# An investigation into the use and application of knowledge management by quantity surveying firms in Kenya

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## ABSTRACT

**Purpose**

Knowledge Management (KM) focuses on the reuse of previous experiences and practices by applying knowledge acquired from previous projects to new ones. Accordingly, this study sought to find out whether quantity surveying firms in Kenya are making use of KM strategies to increase the efficiency of their services.

**Method**

Data was collected by means of structured a questionnaire in Nairobi, Kenya on how these firms create, store and share knowledge acquired from past projects to future assignments.

**Findings**

The study findings indicate that the firms practised some form of KM. The most common occasion where project-related knowledge was generated and shared was in the design meetings. Computer databases were the most common forms of data storage; and mentorship and apprenticeship the most common ways of distributing knowledge within the firms.

**Value**

To enhance KM in quantity surveying firms, the study recommends the use of contract reporting during project execution, holding of post-performance evaluation conferences and encouraging employees to document their experiences at the end of each project. Additionally, further study should be carried out to investigate the extent of use of KM amongst other stakeholders e.g. architects, engineers and contractors in Kenya to determine the overall level of use of KM in the entire construction industry.

**Keywords:** knowledge management, quantity surveying, construction, Kenya.


## 1.  INTRODUCTION

Knowledge Management refers to the range of strategies and practices used in organizations to identify, create, distribute and enable the adoption of insights and experiences in an organization. Such insights and experiences comprise knowledge, either as embodied in individuals or embedded in organizational processes or practice (Nonaka & Takeuchi, 2007). As a discipline, KM has steadily gained popularity over the last 20 years as a means of capturing and monitoring ever-developing bodies of intellectual capital, and promoting its leverage (Frappaolo, 2002). This systematic and deliberate management of knowledge assets is necessary to ensure corporate survival (Carrillo et al., 2004).

Extensive research has been carried out the world over on the application of KM to fields such as management, information & media, construction, public health and public policy. In Kenya, however, there is little documentation of past or ongoing research in the various fields of specialization on the same.

In the construction industry, various players come together to ensure the successful implementation of a project brief. One of the most crucial tasks during construction project management is contract management. The quantity surveyor, in most cases, is in charge of this.

Contract management refers to the "collection of plans, systems, and activities required to successfully execute and control the commercial experience of contracting", (Gilbreath 1992, p. 4). Effective contract management ensures that commercial risks are mitigated and projects are completed successfully in terms of time, cost and quality. Consequently, there is need for the contract manager to use the knowledge and experiences acquired from previous projects to improve on future ones. This knowledge is usually buried in unread reports and filing systems or lost because of staff turnover. This leads to wasted activity and impaired project performance, (Carrillo, Anumba, & Kamara, 2000). If properly tapped, this knowledge can be used to improve on the construction process and, in particular, on the management of construction contracts.

### Statement of the Problem

Talukhaba (1988), Mbatha (1993), Mbeche & Mwandali (1996) and Talukhaba (1999) established that time and cost performance of construction projects in Kenya is poor and that time and cost overruns are a common phenomenon in the Kenyan construction industry. Talukhaba (1988) established that 75% of projects initiated in Kenya are likely to escalate in time with a magnitude of over 50%; and over 50% of them are

likely to escalate in cost with a magnitude of over 20%. This was attributed to poor management of the construction process by the parties involved.

The construction process is managed, in part, by contracts between the owner, the consultants and the contractors. This means that where construction contracts are not managed and administered properly, time and cost overruns are more likely to occur. EUCI (2009) notes that the management of a contract determines the outcome of any defect, delay, failure, and claim.

This study aimed at investigating ways in which contract management can be improved using the concept of KM to enhance the performance of construction projects in Kenya. This was on the premise that a construction project generates a wealth of information and experience which constantly flows between the project participants and their assistants (Frappaolo, 2002) and which can be used to improve subsequent projects. The study looked specifically at the quantity surveyor as a contract manager.

The study aimed at answering the following research questions:

- Are quantity surveying firms in Kenya aware of the knowledge resources in their possession?
- Are these quantity surveying firms managing these knowledge resources so as to improve the process of contract management?
- Which are the most appropriate KM strategies that can be applied to contract management by quantity surveying firms?

