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Final Year Project II

Dissertation Report

by

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Project Title: A web-based project
management system: sign-off
documents management system
(SOMs)

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Abstract

On-time delivery is vital for software industry. However, for several decades, the software industry continues to be afflicted by missing the scheduled deadline.[1],[7] There are numerous studies conducted suggested that the delay in process validation and verification is one of the main cause which postpone the entire processes due to task dependency and the inefficient project management practices. Most of the project management teams are running on the traditional method of emailing and posting of the sign-off documents, calling the person-in-charge as a reminder to sign-off which is proven ineffective and inefficient as there is always a delay in receiving the verified sign-off documents.

This paper is intended to present an integrated solution: a sign-off documents management system (SOMs) for project based business processes that meant to solve the issues within the inter-organizational process as mentioned above. SOMs serves as a platform to collect the verified sign-off documentations from the clients. This research specifically study on the building of a project management framework which integrates the planning, scheduling, communicating, and sharing functions under a single platform. This is done by employing the computer-based sign-off documents management paradigm as the center of developing SOMs where a virtual control tower are used to handle with computerize reminders alert displayed on the personalized dashboard (Butner,2006) and a Project Management Information System (PMIS) plans and schedules the sign-off and track their execution when needed.

The objectives of this project are to review the current practice in software industry sign-off documents management process, to explore the potential of integration of documents management system and tracking and reminder system in software industry's sign-off management and to develop a customized sign-off management system at software industry

The web-based project management system is targeted for the use of the contractors of software industry which are always on tight schedule and unbearable with any delay. A series of interviews and questionnaires are carried out among 24

practitioners who are mostly from the IT consultants firm based in Kuala Lumpur. The results from the interviews are further analyzed to understand the problems faced by most software project team before specified the solutions.

From results tabulated from the preliminary survey on 24 practitioners, 75% of the practitioners agreed that the proposed SOMs is useful for their organization as it seems to provide the exact solution to the problems they are facing currently. SOMs is believed to increase the productivity of the project team, promoting the paper-less culture resulting in lower printing cost and a more systematic way to cope with the tight project timeline.

User Acceptance Testing (UAT) are carried out for SOMs prototype I and II among 20 practitioners to evaluate the performance of SOMs prototype I and user satisfactions, assess the relevancy of SOMs to project-based software industry's sign-off documents management practice and to get the constructive comments and recommendation to improve the prototype.

This dissertation report comprises of five chapters. The first chapter discusses a brief introduction about the background of the project, and describes the problems being solved. . The second chapter discusses on the literature review. The third chapter is about the methodology used in development of SOMs. The forth chapter will cover the result and discussion and the fifth chapter concludes the overall project and discuss on the future work recommendation.

Chapter 1 Introduction

1.1 Background of Studies

On-time delivery is vital for software industry. However, for several decades, the software industry continues to be afflicted by missing the scheduled deadline. Delivery project on time has becoming more complex due to the extent of scope which required the fragmented parties located at different places to communicate with one another for efficient project execution, delay in process validation and verification which postpone the entire processes due to task dependency and the inefficient project management practices. In this paper, the focus is casted on the delay in getting the verified sign-off documents which faced by most project team.

Process sign-off is a document for auditing purpose. It is prepared after the project team is done with that particular process and serves as a verification statement between the client and project team. The purpose of the process sign-off is to:

- Agree and signoff on the specific project phase.
- Agree on the information and data to be included in the system.
- Obtain actual sign-off for the team to proceed the following project phase.

During the process validation, the client is required to check against all the information that will be included in the system and check against the expected execution behavior as intended by the client. Process validation sign-off is very important for project team as it serve as prove to the project team on the agreement with the client in case there are discrepancies in the future.

Over the decades, much organization had implemented various go green solutions and streamlined their processes, however for document sign-off is still printed or emailed for gathering approval. Currently, all the sign-off documents are sent either through hard copies or email to the clients and cause a lot of problems to the project team as well as the client. There is no proper platform for the client and project team to deliver the sign-off documents. The project team always faces the difficulties to get the sign-off document on time which delay the whole project due to task dependency. Others than that, the project team also incur extra cost to call the person-in-charge to remind them about the

due date of sign-off delivery. These factors not just incur high cost in purchasing paper but also incurred printing, posting, storage, scanning and disposal costs.

As a remedy for the foreseen problem, this paper proposed a sign-off documents management system (SOMs) for software project based business processes. This system is designed to improve the project management flow and to provide a greater consistency in getting the verified sign-off documentations from the clients. This project is believed to increase the productivity of the project team, promoting the paper-less culture resulting in cost reduction and process improvement through a more systematic way to cope with the tight project timeline.

1.2 Problem Statement

The current situation in software industry is the traditional manual sign-off generation used for management of sign-off documentation. Most of the project management teams are running on the traditional method of emailing and posting the verified sign-off documents which is inefficient as there is always delay in receiving the verified sign-off documents. The delay in receiving verified sign-off documents will also affect the whole project process due to the task dependency. If this traditional sign-off management method is not being improved, project team will not only wasting their time and money but also cause overburden of human resource. As a remedy for the foreseen problem, this paper proposed SOMs to upgrade the sign-off document management in a project team. In order to achieve effective and efficient sign-off documentation management in a project team, there is a needs of having a system that automate and monitor the complete set of sign-off documentation involve in that particular project.

1.2.1 Project Significant

The significant of the project are:

- a.) Increase the effectiveness and efficiency of the project team to cope with project timeline.
- b.) Decrease printing, delivery and filing cost.
- c.) Minimize the delay of getting sign-off through constant reminders.
- d.) Promote the paperless organization culture.

1.3 Objective

This paper focus is to design a system that automate and monitor the sign-off documents delivery to improve the project management flow and to provide a greater consistency in getting the verified sign-off documentations from the clients.

The objectives of this project are:

- i.) To review the current practice in software industry sign-off documents management process.
- ii.) To explore the potential of integration of documents management system and tracking and reminder system in software industry's sign-off management.
- iii.) To develop a customized sign-off management system for software industry

1.4 Scope of study

This study is limited to the software industry's project team within Kuala Lumpur. The scope will be focusing on the current practice of sign-off documents management process and the development of the new web-based approach in software industry sign-off documents management. The evaluation of the system is based on the real life project sign-off documents management in software industry.

1.5 Relevancy of the Project

This project is highly relevant to the contractors of software industry as there are no existing project management systems that act as a platform specifically to cater the needs of the software-based project team. The web-based project management system available in the market only provides a platform for upload and downloads of files and do not have specific functions that fit into the software-based project lifecycle. Furthermore, most of the reminding works are still done manually and repetitively. This shows that the current project management system is still lacking of adequate functionalities concerned with managing problem related to the delay of getting sign-off documents.

1.6 Feasibility of the Project within Scope and Time Frames

This project is feasible within the scope and time frames. The author has a basic knowledge in HTML, PHP and MySQL during her studies in Universiti Teknologi

PETRONAS. This project covered only the platform for sign-off documentations and automation in reminding the clients which can be developed within a time frame of six months with three months for the research on the topic as well as the development of system.

Chapter 2: Literature review

2.1 Importance of on time project delivery

Capability of on time project delivery is a crucial aspect to evaluate the performance of firms and their market competitiveness. Dainty et al (2003:217) [8] cited Cooke-Davis (2001) [6] who declares that the project management competency as one of the criteria that cause uncertainty in project performance. PonPeng & Liston (2003:281) [16] stated that problems such as schedule delays, budget overruns, negligence of quality standards as well as a large number of claims result to a large extent from not selecting the particular contractor for project. Chan and Kumanswamy(1993) [5] also state that timely delivery of projects within budget and up to the quality specified by clients is an indicator of successfully delivery.

2.2 Effects of software overrun

On-time project delivery is also an essential objective for the software industry. However, for several decades, the software industry continues to be afflicted by missing the scheduled deadline.[7] Jenkins, Naumann and Whetherbe [1] in their survey revealed that the average software effort runaway was 36%. Phan,et al.[7] in his survey also found out that the average software effort runaway was 33% which is similar to the 36% runaway reported by Jenkins.

