried out in the southwestern zone of the country as this zone accounts for more than one-third of the total population of QSFs in Nigeria. The Census sampling method was adopted where all 134 QSFs registered with the Quantity Surveyors Registration Board (QSRBN) in southwest Nigeria were sampled. Out of a total of 134 QSFs where questionnaires were distributed, a total of 86 (64%) questionnaires were retrieved and deemed fit for analysis. The reliability of the questionnaire was tested and the Cronbach Alpha test gave a value of 0.888 which makes the data fit for analysis. Descriptive and inferential statistics were used to analyse the data collected and the result discussed. Mean Item Score (MIS) was used to rank the KPIs while Gap analysis is used to compare actual performance with potential performance (Markovic, 2019). This was used in this study to compare the rate of importance with the rate of use of the identified KPIs. This showed how important the KPIs are to QSFs, how well QSFs use these KPIs as well as how to close the gap between the important and used KPI by indicating the opportunities for improvement. The Gap analysis is adopted in this study to understand what to improve in the use of KPIs.

4. FINDINGS AND DISCUSSION

The difference in perception of respondents on the level of importance and the level of use of the identified

KPIs of KM was assessed. From table 1, the result showed that the usefulness of the data stored (MS = 4.50) and knowledge exchange that led to innovation (MS = 4.41) was ranked as the most important KPI of KM. These also ranked highest as the most used performance indicators of KM in the firms with a mean score of 4.23 and 4.24 respectively. This finding is similar to the findings of Hoss and Schlussel (2009) and Wu et al (2009). Distributed incentives (MS = 3.63, 3.47), Taxonomies (classifications) in database (MS = 3.56, 3.47) and other contributions (MS = 3.53, 3.36) were ranked least respectively in both importance and use. The finding corroborates the findings of Adegbembo (2014) where it was affirmed that in QSFs in Nigeria, employees who share knowledge do not receive any form of incentive or recognition. According to Javier (2011), providing rewards to employees increases their commitment and motivates them in creating and sharing knowledge in organisations. Also, Adegbembo, Awodele and Ogunsemi (2015) found that QSFs in Nigeria do not have a specific unit nor specific staff responsible for knowledge management and its needs. This, however, may have contributed to organisations not realising the need for incentives to employees who share and use knowledge as well as the need for organising knowledge in databases and other contributions. All KPI had a mean score above 3 in terms of their importance and use within the organisation.

Table 1: Level of importance and use of KM KPI

	IMPORTANCE			**USAGE**			
	Mean	**SD**	**Rank**	**Mean**	**Rank**	**SD**	**Gap**
Usefulness of stored knowledge in database	4.50	0.732	1	4.23	2	1.037	0.27
Knowledge exchange that lead to innovation	4.41	0.639	2	4.24	1	0.735	0.16
Efficiency of knowledge exchange	4.34	0.745	3	4.03	12	0.951	0.30
Attending meetings in person	4.33	0.710	4	4.17	7	0.897	0.15
Time saved using knowledge in database	4.33	0.659	5	3.94	19	1.088	0.38
Time and money saved by implementing best practices	4.28	0.807	6	4.09	8	0.903	0.19
Users of knowledge-base	4.28	0.697	7	4.02	13	1.062	0.26
Meetings where useful information is exchanged	4.27	0.622	8	4.21	3	0.883	0.06
Re-usability of stored knowledge	4.26	0.689	9	4.19	5	1.023	0.07
Cost effectiveness of operations	4.23	0.746	10	4.20	4	0.838	0.03
New experience and more contributions from participating in activities	4.21	0.769	11	4.05	9	1.005	0.16
Sufficiency of information in the databases	4.20	0.879	12	4.05	9	1.051	0.15
Downloads	4.17	0.723	13	3.99	15	0.927	0.19
Ease of use of shared solutions/contributions	4.15	0.728	14	3.88	22	0.938	0.27
Best practices that lead to innovation	4.14	0.754	15	4.19	5	0.875	0.05
Problems solved	4.13	0.779	16	4.05	9	0.957	0.08
Hours of participating in workshops/seminars/networks or other activities	4.12	0.900	17	3.84	29	0.906	0.28
Frequency of knowledge update from best practices	4.09	0.876	18	3.88	22	0.860	0.21
Friendliness of database	4.07	0.892	19	3.86	26	0.870	0.21
Sufficiency of help-instructions in the databases	4.07	0.837	20	3.85	28	0.914	0.22
KM Initiatives that improved the organisation	4.06	0.974	21	3.93	20	1.156	0.13
Sufficiency of information/education for the new routines and procedures	4.03	0.846	22	3.86	26	1.097	0.17