## 2. LITERATURE REVIEW

### 2.0 Knowledge Management

### 2.0.1 Introduction

The term Knowledge Management was coined by Karl Wiig in 1986 (Beckman, 1999) as an attempt at harnessing the individual knowledge of members in an organization and applying it to business processes to create or improve economic value. KM emphasizes the reuse of previous experiences and practices, but its focus is on mapping these to the changing landscape of the market. In the case of contract management, this would mean applying knowledge acquired from previous projects to new ones. Nonaka & Takeuchi (2007) express a strong connection between knowledge creation and innovation in product and service development. They give examples of large Japanese companies such as Canon and Sharp which have relied on knowledge creation to foster long-term innovation and strong business performance.

Knowledge has certain unique characteristics. Day & Wendler (1998) and Wissenmanagement Forum (2003) identify the following:

- It is a prerequisite for human action hence it is intrinsically linked to people;

- It is created dynamically (through changes to cognitive structures);
- It tends to remain in people's heads because it comprises personalized experiences and is, therefore, difficult to transfer;
- It tends to fragment as it grows; "Today's special skill could be tomorrow's common standard as fields of knowledge grow deeper and more complex";
- It is in constant flux as more is created each day;
- The value of knowledge is difficult to quantify and it is unpredictable on who will benefit most from it;
- It tends to be specific as it is created within a certain context. For instance, knowledge created in the process of contact management will be useful only within that same context;
- Knowledge can be considered subjective; even within a firm, employees may disagree on what is useful knowledge.

Due to its dynamic nature, how knowledge is captured and implemented will determine its usefulness. Dataware Technologies (2006), point out that Information Technology is crucial to successful KM implementation, but Sena & Shani (1999) and Egbu (2008) note that knowledge sharing need not necessarily involve huge capital investment or IT systems. Focus can be placed on other areas of a firm's business. According to Wiig (1999, p. 3-2): 'some companies focus on knowledge sharing among individuals or on building elaborate educational and knowledge distribution capabilities. Others foster environments in which their employees can be innovative and creative. Still, others pursue building and exploiting intellectual capital to enhance the economic value of their enterprise.'

### 2.0.2 Knowledge Management Application and Use

Frappaolo (2002) states that the key KM applications are based on a model that sees the role of KM as that of sharing knowledge in an organisation in such a way that each individual or group understands the knowledge with sufficient depth and context so as to apply it effectively in decision making and innovation. He enumerates the following KM applications:
- Intermediation: - This is the connection between knowledge and the people. It refers to the brokerage function of bringing together those who seek a certain piece of knowledge with those who are able to provide that piece of knowledge.
- Externalization: - This refers to the process of capturing knowledge in an external repository and organising the knowledge according to some classification framework. Capture can take the form of a database, a document or a videotape.

- Internalization: - This is the extraction of knowledge from an externalised repository, and filtering it to provide personal relevance to the knowledge-seeker.
- Cognition: - It is the process of making or mapping decisions based on the available knowledge. In its simplest form, cognition is achieved by applying experience to determine the most suitable outcome to an unprecedented event, opportunity or challenge.

There are various KM strategies/processes available to firms to help the successfully make the applications above. The different KM strategies are means of helping companies develop knowledge as a source of value-creation, redirecting their attention away from capital, natural resources and labour (Earl & Scott, 2000). Four core KM processes can be distilled from the eight-stage process proposed by Beckman (1999):

- Knowledge Creation
  This could be done through the:
  o acquisition of external knowledge, for example through mergers, recruiting new personnel, acquisition of patents and the use of consultants.
  o establishment of integrated project teams that include clients.
  o application of "lessons learned" as well as "methods to elicit tacit knowledge".

- Knowledge Capture and Storage
  This could be through manuals, databases, case studies and reports. This is explicit knowledge. Knowledge will also be stored in the memories of the company's employees (tacit knowledge).

- Knowledge Sharing
  This is facilitated by various tools and methods which include information technology applications like the internet and the company intranet. Dataware Technologies (2006) also lists document management systems, information retrieval engines, data warehouses and data mining tools as other forms of knowledge distribution. (Egbu, 2008) states that storytelling is also an important way in which people share knowledge. A common language, training on the job and mentoring are also key aspects of knowledge distribution.

