JABATAN KERJA RAYA PROJECT DELIVERY EXCELLENCE THROUGH EFFECTIVE PROJECT COMMUNICATION MANAGEMENT

NOORHAYATI BINTI ABD HAMID

UNIVERSITI TEKNOLOGI MALAYSIA

JABATAN KERJA RAYA PROJECT DELIVERY EXCELLENCE THROUGH EFFECTIVE PROJECT COMMUNICATION MANAGEMENT

NOORHAYATI BINTI ABD HAMID

A capstone project report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Project Management

Faculty of Civil Engineering
Universiti Teknologi Malaysia

JANUARY 2015

To my beloved mother and my lovely daugther

ACKNOWLEDGEMENT

First of all, i would like to express my sincere appreciation to my capstone project supervisor, Assoc. Professor. Dr. Nik Hasnaa Binti Nik Mahmood from the Faculty International Business Science, Universiti Teknologi Malaysia, for her generous patience, advice, guidance and encouragement during the preparation of the capstone project report.

I would like to express my sincere thanks to all staff of Jabatan Kerja Raya Malaysia who generously spent their precious time to participate in the questionnaire of my project data collection and comment to my capstone. Their opinions and comments are useful indeed.

Finally, I most thankful to my mother for their support and encouragement given to me unconditionally in taking this capstone project report. Last but not least to my lovely daugther that give me a strength and inspiration to finished my report.

Without the contribution of all those mentioned above, this work would not have been possible.

ABSTRACT

The purpose of this study is to identify the process of communication management that is being practiced currently in JKR in project life-cycle to produce an excellence project delivery. The objectives of this study are to identify client perception regarding to process of effective communication management and also to identify client's perception in regard to effective project delivery excellence. Other objective in this study is to examine relationship between effective communication management and project delivery excellence and also to examine the influence of effective communication management toward project delivery excellence faced by JKR regarding project communication management during it course of project implementation delivery stage. Location of the study is in JKR Headquarters. The methodology use for this study is survey by distributing a set of questionnaires to 80 respondents at the Kementerian Kesihatan Malaysia, Head of Design Team (HODT), Consultants and Contractors by hand, by email and by online. Data gathered from questionnaire was analyzed using descriptive statistic (mean, percentage and standard deviation) and inferential statistic (Pearson Correlation and Multiple Regression). The overall mean for communication (4.0407) falls into range 3.68-5.00 which is high and mean for delivery was (3.9975) falls into range 3.68-5.00 which also high. The result for correlation shows that has a moderate correlation between effective communication and project delivery excellence which is 0.407 and correlation is significant at the 0.01 level (2-tailed). The R^2 indicates that communication contribute 16.6% to project delivery excellence. Based on the Statistic F = 14.680 significant shows there is a relationship between communication and project delivery excellent. Significant Beta coefficient for communication management $\beta = 0.407$ shows that communication management influence project delivery. If communication management is increased by 1 unit, project delivery excellence will increase 0.4 units.

ABSTRAK

Tujuan kajian ini dijalankan adalah bagi mengkaji hubungkait di antara pengurusan komunikasi berkesan memberi kesan kepada penghasilan projek yang berjaya. Kertas ini juga akan menggariskan proses-proses komunikasi yang digunakan oleh JKR untuk menguruskan sesuatu projek diperingkat penyerahan projek. Kajian ini melibatkan pihak pelanggan iaitu Kementerian Kesihatan Malaysia, Bahagian Pakar JKR, pihak perunding dan pihak kontraktor. Kaedah yang diguna pakai adalah kaedah lapangan dengan mengedarkan soalan kajian kepada 76 responden melalui email, online dan tangan. Responden di sasarkan dari kalangan pegawai kumpulan professional bagi sektor kerajaan dan swasta. Data yang dikumpul dari soalan kajian dianalisis menggunakan kadah statistik diskriptif dan keputusan dikira berdasarkan purata, peratus, dan sisihan piawai. Keputusan telah menunjukkan bahawa berlaku komunikasi berkesan di dalam perlaksanaan projek di JKR. Kebanyakkan maklumbalas menunjukkan berlakunya proses komunikasi semasa pelaksanaan peringkat serahan kepada pihak pelanggan. Aras bagi persepsi pihak pelanggan terhadap komunikasi berkesan semasa perlaksanaan projek oleh pihak JKR adalah tinggi. Walaubagaimanapun, penambahbaikan dari segi proses komunikasi semasa pelaksanaan projek perlu sentiasa dipertingkatkan bagi memastikan penyerahan projek kepada pihak pelanggan menepati piagam pelanggan JKR iaitu menyerahkan projek pada masa yang telah ditetapkan, mengikut kos yang ditetapkan dan kualaiti yang baik.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OFABBREVIATIONS

