

Appraisal of the financial investment in Knowledge Management practices: a case of selected Quantity Surveying firms

Ali, A.A¹, Idowu, F.A² & Adamu, A³

^{1, 2, &3} Ahmadu Bello University, Zaria, Department of Quantity Surveying
aaabdu2000@gmail.com and idowufaruq@gmail.com

The economy of the future will be driven by knowledge economy. Competitiveness is highly related to the level of knowledge and technology. Knowledge is the key resource today, and the firms that can learn to manage it more effectively will win. This research was aimed at appraising the financial investment in knowledge management (KM) practices with a focus on Quantity Surveying (QS) firms. The scope of this research is Medium and Large Scale Consulting firms in accordance to National Bureau of Statistics (NBS); Small (below 10 employees), Medium (between 11 and 20 employees) and Large (Above 20 employees). A quantitative research approach was adopted in this study. A total number of Sixty-three questionnaires were administered to registered Quantity Surveying firms in Kano, Kaduna states and the Federal Capital Territory Abuja. Forty one (41) questionnaires were completed and returned by the respondents representing 65.08% return rate. The study found poor cash management as the major financial problem that KM units face in their firms, with about (46.34%) percent, seconded by insufficient or sometimes no financing and lack of budget with about (21.96%) percent. KM benefits are highly important to QS firms practicing KM in their respective firms. The study also revealed that the financial investment on KM practices in QS firms has a financial investment/effort (N50, 000-100,000) equivalent of (\$139-278) and As such, these QS firms are highly recommended to adopt knowledge management practices because the level of financial investment on KM practices in QS firms is moderate i.e. affordable leading to increased efficiency and productivity at work.

Keywords: Financial Investment, Knowledge management, Quantity Surveying firms,

Introduction

The economy of the future will be a knowledge economy. Competitiveness is highly related to the level of knowledge and technology (Drucker, 1998). Knowledge is the key resource today, and the firms that can learn to manage it more effectively will win (Cartlidge, 2000). To survive and grow in the future, the Quantity Surveying profession must respond quickly and creatively to the challenges of accelerating social, technological, economic and environmental change. An essential element in the future success and expansion of the profession is the skill and knowledge base at the core of professional practice (Royal Institute of Chartered Surveyor, 1991).

Quantity Surveying Firms are project-based professional services organizations that offer their client services as their main output, depend on knowledge (Kang & Choi, 2005). They provide construction cost consultancy services from the inception of planning to the completion of a construction project. They depend on well-educated and skilled personnel (Kang & Choi, 2005). They concentrate on temporary assignments or projects and are characterized by knowledge assets (Abeid & Arditi (2002). Their critical elements are in the heads of their employees, in networks, customer relations, manuals and service delivery systems. (Scarborough & Swan 1999). They strongly depend on employee loyalty and therefore vulnerable to exits (Scarborough & Swan 1999).

Adegbembo *et al.* (2015) assessed KM practices in QS firms, and found that there is little awareness of KM in QS firms in Nigeria based mainly on the perception of the Quantity Surveyors. Hence, Knowledge Management units of organisations spend a lot of funds on knowledge identification, generation, organisation, storage and dissemination for the achievement of the overall goals of the organizations but, the financial investment (effort) is still not known.

This study aimed at appraising the financial investment on practices in the Nigerian Quantity surveying firms, and thus, the objectives of the study includes, to identify financial sources for knowledge management units in the consulting firms, to determine the Level of financial investment for best tools for capturing and sharing knowledge experiences and to assess the benefits of knowledge management practices in the consulting firms.

Literature Review

As we move from the industrial age to the intelligence age, knowledge has become a central force behind a successful firm. With the faster and greater capability to process information in the quantity surveying firms, the amount of knowledge has been exponentially utilized by organization. Organizations try to recognize assets they have that are not being fully utilized. Such assets are employees and their knowledge (Adegbembo *et al.*, 2015). The assets include human skills, experience, know-how, best practices, databases etc. These assets provide opportunities to cut costs, save design time, and reduce the time to market (Quintas *et al.*, 1997). Knowledge has become a critical corporate asset (Drucker, 1995). Leonard and Sensiper (1998) define knowledge as “information that is relevant, actionable and based on least partially on experience”.