- Knowledge Application
  This is the most essential task of KM. Successful application of KM can only be done after the prejudice of barriers within the firm have been overcome.
  Despite the various theoretical advantages of applying KM in firms and to processes, this may not always be easy. Difficulties may be encountered in doing so. Carrillo et al. (2004) and Kagiri (2008) cite the following as the major barriers to the implementation of KM in construction companies:

- o Lack of time: The pressure to deliver products under a very tight schedule does not always permit a knowledge-sharing culture;
- o Lack of agreed standard work processes: This is a recurring problem in the construction industry;
- o A negative organizational culture both at the firm and project level is also seen as a significant barrier to the implementation of KM. This is usually the case where small teams are formed and little communication takes place between them and where these are unwilling to admit the existence of a problem;
- o Lack of a dedicated staff or department to KM in firms;
- o Where an organization has a top-down structure, only the top management is considered capable of generating knowledge. Any knowledge generated by lower level employees can be easily disregarded;
- o Lack of both social and analytical skills among the employees in an organization. These two skills are crucial for the knowledge manager and any other person and any other person interested in developing the bodies of knowledge in any organization;
- o Protracted efforts by firms to keep the knowledge they possess secret in an attempt to maintain a competitive advantage. This is contrary to the main focus of KM;
- o Lack of, or low investment, in information technology by a firm. Lack of any form of a computerized KM system constrains knowledge sharing and distribution.

### 2.0.3 Knowledge Outcomes

Prusak (2000) proposes a measure of the effectiveness of the KM activities to entail checking whether:

- there is any improvements in the speed of a knowledge work process (for example, new product development);
- there are any improvements in the overall cycle time for new products;
- the rate of customer retention and any measurable corporate reputation has improved;
- there are any improvements at the rates in which future sales are won;
- there is an improvement at the rate at which new sales people become effective.

### 2.1 Construction Contract Management

Construction contract management is an attempt at controlling the cost, schedule and technical performance of major construction projects using contract documentation. The contracting process begins with the inception of a need to contract for outside services and a determination of the scope

of work and continues through to the completion of contracted performance, final payment and acceptance, and formal contract closeout or termination (Gilbreath, 1992). The four major phases of any construction contract are:

- **Contract Planning**

This refers to the stage where critical decisions concerning the content and management of construction contracts are made. It is an integral part of a broader overall project plan. Keane & Caletka (2008) point out that planning as a systematic function is a principle cornerstone of effective construction contract management.

- **Contract Formation**

This is the stage where an attempt is made to secure fair and equitable contracts that are well-defined and priced, that protect the interests of the contracting parties and contain enforceable compliance controls and can be properly administered. It entails: developing contract documents; bidder qualification and selection; issuing requests for proposals (RFPs); bid receipt and evaluation; and contract award.

- **Contract Administration**

This refers to the collection of processes, responses to events and controls which are employed during the entire contract period to ensure its efficiency. Contract administration begins with signing of the contractual documents and continues throughout the performance period, and ends with the formal termination of the contractual relationship (Gilbreath, 1992). In this period the contractor's submittals are checked, proper contract filing and recording is done (Kwakye, 1997) and back-charges, change orders and claims are dealt with. At contract close-out, whether upon completion of the work or due to a termination of the agreement because of other reasons such as a breach of the contract, each party's fulfillment of the contractual 'deliverables' is examined (KPMG, 2011).

- **Contract Monitoring**

This term refers to a formal program of contract reporting and auditing. It includes activities such as 'inspection of the contractor and subcontractors cost reporting systems, purchasing documents, payroll records, employee timesheets, bank records, invoices and operations logs', (KPMG, 2011, p. 2). Contract reporting and auditing are two common tools utilized at this stage. Contract reporting is used to check whether the contracting process has been a success while contract auditing refers to an examination of contract activity, controls, or charges to determine if they are correct, effective, prudent and/or adequate. It can be an effective tool in eliminating wasteful spending and cost overruns (KPMG, 2011) and will vary by circumstance, type of client and type of contract.

### 2.1.1 General Nature of Construction and the Construction Industry

Major construction projects represent some of the largest and most complex undertakings known. What is often overlooked when viewing a massive structure is the intricate web of commercial transactions, business arrangements, and the management challenges that were required (Gilbreath, 1992). Construction activities cover a range of loosely integrated groups of participants/organizations and sub-markets over a wide geographical area. Together, these contribute to the production, alteration, refurbishment, maintenance and repair of fixed capital. Carrillo et al. (2004) notes that these participants frequently disband upon project completion without carrying out post-project reviews and disseminating the lessons learnt. Egbu (2008) makes four observations regarding construction projects in relation to knowledge:

- People rely heavily upon communication to solve day-to-day problems;
- The industry values *experience* very highly and personal communication emerges as the most common way of transferring learning from experience;
- Most companies regard *training* as a means to improve on their existing knowledge;
- The industry finds it very *difficult to capture knowledge* gained from experience.

This implies that even though a lot of knowledge is generated during a construction project, it is not easy to quantify and effectively pass it on to the other project participants.

