
INVESTIGATING KNOWLEDGE MANAGEMENT IN PUBLIC BUILDING MAINTENANCE IN KUWAIT

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ABSTRACT

Public Building Maintenance (BM) departments in Kuwait have the duty of maintaining buildings that vary in shape, type, size, complexity and purpose. The services provided by the departments extend from minor repair works to bespoke renovation and reconstruction projects making the process of maintenance complex. Knowledge Management (KM) is being implemented by organisations to improve their business performance. This paper is based on a study that investigated the current state of KM in the public part of the BM sector. Interviews were conducted to identify BM process, current KM activities and tools, barriers to knowledge sharing and perception to KM implementation. Findings of the study have assisted in modifying a proposed BM process based on procedures followed by the majority of interviewed departments, where knowledge capturing, organising, and retrieval activities can then be embedded in the process. The study revealed that there is lack of formal knowledge management techniques carried out within departments. Furthermore, there is no established communication links between branches of the same department resulting in lack of experiences and knowledge exchange between colleagues. Cultural/ethnic differences, fear of losing job, not knowing how to share knowledge and lack of time were the main barriers to knowledge sharing. However, the participants showed a positive attitude toward the introduction of a KM system with added activities and roles in the BM process related to KM.

Keywords: Building maintenance, Knowledge management, Kuwait, Public sector.

1. INTRODUCTION

Public Building Maintenance (BM) departments in Kuwait have the duty of maintaining properties owned by the state. Buildings owned by a particular ministry vary in shape, type, size, complexity and purpose. Furthermore, services provided by the departments extend from minor repair works to bespoke renovation and reconstruction projects. Such diversity in categories of buildings and services can make the process of maintenance complex. This requires organisations to seek means to improve their business performance in maintaining public buildings. BM and construction organisations implement the concept of Knowledge Management (KM) to improve performance, reduce cost, increase efficiency and quality (McAdam & Reid 2000; Robinson et al. 2001; Syed-Ikhsan & Rowland 2004). However, even though the area of KM has been widely researched, much of the literature on KM has focused on the private sector while little has concentrated on the public sector (Cong & Pandya 2003; BSI 2005). A major reason is that the public sector implements KM to improve services rather than for gaining financial benefits (Syed-Ikhsan & Rowland 2004).

Regarding KM studies in the public sector, Yao et al. (2007) discovered that public employees acquire information and knowledge through informal channels due to the absence of formal knowledge networks. Their research also revealed that barriers to knowledge sharing in public organisations include lack of time, lack of incentives/rewards and weak culture for sharing. Syed-Ikhsan & Rowland (2004) found that the surveyed public ministry did not have a specific KM strategy. However, their study revealed that knowledge existed in the organisation's processes, policies, workflow and databases. Al-Athari and Zairi (2001) conducted an empirical study on the capacity of KM in public and private organisations in Kuwait. Their research revealed that majority of participants from both

sectors felt that knowledge is important to organisations. Furthermore, internal journals are the most important method to facilitate the sharing of knowledge. They also discovered that the majority of employees consider knowledge as power, something private and it is being guarded to protect their positions.

KM principles have been adopted in BM to leverage employees' knowledge assets (Fong & Lee 2009). Egbu (1999) emphasis that relative importance of refurbishment management skills and knowledge is higher than those in general construction management. Through mapping the process in reactive maintenance projects, Ali et al. (2002) revealed several major problems including selecting the right contractor for the right problem, double handling of data entry and transfusing of information. Such issues were due to lack of communication and knowledge sharing. Ali et al. (2002) then proposed KM system prototype named "More Productive Minor Construction through IT" (MoPMIT) to deal with such problems and to improve the business process. The main aim of this paper is to further develop the BM process model, initially proposed by Almarshad et al. (2010) to identify where KM activities can be implemented in BM of public departments in Kuwait. The paper also investigates current KM activities, tools, perceptions and barriers of KM implementation.