KKM	Kementerian Kesihatan Malaysia
PWD	Public Work Department
CPC	Certificate of Practical Completion
DV	Dependent Variable
PM	Project Manager
HOPT	Head of Project Team
HODT	Head of Design Team
IV	Independent Variable
JKR	Jabatan Kerja Raya
SD	Standards Deviation
CCC	Certificate of Completion and Compliance
SME’s	Subject Metter Expert
SO	Superintending Officer
SPSS	Statistic Package for Social Sciences
SKALA	Sistem kawal dan lapor
ICT	Information and Communication Technology

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background

Jabatan Kerja Raya (JKR) Malaysia (originally known as Public Works Department - PWD) was formed in year 1872 where Major J.F.A McNair as the first head of the organization. The events that lead to the formation of PWD began earlier than 1872 when the British East India Company - trading between England, India, and China - needed a safe station for refitting their ships. They found it in Penang. Penang was well positioned for their purpose. In 1786, they persuaded the Sultan of Kedah to give up the rights of the island to the company. They managed to get Penang in 1791 through a treaty. In 1825, through the Anglo-Dutch Treaty, Malacca reverted to the British in exchange for Bencoolen. Raffles, in 1819, entered into a treaty with Sultan Hussein and Temenggong Abdul Rahman giving the British the rights to establish settlements in Singapore. These three territories (Penang, Malacca, and Singapore) formed the Straits Settlement in 1826.

