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**COLLABORATIVE SITE MONITORING SYSTEM FOR
CONSTRUCTION SITE**

CHONG KA FUNG

**A project report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Science (Construction Management)**

**Faculty of Civil Engineering
Universiti Teknologi Malaysia**

NOVEMBER, 2008

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DEDICATION

DEDICATED TO MY FAMILY AND LEE HAN WEI

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This paper is successfully completed with the assistance and support of my honorable project supervisor, Dr. Arham Bin Abdullah.

Therefore, I would like to take this opportunity to express my heartfelt gratitude to him for his continuous support and guidance throughout the process of making until the completion of this dissertation. His enthusiasm has been a great source of inspiration to me and it is indeed fortunate to be under his supervision and guidance. His dedication will always be remembered.

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ABSTRACT

With advancements in information technologies, innovative wireless web-based project management solutions with broadband speed provide the means to deliver development and construction projects faster and smarter which will overcome many of the current business inefficiencies. Statistics show that performance of work in construction industry has been far below other industries for the past three decades. In order to achieve these goals, attention must be paid to the planning, monitoring and controlling of the processes rather than on assessing, measuring, and repairing after the product is finished. Therefore a study is conducted to study the collaborative site monitoring system for construction site. A model of process in managing a construction project was identified through interview with project managers. The study on the implementation of Closed Circuit Television System (CCTV) at the construction site was conducted. A prototype of an online construction site monitoring system was developed using Macromedia Dreamweaver 8. Finally, the prototype will be used as a collaborative monitoring tool in managing construction project.

ABSTRAK

Dengan kemajuan dalam teknologi maklumat, wayarles inovatif web berpangkalan penyelesaian pengurusan projek dengan kelajuan jalur lebar menyediakan cara bagi menyampaikan pembangunan dan projek-projek pembinaan lebih cepat dan lebih bijak yang akan mengatasi banyak ketidakcekapan bagi perniagaan semasa. Perangkaan menunjukkan prestasi bagi industri pembinaan telah jauh di bawah industri-industri lain untuk tiga dekad yang lepas. Dengan tujuan mencapai matlamat, perhatian mesti dibayar pada perancangan, memantau dan pengawalan bagi proses-proses dari menaksir, mengukur, dan memperbaiki selepas produk selesai. Oleh itu satu kajian dijalankan untuk mengkaji sistem pengawasan tapak kolaboratif untuk tapak pembinaan. Suatu model proses dalam pengurusan sebuah projek pembinaan telah dikenalpasti melalui temu bual dengan pengurus projek. Kajian pada pelaksanaan Sistem Televisyen Litar Tutup (CCTV) di tapak pembinaan itu telah dikendalikan. Sebuah prototaip satu sistem pengawasan tapak pembinaan yang dalam talian adalah dibangunkan menggunakan Macromedia Dreamweaver 8. Akhirnya, prototaip akan digunakan sebagai satu alat pengawasan kolaboratif dalam pengurusan projek pembinaan.

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CHAPTER 1

INTRODUCTION

1.1 Background

Online social networks are becoming increasingly popular and it can be envisioned how they will enhance online collaborative knowledge management (McDonald, 2003) in the context of human resource development. Online social networking sites introduce a new quality of social participation in online environments through identification and motivation to contribute to the community, to share experience and discover expertise in the organization. The development of the semantic social network portal (SSNP) endeavors to combine ontologies (Gruber, 1993), here specification of work-related concepts, semantic web portals (Davies et al., 2003; Lara et al., 2003) with explicit representation of social networks in the process of collaborative knowledge management.

In today's construction industry, information and automation technology are viewed as potential resources. Computer Integrated Construction (CIC) is an emerging technology, and it is an approach to assisting construction firms respond to the difficult

environment in which they are operating. A strategy for implementing Computer Integrated Construction (CIC) during the life cycle of the project especially at the construction stage should be formulated and promoted for application in the construction industry. (Memon, 2005)

Kangari (1995) describes that the management of project information begins from day the decision is made to bid on a contract and continues will after the close out phase, and a great many types of documents are used and created during the construction process (Ganeshan et al. 1994). Keeping track of information flow on a construction job site is a vital task that has a direct bearing on the timely completion of a building aspect on issues such as disputes. (Kangari, 1995)

Russell (1993) describes a computerized approach for collecting and proceeding site information, which builds on the traditional superintendent's daily site report. The purpose of a computer based information system for engineers is to integrate the collection, processing, and transmission of information so that engineering professionals can gain more systematic insight into the operations and functions they are managing. (Lock, 1993)

With advancement in computer technologies, particularly in database management system (DBMS), it is cost effective to develop a computerized database for even small projects and organizations. Mazerolle and Alkass (1993) propose a DBMS in a project control process to store information on each delay when it occurs. Hiroshi and Nobouh (1993) described a filling system of construction pictures and its integration with a database. Hamilton (1993) states that, using a relational database improves record management process such as tracking the progress and location of shop drawings, within a firm, listing present and past projects, maintaining correspondence, calculations, telephone records, and memoranda.