Knowledge is characterized as consisting of data or information that have been organized and processed to convey understanding, experience, accumulated

learning, and expertise as they apply to a current problem or activity. Based on various views of knowledge, it is clear that information becomes knowledge when it is combined with context and experience (Adegbembo *et al.*, 2015).

According to knowledge management in QS profession: Knowledge management is a systematic approach to help information and knowledge emerge and flow to the right people at the right time to create value (Marwick, 2001).

Financial Sources for Knowledge Management Units

Knowledge Management units of organizations spend a lot of funds on knowledge identification, generation, organization, storage and dissemination for the achievement of the overall goals of the organizations. Usually, Knowledge Management units are funded by their parent organizations. The amount of fund an organization allocates to the Knowledge Management unit may depend on what priority or value it places on the importance of organizational knowledge in achieving its goals and objectives. Other sources of funds for Knowledge Management units include grants and bequests from friends of the organization. Loans from finance houses may also help to fund Knowledge Management units. However, this must be approved by the organization (Adegbembo *et al.*, 2015).

Benefit of KM

KM is applicable to QS firms and is a possible means to enhance quantity surveying professionalism either individually and organisationally. (Alhaji and Idowu, 2016) As Riege (2005) argues, although technology is rarely the ultimate solution to, or driver of a knowledge sharing strategy, the integration of the right technology is important. According to Liebowitz (2000), Wiig (1999) and BeckMan (1997) and Alhaji and Idowu (2016); some of the benefits of KM practices in the Nigerian Quantity Surveying Firms.

S/No	Benefits	Source
1	Improved efficiency and productivity at work	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
2	Better decision making	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
3	Higher levels of expertise and knowledge.	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
4	Increased flexibility and adaptability	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
5	Improved service quality and customer satisfaction	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
6	Rapid and effective enterprise problem solving	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
7	Reduced duplication of effort	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
8	Enhanced employee capability and organizational learning	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000; Alhaji and Idowu, 2016)
9	Increased employee morale	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
10	Increased revenue	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
11	Business Growth	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
12	Increased innovation	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
13	Practice and process improvement	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
14	Increased customer satisfaction	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
15	Employee stimulation and motivation	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)
16	Raise company professional image	(BeckMan, 1997; Wiig, 1999; Liebowitz, 2000)

Knowledge Management Tools

Very few authors have defined KM tools. A popular definition by Ruggles (1997) describes them as the technologies used to enhance and enable the implementation of the sub-processes of KM, e.g. Knowledge generation, codification and transfer. He further argued that not all KM tools are IT based, as a paper, pen or video can also be utilized to support KM.

KM technologies depend heavily on IT as the main platform for implementation. Examples of KM technologies for capturing knowledge are knowledge mapping tools, knowledge bases and case-based reasoning. Although there is a debate about the degree of importance of such technologies, many organizations consider them as important enablers to support the implementation of a KM strategy (Anumba *et al.*, 2000; Egbu, 2000; Storey & Barnet, 2000). KM technologies consume about one third of the

time, effort and money that are required for a KM system and the other two thirds relate mainly to people and organizational culture (Davenport & Prusak, 1998; Tiwana, 2002). Ruggles (1997) relates the importance of IT tools to their quick evolution, dynamic capabilities and high cost. KM technologies consist of a combination of hardware and software technologies.

A considerable proportion of the rework, delays, mistakes and cost overruns on construction projects can be attributed to poor knowledge management. While many organizations have some elements of knowledge management practice, which are not necessarily labeled as such, there is much more that can be done to improve the construction project delivery process through better management of the knowledge generated on projects and in individual firms. There are serious dangers for companies that ignore knowledge

management – they run the risk of simply repeating past mistakes or worse, taking decisions that can lead to major disasters. On the other hand, organizations that proactively manage their knowledge stand to reap considerable rewards (in cost savings, process efficiencies, reductions in errors and rework, etc.) And will be able to deliver more innovative solutions to their clients (Alhaji and Idowu, 2016).

Research Methodology

The research methodology involves the systemic rules and procedures upon which this research agenda is based and against which the data collected are interpreted and the findings evaluated.