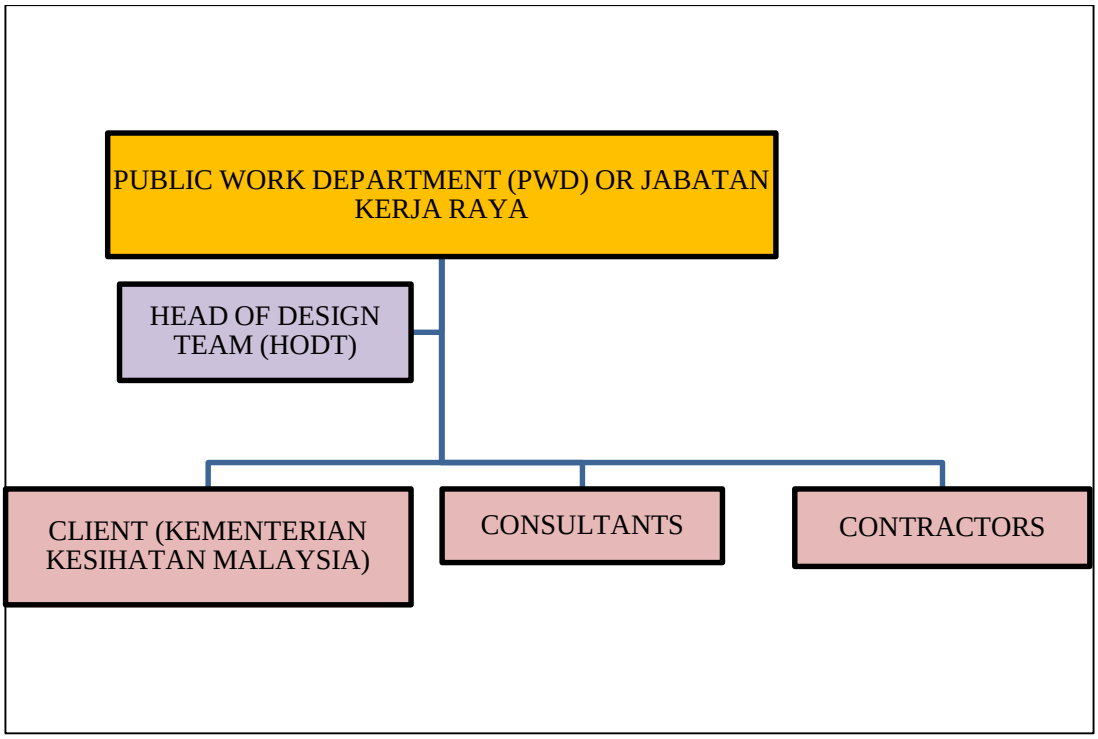

Figure 1.1: Relationship between JKR and Stakeholders

Project Communications Management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information. Project managers spend most of their time communicating with team members and other project stakeholders, whether they are internal (at all organizational levels) or external to the organization (PMBOK 5th Edition).

Effective communication creates a bridge between diverse stakeholders who may have different cultural and organizational backgrounds, different levels of expertise, and different perspectives and interests, which impact or have an influence upon the project execution or outcome. This topic is to show the effectiveness of communication during construction and how it helps the construction industry to enhance production and delivery the project within the stipulated period of time.

Communication is a means by which operatives and others member of the construction team are linked each other in order to achieve the goal. Basically, communication is the way information is exchanged between entities. There are various components of the communication process. They include the message, source, encoding, channel, decoding, receiver, feedback, noise, context and shared meaning. One of the primary points of effective communication is that it is interactive. During a project, communication can occur in various directions depending on who is communicating. There is upward communication to management from your own organization and the customer's organization. Lateral communication takes place with customers and within project teams (A. Mehta, 2010). Communication is a large sense of it is used to express facts, ideas, opinion, feeling and emotions between two or more people and through communication exchange of thought, information is also a good tool for human relation to produce an excellence projects delivery. Through effective communication, the employees especially in construction industries firms find it easy and highly productive to work together. Instruction and order are given and they are carried out as expected once they are well understood and act upon rightly.

Successful project communication is only possible when the entire project team is communicating effectively. To ensure this, the entire team needs to understand the goals, objectives, outcomes and benefits of the project. That is, the vision of the project needs to be clear and clearly communicated both internally and externally (H. F. Cervone, 2014).

Research reveals that communication between parties is critical to the success of an alliance (Hua et al., 2005) and (Cheng et al., 2001). Nevertheless, in practice, various stakeholders usually handle different stage of the building life cycle independently and overlook the importance of communication, which results in incomplete and loosely coupled construction processes. According to a research to a research conducted in Turkish construction industry, most of the problems that occur during the construction phase are due to a lack of corporation and communication

between designers and contractors and lack of prompt expert decision during on-site engineering (Aksoy et al., 1996).

Construction project development involves various parties, various processes, different phases and stages of work with a great deal of input from public and private sectors. The major aim is to bring the project to successful completion. The successful delivery of construction project development activities depends on the quality of managerial, financial, technical and organizational performance of the respective parties. The common assessment of the success of construction project is that they are delivered on time, to budget, good quality, to technical specification and meet client satisfaction.

Successful project delivery should be viewed from the different perspective of individual, owner, developer, contractor, general public etc. Project success is normally thought of as the achievement of some predetermined project goals, which commonly include multiple parameters such as time, cost, performance, quality and safety. Often the client and contractor would generally consider a project to be successful as long as their respective project objectives are achieved, particularly the financial ones (Lim et al., 1999).

The criteria of time, cost and quality have long been used to evaluate the performance and success of development projects (Chan et al., 2002). This criterion has been named as “the iron triangle” (Atkinson et al., 1999). Although these basic criteria (cost, time and quality) are easy and timely to measure, they have been criticized for being inadequate for several reasons. Researchers have argued that these basic criteria are insufficient on their own unless they are continuously measured. These parameters do not provide an adequate vision of the potential for improvement and the information obtained usually arrives too late for corrective action to be taken. Project success is a strategic management concept where project efforts must be aligned with both short and long term goal of the company.