### 2.2 Application of KM to Construction Contract Management

The implementation of KM strategies varies from firm to firm given the unique needs and environments of each of them (Wiig, 1999). Kagiri (2008) outlines eight basic aspects necessary for successful implementation of KM:

- The top management should incorporate KM into the broad vision of the firm;
- The firm should have a "targeted KM focus" which enables it to establish a KM culture based on the nature, strengths and weaknesses of the firm's knowledge assets;
- A specific person or professional team should be in charge of implementing the KM practices;
- The firm should regularly assess the impacts and benefits of their KM efforts;
- The firm should put in place incentives to encourage the employees to use the KM system;

- The KM system to be made familiar to all the employees in the firm;
- To develop a successful KM culture, employees have to be empowered and motivated to act intelligently;
- A firm with a KM vision and strategy should incorporate KM in all its aspects.

KM strategies can be applied to the following aspects of construction contract management:

- Pre-Bid Conferences and Site Visits

The minutes of all pre-bid meetings, if any, should be filed and recorded. The questions raised by bidders during these meetings can be used later to improve on the contents of the Requests for Proposals (RFP) for future projects. Contractor feedback to contract documents or contract formation procedures is also very important in getting rid of unreasonable, unclear or unnecessary terms from the RFP documents.

- Bid Evaluation Process

The results of a bid evaluation, its contents and the data leading to an award recommendation should be documented. This will save the project team valuable time in case an agreement is not reached with the apparent successful bidder and the process has to be repeated with the other bids to make a choice. The contract manager can also keep a database on different contractors giving their reputation, past responsiveness to RFPs, their stability, community representation and the collateral relationship, if any, that they may be having with the client.

- Use of a Fair Price Estimate

A fair price estimate is prepared by the quantity surveyor to serve as a benchmark for the when checking and evaluating the bids. This means that the quantity surveyor has to constantly have up-to-date records of the unit prices of the building elements for use in any new project.

- Contract Abstracts

Many construction contract documents are voluminous and locating their requirements can be difficult. Contract abstracts can be used to reduce the contract documents to their essential elements. These should be amended from time to time as the original contract documents are amended. Where the contract requires the contractor to submit items or documents for the owner's review and approval, a submittals checklist showing a list of what is due and when can also be used. This makes the retrieval of information easy and more accurate saving time and costs because of omitted items.

- Post-performance Evaluation

As part of the contract closeout process, an evaluation should be done of the contractor's performance by those who have dealt with him in the different aspects of the project. This information is useful when reviewing the contractor for future work. Field and administration personnel should also indicate improvements they recommend for future contracts of the same type. The contract and contractor evaluation should be done after all

the members of the consultants' team have been consulted to eliminate prejudice of one party over the contractor and to provide a more objective evaluation. Carrillo et al. (2004) suggest that this period be used by all the project participants to share their experiences even from projects not related to the one just concluded.

- Contract Reporting

Contract reports are periodically generated during the entire contractual period and are used to indicate the commercial success or failure of the contracting process. These serve to isolate the problem areas in a contract and suggest the corrective measures. This information is then integrated with the other data used for the particular project and filed for early detection and prevention of the same problems should they be likely to occur in future projects.

In contract reporting, Kerzner (1998) suggests the use of a checklist of the key performance indicators to help understand the contracting status and performance:

**Contract Formation**
- Number of qualified bidders, addenda issue and the number of responsive bidders compared with the number invited;
- Planned versus the actual dates of the formation activities;
- Frequency of use of the letters of intent;
- Average effective period of the letters of intent;
- Percentage of contract amounts priced as lump sum, unit price and cost plus;
- Deviations from planned pricing methods.

**Contract Administration**
- Planned versus actual payments;
- Number of change orders;
- Percentage of change order cost to original contract prices;
- Number and amount of back-charges;
- Number and amount of claims;
- Percentage of change orders prices as lump sum, unit price and cost plus;
- Average elapsed time of identification of need for change, change approval, issuance of change order and payment;
- Owner time charges to contract administration tasks.

## 3. METHODOLOGY

The aim of this study was to establish how the management of construction contracts could be improved and made more efficient using the concept of KM. Its main objective was to find out to what extent KM

was practiced by the firms under study and, specifically, its application to contract management. This was irrespective of whether these firms referred to these practices as KM or not.

Since KM as a tool of commercial effectiveness is a relatively new field of study (Beckman, 1999, Liebowitz, 1999 & Wiig, 1999), the research was exploratory in nature via a descriptive survey. The target population of the study was therefore all registered quantity surveying firms. The choice of the quantity surveyor over the other consultants involved in construction projects was because of the pivotal role they play in the administration of the construction contracts.