Lessons learnt in databases	4.03	0.874	23	3.71	38	0.944	0.33
Personnel's that are trained in KM	4.02	1.062	24	3.74	35	1.321	0.28
Utilizing search from search engine	4.02	0.854	25	3.81	31	0.976	0.21
Success stories contributed from information bank	4.00	1.085	26	3.83	30	1.190	0.17
New contact/relations established from participating in activities	4.00	0.933	27	3.79	32	0.984	0.21
Time saved in sourcing for information in database	3.99	0.964	28	3.65	41	1.026	0.34
Discussions that saved time, improved efficiency	3.99	0.728	29	4.01	14	0.804	0.02
Returning users in databases	3.98	0.854	30	3.97	16	0.939	0.01
Calls to support function	3.97	0.913	31	3.62	43	1.086	0.35
New strategic initiatives generated by collaborating	3.93	0.930	32	3.65	41	1.082	0.28
Reuse of historical facts in the community	3.92	1.020	33	3.72	37	1.185	0.20
Ease of locating competent colleagues	3.91	0.863	34	3.77	33	1.002	0.14
Lessons learned contributed	3.91	1.059	35	3.95	18	1.187	0.05
Searches from search engine	3.91	0.953	36	3.88	22	0.900	0.02
Discussions that lead to innovation	3.88	0.873	37	3.92	21	0.910	0.03
Backchannel events (lunches, hallway communications, one-on-one meetings)	3.87	0.930	38	3.74	35	1.042	0.13
Solutions contributed from information bank	3.86	1.076	39	3.87	25	1.196	0.01
Meetings conducted virtually	3.86	0.948	40	3.77	33	0.929	0.09
Active contributors	3.84	1.027	41	3.71	38	1.216	0.13
Best practices contributed	3.81	0.914	42	3.97	16	1.173	0.15
Anecdotes (account of a real incident) used	3.79	1.007	43	3.69	40	1.032	0.10
Topics in communities in databases	3.71	0.944	44	3.50	45	1.103	0.21
Hours spent with external experts	3.69	0.985	45	3.55	44	1.092	0.14
Distributed Incentives	3.63	0.855	46	3.47	46	1.114	0.16
Taxonomies(classifications) in databases	3.56	1.024	47	3.47	47	1.185	0.09
Other contributions	3.52	1.060	48	3.36	48	1.226	0.16

To examine the gap between the importance and use of the KM KPIs, gap analysis was adopted. From table 1, most of the variables had a low mean gap which may indicate that there is little or no difference in the responses of respondents on the level of importance and level of use of the KPIs in their organisation. Further test was carried out using the quadrant analysis in figure 1. Figure 1 presents the Importance- Use quadrant analysis plot. The x-axis represents the mean values of the importance of KPI while the y-axis represents the mean values of use of KPI. The quadrant analysis was used to assess the importance of KPI in relation to the Use of these KPIs. This was done to reveal the areas where there will be a need for more Use of the KPI to aid the performance of QSFs.