2. METHODOLOGY

The field data collection aimed to investigate the current process and KM state in the BM department in Kuwait. Therefore, interviews was considered the more suitable method for data collection in validating the proposed BM process model, developed by Almarshad et al. (2010), and for exploring KM related issues. Ten interviews were conducted with key professionals holding managerial positions in public maintenance departments.

Table 1 summarises the structure of the interviewed departments. The organisations were classified based on the number of employees. Organisations with less than 50 employees are classified as small, with 50-249 employees are classified as medium and large for departments with more than 250 employees. Organisational branches vary from a single branch to several branches located in different parts of the country.

Table 1: Participating BM departments.

#	Name	Organisation size	Number of branches
1	Audit Bureau	Small	1
2	Kuwait University	Small	3
3	Ministry of Communication	Medium	2
4	Ministry of Defence	Large	21
5	Ministry of Education	Large	6
6	Ministry of Interior	Medium	7
7	Ministry of Justice	Medium	3
8	Ministry of Public Works	Large	6
9	Ministry of Social Affairs and Labour	Medium	1
10	National Guard	Small	1

In order for the results and findings of the interviews to be generalisable, it was essential that size of participating organisations to be evenly distributed. Therefore, three small, four medium and three large organisations were interviewed to assist in modifying the proposed BM process and to investigate issues related to knowledge and its management. Furthermore, it was necessary that participants should have held a higher managerial position for several years in a BM department to be able to reflect on the organisational process that involve different parties. As a result, four managers, one assistant manager and five division heads participated in the interviews, all of which had a

minimum of eight years of experience. The potential participants were contacted in advance to schedule interview appointments and to check for any regulations that restricts their participation.

The paper examines the process carried out by the BM departments. Afterwards, the study will demonstrate the findings regarding the current KM techniques, technology usage, perception towards KM and barriers to knowledge sharing. Finally, the paper discusses how knowledge can be implemented and managed in the BM process.

3. THE CURRENT PUBLIC BM PROCESS

The initial model, developed by Almarshad et al. (2010), was first validated by these interviews. Figure 1 shows the modified BM process model to represent the actual main activities in the departments. Activities in dashed lines represent processes in departments that have design/planning divisions and in-house teams.

