# COLLABORATION AND COMMUNICATION OF PROJECT TEAM IN PWD WEB BASED PROJECT MONITORING SYSTEM

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# COLLABORATION AND COMMUNICATION OF PROJECT TEAM IN PWD WEB BASED PROJECT MONITORING SYSTEM

REDZUAN BIN JAAFAR

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

Faculty of Civil Engineering
Universiti Teknologi Malaysia

DECEMBER 2010

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This study is dedicated especially
to my beloved
wife and daughter
for their everlasting love, care, support …..

## ACKNOWLEDGEMENT

I would like to acknowledge and extend my greatest gratitude to my project supervisor, Prof. Dr. Muhd Zaimi Abd Majid of Faculty of Civil Engineering, University Teknologi Malaysia for his guidance, knowledge sharing, assistance and advices. I would like also to extend my sincere gratitude to my family for their support, understanding and contributions. In addition, it is a pleasure to thank everyone including all of my friends, colleague, and those who had contributed to the survey questionnaires and the completion of my project.

Last but not least, I would like to take this opportunity to thank Public Works Department for sponsoring me in this master programme.

# ABSTRACT

Collaboration and communication among project teams are essential for web based project monitoring system to generate real time reports. Up to date information can overcome potential problems that will affect project target. Public Works Department of Malaysia (PWD) has been using its web based system (which is known as SKALA) to generate real time reporting for project monitoring. SKALA reporting system depends on the accuracy of data input by project team members. Lagging of real time data input at any event will produce inaccurate project reporting. This study emphasized on the collaboration technology that can facilitate real time data capturing into SKALA from collaborative working among project team members. The research methodology comprised literature reviews, data collection and analysis. Data collection was based on survey questionnaires which were distributed randomly among PWD's project teams. Statistical method such as Frequency Analysis, Average Index and Kruskal Wallis were used to analyse the data collected. Finally the result of this study has identified various factors for SKALA improvements with regard to project teams' collaboration and communication. This will assist PWD to implement, manage and monitor all its projects in a timely manner in order to take prompt actions.

# ABSTRAK

Kolaborasi dan komunikasi di antara pasukan projek adalah sangat penting untuk sesuatu sistem pemantauan projek yang berasaskan web bagi menghasilkan laporan secara masa sebenar. Maklumat terkini mengenai status projek akan dapat mengatasi berlakunya potensi yang akan menjejaskan sasaran projek. Jabatan Kerja Raya Malaysia (JKR) telah menggunakan sistem pemantauan yang berasaskan web (yang dikenali sebagai SKALA) untuk menghasilkan laporan projek secara masa sebenar. Sistem pelaporan SKALA sangat bergantung pada ketepatan masa kemasukan data oleh ahli-ahli pasukan projek JKR. Sekiranya berlaku penangguhan kemasukan data ke dalam Sistem SKALA, ianya akan mengakibatkan penjanaan laporan projek yang tidak tepat. Kajian ini menekankan kepada teknologi kolaborasi yang mana akan dapat membantu penawanan data secara masa sebenar kepada sistem SKALA melalui kolaborasi di antara pasukan projek JKR. Metodologi kajian terdiri daripada kajian literatur, pengumpulan data dan analisis. Pengumpulan data adalah berdasarkan borang soal selidik yang diberikan secara rawak di antara ahli-ahli pasukan projek JKR. Analisis data bagi kajian ini dibuat dengan menggunakan beberapa kaedah statistik seperti Analisis Frekuensi, Kaedah Purata Indeks dan Kruskal Wallis. Di akhir kajian ini, beberapa faktor telah dikenalpasti bagi penambahbaikan sistem SKALA khususnya untuk kolaborasi dan komunikasi di antara pasukan projek JKR. Ini akan dapat membantu JKR untuk mengurus, memantau dan melaksanakan semua projek-projeknya secara lebih tepat dan cepat.