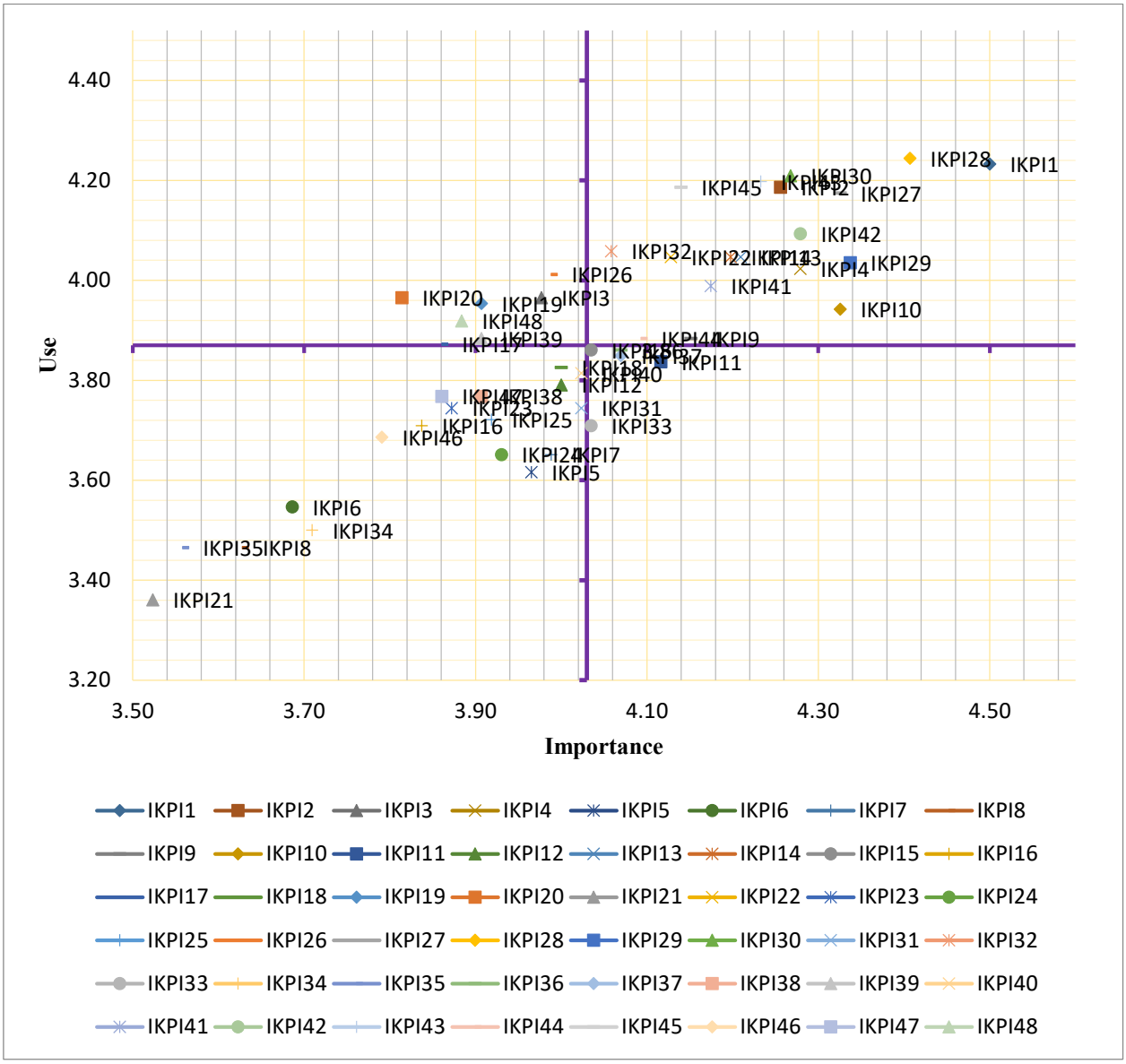

Figure 1: Importance-Use quadrant of KPIs

Examining Table 2, the KPIs in quadrant 1, which is on the upper left hand of the quadrants are KPIs that have been rated as very useful to the organisation but have not been deemed important by respondents. Quadrant 2 which is on the upper right hand of the quadrant shows KPIs that are rated by respondents as very high in terms of its importance and use in QSFs. Continuous improvement on the use of these indicators is encouraged. On the lower right hand of the quadrant which is quadrant 3 are the KPIs that require immediate attention in QSFs as these performance indicators are below average in both importance and use, these are the KPIs that QSFs need to use more to measure KM for better performance in the construction industry. They are; Calls to support function, Hours spent with external experts, Distributed Incentives, Time saved in sourcing for information in the database, active contribution, Backchannel events (lunches, hallway communication, one-on-one meetings), Success stories contributed from information bank, New strategic initiatives generated by collaborating, Reuse of historical facts in the community, Personnel's trained in KM, Taxonomies(classifications) in databases, Ease of locating competent colleagues, Anecdotes (account of a real incident) used, Meetings conducted virtually. This finding is not in line with Oliveria (2014) who noted that tacit knowledge in small organisations is usually more developed than their explicit knowledge due to a lesser number of employees which will increase their physical presence and contact. This tacit knowledge according to Polanyi (1966) are the things we know but cannot express and thus can only be transferred through interaction. The increased physical interaction with others increases knowledge exchange in form of more frequent, informal social meetings, face to face discussions, which in turn leads to new insights and new knowledge.

However, Shannak (2009) and Wong et al (2015) in their study affirmed that these performance indicators are important to the performance of organisations.

The KPIs shown on quadrant 4 at the lower left hand of the quadrant are the KPI that is above average in terms of importance but below average in terms of its use. This implies that these indicators are ranked high in terms of their importance but are not used in QSFs. These performance indicators are very important and so management should encourage their use in measuring the performance of their KM initiative. These are; Hours participating in workshops/seminars, New contact/relations established from participating in activities, Sufficiency of information for new routine and procedure, Success stories contributed from information bank, Friendliness of database, lessons learned in databases, Sufficiency of help-instructions in the databases and Frequency of knowledge update from best practices. The figures in the brackets are the importance ranking and use ranking respectively.

