DEVELOPMENT OF BUILDING MAINTENANCE COMMUNICATION EFFECTIVENESS MODEL FOR HIGH RISE BUILDING MAINTENANCE MANAGEMENT IN MALAYSIA

BY

MOHAMAD RIDZUAN BIN YAHYA

A thesis submitted in fulfilment of the requirement for the degree of Doctor of Philosophy in Built Environment

Kulliyyah of Architecture and Environmental Design
International Islamic University Malaysia

MARCH 2016

ABSTRACT

Practicing building maintenance management in the high-rise commercial buildings are made up of complex communication activities involving many parties. Previous studies reveal that the communication gaps have existed between maintenance management group and building occupant group. The problems identified are related to the complex building maintenance process often involve interests-competing and tasks interrelated organizations. It has therefore become an ineffective communication system among building maintenance stakeholders for supporting value aspect in the building particularly on the operation and maintenance activities. The aim of the research is to investigate the communication factors impact on building maintenance communication performance in building maintenance management practice of high-rise commercial buildings. Thus, the research focused on building maintenance communication which is the transmission and exchange of related information. In this study, a model was developed to show the reality of the relationship between the communication factors and the communication performance indicators. A framework of these factors for managing communication system has been built up from both theoretical and practical points of view in this study. It sets out the relationships between the determining variables of communication factors and influenced variables of communication performance indicators. Based on this model, questionnaire survey was designed to investigate the impacts of communication factors on building maintenance communication performance. One hundred and ten (110) high-rise commercial buildings in Kuala Lumpur and thirty-nine (39) high-rise commercial buildings in Selangor which are two (2) interesting locations for local and international investors in Malaysia have been selected for the study which involving two (2) groups of respondents called as building maintenance stakeholders. The in-house building maintenance personnel (IH) and outsourced team (OS) are in maintenance management group whereas the building owners (BO) and tenants (T) as the building occupant group have been structured interviewed based on the value aspects of communication factors. The testified statistical analysis indicates that, only eight (8) factors of schedule for communication and information distribution, social and informal mechanisms for a cooperative working environment, arrangement of building maintenance management structure, building maintenance information with high quality content, building maintenance stakeholders' experiences, capable building manager, building maintenance information documentation, and building maintenance communication media infrastructure discovered their impacts on the building maintenance communication performance which had a significant relationship with building maintenance communication effectiveness (BMCE). So, it can help maintenance management team to develop strategies for improving communication effectiveness during the operation and maintenance activities by applying needed actions to the related predicting communication performance indicators. In conclusion, effectively managing communication factors through communication performance indicators in building maintenance practice can improve the building maintenance management performance and further benefit for all building maintenance stakeholders and the objectives of the whole operation and building maintenance activities.