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## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| PWD | - | Public Works of Department, Malaysia |
| HOPT | - | Head of Project Team |
| HODT | - | Head of Design Team |
| ICT | - | Information, Communication and Technology |

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Chapter 1

# INTRODUCTION

## 1.1 Introduction

Collaboration and communication among project team members are vital in order to identify issues, misunderstandings and other challenges to project completion. At the same time, it can also contribute real time project reporting to any web based project monitoring system. Currently, Public Works Department of Malaysia (PWD) has been using its web based project monitoring system to generate real time project reporting. Since PWD has to manage and monitor thousands of projects at any point of time, it must require an effective web based project monitoring system. Effective project monitoring system will lead to prompt actions by PWD in accomplishing the projects' targets. This study emphasized on the project team collaboration and communication platform for PWD's web based project monitoring system (which is known as SKALA).

Although system's integration and collaboration is not a new research topic, it is believed to be the key for enabling technologies that drives the construction industry in improving productivity and efficiency (Shen *et al*., 2010). Recent literatures are more focus on computer-aided design collaboration while very little attention was directed to address the potential use of collaboration technology in project stakeholder communication (Chung *et al.,* 2009).

## 1.2 Background

PWD is a technical government department that has been entrusted with constructing and maintaining public infrastructure in Malaysia. It was formed in 1872 as the technical advisor to the Government (PWD Strategic Frameworks, 2007). Projects implemented by PWD include roads, airports, government buildings, maritime and ports. According to PWD Strategic Frameworks (2007), PWD's vision is to become a world class service provider and centre of excellence in asset management, project management and engineering services for the development of nation's infrastructure through creative and innovative human capital and state of the art technology.

Based on PWD Strategy Map 2006 - 2020 (PWD Strategic Frameworks, 2007), PWD has to leverage on ICT to enhance its project delivery system. In managing projects, PWD is involved in the planning, designing, procurement, implementing and monitoring aspects of the projects. In any project implementation, PWD has to balance the time, resources, cost and quality factors of the project according to PWD's standard quality and its clients' needs (PWD Quality Manual, 2009). During 9$^{th}$ Malaysian Plan, PWD has been given the authority by the Malaysian Government to implement 5889 projects with the total cost of RM40 billion (PWD Strategic Frameworks, 2007).

Since PWD is committed to deliver its projects to the clients as stated in its core business objectives in term of time, cost and quality, it needs comprehensive monitoring tools to help the organisation to control its projects effectively and efficiently. The reports produced are very critical for fast decision and policies making to overcome the problems occurred during projects' implementation. Currently, PWD is using a number of systems or applications to execute or monitor its projects. The systems or applications are based on variety of software ranging from commercial software such as Microsoft Project or Primavera to in-house development of software's applications.

SKALA is a web based project monitoring for PWD Malaysia and was first developed in-house by PWD Information and Communication Technology (ICT) Branch in 1985 (SKALA Manual, 2006). Although there are other software's applications for project management system, the uniqueness of SKALA is that it is tailored to PWD's certified ISO 9001 Quality Management System processes (PWD's Quality Procedure, 2004). It was developed to customise the needs of PWD's main core business which is project management. The main function of SKALA system is to generate real time project status for all PWD personnel as well as its clients. The on-line reports generated by SKALA include details of project information as well as project performance such as project progress.

SKALA has been used by all PWD project team members throughout project life cycle starting from receiving project from the clients until handing over the projects as shown in Figure 1.1.