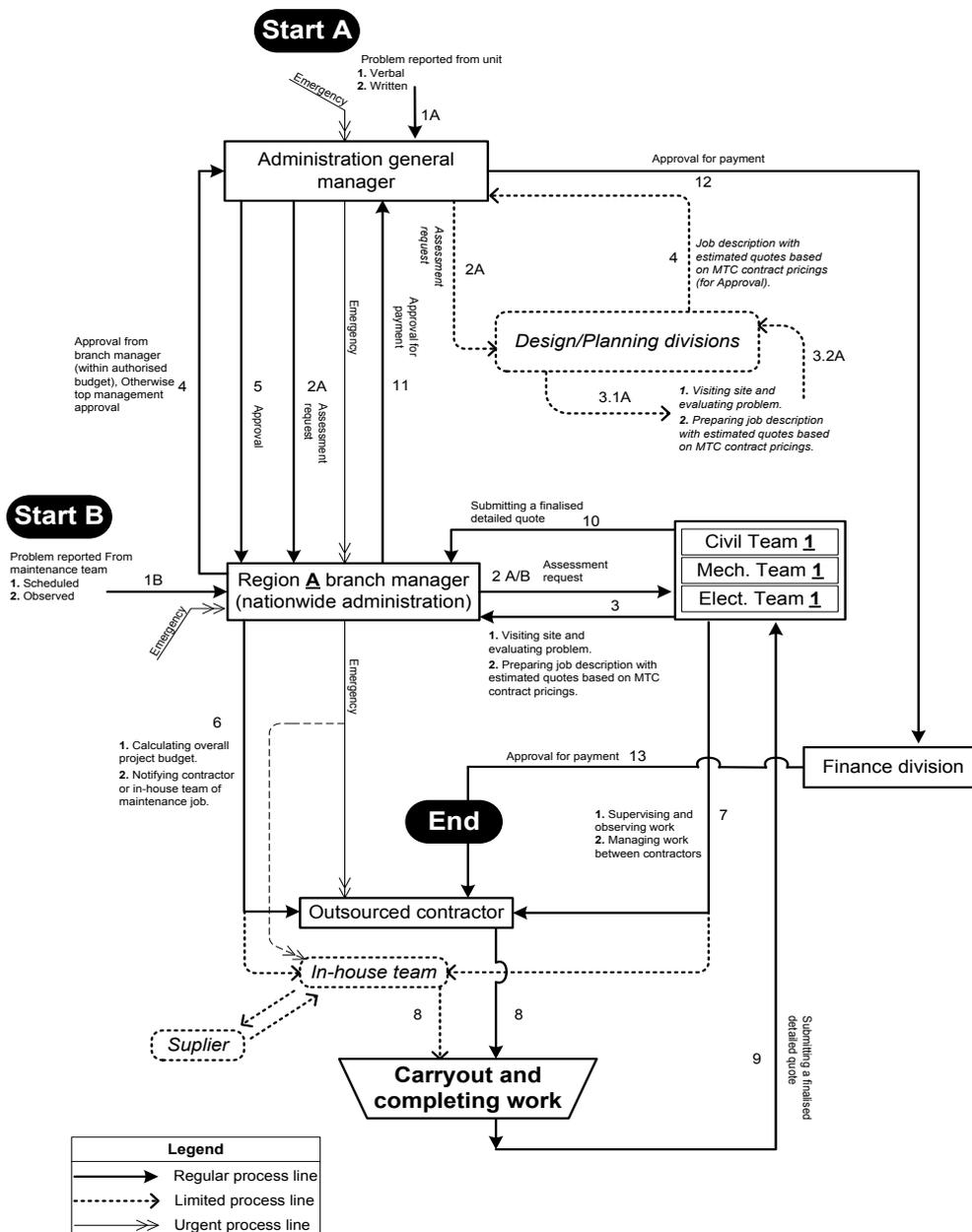


Figure 1: Typical building maintenance process in Kuwait.

The processes shown in the model are generally typical for BM departments that consist of single or multiple branches. Prior to maintenance or repair works, several activities are carried out including assessing the needs, issuing approximate quantities, calculating estimated costs, issuing sketches, obtaining permissions and approvals. Such duties are carried out by the design/planning divisions. However, with absence of the divisions in some organisations, management and maintenance teams share the above responsibilities. During the project, the designated maintenance team observes and supervises the works being carried out and resolves any arising issues. When there is more than one specialised contractor working in a project, the public maintenance employees manage the contractors and their activities. Upon finishing the project, the contractor/in-house team and the supervising group submit project completion documents including a re-measured and modified total cost, detailed list of quantities and issue as built drawing when required for items and works that were carried out in the project. In case of emergency, all the interviewed organisations indicated that they neglect the processes which usually take place prior maintenance works to speed up reaction times. Such documents are issues following project completion.

The current practices of KM only use face-to-face meetings between different teams. All participants indicated that they have regular meetings with their teams. Several issues are discussed in meetings including those related to maintenance projects, significant problems and their solutions. The meetings are commonly conducted on weekly or bi-weekly basis. As shown in Figure 2, the majority of meetings take place at different organisational levels: meetings at High Level (H.L.) between administration general manager and division heads, meetings at Middle Level (M.L.) between division heads and their maintenance teams and meetings at Lowest Level (L.L.) between maintenance teams and contractors and/or in-house teams. Figure 2 shows an administration with a single branch and a design/planning division. A BM department can have multiple branches each of which can consist of several maintenance teams and the same situation can occur with design/plan divisions.