خلاصة البحث

إدارة عملية صيانة المباني التجارية متعددة الطوابق عبارة عن مجموعة من أنشطة الإتصال التي تضم أطراف متعددة. الدراسات السابقة كشفت عن وجود فجوة إتصال مابين مجموعة إدارة الصيانة ومجموعة شاغلي أو ساكني المبني . المشاكل التي تم تعريفها مرتبطة بمجموعة من أنشطة صيانة المباني والتي تضم عادة إهتمامات او مصالح متنافسة وواجبات او مهام لمنظمات مترابطة . بالتالي أصبحت تأخذ صفة الأنشطة الجماعية التي تتطلب مدخلات من أطراف مختلفة . المشكلة الأساسية في إدارة صيانة المباني هو وجود نظام إتصال غير فعال مابين أصحاب المصلحة ذوي الصلة بصيانة المبني ودعم الجانب القيم في المبني ، وبالأخص فيما يلي أنشطة التشغيل والصيانة . الهدف من هذة الدراسة هو بحث أثر عوامل الإتصال علي آداء الإتصال لصيانة المباني في إدارة صيانة المباني مُطبقة علي مباني تجارية متعددة الطوابق. لذلك البحث ركز علي الإتصال لصيانة المباني والذي هو عبارة عن عملية تبادل ونقل معلومات ذات صلة . في هذة الدراسة ، تم تطوير نموذج لعرض واقعية العلاقة مابين عوامل الإتصال ومؤشرات آداء الإتصال. الإطار العملي لهذة العوامل المتعلقة بنظام إدارة الإتصال تم بناؤه من وجهات رأي نظرية وعملية في الدراسة . حُددت العلاقات بين المتغيرات المحددة لعوامل الإتصال والمتغيرات المتأثرة بمؤشرات آداء الإتصال. إستنادا علي هذا النموذج ، تم تصميم إستبيان لبحث أثر عوامل الإتصال علي آداء الإتصال لصيانة المباني. تم إختيار 110 (عشرة ومائة) مبني تجاري متعدد الطوابق في كوالالمبور ، و 39 (تسعة وثلاثون) مبني تجاري متعدد الطوابق في سلانغور ، وهما من أكثر المناطق التي تجذب إنتباه المستثمرين المحليين والأجانب في ماليزيا ، كما أحتوت الدراسة علي مجموعتين من المستطلعين تمت تسميتهم بأصحاب المصلحة لصيانة المباني . أفراد صيانة المباني الداخلية (IH) ، وفرق العمل الخارجية (OS) هما ضمن مجموعة إدارة الصيانة ، بينما ملاك المباني (BO) والمستأجرين (T) بإعتبارهما مجموعة شاغلي المبني ، تم إجراء المقابلات معهم علي إساس الجوانب القيمية لعوامل الإتصال . التحليل الإحصائي أشار وشهد علي ان هنالك 8 ثمانية عوامل من الجدول وهي الإتصال وتوزيع المعلومات ، الآليات الإجتماعية وغير الرسمية لبيئة العمل التعاونية، الترتيب لإدارة هيكل صيانة المباني ، معلومات صيانة المباني مع المحتوى عالي الجودة، خبرات أصحاب المصلحة لصيانة المباني ، كفاءة مدير المبني ، أرشفة معلومات صيانة المباني والبنية التحتية لوسائل الاتصال لصيانة المباني لها تأثير علي آداء الإتصال لصيانة المباني والذي له علاقة مهمة مع فاعلية الإتصال لصيانة المباني (BMCE). ولذا يمكن ان تُفيد فريق عمل إدارة الصيانة لتنمية إستراتيجيات لتطوير فعالية الإتصال خلال أنشطة الصيانة والتشغيل بواسطة تطبيق الأفعال المطلوبة ذات الصلة بالمؤشرات المتوقعة لآداء الإتصال. في الخلاصة ، الإدارة الفعالة لعوامل الإتصال من خلال مؤشرات آداء الإتصال في التطبيق علي صيانة المباني يمكن ان يطور آداء إدارة صيانة المباني ، بالإضافة الي انه يعود بالفائدة علي كل اصحاب المصلحة لصيانة المباني ويخدم الأغراض لكل أنشطة التشغيل وصيانة المباني.

ABSTRAK

Amalan pengurusan penyelenggaraan bangunan di bangunan-bangunan tinggi komersial terdiri daripada aktiviti-aktiviti komunikasi yang kompleks yang mana melibatkan banyak pihak. Kajian sebelum ini menunjukkan bahawa jurang komunikasi telah wujud antara kumpulan pengurusan penyelenggaraan dan kumpulan pengguna bangunan. Masalah-masalah yang dikenal pasti adalah berkaitan dengan proses penyelenggaraan bangunan yang kompleks sering melibatkan kepentingan organisasi-bersaing dan tugas-tugas yang saling berkaitan. Oleh itu, ia telah menjadi sistem komunikasi yang tidak berkesan di kalangan pihak-pihak berkepentingan untuk menyokong aspek nilai di dalam bangunan terutamanya mengenai operasi dan aktiviti-aktiviti penyelenggaraan. Tujuan kajian ini adalah untuk mengkaji kesan faktor-faktor komunikasi terhadap prestasi komunikasi penyelenggaraan bangunan dalam amalan pengurusan penyelenggaraan bangunan-bangunan tinggi komersial. Oleh itu, kajian ini telah memberi tumpuan kepada komunikasi penyelenggaraan bangunan yang merupakan penghantaran dan pertukaran maklumat yang berkaitan. Rangka kerja faktor-faktor komunikasi ini untuk menguruskan sistem komunikasi telah dibina berdasarkan kedua-dua teori dan praktikal dalam kajian ini. Ia menggariskan hubungan antara pembolehubah menentukan faktor-faktor komunikasi dan pembolehubah dipengaruhi petunjuk-petunjuk prestasi komunikasi. Berdasarkan rangka model ini, kajian soal selidik telah direka untuk menyiasat kesan faktor-faktor komunikasi terhadap prestasi komunikasi penyelenggaraan bangunan. Seratus sepuluh (110) bangunan-bangunan tinggi komersil di Kuala Lumpur dan tiga puluh sembilan (39) bangunan-banguanan tinggi komersial di Selangor yang mana merupakan dua (2) lokasi yang menarik untuk pelabur-pelabur tempatan dan antarabangsa di Malaysia telah dipilih untuk kajian yang melibatkan dua (2) kumpulan responden dipanggil sebagai pihak-pihak berkepentingan dalam penyelenggaraan bangunan. Kakitangan dalaman penyelenggaraan bangunan (IH) dan pasukan sumber luar (OS) adalah dalam kumpulan pengurusan penyelenggaraan manakala pemilik bangunan (BO) dan penyewa (T) sebagai kumpulan pengguna bangunan telah ditemuramah secara berstruktur berdasarkan aspek-aspek nilai bagi faktor-faktor komunikasi. Analisis statistik menunjukkan bahawa, hanya lapan (8) faktor seperti jadual untuk komunikasi dan penyebaran maklumat, sosial dan mekanisma secara informal untuk persekitaran jalinan kerjasama, susunan struktur pengurusan penyelenggaraan bangunan, maklumat penyelenggaraan bangunan dengan kandungan berkualiti tinggi, pengalaman pihak-pihak berkepentingan dalam penyelenggaraan bangunan, kemampuan pengurus bangunan, dokumentasi maklumat penyelenggaraan bangunan, dan infrastruktur media komunikasi penyelenggaraan bangunan ditemui impaknya kepada prestasi komunikasi penyelenggaraan bangunan yang mana mempunyai hubungan yang signifikan dengan keberkesanan komunikasi penyelenggaraan bangunan (BMCE). Dalam kajian ini, model telah dibangunkan untuk menunjukkan realiti hubungan antara faktor-faktor komunikasi dan petunjuk-petunjuk prestasi komunikasi. Jadi, ia boleh membantu pasukan pengurusan penyelenggaraan untuk membangunkan strategi-strategi untuk meningkatkan keberkesanan komunikasi semasa operasi dan aktiviti-aktiviti penyelenggaraan dengan menggunakan tindakan yang diperlukan untuk meramalkan petunjuk-petunjuk prestasi komunikasi. Kesimpulannya, keberkesanan menguruskan faktor-faktor komunikasi melalui petunjuk-petunjuk prestasi komunikasi dalam amalan penyelenggaraan bangunan boleh meningkatkan prestasi pengurusan penyelenggaraan bangunan dan juga faedah bagi semua pihak-pihak berkepentingan dalam penyelenggaraan bangunan dan objektif-objektif keseluruhan operasi dan aktiviti-aktiviti penyelenggaraan bangunan.