Likewise, strategic project planning and are critical for project success (Tmeemy et al., 2010).

In this fast moving society, consumers are more demanding and more discerning than ever before, wanting everything better, faster, cheaper, safer and easier. Informed clients are looking for construction companies that are able to demonstrably deliver better, more knowledgeable, experienced and progressive to consistently meet their business needs.

The purpose of this study is to identify how effective project communication management contributes toward project delivery excellence.

1.2 Statement of the Problem

The construction industry is wholly reliant upon effective communication between individuals, teams and organizations. However, in a project-based industry, interaction tends to be characterized by unfamiliar groups of people coming together for short periods before disbanding to work on other endeavors. This temporal dimension complicates an already problematic communication environment in which technical language, an adversarial culture and noise/distraction all combine to prevent straightforward information flow from one party to the other. Indeed, the sheer number of stakeholders involved in the processes undertaken during a construction project renders communication networks exceptionally complex and subject to change. Furthermore, with the current imperative to improve industry performance by designing and constructing more rapidly, many processes that are reliant upon effective communication occur concurrently. This increases the probability of problems occurring in the

transmission and reception of vital information to the construction effort (Dainty et al., 2005).

A particularly challenging aspect of construction work is how to convey design information. It has been estimated that a delay in the supply of adequate information during the construction phase of a project may contribute 21–30 per cent to the total delay within projects (Ganah et al., 2000).

Previous study by (Sambasivan and Soon, 2006) shows that the important effects of construction delays as perceived by contractors and consultants were exactly the same as a those of clients. They found that the main cause of the delay and ten most important cause were: (1) contractor's improper planning, (2) contractor's poor site management, (3) inadequate contractor experience, (4) inadequate client's finance and payments for complete work, (5) problems with subcontractors, (6) shortage in material, (7) labor supply, (8) equipment availability failure, (9) lack of communication between parties, and (10) mistake during the construction stage. They also identified main effects of delay and they were: (1) time overrun, (2) cost overrun, (3) disputes, (4) arbitration, (5) litigation, and (6) total abandonment.

JKR is the oldest and largest technical department in Malaysia. JKR has undergone many changes and challenges in the development of the country. However, JKR is still facing a problems related to the project delivery to the clients. Recently some of the issues highlighted in the Medias and by the publics are the delays of project completion, increasing of project cost and also poor quality of the end products. The major fallings in project delivery have been in extensive delays in the planned schedules, cost overruns, and serious problems in quality and an increase in the number of claims and litigation associated with construction project (Ellis, 1991). These issues gave bad impacts to JKR reputation and destroyed the image of JKR as technical expertise organization in Malaysia. One of the factors that contribute to this poor project delivery is ineffective communication management.

1.3 Objectives of the Study

The study will be conducted to identify the methods and strategies of communication process that has been practice in JKR project delivery. The study aims is to get a better understanding of the issues and problems concerning project communication in order to deliver an excellence project outcome in JKR.

The objectives are:

i) To identify client perception regarding to process of effective communication management.
ii) To identify clients perception in regard to effective project delivery.
iii) To examine relationship between effective communication management and project delivery excellence.
iv) To propose an effective communication management toward project delivery excellence in Jabatan Kerja Raya.
v) To examine the influence of communication management on project delivery excellence.

1.4 Research Hypothesis

H1 – There is a relationship between effective communications management and project delivery excellence.

H2 – There is an influence of effective communication on project delivery excellence.

1.5 Scope of the Study

The study will specifically focus on process that contributes to the project communication management under the perspective of Kementerian Kesihatan Malaysia – Development Division, Structure Head of Design Team (HODT) – Health Unit, Consultants and Contractors. This study is to identify the effectiveness of the communication management by practicing communication process to producing an excellent end product in terms of time, cost and quality. This study will focus on project delivery stage. Other Sectors in JKR are not included in this study.