Quantitative research was used for the purpose of this study. The questionnaire was used for the purpose of collecting data relevant to the financial investment on KM practice in the Nigerian Quantity Surveying firms as well as the benefits of KM practices.

Question regarding the financial investment for the best tools for capturing and sharing experiences, the level of measures for respondent to rate were from 1= “No financial investment” to 5= “Very high financial investment”. For the last question regarding the benefits of KM practices, the levels of measure for respondents to rate were from 1= “Not important” to 5= “Very important”. The questionnaire employed is a multiple choice type using 5 point Likert scale with 5 being the highest and 1 the lowest. This is chosen for ease of uniformity of the responses and it gives a manageable sensitivity to the respondents as regards choices.

The accessible population for the study was gotten from the list of registered Quantity surveying firms from the Nigeria Institute of Quantity Surveyors (NIQS) website at (<http://niqs.org.ng/niqs-firms/>) which indicates that 52 Quantity surveying firms are registered in Abuja, 46 in Kaduna while 10 are registered in Kano state, having a total of 108 firms, where the questionnaires were administered to one Quantity surveyor

per firm. In order to determine a suitable size for the sample, Kish (1965)’s formula was used for calculating the sample size i.e. Using Formula:

$$n = n_1 / (1 + n_1 / N) \quad (1)$$

Where

$$n = \text{Sample size } n_1 = S^2 / V^2 \quad (2)$$

N = Population size

V = Standard error of sampling distribution
 $= 0.05$ $S^2 = P(1-P) = (0.5)(0.5) = 0.25$

P = the proportion of standard deviation in the population element (total error = 0.1 at 95% confidence level).

Out of the 63 questionnaires administered, which represent the sample size of the study, 41 questionnaires were completed, returned and reviewed, by the respondents representing 65.08% return rate. These locations were chosen because of the abundant registered Quantity Surveying firms in these states, and either they have their Head office or branches in the states. Also, due to time limitation.

The data was analysed with the use of statistical instruments. The data collected was analysed using descriptive statistics specifically mean, standard deviation, and percentages of frequencies. The data collected from the survey conducted was presented in tables

The scope of this research is medium and large scale consulting firms in accordance to national bureau of statistics (NBS); Small (below 10 employees), Medium (between 11 and 20 employees) and Large (Above 20 employees), as mentioned earlier. Also, small scale firms were not used as they hardly practice KM due to the lower number of employees in the firms.

A probabilistic or random sampling method was strategically employed for the sample size study and the main advantage of using random sampling is its simplicity

The analysis of the survey was divided into three sections, where sections one (1) examines the main budgeting aspect of KM in the respective firms. In section two examines the extent of financial implication for the best tools for capturing and sharing experiences, and section three assesses the

benefits of knowledge management practice in the firms.

The data collected were analysed with the aid of descriptive analysis using mean, frequencies and percentages with the aid statistical package for social sciences (SPSS) 20 software.

Results and Discussion of Findings Breakdowns of Administered Questionnaires

Table 1 shows the summary of the respondents to the questionnaire distributed to Quantity Surveying Firms in Kano and Kaduna states, as well as the Federal Capital Territory Abuja.

For field surveys in the construction industry, responses rate above 30% - 40% is considered statistically viable and satisfactory, and the results could be generalised and accepted as valid. (Love & Smith 2003; Liberatore *et al.*, 2001; Moser & Kalton 1971). Table 1 depicts the breakdown of administered questionnaires.

Table 1: Breakdown of Administered Questionnaires

Questionnaire Administered	63
Questionnaire Retrieved	41
Percentage response	65.08%

Sources of funds for KM unit

The results presented on Table 2, revealed that majority of the respondents (70.74%) indicated that the KM unit in their firms is funded by the parent organisation

depending on what priority or value it places on the importance of organisational knowledge in achieving its goals and objectives. This result is in line with Goodluck (2015) that KM unit are usually funded by their parent organisations. Only 9 respondents (21.96%) from the survey indicated that the KM unit in their firms are funded by loans from finance houses, to cater for their KM activities for the achievement of the overall goals of the organizations while 7.30% indicated that his firm is being funded from other source and therefore, cannot be considered as it is least ranked.