APPROVAL PAGE

The thesis of Mohamad Ridzuan bin Yahya has been approved by the following:

_____
Asiah binti Abdul Rahim
Supervisor

_____
Noor Aziah binti Mohd Ariffin
Supervisor

_____
Nurul Hamiruddin bin Salleh
Co-Supervisor

_____
Abdul Razak bin Sapian
Internal Examiner

_____
Rahinah binti Ibrahim
External Examiner

_____
Yahaya bin Ahmad
External Examiner

_____
Radwan Jamal Yousef Elatrash
Chairman

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This thesis is dedicated to my father, who taught me the best knowledge to gain is by learning for its own sake. It is also dedicated to my mother, who taught me that even the toughest task can be accomplished if it is done step by step. Last but not least I dedicated this to my lovely wife, who taught me on new appreciation for the meaning and importance of love. Their inspirations have kept me pursuing on whatever I do without giving up.

ACKNOWLEDGEMENTS

First and foremost, thank you Allah for his blessings and bestow to me with patience, perseverance and high spirit. Alhamdulillah, praise to Allah, the Most Gracious and Most Merciful. With His blessing, my PhD research can be accomplished in the face of the several constraints that came across.

I wish to express my deepest gratitude to my supervisors, Prof. Dato' Sri Ar. Dr. Asiah Abdul Rahim, Asst. Prof. Dr. Noor Aziah Mohd Ariffin and Asst. Prof. Dr. Nurul Hamiruddin Salleh for their valuable comments as well as ample ideas that had guided me along the study.

I would like to express my special thanks to the all members of Building Maintenance Research Team" especially to my former main supervisor cum advisor for the opportunity to work with them on such an amazing research and for all of their valuable advice throughout, Prof. Sr. Dr. Md. Najib Ibrahim from Kulliyyah of Architecture & Environmental Design (KAED), the Royal Institution of Surveying Malaysia and the Construction Research Institute of Malaysia (CREAM) for their effective networking as well as collaboration. My great appreciation is also express to the facilities management, building maintenance management, other building stakeholders and construction industry player.

I also would like to express my thanks to all the faculty members in the Kulliyyah of Architecture & Environmental Design (KAED), International Islamic University Malaysia especially to the current and the past Deputy Dean of Postgraduate and Research for their help and assistance; all staff of Dar Al Hikmah Library and KAED Resource Centre of International Islamic University Malaysia for their help and assistance; the Ministry of Education for funding of my study by a scholarship of the Malaysian Government. To my beloved family, especially to my parents and parent in-law, Yahya Taib, Hasmah Mohamad, Maimun Muda, Mohamad Othman and Mek Ngah Awang, for their everlasting support and encouragement to complete the research and for their 'doa'.