1.6 Significance of the Study

Organizations are totally reliant on communication, which is defined as the exchange of ideas, messages or information by speech, writing and signal. The study on communication management in the contact of project delivery is very rare in local and abroad compare to other countries. As a result of this study will be benefit to others to improve in project communication skill, clear of roles and responsibilities and better understanding between JKR and the Client's. This study could improve the delivery of construction projects using effective project communication management in both the internal and external stakeholders. This could, in turn, increase value for construction money, meet the duration of the construction period, and enhance the level of quality of end product in construction.

1.7 Definition of Terms

a) Project Communication Management

Project Communication Management is the knowledge area that employs the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval and ultimate disposition of project information (Project Communication Handbook 2nd Edition, 2007). Communications management is the formal or informal process of conducting or supervising the exchange of information either upward, downward, laterally or diagonally. There appears to be a direct correlation between the project manager's ability to manage the communications process and project performance. The communications process is more than simply conveying a message; it is also a source for control. Proper communications let the employees in on the act because employees need to know and understand. Communication must convey both information and motivation (Harold Kerzner, P H.D. Eighth Edition).

b) Project Delivery

A project delivery is a system used by an agency or owner for organizing and financing design, construction, operations, and maintenance services for a structure or facility by entering into legal agreements with one or more entities or parties.

Effective project delivery includes strategies, tactics, and tools for managing the design and construction deliver process and for controlling key factors to ensure the client receives a facility that matches their expectations

and function as it are intended to function. Improvement in building quality directly contributes to reduced operational costs and increased satisfaction for all of the stakeholders. Successful project delivery requires the implementation of management systems that will control change in the key factors of scope, costs, schedule, and quality to maximize the investment.

c) Project Management

Project Management is the application of knowledge, skills, tools and techniques to execute projects effectively and efficiently. It's a strategic competency for organizations, enabling them to tie project results to business goals-and thus, better compete in their markets. Project management is accomplished through the application and integration of the project management project management processes of initiating, planning, executing, monitoring and controlling and closing. Managing project includes identifying requirement, balancing the competing demands for quality, scope, time and cost, adapting the specifications, plans, and approach to the different concerns and expectation of the various stakeholders and establishing clear and achievable objectives. Effective project management includes strategies, tactics, and tools for managing the design and construction delivery process and for controlling key factors to ensure the client receivers a facility that matches their expectation and functions as it is intended to function. Improvement in building quality directly contributes to reduce operational costs and increased satisfaction for all of the stakeholders (PMBOK® Guide, section 1.3).

REFERENCES

Adeleke, A., Ogundele, O.J.K. and Oyenuga, O.O. (2004) Business Policy and Stratergy. Lagos: Concept Publications.

Ahmed, S.M., Azhar, S., Castillo, M., Kappagantula, "Construction delays in Florida: An empirical study", Department of Community Affairs, Florida, 2000.

Aibinu, A.A., Jagboro, G.O., "The effects of construction delays on project delivery in the Nigerian construction industry", International Journal of Project Management, vol. 20, no. 8, pp. 593-599, 2002.

Akinsiku, O.E. and Akinsulire, A. (2002) Stakeholders' Perception of the Causes and Effects of Construction Delays on Project delivery. Journal of Construction Engineering and Project Management [Online ISSN 2233-9582] Available at: http://dx.doi.org/10-6106/JCEPM.2012.2.4.025. [Accessed in June 2014].

Aksoy, S., Akcelik, N., and Eksioglu, S. (1996) Geotechnical problems encountered during the excavation of Bolu Tunnel, Sixth Turkish Congress on Soil Mechanics and Foundation Engineering, Dokuz Eylul University, Izmir Turkey, (1996) pp. 24-25.

Al-Humaidia, H.M., Tanb, H.F., "A fuzzy logic approach to model delay in construction project using rotational fuzzy fault tree models", Civil Engineering and Environmental System, vol. 27, no.4, pp. 329-351, 2010.

Alshawi, M., and Ingirige, B., (2003) "Web-enabled project management: an emerging paradigm. Automation in Construction. Vol.12 No. 4, pp. 349-64

Al-Tmeemy, S., Abdul-Rahman, H., Harun, Z. (2010), Future criteria for success of building project in Malaysia. International Journal of Project Management.