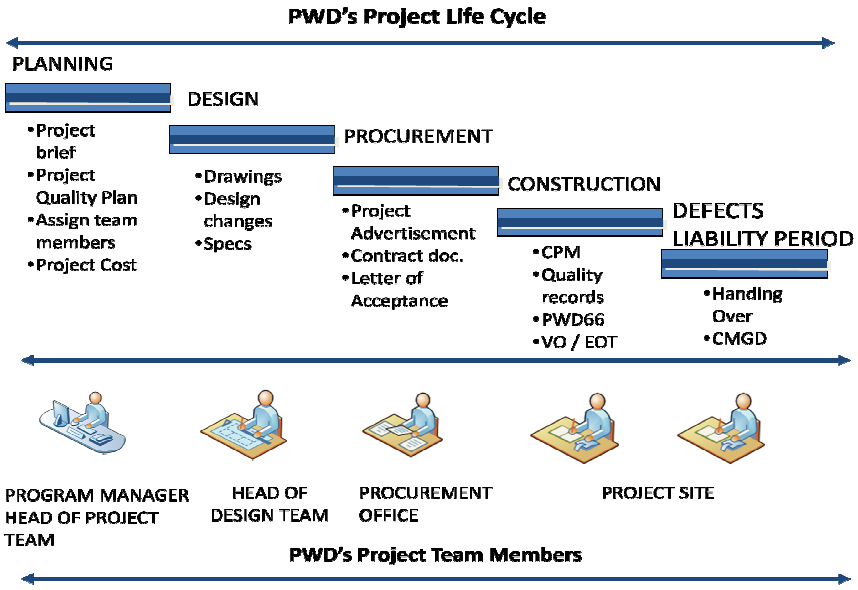


**Figure 1.1** PWD's project team members throughout various project life cycles

SKALA users consist of PWD's top managements and other personnel in project teams such as Program Managers, Head of Project Team, Head of Design Team, Procurement Officers and Project Site Team Members (SKALA Manual, 2006).

## 1.3 Problem Statement

One of the main objectives of SKALA is to become a reliable project monitoring system. A major component of achieving the objective requires SKALA to generate real time reporting. Up to date reports will assist project team to take prompt actions on the problems arisen before it can become unmanageable. SKALA reporting system depends on the data input from project team members through collaboration and communication.

Existing SKALA is developed based on workflow system. Since SKALA workflow describes only the information needed for process automation, it does not have the complete models of collaboration. SKALA needs to be enhanced with collaboration tools that can facilitate timely data input. Lagging of timely data input at any event will produce inaccurate project reporting.

The features of the collaboration tools should be able to meet the requirements of collaboration and communication among PWD project team members. Initial study is required to determine the acceptance among project teams for SKALA enhancement regarding project collaboration technology.

Similarly, study based on the literature review shows that since any problem needs to be addressed rapidly, the project manager should depend on the system that can provide timely indication of project problems, whether they are real or potential (Cheung *et al.*, 2004). This statement is supported by Shen *et al*. (2010) which indicated that one of the major problems on system integration and collaboration in the construction industry is "difficult to access accurate data, information and knowledge in a timely manner in every phase of the construction project lifecycle".

Guo *et al*. (2010) had concluded that application of Life Cycle Management has not been successful because it is still lack of an effective communication and collaboration information platform. Researched by Nikas *et al*., (2007) also found that collaborative work practices should be established before the collaborative technology is introduced to the organisation.

## 1.4 The Aim and Objectives of the Study

The aim of this study was to establish the appropriate features for PWD project teams' collaboration and communication in SKALA. In order for SKALA to function effectively, project team members must adopt the technology and fully accept the technology tools. The aim of this study can be achieved through the following objectives:

i. To investigate the project collaboration and communication requirements;
ii. To identify the required improvements of SKALA in collaboration and communication;
iii. To establish the appropriate features of project collaboration tools for SKALA improvements.

## 1.5 Scope of the Study

The scope of this study only covers internal communication activities and collaboration in project management among PWD project team members. The PWD project team members are Head of Project Teams (HOPT), Head of Design Teams (HODT), Procurement Offices and Project Site Teams in PWD Headquarter, States and Districts. The scope does not cover the project team members' communication with other external stakeholders such as the clients, contractors or consultants.

## 1.6 Research Methodology

The methodology used for this research comprises three phases as shown in Figure 1.2. Generally, phase 1 consists of problem statement, aim and objectives of this study and literature review. Furthermore, study on the existing SKALA system had also been conducted in phase 1. In phase 2, data was collected through survey questionnaires. Survey questionnaires were designed based on various aspects and factors identified from literature review. The objectives of survey questionnaire are:

i. To investigate the requirements of project team collaboration and communication;
ii. To identify the required improvements of SKALA in collaboration and communication;
iii. To establish the appropriate features of project collaboration tools for SKALA improvements.

The survey's respondents were selected randomly from PWD project team members such as Head of Project Teams, Head of Design Teams, Procurement Offices and Project Site Teams as well as PWD Top Management Offices, PROKOM (Project Complex Department) and Quality System Department.

After data was collected, it was analysed and concluded in Phase 3. Details of research methodology and processes involved in each phase are further discussed in chapter 4.