According to Robert Glass (1997) [17], software runaway is the project that has consumed close to double its estimated time or more primarily because of the difficulty of building the software needed by the system. When the software delivery is delayed, it is not without extra cost consequences which include the original agreed project cost and the possible cost incur due to the delay. Aibinu (2002) [2] also mentioned that the delay in project delivery resulted in disagreement and total abandonment of contract by the both parties (project team and clients). Aibinu also added that the delay in project delivery will also give rise to heated arguments between the owner (client) and the contractor (project team).

2.3 Causes of delay in project delivery

Andy Cole (1995) [4] defined software overrun as project that failed significantly to achieve its objective or has exceeded its original budget by at least 30%. Ma, Collofello, and Smith-Daniels (2000) [15] identified management-related, personnel related and organization-related causes are more prevalent than technology related and product related ones. Genuchten(1991) [14] also support the above with the statement “two-third of reasons for project delays was organizational and managerial instead of technical”. Cooke-Davies (2001:185) [6] also mentioned that project management is a tool for project success.

Besides, Sambasivan & Soon (2007:527) [19] also state that the inability of the client and his representatives in the project team to have a comprehensive overview of the construction process from inception to completion of the project is very likely causing the non-realization of projected delivery dates. Lack of project management competence could adversely affect delivery time of a project (Dainty, Cheng & Moore, 2003:189) [8].

2.4 Importance of sign-off verification

Most of the growing software development organizations implement process oriented system life cycle. (Marjanovic 2000) [15] . Eder et al (1999) [9] recognized the importance of temporal properties for process oriented life cycle. Process oriented system life cycle required the verification of model in term of underlying language as a prerequisite to the deployment of a process model. (Sadiq et al 2003) [18].Process verification is important to ensure that the resulting process model is executable in a given process management system. In other word, process validation is a process to determine whether a software model will execute as intended by the designer and also by the end users. Due to the increase complexity of workflow specification, validation of signoff document for each process is essential to prevent any undesirable execution behavior that compromises process goals. (Sadiq et al 2003)[18].

2.5 Advantages of a proper managed electronic sign-off documentation

Eloranta. E, Hameri. AP, and Lahti.M (2001) [10] in the survey of 8,000 projects with various aims reported that only 16% of the project team achieved the initially stated goals concerning time, budget and quality. This is not a desirable result for the

management of project which objectives concerned on money spent, result-oriented and project quality. It has been proven that the common cause of project schedule runaway is the inefficient sign-off document flows due to lacking of a proper sign-off management system. Eloranta.E, Hameri AP and Lahti.M (2001) also claimed that a better document management is able to indirectly improve the performance of projects. Web-based sign-off documentation offers the platform for effective communication to bring together the widely dispersed project stakeholders (project team and the clients) which is vital in project management. Scanlin(1998) [12] mentioned that communication consumes 75-90% of a project manager's time and therefore needs to be current and available on time. Deng et al. [20] support the statement above by pointing out the extensive physical distance between project participants, is the main cause leading to delays in decision making.

Besides, Lutteroth.C., Weber.G (2011) [13] also pointed out a few advantages of electronic documents technologies such as possibility transfer, store, complete, search and manage them more efficiently. Lutteroth.C, Weber.G (2011) also claimed that many organizations are trying to move away from paper forms to electronic form technologies as it is more cost-effective. Alshawi (2003) [3] in the case study of CATHQUARTER mentioned that a web-enabled project collaborative tool enable the increase the speed and accuracy of communications, resulting in the reduced errors and rework cost, cost of hardcopy production, distribution and storage.

2.6 Importance of reminders in project management

The computerized reminder is one of the methods that remind the user of an interactive viewing system. (Lawler et.al 1997). Kerzner (1998) stated that reminders represent a convenient control for project managers to use in managing project schedules and task deadlines. However, for several decades, many project managers still fail to include structured reminders in their project planning process for project teams to meet the task deadlines. Bandura (2001) also claimed that timing reminders are important to sustain team members' motivation to achieve desired task outcome.

Chapter 3: Methodology

3.1 Research Methodology

In order to clearly address the issues in sign-off documentation management within the project-based business, both the quantitative and qualitative research approaches were used.

Firstly, it is important to find the current practice of project team sign-off document management system. This aspect initially gave the author a full understanding of the activities and procedures involved in project-based sign-off document management. The overall approach consisted of semi-structured interview and questionnaires with software project-based business staff in Kuala Lumpur. Twenty-four practitioners are being surveyed during the phase one of the study and the testing phase of the system. From the result from the first phase, the weaknesses in sign-off documents delivery policy and current practices are being identified. The sample in testing phase were use as a representative that was randomly selected from the twenty-four practitioners from phase one. Inferential statistical analysis was conducted based on the result in testing phase which includes the reliability test and factor analysis.

Second, it is expected to develop a conceptual model for sign-off documents management for project-based software industry. This conceptual model integrates the computer-based documents management system with enhanced reminder capabilities that able to deal with the delay of sign-off. The solution proposed includes i.) Control Tower (CT) that handle computerized reminders alert displayed on the personalized dashboard and send notification email to the person-in-charge. ii.) computer-based documents management paradigm that have the ability to import, organize and view the documents electronically. SOMs will be developed using php language. The developed SOMs will be tested in free-hosting web and a series of evaluation will be carried out.

3.2 Research Procedure

This research is divided into three main phases. In the first phase, the author identifies the activities and procedures involved in sign-off documents management of project-based software industry. This is done through literature review and project-based software executive's review. Semi-structured interview and questionnaires are conducted among the project-based software industry' executives to identify the current practice of sign-off documents management system and the weaknesses in the existing sign-off documents delivery policy. The result from the semi-structured interview and questionnaires are being analyzed to select and rank the functions of the sign-off documents management features in chronically order.

The second phase of this research focused on the prototyping method in development of SOMs prototype. The prototype developed is a web-based system that can be access through World Wide Web (WWW).

In the third phase of this research, prototype testing is performed to assure its functions, performance, operability, reliability and user satisfaction. User perception questionnaires are conducted to get the feedbacks and comments from the industry practitioners. Every tester's comments are jotted down and further analyzed to improve the prototype of SOMs before the author conduct the second user acceptance testing.

3.3 Development Methodology

The development methodology chosen for this project is the prototyping based methodology. This research methodology involved five phases:

- i.) Planning
- ii.) Analysis
- iii.) Design
- iv.) Prototyping
- v.) Testing

As the outcome of this project is a project management system which is customized for the software-based industry, prototyping methodology allows the author

to identify the best methods to be used for the functions in the system by emphasizing in analysis, design and implementation concurrently. This methodology also provides a continuous follow-up on the users' needs and requirements. Prototyping methodology allows the author to create part of the solution to demonstrate functionality and make needed refinements before developing the final solution. This also indicates that users can evaluate the prototypes earlier and participate in the development of the application to bridge the knowledge gaps between the developer and users to ensure that the final product meet the users' expectations.

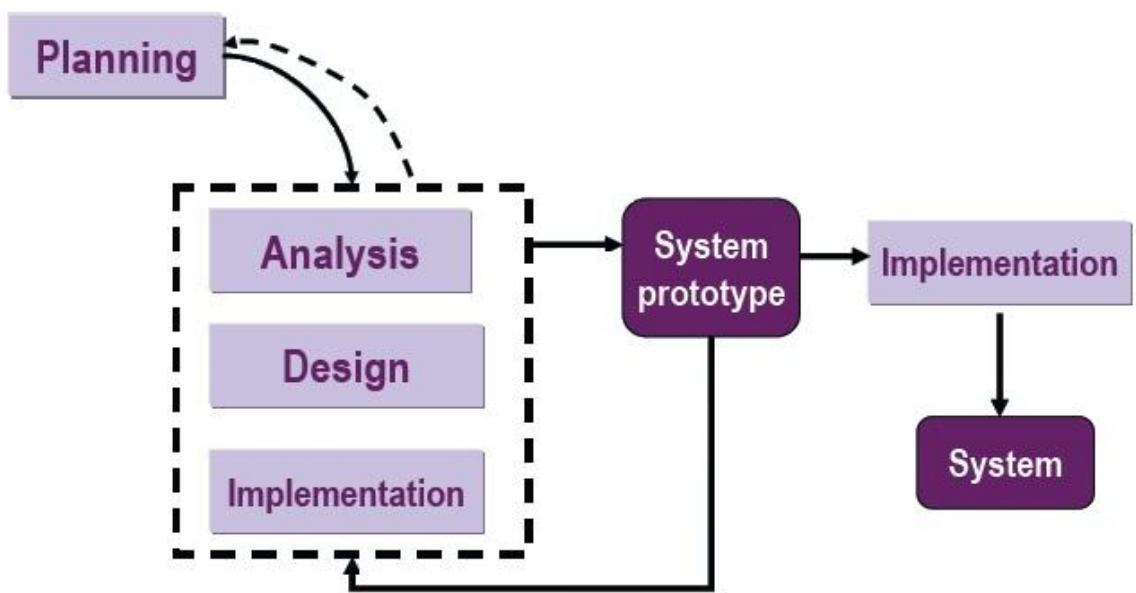


Figure 4: Prototyping-based Development Model

3.3.1 Planning

The planning phase includes 3 steps:

i.) Literature review

The objective of reading the literature review is to understand the topic in detail and analyze the former study done by other researchers within the scope of topic.