In line with the National IT Agenda, which was formulated in 1996, the Malaysian Government has been aggressively promoting IT and its application in every sector including construction industry. (Mui et al., 2002)

The Construction Industry Development Board (CIDB) Malaysia has realized that it is vital to have a structural approach to the introduction of Computer Integrated Construction (CIC). One reason for this is that, using Computer Integrated Construction (CIC), it is likely that a completely different and efficient way of construction process may be developed. The other reason is the tremendous advantages to be gained by enabling computers in different sectors of the company to communicate and exchange information.

Digitalize the Construction Monitoring (DCM) is the demand of Malaysian construction sector to implement Tele-construction in this sector. It is defined as to develop the link between existing method of monitoring the physical progress of work activities and modern technology by developing an Artificial Intelligence (AI) to emulate human brain. By implementing Digitalizing the Construction Monitoring (DCM) in the construction industry both operational and strategic benefits will be achieved such as; communication improvement by rapid and accurate transmission and availability of data, images and knowledge, in avoiding delays and claims on construction projects, effective control to describe the required work, support decision making, analyze, progress on to other participants, record for future reference during claims, and support estimating on similar projects in the future. (Memon, 2005)

Digitalize Construction Monitoring (DCM) approach is intended to be a user friendly application that is easy to access by to different project team members. The main objectives and the scope of the system are as follow:

- To enable computer system to solve the problem intelligently by emulating the human brain.
- To reduce the amount of time spent recording, preparing and posting reports.
- To improve the tracking and control of the project and activities status.
(Memon, 2005)

1.2 Problem Statement

Evaluation and benchmarking of the outcomes are critical to improving current practices. Communicating and feeding back information and messages to the project team is also essential to achieving the project goals by all participants. Thus, the effectiveness of the project manager to communicate, evaluate and feedback to the rest of the project team during each stage of the life-cycle determines how efficiently the project's goals will be achieve. (Che Wan Fadhil, 2002)

The Egan report stresses the need for project managers to integrate project's phases (from conception to final delivery) leading to performance improvement, and for designers to develop greater understanding of how they can contribute value in the project process and the supply chain. (Egan, 1998)

Current project management practices are often isolated and are concerned with managing problems related to individual stages of the project. For example, problems of reworking occur due to conflicting information and information and information not received in time to the parties concerned. The main cause is the lack of consistency in the flow of information between the different parties involved in the construction project. (Che Wan Fadhil, 2002)

Many participants who specialized in construction and have different views of the process have drifted apart and are often geographically isolated from each other. These have resulted in the fragmentation of the construction industry itself. As a result of the fragmentation in construction industry, generating, sharing, and maintaining project information throughout a project life cycle constitute a complex assignment. (Che Wan Fadhil, 2002)

In recent years, integrated environment and information integration has shown to have many promises towards solving the lack of compatibility of the information exchange. Many researchers and industry leaders believe that the construction industry would benefit from a more rigorous integration and sharing of information among project participants within one environment. This can be done through the process of Computer Integrated Construction (CIC), which is an emerging technology to automate the flow and exchanging of construction project information. However, the complexity and vast amount of information involved in any construction project have hindered the flow of information within one environment. (Memon, 2005)

Statistics show that productivity of the construction industry has been far below other industries for the past three decades. In addition, productivity is not the only problem facing the industry. Quality of work, waste, and safety are among the issues that decline the industry's overall performance. Therefore, increasing productivity,

improving quality, minimizing waste, and providing a safe environment for workers are main the goals in managing a construction project. In order to achieve these goals, attention must be paid to the planning, monitoring and controlling of the processes rather than on assessing, measuring, and repairing after the product is finished. (Nuntasunti, 2003)

In short, there are many problem occur with lack of practices of integration and collaborative in monitoring or managing the construction progress in today construction industry. Therefore, this study will focus on develop a prototype of web base for online construction monitoring system.

1.3 Aim of Study

The aim of this study is to develop a prototype of an online construction site monitoring system in enhancing the communication problems existed between parties involve in construction project.