Financial problems faced by km units in firms

Table 3 presents results on the financial problem. It was deduced that some firms face problem of insufficient or sometimes no financing at all for their KM activities (31.74% response). This may be due to the fact that there is little awareness of KM and its practices in quantity surveying firms (Adegbenbo *et al.*, 2015). The most rated financial problem according to the survey is poor cash management by the company's principal partner or by the firm's accountants with 46.34% while 21.96% of the respondents firm indicated that no budget is being prepared for the purpose of executing KM activities. This result is in line with Popoola (2000) that a major cause of failure of KM projects objective is the lack of formulation and implementation of appropriate budgetary policies.

Table 2: Sources of funds for KM unit

S/No	Sources of fund	Frequency	Per cent	Cumulative Per cent
1	Parent organization	29	70.74	70.74
2	Loans from finance houses	9	21.96	29.28
3	Others	3	7.3	100
Total		41	100	

Table 3: Financial problems faced by KM units in firms

S/No	Problems	Frequency	Per cent	Cumulative Per cent
1	Insufficient or no financing	19	31.74	31.7
2	Poor cash management	13	46.34	68.3
3	No budget	9	21.96	100
Total		41	100	

Level of financial investment for best tools for capturing and sharing knowledge

The best tools for capturing and sharing knowledge according to Liebowitz (2000) are the experience, skills and knowledge can be captured by means of interviewing, protocol analysis, questionnaires and surveys and observation and simulation.

Table 4 indicates the responses of respondents on the level of financial implication of KM tools. It was shown that questionnaires and surveys were ranked the highest method for capturing knowledge with a mean of 2.38. The second rated method is observation and simulation with a mean of 2.23 while interview was least ranked with a mean of 1.62 indicating low financial implication. As such, this is consistent with study carried out by Appiah (2014) that Knowledge capturing through interviews was not highly adopted based on its low percentage in his survey, as such it has low financial extent.

Also, methods used to communicate knowledge within the organisations were analysed after knowing the various methods used to capture knowledge. The various methods employed by the quantity surveying firms according to the survey were through the firm intranet; by specific meetings to discuss lessons learned; discussion via e-mail and distribution of physical documents and several other means. Information Technology such as email, Internet, Intranet, Lotus Notes, distribution of printed documents, CD ROMs, etc. are greatly enabled knowledge transfer (Smith, 1989). It was noted that the firm's internet/extranet was the highest ranked with a mean of 3.62 indicating high financial implication. Telephone was ranked next with a mean of 3.15 and next ranked was specific meetings to discuss lessons with a mean of 3.08, both indicating moderate financial investment in the firms. The least rank was distribution via e-mail and physical distribution with a mean of 2.54 indicating low financial investment needed. Egbu *et al.* (2002) reported that the most used technologies and techniques for transferring experience to others are the

telephone, internet/intranet, e-mail, documents and reports, along with meetings.

From table below, the survey showed that project seminar was ranked highest with a mean of 3.92 which is consistent with Ruggles (1997) that training requires more resources than other techniques. Expert system technology was ranked next with a mean of 3.85 and data base system with a mean score of 3.15 indicating moderate financial investment. This concurred with Prusak, (1998); Tiwana, (2002) that KM technologies consume about one third of the time, effort and money that are required for a KM system and the other two thirds relate mainly to people and organizational culture. Meetings and tutoring were ranked low with a mean score of 2.46 and 2.15 respectively. This is in line with Appiah (2014) that tutoring/mentoring was observed to be the major method of transferring knowledge to others in Q.S firms. This is because of its very low financial investment, efficiency and effectiveness.

KM activities

From table 5, methods for transferring experience to others were shown to have a moderate level of financial investment in the KM units of the respondents firms with a group mean score of 3.31. This is consistent with Goodluck (2015) that Knowledge Management units of organizations spend a lot of funds on knowledge identification, generation, organization, storage and dissemination for the achievement of the overall goals of the organizations. The techniques and technologies for communicating knowledge were ranked second with a group mean score of 3.10, indicating moderate financial investment also. Methods used to capture knowledge were least ranked with the lowest group mean score of 2.08 indicating low financial investment. The survey further showed the overall group mean for KM activities using the best tools in Q.S firms have a mean score of 2.83. A threshold point is at 3 (moderate financial investment) which means that the financial investment on KM practices in QS

firms have a moderate financial investment/effort.