The literature review focus on the method to computerize the document management and the importance of getting sign-off verification on time to cope with tight project timeline. Details on these studies are discussed in Chapter 2.

The literature review is carried out throughout the whole project to give the author a better guideline and understanding on the research title and able to develop an effective sign-off documents management system prototype.

ii. Data Collection

The data collection phase is done through semi-structured interview and questionnaires survey. A series of interviews are being carried out among the IT consultants based in Kuala Lumpur in order to eliminate defeat during the project planning phase. The main reason and questionnaires survey is to highlight the current sign-off documents management practices and supported with the semi-structured interviews with the industry's practitioners to identify the industry requirements for sign-off documents management system (SOMs).

The questionnaires for data collection in planning phase are divided into two sections as shown in below:

a.) Section A

- Questions are designed to identify the current practices of sign-off documents management and the specification needed to be included in the SOMs.

b.) Section B

- Questions are focus on the recommendations of the respondents for the proposed SOMs. The result of this section will be used in the SOMs prototype development phase.

This phase is essential to understand the problems faced by most software project team before specified the solutions. Others than that, the existing literature regarding the

problems are being reviewed to evaluate the theoretical framework which result in the synthesis of knowledge required to produce and appropriate solution for the problem statement.

3.3.2 Analysis

In the analysis phase, the author analyzed the data collected from the semi-structured interview and questionnaires survey. From the analysis of the survey, the author takes in consideration on the following aspects:

- Most of the project teams are currently using the traditional way of getting sign-off from their clients.
- The absence of information system that specifically designed to support the management of sign-off documentations in project team.
- The absence of system that integrate planning, scheduling and reminders with real-time event driven control system.

3.3.3 Design

In design phase, a conceptual model is developed. As shown in figure 2, the proposed conceptual model combines the concept of Computerized Reminder System (CRS) in Control Tower (CT) concept model and Documents Management (DM) paradigm.

a.) Control Tower (CT)

CT is used to handle the reminder alert notification displayed on the personalized dashboard and send notification email to the person-in-charge. CT also implemented Accuracy Management (AM) concept to make sure that CT waits for the status of the sign-off and only display and deliver the correct warning messages based on the predefined rules (as shown in Figure 3) .

b.) Document Management System (DMS)

DMS is used to release, send, track and store sign-off documents. DM paradigm has the ability to import, organize and view the documents electronically. The concept of DMS enables SOMs to perform history tracking.

The conceptual model developed is as shown below:

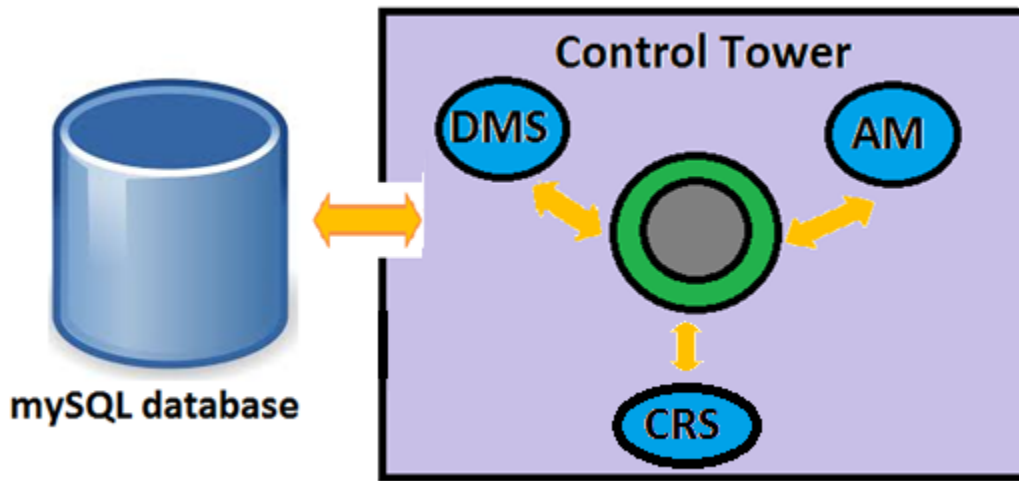


Figure 5: Conceptual model for SOMs

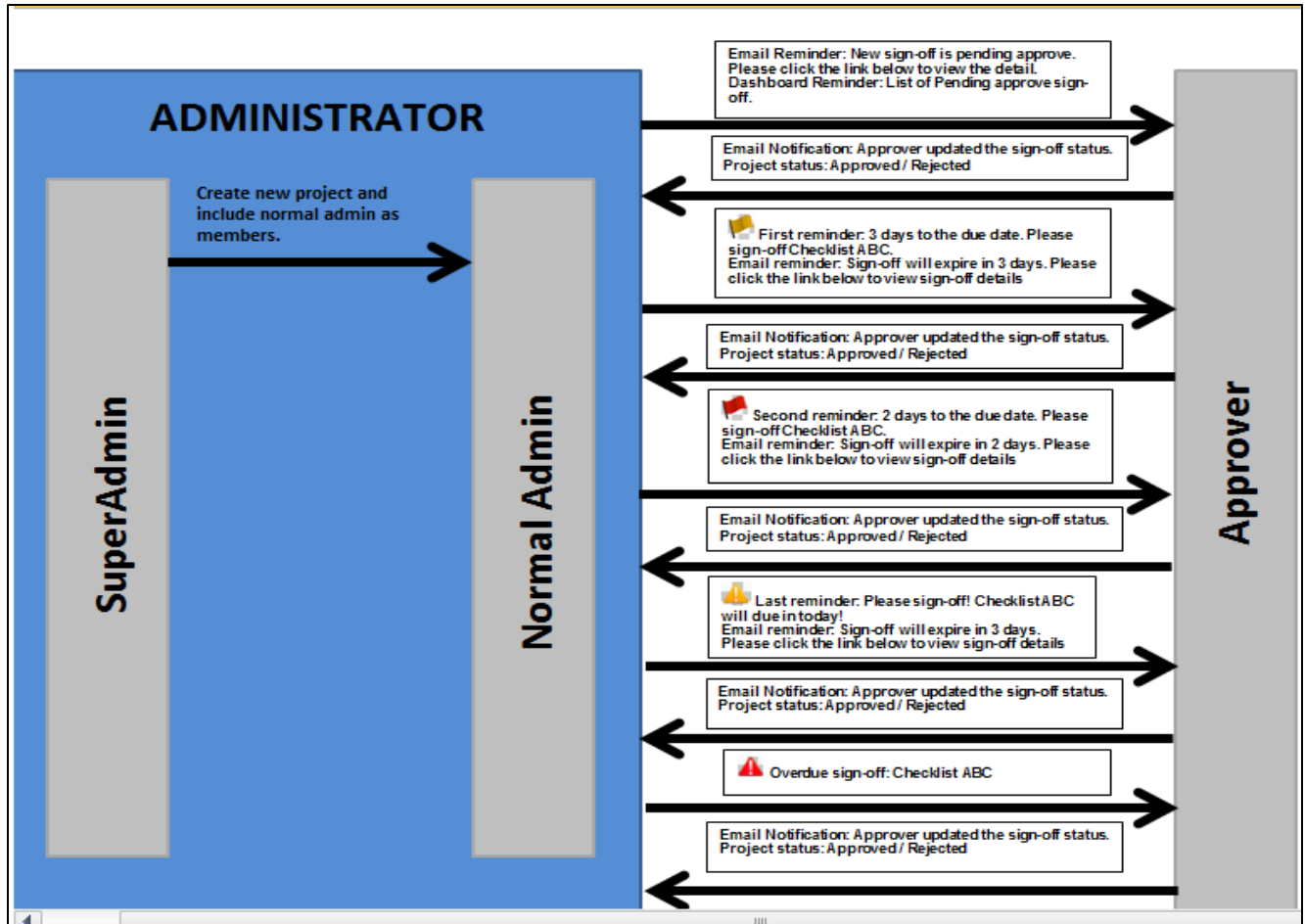


Figure 6: The control tower alert reminder system.