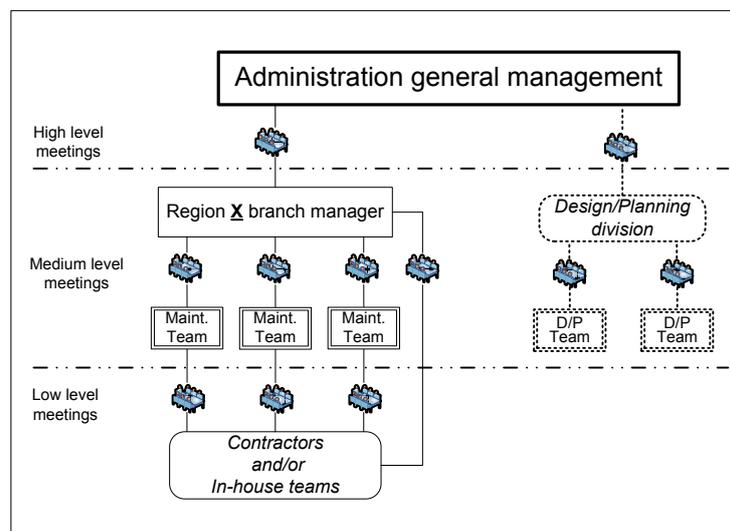


Figure 2: Structure of meetings in a BM administration.

Three organisations (two medium and one small) indicated that they have a maintenance committee that consist of all division heads and that they meet on weekly basis. The other eight organisations do not have maintenance committee however; the general managers meet branch managers (H.L.) individually and all together. Also, all organisations indicated that branch managers meet their maintenance teams (M.L.) individually or all together. Figure 2 above shows the lack of horizontal communication flow between front line employees located in different teams and branches. Therefore, maintenance teams can be isolated in terms of knowledge sharing from other teams and divisions.

4. KEY KM PRACTICES RELATED TO PUBLIC BM IN KUWAIT

4.1 Knowledge management techniques

All participants indicated that no department has a formal knowledge management strategy. Concerning how knowledge is gained, shared and transferred; several methods were pointed out by the BM departments. The first approach is through learning on the job. Nine departments stated that their maintenance teams generally consist of experienced and inexperienced members, which creates opportunities to share and transfer knowledge. One small department however indicated that its engineers independently supervise the maintenance jobs. The second method for knowledge exchange is through meetings. All participants asserted that regular meetings are conducted at different departmental levels. The third method is by attending training courses. All departments stated that they provide regular training programmes for their employees to increase their knowledge. The last approach is through storytelling. One branch in a BM department expressed that regular events are organised where the experienced engineers give lectures regarding their insights and experiences.

4.2 Technology usage

All participants stated that employees have some knowledge of computer use. The usage extends to preparing project documents, filling administrative forms and surfing the internet. Also sketches and some project drawings are prepared using CAD drawing tools. All the ten departments indicated that most of their computers located in branches have internet connections. Three departments have IT infrastructure where computers are connected to organisational network. These departments use commercial facilities management software to maintain maintenance activities. However, none of the organisations has databases where policies, solutions and decisions can be stored, organised or accessed.

4.3 Perception towards KM

The participants showed a positive perception towards KM and stated that knowledge sharing would benefit all parties in the organisation and it can prevent the repetition of mistakes in future projects. Furthermore, the majority of participating organisations believe that the lack of knowledge sharing between employees can lead to additional expenses and lower value for money spent on maintenance projects. Such attitude could be significant in terms of top management support and commitment to implement KM considering the managerial positions held by interviewees. The participants also believe that there is large scope for performance improvement in their departments. When asked of opinion towards introducing a KM system with few extra activities, all participants except one deem that such step is useful and it would improve the output of their organisations. The majority of participants believe that their employees might accept few extra activities in the process to improve performance.