The study was carried out in Nairobi, Kenya. As per the June 2010 Board of Registration of Architects and Quantity Surveyors (BORAQS) Schedule 'D', there are 152 registered quantity surveying firms in Kenya. The study, however, considered only the firms based in Nairobi due to constraints of time and money.

- **Sample Size**

30 quantity surveying firms were used in the study. Simple random sampling was used to select the 30 firms from the numbered list provided by BORAQS. This was done by use of random numbers generated by a scientific calculator. The firms with the numbering on the list corresponding to random numbers generated by the calculator were selected for the study.

- **Data Collection Instruments and Techniques**

Primary data was collected by use a survey method using structured questionnaires. The questionnaires were hand delivered to the 30 quantity surveying firms and covered general questions on the firm; *Knowledge Creation; Knowledge Capture & Storage; Knowledge Distribution; Knowledge Application;* and *General Remarks*. The questionnaire consisted of a mix of both open-ended and closed questions. Closed-ended questions were used to obtain information on which clear and concise responses were required and where the risk of ambiguity and misinterpretation of questions was considered to be higher. Open-ended questions, on the other hand, were used where in-depth explanations were required to be given on matters of practice and which were expected to vary from firm to firm based on their specific way of carrying out tasks.

## 4. FINDINGS OF THE RESEARCH

The findings from this study on the extent of use of KM in contract management by quantity surveying firms are summarised below:

### 4.1 Knowledge Creation

The study established that the main sessions where most of the knowledge related to contract management is generated and shared are the design meetings, formal company meetings and regular updates from projects each selected by 25% of the firms. After-review seminars on completed projects were also shown to be important when it comes to documenting the experiences from projects and adding the documented information to the knowledge repositories in the firms. These sessions serve the purpose of creating knowledge because other than being normal meetings where the participants just discuss project progress, they also serve as brain storming sessions where the different consultants share ideas on how the project can be improved. Many ideas are generated as each participant gives his views from the perspective of his professional and social experiences.

The respondent firms were asked whether they have a KM policies and procedures manual. Only 25% of the firms had one. The lack of a policies and procedures manual indicates a lack of standard ways of doing things in the firms. This could impact negatively on the learning curve of new employees especially where they have to learn the routine tasks which are carried out by the firms. Documenting these tasks in a procedures manual makes it easier both to teach and learn these tasks. Of the firms that kept a procedures' manual, the manual was compiled from data gathered from design meetings, formal company meetings, site meetings, networking with other consultants and regular updates from projects. None of the respondents cited informal company meetings as a source of information for preparing the policies and procedures manual. This information is shown in Fig. 1.1 below:
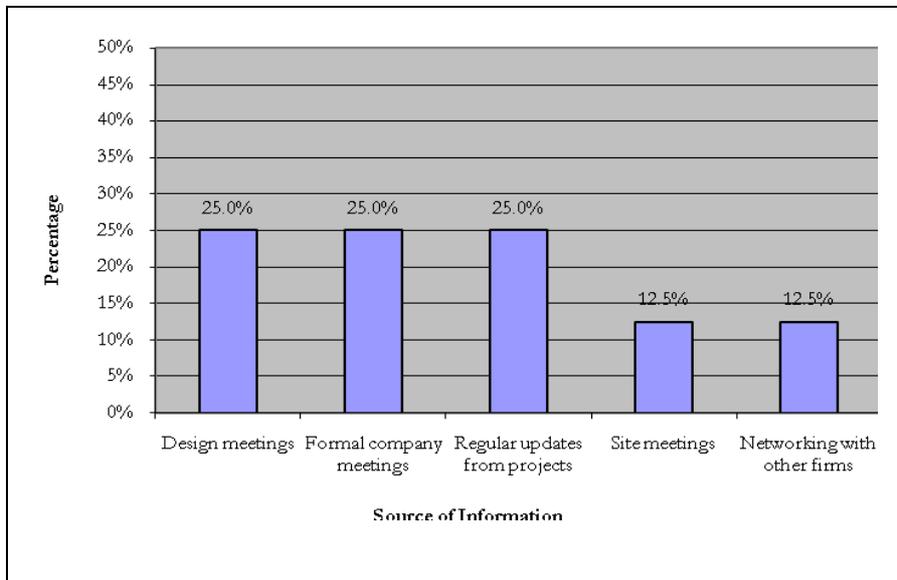
**Figure 1.1** Source of information in policies and procedures manual

From the literature review, it was established that knowledge comprises personalized experiences and is in constant flux as more is created each day. This means that formal meetings alone may not be sufficient to capture all this knowledge. Informal meetings (such as lunch and tea breaks, team building sessions etc.) are useful tools for passing on this knowledge especially in firms where they are more frequent than the formal meetings. The fact that no documentation of the ideas generated and shared is done means that many useful ideas maybe lost during these sessions.