3.3.4 Prototyping

In this phase, the author takes a few steps to develop the prototype for SOMs.

a.) Design System Architecture

In this phase, a framework of user interaction design is rapidly drafted based on the information gathered in the requirement planning phase to describe the system fundamental functions and relationship. This includes the design of the information and operation flows within the system and to figure out the desired system input, process and outputs. The initial system design will be continuously refined throughout the system development as a basis of system development. The figure below shows the proposed functional model for SOMs.

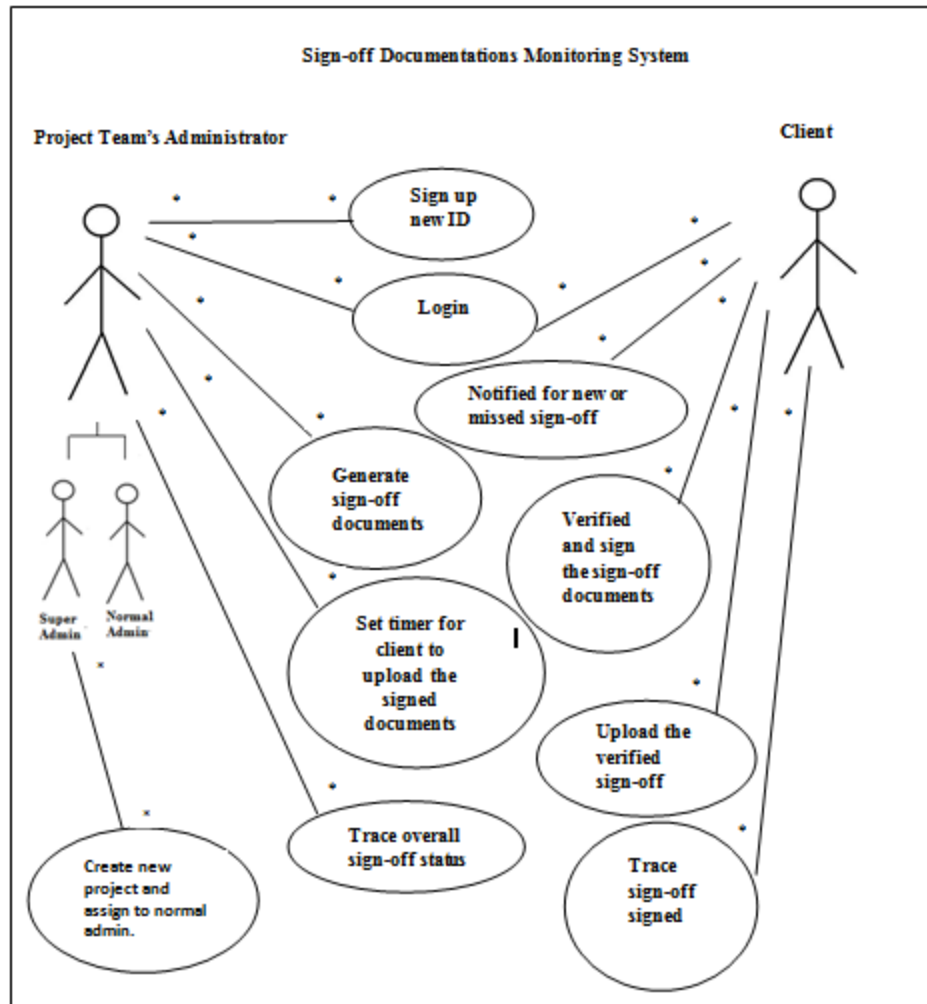


Figure 4: Use-Case diagram for SOMs

The main actors proposed in the systems are:

- i.) Administrator: The administrator is the person in charge to control the whole process in the SOMs.

Table 1: Proposed administrator’s flow of event

Use case name	Generate sign-off documents
Participating Actors	Super admin
Flow of Event	1.) Login

	<ul style="list-style-type: none"> 2.) Create projects and add members 3.) Generate sign-off documents 4.) Set timer for client to verify and upload sign-off 5.) Trace over sign-off status 6.) Have overview of the monthly report.
Alternative Flow (if fail)	<ul style="list-style-type: none"> 1a.) Admin input the wrong ID and password. 1b.)System informs the user and exits. 2a.) Admin upload file not in PDF form. 2b.) System informs the user and exits. 3a.) Admin input wrong time format.
Participating actor	Normal admin
Flow of Event	<ul style="list-style-type: none"> 1.) Login 2.) Generate sign-off documents 3.) Set timer for client to verify and upload sign-off iv.) Trace over sign-off status
Alternative Flow (if fail)	1a.) Admin input the wrong ID and

	<p>password.</p> <p>1b.) System informs the user and exits.</p> <p>2a.) Admin upload file not in PDF form.</p> <p>2b.) System informs the user and exits.</p> <p>3a.) Admin input wrong time format.</p> <p>3b.) System informs the user and exits.</p> <p>4a.) Admin input wrong project ID.</p> <p>4b.) System informs the user and exit.</p>
Entry condition	Admin entry the correct user authentication and valid input.
Exit condition	Admin upload the sign-off file successfully, successfully trace the sign-off status or exit due to no update.

ii.) Client

Table 2: Proposed approver's flow of event

Use case name	Verify, validate and send sign-off documents.
Participating Actors	Client/ Approver

Flow of Event	<ol style="list-style-type: none"> 1.) Login 2.) Verify, validate and send sign-off documents 3.) Upload the verified sign-off documents. 4.) Trace over sign-off status
Alternative Flow (if fail)	<ol style="list-style-type: none"> 1a.) Client input the wrong ID and password. 1b.)System informs the user and exits.
Entry condition	Admin entry the correct user authentication.
Exit condition	Admin upload the verified sign-off file successfully, or exit due to no sign-off received.

b.) System Construction, Implementation, Testing and Refining

The system construction phase focus on the programming and system testing. All the functions initiated in the design phase will be programmed and tested accordingly before the User Acceptance Testing. In this phase, the prototype will be repetitively tested to evaluate whether any problem arose or any new requirements arose. Once all the functions are determined to perform their functions as desired, all the components will be integrated under a same interface and perform the overall functionality testing by the targeted users. All the feedbacks from the users are being recorded and addressed accordingly by redefine the user requirements in the requirement planning phase and back to the design phase again as shown in Figure 1. The prototyping phase was iterated in these four phases before the author come out with a finalized prototype which met the users' requirements.

3.3.5 Usability studies

This activity is carried out after the finalized prototype is done to study the general usability of SOMs and the extend it achieve the objective and goal set earlier on. A series of questions regarding the system usability scale will be designed and the survey will be carried out among 24 practitioners to get the immediate response towards the system when they use it.