Last but not least, the person behind the scene, my lovely and wonderful wife, Prof. Dr. Rosfarizan Mohamad who is interested and always encourages in whatever dreams I am pursuing. The one who makes it possible for me to remain sane and fed while completing this thesis.

Thank You, "Terima Kasih", "Syukran Jazilan" to all. May Allah shower us with His Blessings and Love and living in the path of Islam. Amin.

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LIST OF ABBREVIATIONS

ANOVA	analysis of variance
BMCE	building maintenance communication effectiveness
C & S	civil and structure
CAD	computer aided design
IEM	Institution of Engineers Malaysia
IT	information technology
KMO	Kaiser-Meyer-Olkin
M & E	mechanical and electrical
MSA	measure sampling accuracy
RISM	Royal Institution Surveyor Malaysia
SPSS	statistical package for the social science

LIST OF SYMBOLS

α	Alphas
r	Pearson product-moment correlation coefficient
γ_{xy}	Correlation coefficient between X and Y
N	Size of the sample
X	Individual's score on the X variable
Y	Individual's score on the Y variable
$PC_{(m)}$	Principal components analysis

CHAPTER ONE

OVERVIEW OF THE RESEARCH

1.1 INTRODUCTION

Practicing building maintenance management is made up of complex activities involving many parties. Furthermore, building maintenance organizations have developed more systematic and sophisticated tasks or activities which require various contributions from different specialized bodies. These organizations then form a task-based building maintenance team to implement building maintenance management activities in order to accomplish an efficient building maintenance management. The parties involved in the operation and maintenance activities of a building are typically the building owners, tenants, in-house maintenance management personnel, out-sourced contractors and out-sourced consultants. All of them have different backgrounds as well as knowledges. So, communication problems occurred during the operation, and maintenance activities tend to influence the information flow and building maintenance communication performance.

According to Morsing & Schultz (2006), the communication process is the synchronisation of the task activities depends on how manager report to the stakeholders. Each building stakeholder in a building is typically in charge of a particular functional task during the operation and maintenance activities. In order to make decisions appropriately and accomplish their tasks, they need accurate and timely information from others so that they can make decisions appropriately and accomplish their tasks (Dennis et al., 2008). The various building maintenance information should be soundly transmitted among building maintenance stakeholders

for task implementation (Goh et al., 2005). This significant of communication in the maintenance activities can be demonstrated by (Littlejohn & Foss, 2011) statement "good communication system can make many parties involved to do certain tasks in an integrated and orderly manner and to coordinate their efforts and skills towards a common goal."

1.2 PROBLEM STATEMENT

Effective communication among building maintenance stakeholders has a critical influence on the building maintenance management performance. Numerous studies have emphasized the importance of effective communication for work success (Elving, 2005; Morsing & Schultz, 2006; Dennis et al., 2008; Adejimola, 2008). According to Bruce et al. (2013), statistical analysis shows that most of the variation in the perception of work success can be attributable to the variation in communication effectiveness. If there is effective communication among all parties involved, accurate information will be quickly communicated, and consensus decisions can be simply achieved among them (Bruce et al., 2013). Hence, managing building maintenance communication and achieving communication effectiveness is important for maintenance work success, and it will improve the quality of maintenance works, decrease conflicts and reworks.

The communication gap between the maintenance management group and the building occupant group exists during the operation and maintenance activities in high-rise commercial office buildings in Malaysia (Syahrul & Emma, 2010). However, communication among building maintenance stakeholders is the complex activities, and its effectiveness is challenging to accomplish. Reported communication problems are usually insufficient information, information received late from others or

having technical hitches to access information sources among building maintenance stakeholders. Poor communication performance may be caused by the complex characteristic features of communication system, such as communicators with dissimilar backgrounds and various communication channels. As pointed out in the beginning, building maintenance managements have become more complex in maintenance planning, maintenance schedule and maintenance progress, presenting the complicated data for information flow to building maintenance stakeholders. For example, maintenance planning is now used to operate maintenance activities accordingly. However, usually maintenance schedule overlaps and maintenance progress is compressed. In planned maintenance, changes and rescheduling during the operation and maintenance activities, requires in-house maintenance management personnel to timely deliver fully coordinated, certain, and accurate information to other building maintenance stakeholders.

Other problems among building maintenance stakeholders in inter-organizations during the operation and maintenance activities are as follows:

a. The building maintenance stakeholders got their dissimilar outlooks and opinions in terms of quality and priorities (Goh et al., 2005; Yik et al., 2010; May, 2010).
b. These varied backgrounds of each building stakeholder hold back the development of effective communication (May, 2010). Thus, effective communication across interfaces among the building maintenance stakeholders is required (Jee & Jin, 2014).
c. In complex building maintenance managements, various information are made by different background building maintenance stakeholders and organizations to communicate among them. The complex information