The employees in all the firms surveyed underwent some form of evaluation on the quality and efficiency of their work. 45% of firms base their evaluation the speed of completion of assignments; 26% base it on the accuracy of undertaken assignments regardless of the time taken to complete them; 19% base it on the employee's ability to generate and share knowledge with other people in the firm. This implies that these firms value the knowledge possessed by their employees and their ability to share it for the benefit of all in the firms. The responses under 'others' were given by 6.3% of the respondents. These included evaluations based on the overall quality of work; the satisfaction of the person who has carried it out; and the ability to pick out important occurrences in a specific project that are to be applied or considered by all other employees in similar future projects were considered important (Fig. 1.2 below).

For the firms to benefit more from KM, more emphasis should be placed on the employees' ability to generate and share knowledge with other persons in the firm. This will ensure that in their absence or when they leave the firm, the transition of work will be smoother between them and the new assignees.
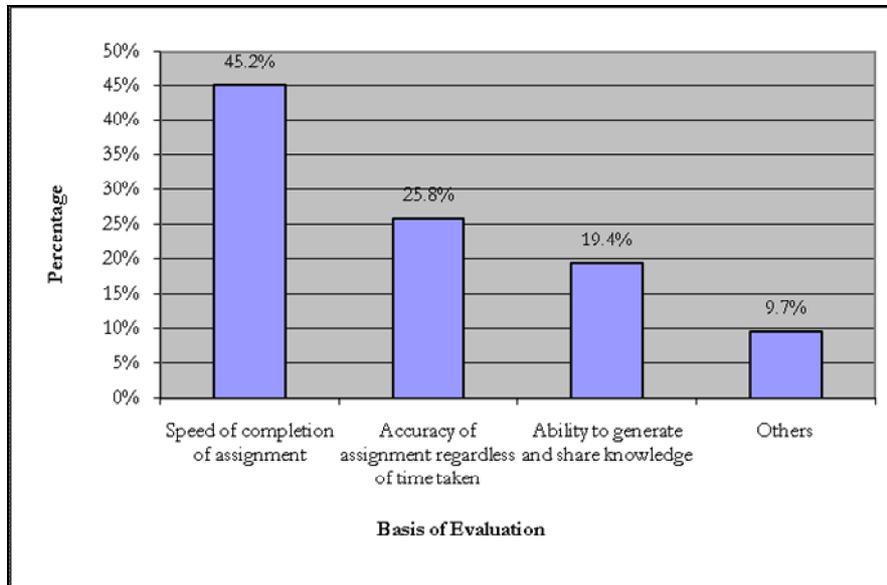
**Source:** Field Survey 2011

**Figure 1.2** Basis of employee evaluation

## 4.2 Knowledge Capture and Storage

All the firms indicated that they carried out project reviews and extracted from these useful components which could be applied to future assignments. This was done based on contract reports generated throughout the life of the project. The study established that in 75% of the firms it is not company policy to record this information and the gathering and documentation of new information is done by the employees out of their own personal initiative. In 12.5% of the firms, the information is gathered and documented as a result of the firms' policies while rest (12.5%) document the information as a result of other incentives offered by the firms such as monetary rewards.

The fact that in 75% of the firms no requirement exists to record new experiences and skills acquired over the course of employment means that in these firms, there is a lot of information lost as the employees would see no need to do extra work which they are neither required to do nor are they being paid for. Of the firms where the information is gathered and recorded either as a result of the company policies requiring this to be done or as a result of the incentives offered by the firms, in 40% of them the information is recorded by the employed quantity surveyors; in 33.3% the recording is done by the administrative staff (secretaries) and in only 26.7% of them is the recording done by the firms' partners/ directors. This shows that the chief knowledge officers in majority of the firms are the employees (cumulative 73.3%) and not the owners of the firms. This implies the need

to ensure a closer follow-up to ensure that this is done to prevent vital knowledge from being lost with staff turnover.