3.4 Tools Required

Table 3: Hardware and software specification

No.	Category	Client	Server
1	Hardware	Personal Computer	<ul style="list-style-type: none">• Intel®Core™2 Quad CPU Q9505 @ 2.83GHz• 1.98 GHz,3.46GB of RAM• Physical Address Extension
2	Documentation	Microsoft Office Word 2007 Notepad	
3	Development Tools	PHP, HTML, MySQL	
4	Sign Off Documentation Tools	Microsoft Office Word 2007	

3.5 Gantt Chart

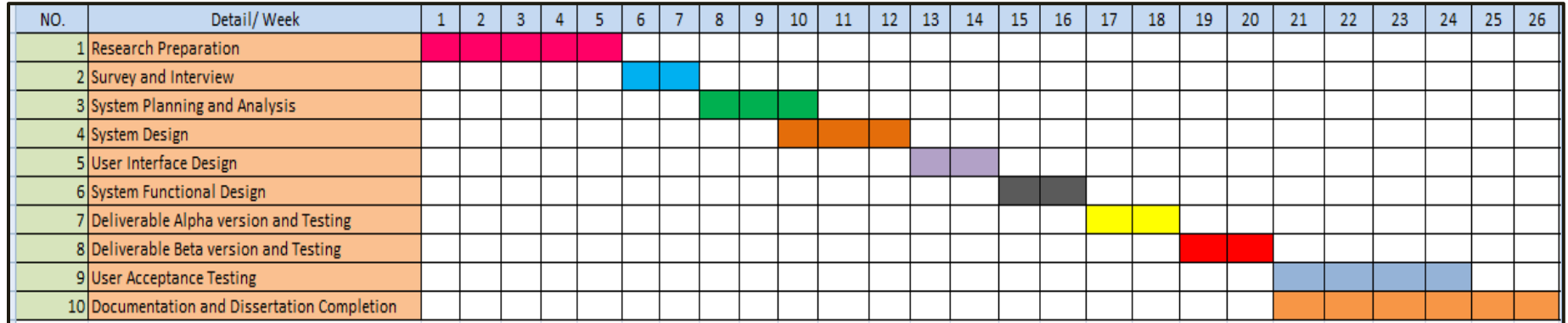


Figure 5: Gantt chart

3.6 Key milestone

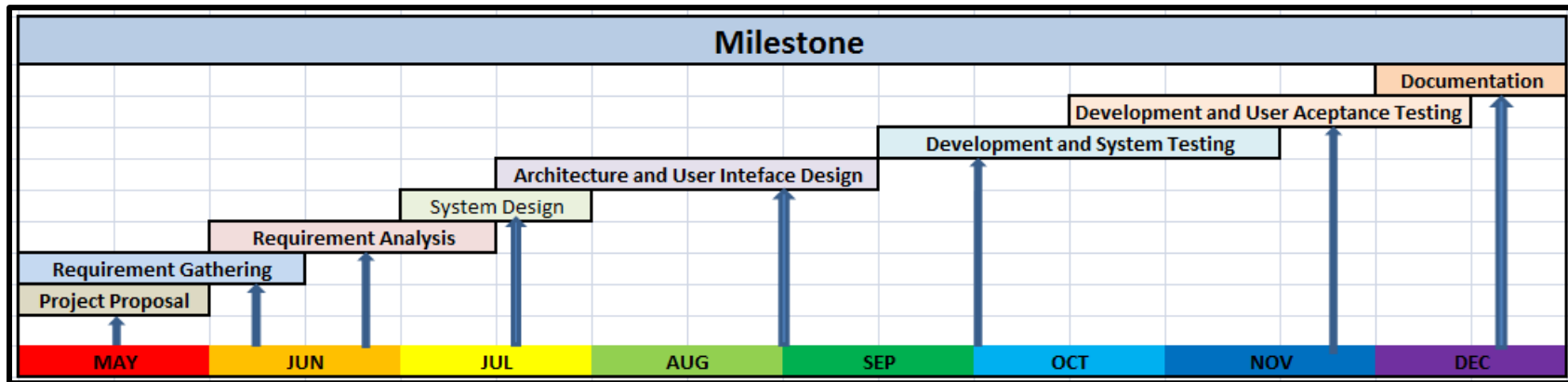


Figure 6: Key Milestone

Chapter 4: Result and Discussion

4.1 Introduction

This chapter will discuss about the analysis of the data collected, user acceptance testing and interpreted the results in required form.

4.2 Preliminary survey analysis

A preliminary survey analysis was carried out among the 24 practitioners during the planning phase in the software industry to identify the problems faced by the project team and further analysis to come out with an adequate solution to solve their problems.

The first three questions in the survey form aimed to determine the relevancy of sign-off documents in the project life cycle and the methods practiced by the project team in sign-off documents delivery. The next four questions are focused on the effectiveness and efficiency of the current sign-off documents delivery methods. The last two questions aimed to determine the features and functions that should be include in the Sign-Off documents Management system (SOMs).

1.)

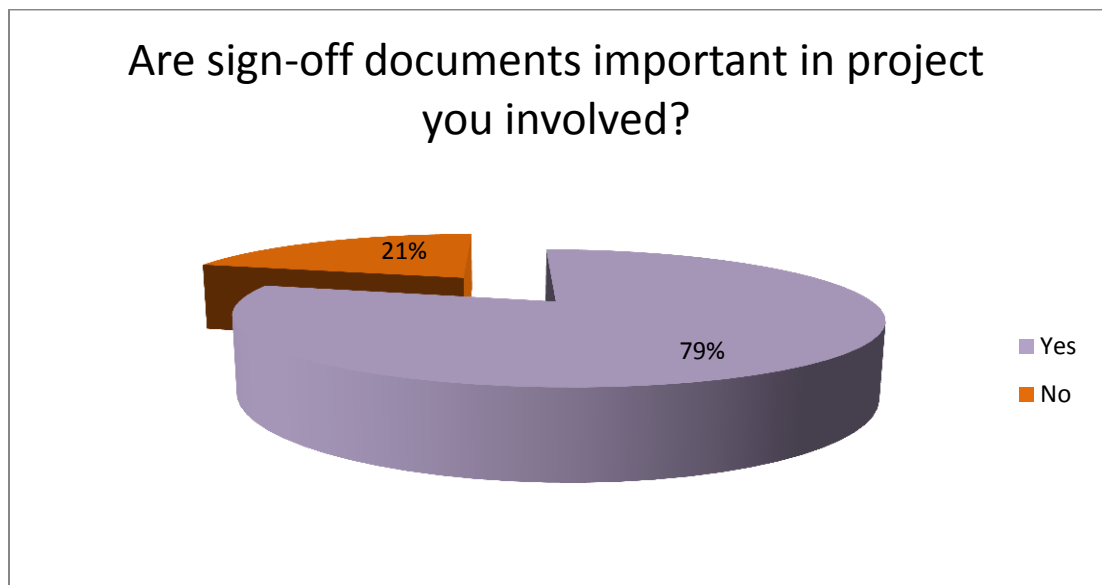


Figure 7: Statistic for importance of sign-off documents in project life cycle

This question aims to find out the importance of sign-off documents in project team. The survey analysis shows that (19/24) 79% of the respondents mentioned that sign-off documents are important in their project life cycle. According to the respondents, it is important for them to get the sign-off documents verified when sending designs and systems finalized functions and code to the clients. It is validated in law that by signing-off the project, the clients accepts the responsibility for the project. If there are any discrepancies regarding the project in the future, it will be under the clients' responsibility and hence it serves as insurance for the project team once the sign-off is being validated. The another (5/24) 21% of the respondents mentioned that sign-off documents are not really important in their work practices claimed that trust is the foundation for successful long-term relationships in business. Sign-off is not a practice in their workstation at which the client is just nearby and everything can be done verbally. According to the analysis the similarity between the 5 practitioners are all of them are working in a small service firm at which the customers are mostly someone closed to their area.

2.)