4.4 Barriers to knowledge sharing

In this part of the interviews, the participants were asked about the employees' willingness to share experiences and the presence of main barriers against knowledge sharing. The majority of participants indicated that their employees willingly share their knowledge. Four participants asserted that some employees only share their experiences when asked. Less than half claimed that factors such as citizenship and ethnicity play a significant role in willingness to share knowledge among employees. Such remarks are consistent with Al-Kazemi and Ali (2002) who found that most important problems in Kuwaiti organisations include the dominance of personal relationships over work relationships, influence of personal loyalty and favouritism at work and bias in promotion and evaluation. In addition, it should be considered that foreigners have to bear with annually renewed contracts. Such issue place perhaps a significant pressure on non-citizens to always be in higher standards compared to Kuwaitis. Table 2 below shows KM implementation barriers identified by the interviewees from frequently cited to the least.

Table 2: Barriers to KM implementation.

#	Barrier name
1	Cultural/ethnic
2	Fear of losing job
3	Not knowing how to share knowledge
4	Lack of time
5	Loss of reputation and power
6	Lack of incentive

5. INTERPRETATION OF THE CURRENT KM AND BM WITH THE SECI PROCESS

This section firstly illustrates several issues related to KM based on the findings from interviews then discusses how knowledge activities can be incorporated into the current BM process. As shown in Table 1, many departments have several branches. The interviewees acknowledged that maintenance teams located in different branches are somewhat isolated from each other as there is no formal communication between their employees. Only one small organisation indicated that frequent gathering and events for BM employees are organised outside work premises. More than half of organisations also stated that maintenance teams within a branch usually sit together towards the end of their daily work. It was noticed that the larger the organisation the less interaction between employees. However, few participants pointed out that there might be informal communications between some individuals located at different branches. Only one medium size department has indicated that team members located at different branches are connected through wireless devices for communication. All departments that consist of one branch have acknowledged that their team members communicate face-to-face with each other as they are located in one place.

More than half of organisations with several branches have acknowledged that discrepancies in procedures exist between branches such as approaches to approvals and business standards. Also they indicated that mistakes are repeated between projects and between branches. The participants stated that it is common to find a product being approved in one branch while being rejected in other branch. The participants stated that they record their problems and solutions only when such matters are large enough to be presented and discussed in meetings. However, it was indicated that it would be difficult to search and find old problem/solution records since no indexing methods are currently being used. Only one small organisation has expressed that they organise their major problem/solution documents for easy access.

The organisational structure combined with regional distance between employees can limit communication and create the *“reinventing the wheel”* situation between branches. Also, in departments that have planning/design divisions, there are no regular gatherings between employees of the divisions and those in branches that carry out the work. This may further contribute to repetition of mistakes in preparing for new projects since knowledge exchange is not taking place.

A number of studies have investigated the process of KM such as: the three processes of generation, codification, and transfer of knowledge by Davenport & Prusak (1998), the four processes of knowledge creation, storage/retrieval, transfer and application by Alavi & Leidner (2001) and the four processes of knowledge developing, distributing, combining and consolidating by Wiig et al. (1997). Moreover, Nonaka & Takeuchi (1995) introduced a concept that produces and converts knowledge from tacit to explicit and vice versa through social interactions between individuals. The model, as shown in Figure 3, has four main modes: Socialization, Externalization, Internalization and Combination (SECI). The objective is to introduce as few as possible of extra activities and to make use of the current processes when implementing the concept of KM in the BM departments since additional work load may hinder the introduction of any new concept.