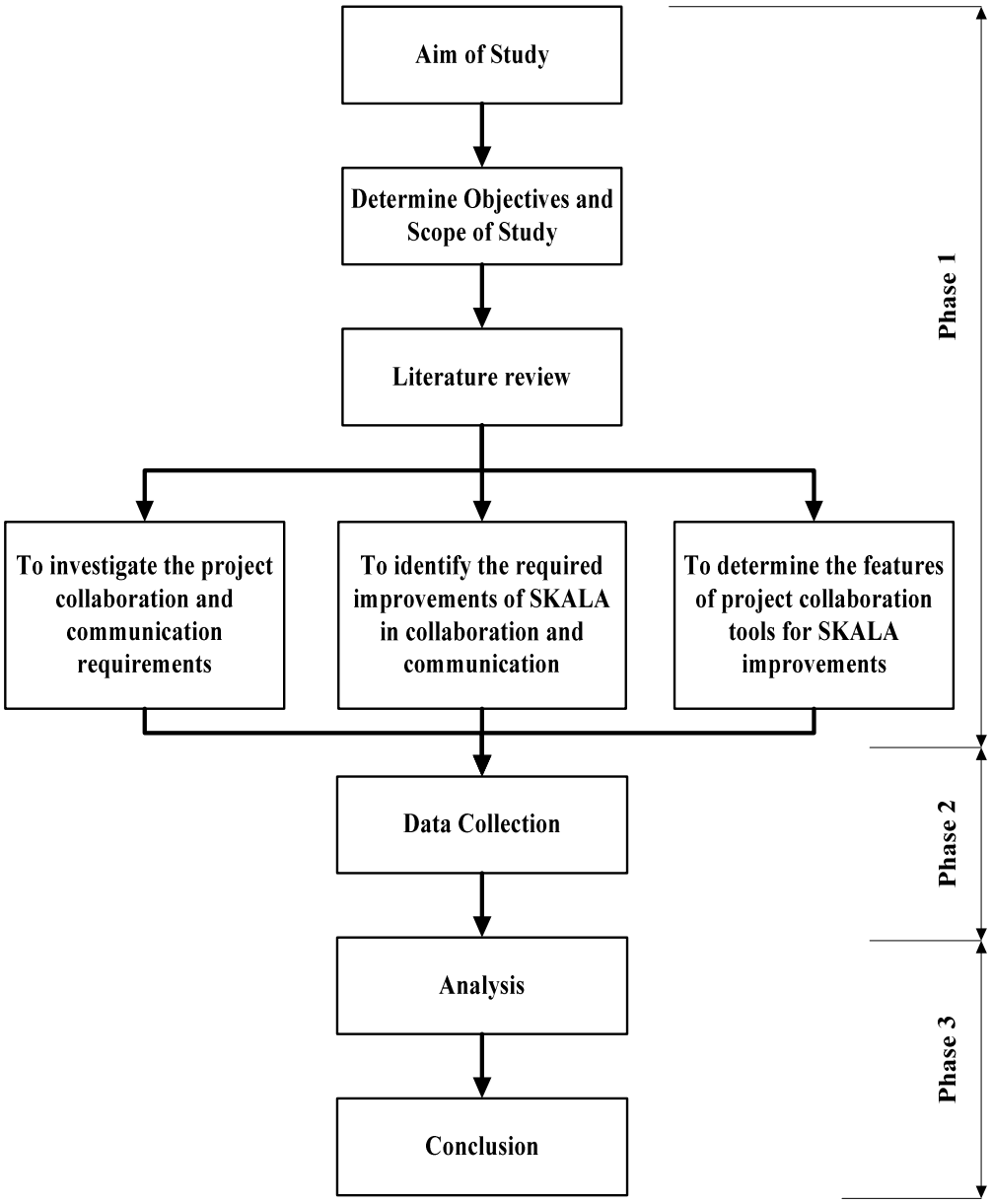


**Figure 1.2.** Flow chart of Research Methodology

## 1.7 Summary of Chapter

This Chapter is the overview of the study which includes the introduction of the topic, the problem statement, the aim, objectives as well as the scope of the study. It also briefly discusses on the research methodology. Details of research methodology and process involved in each phase are further discussed in chapter 4.