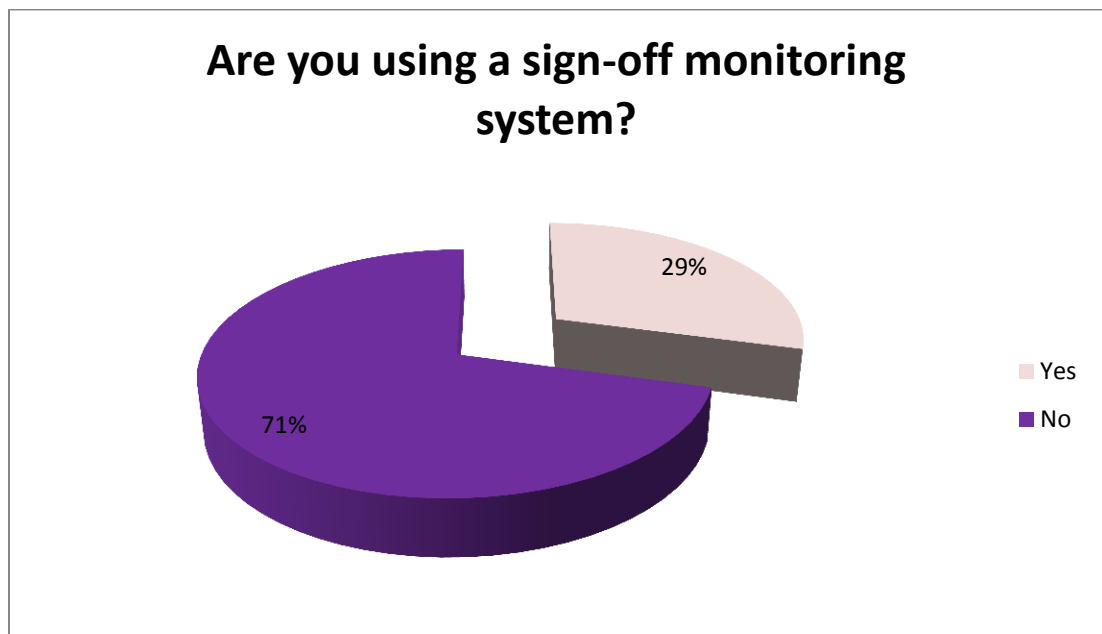


Figure 8: Statistic for the application of sign-off documents management system among the respondents

As seen from figure 5 and figure 6, it can be seen that even though the importance of sign-off documentations are an undeniable fact, most of the project team are not using any formal sign-off documents management system in their working culture. According to the survey, 17 out of 24 (71%) respondents who are not using any formal sign-off system in their daily work while 29% of the respondents are using a simple sign-off system in getting their sign-off documents. One of the respondents who are not using the sign-off system claimed that it is difficult for them to get the sign-off on time from the client normally.

3.)

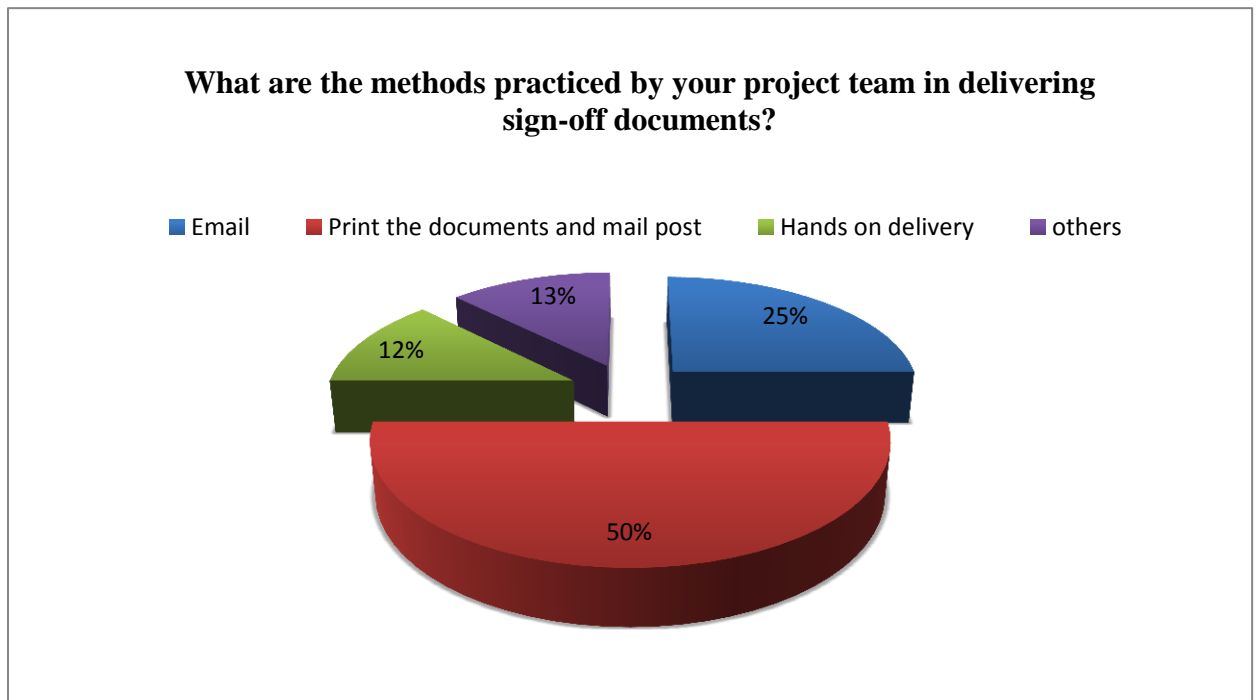


Figure 9: Statistic for the methods practiced by the respondent in delivering sign-off documents

This question aims to track the traditional methods practiced by the respondents in delivering sign-off documents. According to the survey, 12% of the respondents hands on deliver the sign-off documents to their clients, 13% of the respondents verifies the sign-off through phone call, 25% of the respondents email the sign-off documents and 50% of them print the documents and mail post to the respective clients. According to the

respondents, if the client is rejecting the sign-off documents, the same process has to be repeated again until the sign-off is being accepted. This analysis shows that most of the respondents do not have a systematic ways to automate their sign-off documents delivery.

4.)

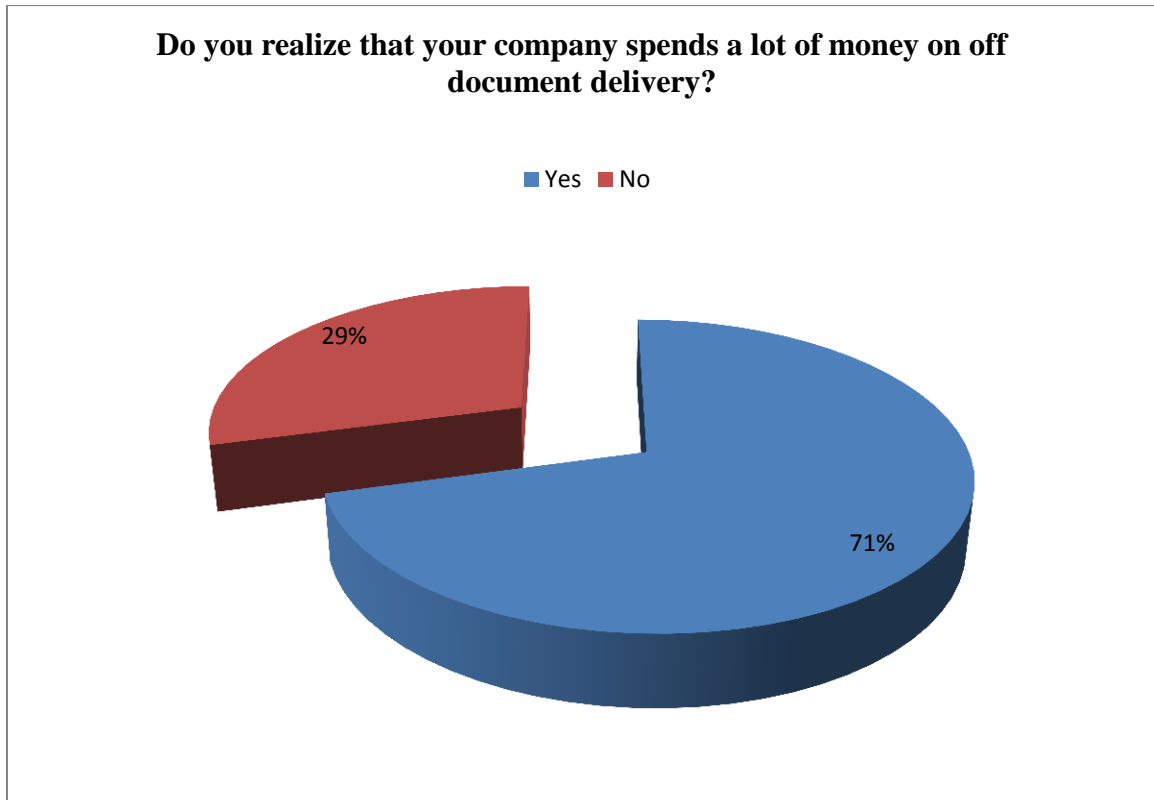


Figure 10: Statistic of the awareness of respondents on monetary expenses in delivery sign-off documents

Figure 8 shows that 71% of the respondents aware that their company spends a lot of money on sign-off document delivery. One of the respondent claimed that the company spends a huge amount of money to in paper, printing and documented the sign-off for auditing purpose. 29% of the respondents do not aware on the monetary expenses in delivering the sign-off documents, as they are not directly in charge on the finance part of the company.