The study found that the main qualification of the person who is entrusted with the task of recording the above information was secretarial skills, selected by 38.5% of the respondents. 30.8% of them gave knowledge of quantity surveying practice as the main qualification while 23.1% of them selected management skills. Social skills were ranked the least important, selected by only 7.7% of the respondents. Technical knowledge (quantity surveying, managerial and secretarial skills) are important when documenting knowledge. Social skills are, however, even more important if the knowledge officer has to extract the knowledge I people's minds and make it available to other members of the firm. The social skills include human warmth and the ability to interact smoothly with all members of the firm. These deserve more emphasis when appointing a knowledge officer.

Quantity surveyors were found to have the highest rate of turnover with 62.5% of the firms surveyed indicating that they work in them for an average of 1-3 years. None of the firms surveyed retained their quantity surveyors for more than 9 years. The majority (62.5%) of administrative staff, on the other hand work in the firm's 7-9 years. This shows that, on average, the secretaries stay in a firm for almost 3 times as long as the quantity surveyors. In all the firms surveyed, it was established that all other types of staff members (support staff, such as drivers, messengers, cleaners) work for them for more than 9 years (see Table 1.1).

| Employees | Percentage duration of employees in the firms | | | |
|---|---|---|---|---|
| | 1 – 3 years | 4 – 6 years | 7 – 9 years | > 10 years |
| Quantity surveyors | 62.5% | 25.0% | 12.5% | 0.0% |
| Administrative staff (secretaries) | 0.0% | 12.5% | 62.5% | 25.0% |
| Support staff (drivers, cleaners etc.) | 0.0% | 0.0% | 0.0% | 100.0% |

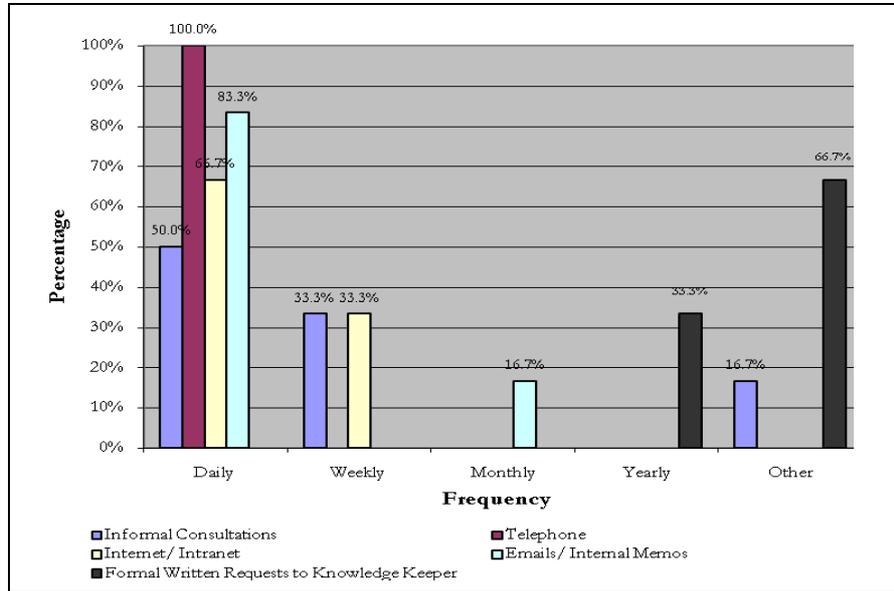**Source:** Field Survey 2011

**Table 1.1** Employee retention

This implies that in firms where proper systems to capture and store knowledge are not in place, the quantity surveyors pass through them, gather experience and leave with that experience. The owners of the firms, therefore, have to start fresh training for new employees who join the firm and the cycle is often repeated. The support staff, on the other hand, spend a longer period with the firms but rarely contribute to the technical aspects of quantity surveying practice in the firms.

The study also established that all the firms used a combination of at least two forms of data storage out of the three cited, that is computer databases, manual filing systems and the intranet/ internet. Looking at the different forms of storage individually, computer databases were used by 50% of the firms, manual filing systems by 38.1% while the intranet/internet was used by 11.9% of the respondent firms. Manual filing systems are still used by a large number of firms with the attendant risk of data storage disorganisation which could lead to loss or misplacement of vital data. A lot of time is also spent when searching for information where indexing is not (properly) done. Investment in information technology is crucial and beneficial as long as backup and security measures have been taken into account.