1.4 Objectives of Study

The objectives of this study are:

- To identify the process of managing project.
- To study the implementation of CCTV at construction site.
- To develop a prototype of an online construction site monitoring system.

1.5 Scope of Study

The study will be conducted at two construction site as a case study on the implementation of Closed Circuit Television System (CCTV). The location of the study is at Palm Beach Country I-95 corridor, Florida, United States of America and Washoe Medical Center, Nevada, United States of America. The study will focused on developing the online construction site monitoring system based on the actual process of monitoring project.

1.6 Research Methodology

Figure 1.1 shows the research methodology for the study. The detail research methodology will be discussed in chapter 3.

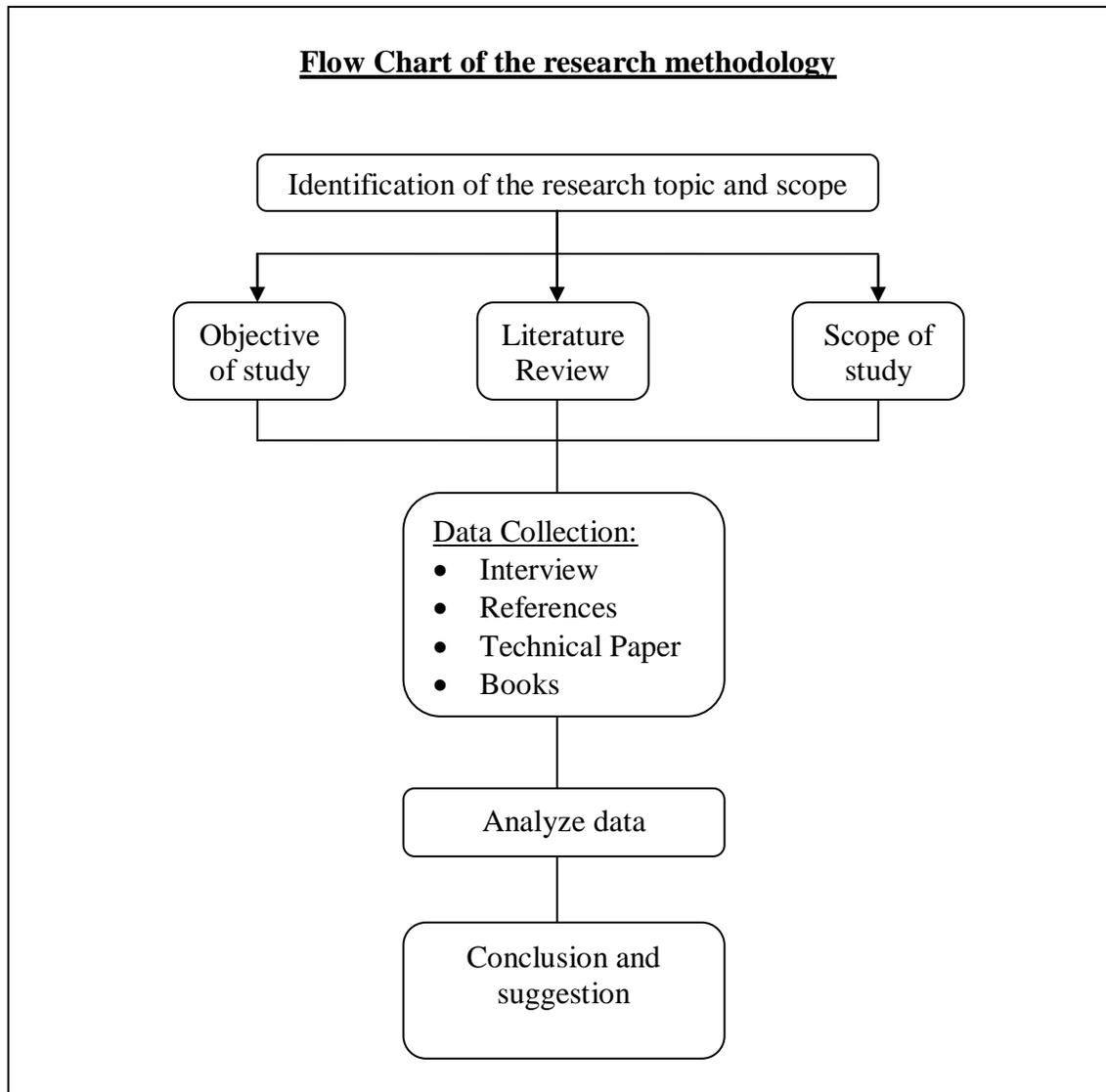


Figure 1.1: Research methodology