5.)

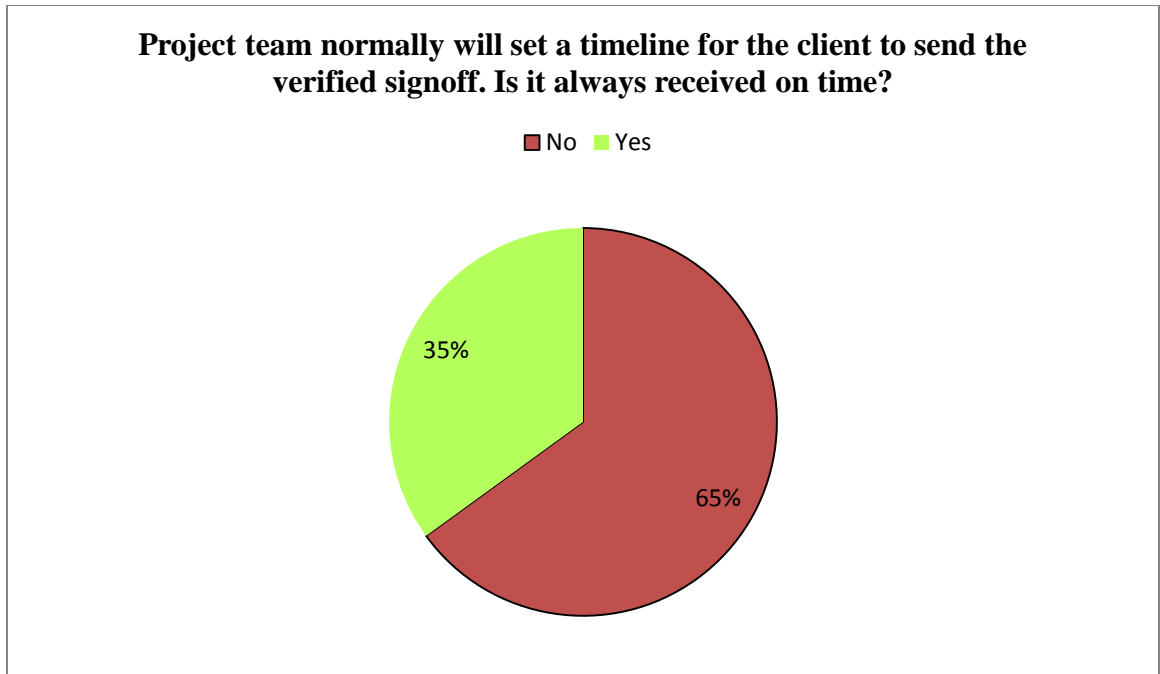


Figure 11: Statistic for setting timeline for sign-off documents

The survey shows that all of the project team will set a timeline for the client to send the verified signoff. Timeline for sign-off documentation is essential for the project team to keep the project on track toward eventual success. Although timeline is set for the sign-off delivery, 65% of the respondents claimed that it is a very normal scenario for them not to receive the verified signoff documentations from the clients on time. The project team members are required to stop their on hand job and call the clients in order to remind them about the timeline. One of the respondent mentioned that the worst case scenario is when they fail to track the person-in-charge and the whole process have to be stopped before they can proceed with it. 35% of the respondents do receive the sign-off on time. The secret behind this success is pre-defined time for each task and keeps reminding the clients through email and phone calls.

6.)

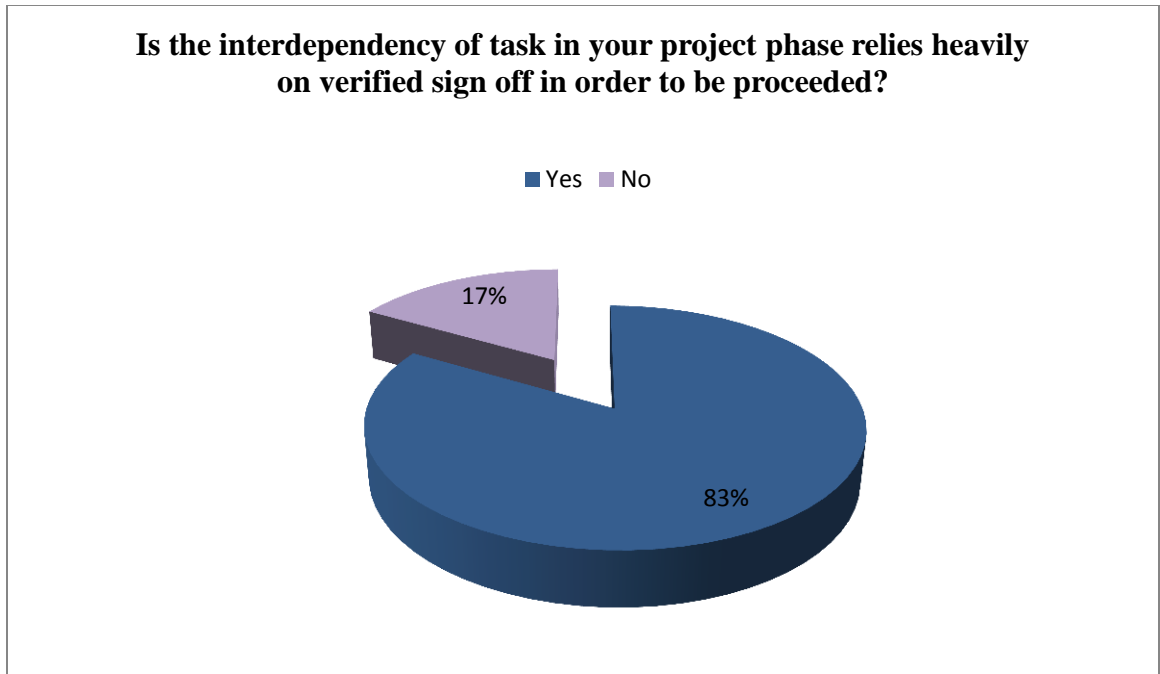


Figure 12: Statistic for the interdependency of task in project phase

The more complex a project is the more dependencies among the tasks that link between all tasks in a project. The most common link between the tasks is finish to start relationship at which the first task must be completed before the second task can start. For example, before the project team gets the approval on the requirements of the system, it is difficult or impossible for them to start coding for the system. It has become the practice of most project teams to obtain sign-off from client before the artwork goes into production. The survey shows that 83% of the respondents claimed that the tasks in the project phase are linked together while 17% of the respondents claimed that their task stand alone and are not affected by any other tasks.

7.)