## 4.3 Knowledge Distribution

The study found the main tools of distributing information in the respondent firms to be informal conversations, telephone, internet/intranet, emails and internal memos, and formal written requests to the knowledge keeper. The frequency of use of these tools is shown in Fig. 1.3 below.
Training programs are also used to transfer knowledge on certain aspects of their practice from the more experienced members to the less experienced ones. The study established that 87.5% of the firms have some form of training program for their employees. The most commonly used form of training is mentoring (38.5%) followed by apprenticeship (30.8%). 23.1% of the firms surveyed use internal training courses for their employees while 7.7% employ external training courses such as those organised by the Board of Registration of Architects and Quantity Surveyors (BORAQS), the Architectural Association of Kenya (AAK.) and the Institute of Quantity Surveyors of Kenya (IQSK) and other forms of Continuous Professional Development. These training methods were always used whenever an employee began a job he/she was doing for the first time. Mentorship and apprenticeship include sessions of story telling where the more experienced members of the firms share their experiences in informal settings, sometimes not even work related. This helps in the learning process as the barriers of formalities are done away with

**Figure 1.3** Frequency of use of different tools of knowledge distribution

## 4.4 Knowledge Application

The firms surveyed had different ways of monitoring whether the knowledge they possess is being made use in tackling the challenges experienced in the course of a project. 55.6% of the firms monitored whether the firm's knowledge is being used by having work done by any member of staff reviewed by another. 33.3% of the firms monitor the time taken to complete the projects as an indicator as to whether their knowledge is being utilised while only 11.1% monitor daily information requests to the knowledge keeper as a means of monitoring whether the knowledge they possess is being used and applied in the new projects. Monitoring requests to the knowledge keeper is the most accurate way of monitoring KM processes in a firm but also the most difficult especially where there are a number of knowledge keepers on different aspects of the firm's practice.

Twenty-five per cent (25%) of the respondent firms offer incentives such as cash rewards to encourage their employees to use the knowledge contained in its repositories. In 37.5% of the firms, it is company policy for the employees to make use of the knowledge repository while in 37.5% of them there are no specific forms of encouragement offered to the employees to make them make use of the available knowledge. This means that in these firms, a lot of information could be collected but this

will just lie idle in the company's archives thus amounting to nothing more than just information.

## 4.5 General Remarks

The respondents were also asked how they approached problems related to contract management in projects. 19% of them responded that they relied on intuition and experience, 33.3% of them consulted experts in the particular area within the firm; 9.5% consulted experts outside the firm and 33.3% consult the relevant textbooks and manuals. 4.8% of the respondents chose the category 'Others'. This, they pointed out, entailed referring to the repertoire of observations and conclusions from different projects on the aspect of contract management that requires the solution. Cumulatively, 80.9% of the respondents make some form of consultation whenever they require assistance or further information on an aspect of the practice. This implies that proper KM will go a long way in enhancing the efficiency of services offered. Were knowledge holders, knowledge repositories and the means of distributing knowledge to be made more accessible to all members of a firm, the benefits of KM would be more easily perceived.

The respondents were also asked whether KM is officially recognised in the firms as a tool of improving business processes. In 57.1% of the firms, it is officially recognised as such. This means that in 42.9% of the firms, no conscious effort is made by their management to manage their knowledge assets and derive benefits from putting them into proper use.

## 5.   CONCLUSION

The purpose of this study was to establish the extent of use of knowledge management by quantity surveying firms in Kenya. The study has shown that all the firms practice one form or another of KM, albeit in varying degrees. All the firms have a system in place of creating, storing, distributing and applying the knowledge they have acquired from previous project experiences. Knowledge in quantity surveying firms is mainly generated in formal meetings with the most valued knowledge being that used in creative project problem solving. Employees mainly quantity surveyors are the chief custodians of the firms knowledge but have relatively higher turnover. Knowledge in the firms is mainly distributed via mentoring and is stored in computer data bases but majorly transmitted via the telephone. All this highlights the crucial role of KM amongst the quantity surveying firms and consequently the need to enhance and harness it.

## 6.   RECOMMENDATIONS

In acquiring knowledge generated during a project, quantity surveying firms should keep proper records of minutes of all pre-bid and post-bid meetings, queries & feedbacks, contract reporting and post-performance evaluations. These experiences can then be used to solve similar problems that may arise in future projects.

Firms should encourage their employees to document their experiences in all the projects and add them to the firm's archive to avoid loss due to turnover in the firms. Once captured, the knowledge may be used by future employees for the benefit of the projects and firms. Frameworks should also be put in place to allow firms to share their knowledge base with other firms to widen the knowledge repositories with each others' experiences.

Quantity surveying firms should be encouraged to invest in information technology as the most efficient mode of knowledge storage to enhance rapid exchange of information.

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