Atkinson, R., (1999) Project management: Cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria: International Journal of Project Management 17, pp. 337-342

Ayeni, B.J. and Pilat, R. (1986) "Oil Production Forecasting for a West Cameron Block 33 Field in South Louisiana". Presented at the 60th Annual Meeting of the Louisiana Academy of Sciences, vol. 59, 1986, page 64.

Biggs, M. (1997) Why choose a web-based project management solution? (Buyers guide), PC World, 15(10), pp. 190-197

Capp, R. (1997) Managing Mega Project. Construction Business Review 6, no.6:56-59.

Chan, I.P.C., Scott, D., and Lam, E.W.M., (2002) Framework of success criteria for design/build projects. Journal of Management in Engineering 18, pp. 120-128

Cervone, H.F. (2014) Effective communication for project success: International digital library: vol. 30 No. 2, 2014 pp. 74-77

Charles, T.J. and Andrew, M.A. (1990) Predictors of cost-overrun rates. Journal of Construction Engineering and Management, ASCE, 116, 548-552.

Cheng, E.W.L., Li, H., Love P.E.D., and Irani, Z. (2001) Network communication in the construction industry, Corporate Communication: An International Journal 6 (2) (2001) pp. 61-70

Corbetta, P., (2003) Social Research: Theory, Methods and Techniques Sage, London

Czaja, R. and Blair, J. (1996) Designing Surveys: A guide to decisions and procedures, Pine Forge Press, Thousand Oaks, California

Dainty, A., Moore, D. and Murray, M., (2005) "Communication in construction theory and practice Book.

Dillman, D. (2000) Mail and Internet Survey: The Tailored Design Method. John Wiley and Sons, London

Ellis, R.D., and Herbsman, Z., (1991) The cost/time/quality integrated bidding system-an innovation in contract administration

Enshassi, A., Al-Najjar, J., Kumaraswamy, M. "Delays and cost overruns in the construction projects in the GAZA strip", Journal of Financial Management of Property and Construction, vol.14, no. 2, pp. 126-151, 2009.

Flanagan, R. and Tate, B. (1997) Cost Control in Building Design Blackwell Science, Oxford.

Ganah, A., Anumba, C., and Bouchlaghem, N., (2000) "The use of visualisation to communicate design information to construction sites", in Proceedings of 16th Annual ARCOM Conference, 6-8 September, Glasgow Caledinian University, UK, 2:833-42

Goudar, J. (2010) Effective Project Communication Management. Available at: http://www.projectperfect.com.au [Access in 16 Julai 2014].

Green, F.B. (2001) Managing the unmanageable: integrating the supply chain with new developments in software. Supply Chain Management: An International Journal, 615, pp. 208-211

Haseeb, M., Xinhai-Lu, Bibi, A., Maloof-ud-Dyian, W.Rabbani, "Problem of projects and effects of delays in the construction industry of Pakistan", Australian Journal of Business and Management Research, vol. 1, no. 5, pp. 41-50, 2011.

Herbsman, Z. and Ellis, R.D. (1991), The cost/time/quality integrated bidding system-an innovation in contract administration.

Hua, G.C., Sher, W., and Pheng, L.S. (2005) Factors affecting effective communication between building clients and maintenance contractors, corporate communication: An International Journal 10(3) (2005) pp. 240-251

Ireland, V. (1983) The Role of Managerial Actions in the Cost Time and Quality Performance of High Rise Commercial Building Projects. Unpublished PhD Thesis, University of Sydney, Sydney.

Jin, L., Ya, W., Study on the Evaluation of Project Communication Performance Based on BP Neural Network. In Advanced Management Science: IEEE International Conference. Chegdu: IEEE, 2010. Pp. 583-586.

Kaming, P., Olomolaiye, P., Holt, G., Harris, F., "Factors influencing construction time cost overruns on high-rise projects in Indonesia", Construction Management and Economics, vol. 15, no. 1, pp. 83-94, 1994.

Kerzner, H., (2001). Project management: A systems approach to planning, scheduling and controlling (8th ed.). New York: John Wiley & Sons, Inc.