Benefits of Knowledge Management practices

The activities and practices relating to Knowledge Management which are being developed in the quantity surveying firms are presented in Table 6. It was realised that, improved efficiency and productivity at work was ranked highest with a mean score of 4.62 indicating highly important benefit derived from knowledge management

practices. Better decision making and higher levels of expertise and knowledge were next ranked with a mean score of 4.44 and 4.37 indicating very important benefits respectively. The least ranked was increased employee morale with a mean rank of 4.05. In all, the benefits of KM practice had a group mean of 4.30. A threshold set point of 4 (very important) which means that KM benefits are very important to quantity surveying firms practicing knowledge management.

Table 4: Financial investment of the best and tools

S/No	FINANCIAL INVESTMENT TOOLS	MEAN	RANK	GROUP MEAN
Methods used to capture knowledge from past projects				
1	Questionnaires and surveys	2.38	1	2.08
2	Observation and simulation	2.23	2	
3	Interview	1.62	3	
Methods for communicating knowledge				
1	The firms intranet/internet	3.62	1	3.1
2	Telephone	3.15	2	
3	Specific meetings to discuss lessons	3.08	3	
4	Distribution via e-mail and physical distribution	2.54	4	
Transferring experience to others				
1	Project Seminar	3.92	1	3.31
2	Expert system	3.85	2	
3	Data base	3.15	3	
4	Meetings	2.46	4	
5	Tutoring	2.15	5	

Table 5: KM activities

S/No	Activities	Group Mean	Mean	Overall G M
1	Transferring experience	3.31	1	2.83
2	Communicating knowledge	3.10	2	
3	Capturing knowledge	2.08	3	

Table 6: Knowledge Management Benefits

S/No	Knowledge Management Benefits	Mean	Rank	Group Rank
1	Improved efficiency and productivity at work	4.62	1	4.3
2	Better decision making	4.44	2	
3	Higher levels of expertise and knowledge	4.37	3	
4	Increased flexibility and adaptability	4.69	4	
5	Improved service quality and customer satisfaction	4.27	5	
6	Rapid and effective enterprise problem solving	4.24	6	
7	Reduced duplication of effort	4.23	7	
8	Enhanced employee capability and organizational learning	4.22	8	
9	Increased employee morale	4.05	9	

Summary of Findings

Majority of the respondents (84.6%) indicated that the KM units in their firms are funded by the parent organization. The financial problems facing KM unit in the respondents firms is poor cash management at all as noted by some of the respondents (38.5%) while others (30.8%) indicated that lack of budget and insufficient or no financing as the financial problem faced by KM unit in the firms.

Based on the Level of financial investment for best tools for capturing and sharing knowledge, the best tools for transferring experience to others were shown to have a moderate level of financial investment of about (3.31) percent in the KM units of the respondents firms, the tools for communicating knowledge have a moderate level of financial investment (3.10) while that for capturing knowledge were least ranked with the lowest group mean score of 2.08 indicating low level financial investment. Also, the financial investment on KM practices in QS firms is neither too low nor too high with a threshold point set of 3 indicating moderate financial investment/effort.

Lastly, based on the Benefits of knowledge management practices in quantity surveying firms, Improved efficiency and productivity at work (4.46) is the highly important benefit derived from knowledge management practices followed by better decision making (4.44) and higher levels of expertise and knowledge (4.37). Hence, the benefits derived from KM practice had a threshold set point of 4 (very important) which means that KM benefits are very important to quantity surveying firmsii. practicing knowledge management.

Conclusion and Recommendations

Conclusion

The findings of this survey revealed that the most of the quantity surveying firms adopt the incremental budgeting technique as well as the programming, planning and budgeting technique to aid planning of annual report and to control activities in the KM unit of their firms.

The financial planning or budget is usually funded by the parent organization is mostly prepared by the principal partners of their firms and that poor cash management is the major problem that KM units face in their firms.

The best tools for transferring experience to others have a moderate level of financial investment in the KM units of the respondents' firm, the tools for communicating knowledge have a moderate level financial investment while that for capturing knowledge have low level financial investment. In all, the financial investment on KM practices in QS firms has a moderate financial investment/effort (N50, 000-100,000) equivalent to ((\$139-278).