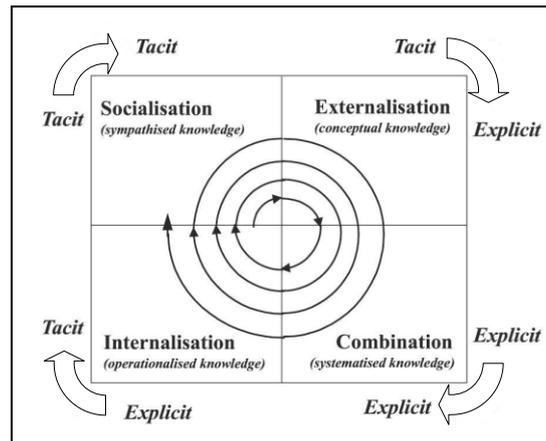


Figure 3: The SECI Process.
Source: (Nonaka & Takeuchi 1995)

In the *Socialisation* mode, tacit to tacit, employees can gain the tacit knowledge of dealing with issues and problems by accompanying and learning from seniors while managing maintenance projects. The mode can also take place when professionals sit together at the end of the day discussing their experiences and practices. These two activities are already taking place in a number of interviewed departments to facilitate knowledge transfer between employees.

In the *Externalisation* mode, tacit to explicit, knowledge is converted from tacit to explicit knowledge to facilitate its communication. Employees can transcribe the gained tacit knowledge into explicit formats to be understood and utilised by others. This can be achieved by introducing a project Review Sheet (RS) to be filled by the end of a maintenance work. Knowledge in form of extraordinary perceptions, solutions and insights to issues that were faced during a maintenance job can be written down in the RS document. Since none of the departments currently use the RS, the form can be introduced to be included with the other documents submitted to the branch manager when the maintenance project is completed.

In the *Combination* mode, explicit to explicit, similar knowledge cases are gathered, combined and then organised to be easily accessed by other employees. All interviewed departments run regular meetings at different organisational levels to discuss issues related to maintenance projects. Knowledge cases extracted from RS forms can be combined, validated and classified during the department meetings. This approach is crucial to standardise the presentation and organisation of knowledge cases.

Internalisation is the fourth and final mode of knowledge creation. Through this form the knowledge is reapplied by other engineers and then updated based on gained experiences (explicit to tacit). The *Internalisation* mode can take place in BM processes before, during and after finishing projects. This can be achieved when employees refer to a KM system to search for or update solutions. The new updated knowledge can be shared between employees, *Socialisation*, to start a new cycle of the SECI spiral.

The spiral represents the interchange between different SECI modes. The increase of the spiral radius stands for the spread of knowledge through various organisational levels. In our case, knowledge can be spread to different levels and branch locations of a BM department.

6. CONCLUSION

Studies have asserted that knowledge is an important asset in organisations. However, much of research has focused on KM within the private sector. The main aim of this paper is to further develop the BM process model, initially proposed by Almarshad et al. (2010) to identify where KM activities

can be implemented in BM of public departments in Kuwait. The paper also investigated current KM activities, tools, perceptions and barriers of KM implementation.

A model was developed showing the main processes followed by BM departments in maintaining public buildings in the state of Kuwait. It was revealed that BM departments have regular meeting at different organisational levels to discuss problems related to maintenance projects. However, the departments do not organise their meetings' decisions and records for later use. In addition, several problems related to knowledge and its management were identified such as teams' isolations, discrepancies, repetition of mistakes. Such issues can be linked to lack of communication and absence of knowledge sharing between employees. By using the knowledge conversion model of SECI, how BM employees can perform KM activities to utilise their accumulated knowledge for future use was illustrated. This can be achieved through making use of the already occurring processes such as meetings and introducing few additional processes such as RS.

In terms of activities, technology use, perception and barriers of KM, it was discovered that there is no formal strategy for KM. It was also revealed that knowledge is mainly learned on the job and transferred by the interaction between the experienced and less experienced employees. It was found that employees are already familiar with computers, their applications and web surfing. Moreover, several barriers to knowledge sharing were acknowledged by the participants. However, positive attitude was largely shown towards the KM implementation. The participants also expressed encouraging views towards proposing a KM system to share, and reuse knowledge to improve the efficiency. Further work should be done to utilise such attitude in order to play a significant role in addressing the barriers and establishing genuine trust culture towards increasing the willingness to share knowledge among employees. This paper is part of a wider research aims to develop a system for knowledge based BM.

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