In summary, the aim of this study was to establish the appropriate features for PWD project teams' collaboration and communication in SKALA. The appropriate features of the collaboration tools in SKALA will assist project team members to manage and monitor all its projects in a timely manner.

The aim of this study can be achieved through the following objectives:

i. To investigate the project collaboration and communication requirements;
ii. To identify the required improvements of SKALA in collaboration and communication;
iii. To establish the appropriate features of project collaboration tools for SKALA improvements.

The scope of this study only covers internal communication activities and collaboration in project management among PWD project team members**.** The PWD project team members are Head of Project Teams, Head of Design Teams, Procurement Offices and Project Site Teams in PWD Headquarter, States and Districts. The scope does not cover the project team members' communication with other external stakeholders such as the clients, contractors or consultants.

Chapter 2

# PROJECT COLLABORATION AND COMMUNICATION

## 2.1 Introduction

This section discusses on the related literature review regarding collaboration and communication among project team members. It also emphasizes on the project teams' collaborative working and collaboration technology. Nowadays, collaborative working is being carried out with advent of computer technology. Collaboration technology relates to software applications used to enable effective sharing of project-related information between geographically-dispersed members of project teams. It is often been used through a web-based platform.

Chinowsky and Rojas (2003) defined that ''A virtual team is a group of people with complementary competencies executing simultaneous, collaborative work processes through electronic media without regard to geographic location.''

Generally, this research is based on three main areas which are project team members' collaboration and communication, collaboration technology and collaboration tools. These are in line with the objectives of this study. It will be reflected in the data collection which will be discussed in Chapter 5.

## 2.2 Project Team Members' Collaboration and Communication

According to Baldwin *et al*. (2009), collaboration in construction industry means joint effort among project stakeholders to accomplish the project targets effectively and efficiently. This statement was supported by Patterson (2001) in his definition that "project collaboration is conducted between various types of team members to achieve specific project goal". Dow and Taylor (2008) also mentioned that "collaboration involves two or more people in carrying out any tasks or processes and it involves work done among peers regardless of their roles". Patterson (2001) also mentioned that generally, executives have interests in multiple projects. A project manager would normally be focussing on a particular project but individual team members may be working on one or more projects at the same time as shown in Figure 2.1.

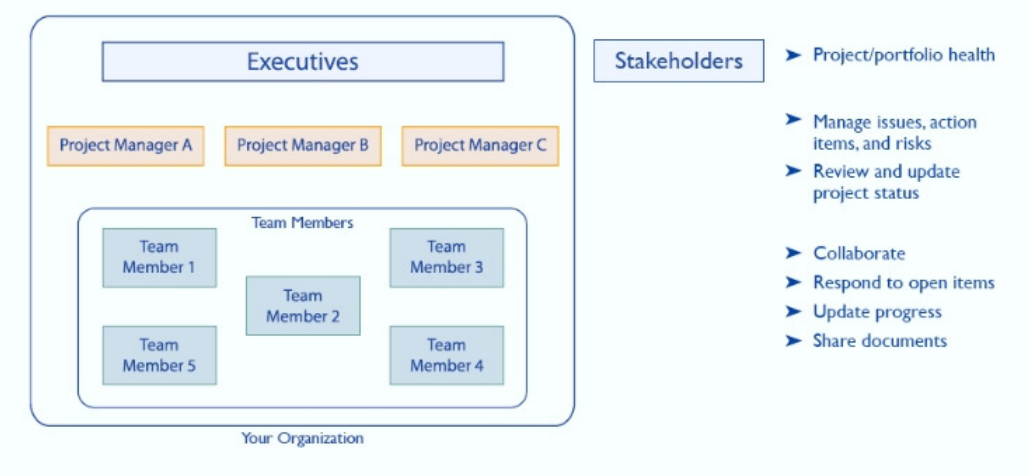


**Figure 2.1.** Project collaboration is conducted between various types of team members (Patterson, 2001).

Chen *et al*. (2007) also described that collaboration also involved with communication among cross functional team as shown in Figure 2.2.