Improved efficiency and productivity at work, better decision making and higher levels of expertise and knowledge are the most important benefits derived by quantity surveying firms practicing Knowledge management. Lastly, KM benefits are highly important to quantity surveying firms practicing knowledge management in their respective firms.

Recommendations

Based on the study, the following recommendations are being made;

This research was only restricted to Quantity Surveying consultancy firms in the Nigerian Construction Industry. As such, similar appraisal should be carried out in construction firms in the Nigerian Construction Industry.

Also, similar research should be run on Engineering and other consultancy firms of the Nigerian Construction Industry and compare the results.

References

- Ali, A. A. & Idowu, F. A. (2016). Assessing the barriers to the use of knowledge management technologies in the Nigerian Quantity Surveying firms. *Construction Focus, Journal of Construction Management*, 1(2). 45-59

- Adegbembo T. F., Awodele O. & Ogunsemi D.R. (2000). *Building Organisational Intelligence: A Knowledge Management Primer*. Taylor & Francis Ltd CRC Press.
- Assessment of knowledge management practices in Quantity Surveying firms in Lagos and Abuja, Marwick, A.D., (2001). Knowledge management technology. *IBM Systems Journal & Magazine IEEE Xplore*, 40(4), 814-830. DOI:10.1147/sj.404.0814.
- Alarape, A. I. & Agbaje, A. (2010). *Introduction to Research Methodology*. Ibadan: Adegun Press.
- Cartlidge, D., (2000). *New Aspects of Quantity Surveying Practice*. Oxford: Butterworth - Heinemann.
- Cartlidge, D., (2002). *New Aspects of Quantity Surveying Practice*. Oxford: Butterworth - Heinemann.
- Choi, Y.S. (2000). *An Empirical Study of Factors Affecting Successful Implementation of Knowledge Management*. Doctoral Dissertation, University of Nebraska.
- Drucker, P. F. (1989). What Businesses Can Learn from Non-profits, *Harvard Business Review*, 67
- Drucker, P.F. (1993). *Post-Capitalist Society*. New York: Harper & Collins.
- Drucker, P.F. (1995). *Managing in a Time of Great Change*. Oxford: Butterworth.
- Egbu, C. O. (2004). Managing Knowledge and Intellectual Capital for Improved Organisational Innovations in the Construction Industry: An Examination of Critical Success Factor. *Engineering, Construction and Architectural Management (ECAM)*, 11(5), 301-315.
- Goodluck, I. (2011). Budgeting for knowledge management in organizations. *Chinese Librarianship: an International Electronic Journal*, 32.
- Leonard, D. & Sensiper, S. (1998). The Role of Tacit Knowledge in Group Innovation. *California Management Review*, 40(3), 112-132.
- Nonaka I & Takeuchi H (1995). *The knowledge Creating Company*, New York: Oxford University Press.
- Nonaka, I. & Ja Konno, N. (1998). The concept of Ba: Building a foundation for Knowledge Creation. *California Management Review*, 40(3), 40-54.
- Popoola, S. O. (2000). *A cost model approach to records management system in Oyo state civil service, Nigeria*. Unpublished Doctoral thesis, University of Ibadan, Ibadan.
- Quintas, P., Lefere, P. & Jones, G. (1997). Knowledge Management: A Strategic Agenda. *Long Range Planning*, 30(3), 385 – 391.
- RICS (1992). Royal Institute of Chartered Surveyors. *Quantity Surveying 2000*.
- Ruggles, R. (1997) *Knowledge tools: using technology to manage knowledge better*. Working paper for Ernst and Young, <<http://www.businessinnovation.ey.com/mko/html/toolsrr.html>> (26 August 2000).
- Scarborough, H., & Swan, J., (1999). *Case Studies in Knowledge Management*. London: Institute of Personnel and Development.
- Seeley, I. H., (1997). *Quantity Surveying Practice (Second Edition)*. London: Macmillan Press Ltd.
- Tiwana, A. (2002). *Knowledge management toolkit. Orchestrating IT, strategy, and knowledge platforms*. United States: Prentice Hall PTR.