Table 2: Importance-Use KPIs Quadrant Analysis

			4.03 (Average Mean Importance Rating)	
3.86(Average Mean Use Rating)	**Mean Use Rating**	**Above Average**	Returning users in databases (30, 16)	The usefulness of stored knowledge in database (1, 2)
			New experience and more contributions from participating in activities (11, 9)	Re-usability of stored knowledge (9, 5)
			Solutions contributed from information bank (39, 25)	Users of knowledge-base (7, 13)
			Lessons learned contributed (35, 18)	Ease of use of shared solutions/contributions (14, 22)
			Best practices contributed (42, 16)	Time saved using knowledge in database (5, 19)
			Discussions that saved time, improved efficiency (29, 14)	New experience and more contributions from participating in activities (11, 9)
			Searches from the search engine (36, 22)	Sufficiency of information in the databases (22, 26)
			Discussions that lead to innovation (37, 21)	Problems solved (16,9)
				Attending meetings in person (4, 7)
				Knowledge exchange that leads to innovation (2, 1)
				The efficiency of knowledge exchange (3, 12)
				Meetings where useful information is exchanged (8, 3)
				KM Initiatives that improved the organisation (21, 20)
				Downloads (13, 15)
				Time and money saved by implementing best practices (6, 8)
				Cost-effectiveness of operations (10, 4)
				Best practices that lead to innovation (15, 5)
		Below Average	Calls to support function (31, 43) Hours spent with external experts (45, 44)	Hours participating in workshops/seminars (17, 29) New contact/relations established from participating (27, 32)
			Distributed Incentives (46, 46)	Sufficiency of information for new routine and procedure (22, 26)
			Time saved in sourcing for information in the database (28, 41)	Success stories contributed from information bank (26, 30)
			Active contributors (41, 38)	Friendliness of database (19, 26)
			Success stories contributed from information bank (26, 30)	Lessons learned in databases (23, 38)
			Other contributions (48, 48)	Sufficiency of help-instructions in the databases (20, 28)
			Backchannel events (lunches, hallway communication, one-on-one meetings) (38, 35)	Frequency of knowledge update from best practices(18, 22)
			New strategic initiatives generated by collaborating (32, 41)	

			Reuse of historical facts in the community (33, 37)	
			Personnel's trained in KM (24, 35)	
			Topics in communities in databases (44,45)	
			Taxonomies(classifications) in databases (47, 47)	
			Ease of locating competent colleagues (34, 33)	
			Anecdotes (account of a real incident) used (43, 40)	
			Meetings conducted virtually (40, 33)	
		Below Average		**Above Average**
		Mean Importance Rating		

Table 3: Quadrant 2 Extracted – KPIs Important and Used by QSFs.

S/N	**KPIs**	
1	The usefulness of stored knowledge in database (1, 2)	
2	Re-usability of stored knowledge (9, 5)	
3	Users of knowledge-base (7, 13)	
4	Ease of use of shared solutions/contributions (14, 22)	
5	Time saved using knowledge in database (5, 19)	
6	New experience and more contributions from participating in activities (11, 9)	
7	Sufficiency of information in the databases (22, 26)	
	Problems solved (16,9)	
8	Attending meetings in person (4, 7)	
9	Knowledge exchange that leads to innovation (2, 1)	
10	The efficiency of knowledge exchange (3, 12)	
11	Meetings where useful information is exchanged (8, 3)	
12	KM Initiatives that improved the organisation (21, 20)	
13	Downloads (13, 15)	
14	Time and money saved by implementing best practices (6, 8)	
15	Cost-effectiveness of operations (10, 4)	
16	Best practices that lead to innovation (15, 5)	

5. CONCLUSIONS AND RECOMMENDATIONS

48 KPIs were identified from the literature and assessed, the findings indicate that only 16 of these KPIs were important and used by QSFs. These KPIs are highlighted as; Usefulness of stored knowledge in database, Knowledge exchange that leads to innovation, Re-usability of stored knowledge, Users of knowledge-base, Ease of use of shared solutions/contributions, Time saved using knowledge in database, New experience, and more contributions from participating in activities, Sufficiency of information in the databases, Problems solved, Attending meetings in person, Efficiency of knowledge exchange, Meetings where useful information is exchanged, KM Initiatives that improved the organization, Downloads, Time and money saved by implementing best practices, Cost-effectiveness of operations and Best practices that lead to innovation. Out of these 16 KPIs, the study concludes that the use of stored knowledge in database and Knowledge exchange that lead to innovation was the most important and most used performance indicator of KM.

Also, the study concludes that Hours participating in workshops/seminars, New contact/relations established from participating in activities, Sufficiency of information for new routine and procedure, Success stories contributed from information bank, Friendliness of database, lessons learned in databases, Sufficiency of help-

instructions in the databases and Frequency of knowledge update from best practices are important to QSFs but are not used to measure KM within the firms. However, the findings show that distribution of incentives, taxonomies/classifications in databases and other contributions were least used and important to QSFs in Nigeria.

The study however recommends that management of QSFs should imbibe the culture of giving out an incentive to employees that share or use knowledge as this encourages employees and makes KM implementation successful. Also, QSFs should put more attention on the organisation of their databases in order to make them friendlier and easier to assess knowledge when it is needed. QSFs should also measure their KM performance based on the participation of employees in seminars, the success stories they contribute and how sufficient information and helpful instructions are in databases, and how well they are updated.

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