Konchar, M. (1997) A Comparison of United States Project delivery Systems.

Li, H., Love, P.E.D., Dawe, D.S., "Effects of overtime work and additional resources on project cost and quality", Engineering Construction and Architectural Management, vol. 7, no. 3, pp. 211-220, 2000.

Lim, C.S. and Zain, M. (1999) Criteria of Project Success: An exploratory re-examination International Journal of Project Management. Vol. 17, No. 4, pp. 243-248.

Ling, F.Y., (2005). Models for predicting quality of building project. Engineering, Construction and Architectural Management, [online] 12(1), pp. 6-20.Availableat:http://search.proghest.com/docview/218645972?Acounted=1451 [Accesses 15 June 2013].

Lynch, T.D. (1996). A Transaction Cost Framework for Evaluating Construction Project Organizations. Ph. D. diss., The Pennsylvania State University.

National Economic Development Office (N.E.D.O) (1983) Faster Building for Industry. Her Majesty's Stationery Office, London.

Newcombe, R., Langford, D. and Fellows, R. (1990) Construction Management 2. Mitchell, London.

Okumbe, J.O., Verste, J.J., "Construction industry perspective on causes and effect of delays in South Africa", Proceedings of the construction and building research conference of the Royal Institution of Chartered Surveyors hold at Dublin Institute of Technology, pp. 4-5, September 2008.

Oltman, J. and McCauleym, S. (2008) Enabling Effective Communication in Projects, MST512: Project Management Research Project.

Pipino, L.L., Lee, Y.W., and Wang, R.Y. (2002) "Data Quality Assessment Communication of the ACM April 2002/vol. 45, No. 4v.

(PMBOK 5th Edition) A guide to the Project Management Body of Knowledge.

Rajhans, K. (2013) Role of communication in the Large-scale Construction Projects in India. National Institute of Construction Management & Research (NICMAR)

Reina, P. (1997) Job's Multi Shell Roof Is a Coup for Design-Build Despite its. Risk, Limit. Engineering News Record 238, no. 16: 32-34.

Samáková, J., Koltnerová, K., Rybanský, R., Project Communication in Functions, process and project-oriented Industrial Companies: Research Papers. Faculty of materials sciences and technology in Trnava, Slovak University of Technology in Bratislava.

Soon, Y.W., and Sambasivan, M., (2007) "Causes and effects of delays in Malaysian construction industy", International Journal of Project Management, vol. 25, no.5, pp.517-526, 2007

Tam, C.M. (1999) "Use of the Internet to enhance construction communication total information transfer system." International Journal of Project Management. Vol. 17/2, pp. 107-111

Thoben, K.D., and Weber, F. (1996) A methodology for analysis and design of effective communication structures for concurrent engineering PACE' 96/A Practical Approach to Concurrent Engineering; Proceedings of European Workshop in Bremen, Germany; 16, September 1996. Mainz Verlag, Aachen 1996.

Thomas, S.R., Tucker, R.L., and Kelly, W.R. (1998) "Critical Communication Variable" in Journal of Construction Engineering and Management. Vol. 124, No. 1

Tone, Konelio, Skitmore, and Martin (2004) Construction project management in Samoa; a survey of intercultural communication. Journal of Building and Construction Management 9(1):pp. 3-25

Vendra, V.K. (2006) Advanced e-presentation system of a work plan for improved project communication unpublished thesis, USM.

Vincent, K.O. and Joel, E.R. (1995) Principles of Total Quality. "Blackwell Science", Oxford.

Weiss, D.S. (2000) *High Performance HR: Leveraging Human Resources for Competitive Advantage*. John Wiley & Sons, Ontario.

Yang, J.B., On, S.F., "Using structural equation modelling to analyze relationship among key causes of delay in construction", Canadian Journal of Civil Engineers, vol. 14, no. 4, pp. 321-332, 2008.

Yang, J.B., Wei, P.R., "Cause of delay in the planning and design phases for construction project", Journal of Architectural Engineering, vol. 16, no. 2, pp. 80-83, 2010.