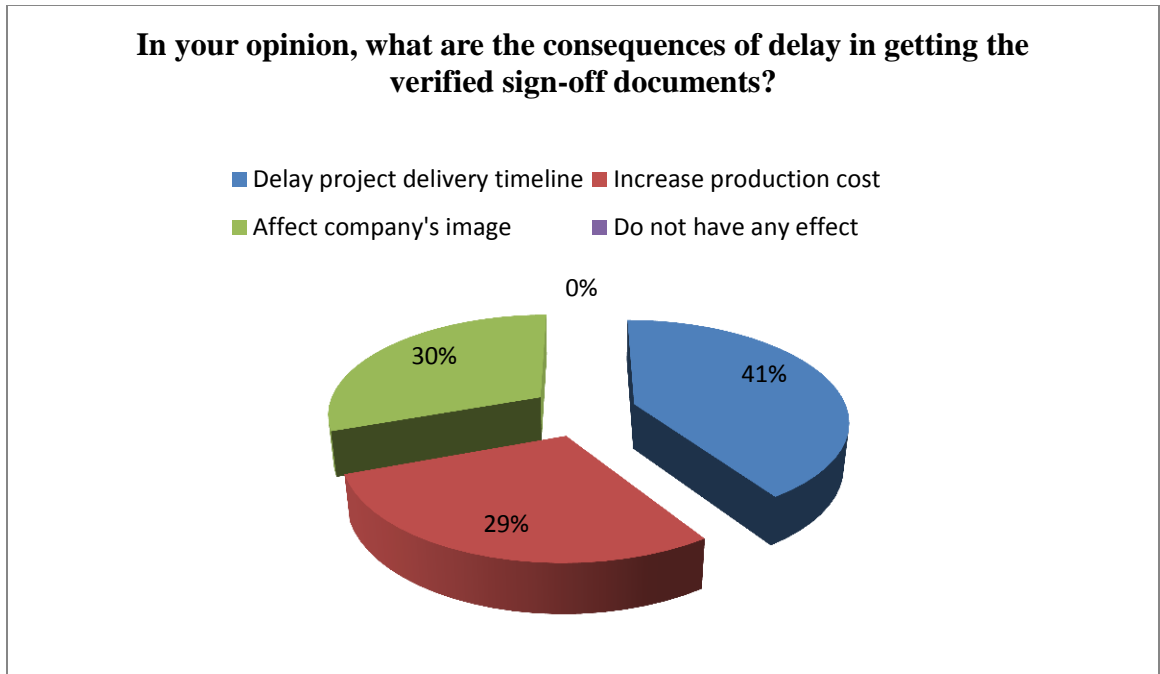


Figure 13: Statistic for the consequences of delay in getting sign-off documents

Delay in getting the verified sign-off documents is a challenging situation for the project team and needs to be handled delicately. 41% of the respondents said that it would indirectly cause the delay in the project delivery. 29% of the respondents agreed that delay in getting sign-off documents would increase the production cost and hence lead to budget overrun. 30% of respondents claimed that the delay in getting sign-off will directly cause delay in project delivery and hence will affect the company's image in long run. In conclusion, delay in getting the verified sign-off documents brings negative effects to the project team.

8.)

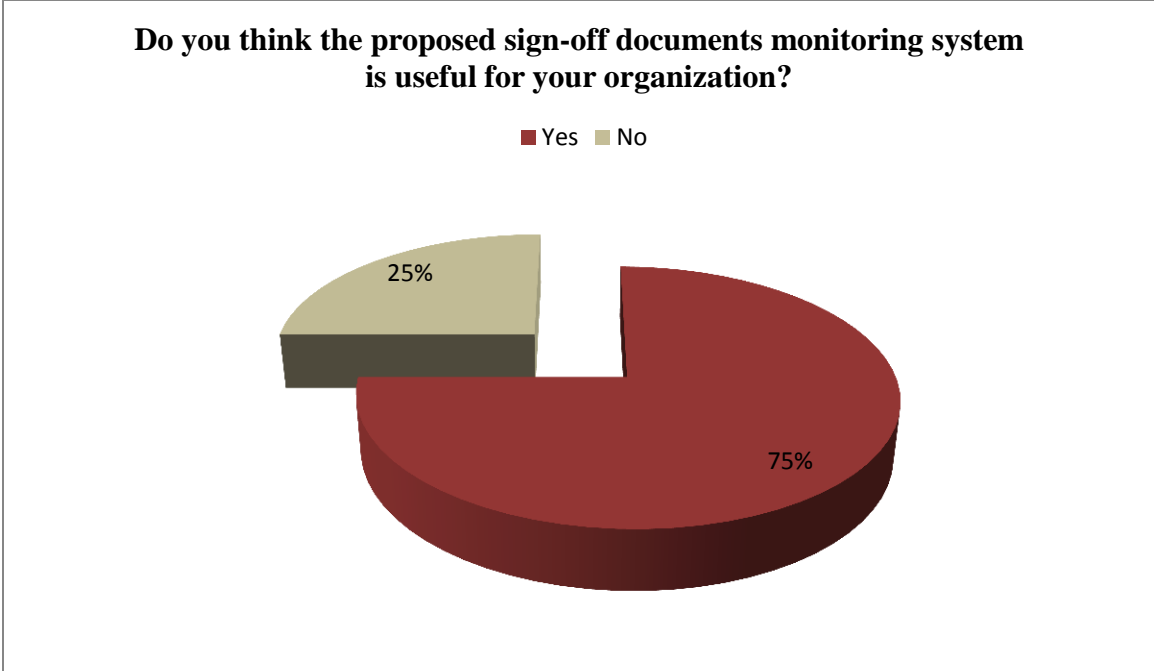


Figure 14: Statistic for market survey

75% of the respondents agreed that the proposed SOMs is useful for their organization in term of managing their sign-off from clients while 25% of the respondents think that it is not really functioning in their working culture. The 25% of respondents mentioned that it is not their culture to use a system to manage their sign-off. The traditional ways of managing signoff documents is more preferable as all the team members and clients already get used to it.

9.)

Please tick function that you think the sign-off documents management system should cover?

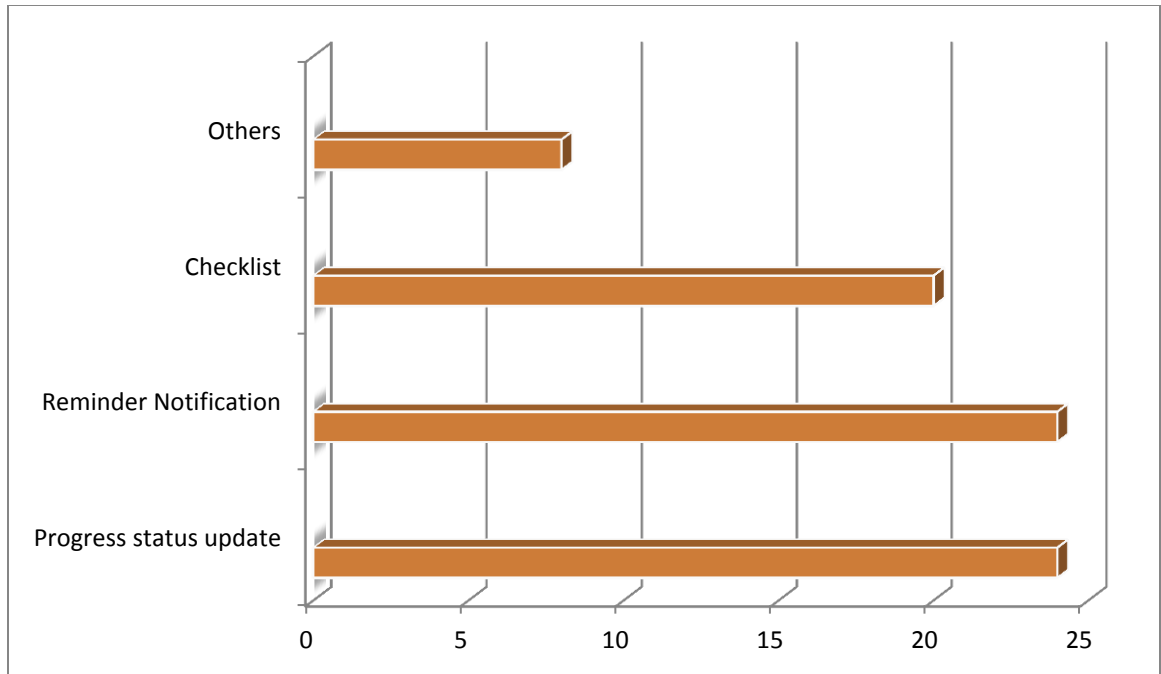


Figure 15: Requirements gathering for the proposed SOMs

Figure 15 shows the requirements of respondents towards the proposed SOMs. The analysis shows that it is crucial for the system to be able to perform progress status update for each sign off documents, provide reminder notification to urge the clients to perform sign-off and also a checklist to trace the progress of the project. Some of the respondents also suggested that the SOMs system should be able to provide a more frequent reminder so that the clients will always be informed about the deadline for the sign-off.

4.3 SOMs Prototype I:

After the preliminary survey analysis was done, the author studied all the requirements and factors of good SOMs and created the first SOMs prototype. Development of SOMs Prototype I involve three phases:

- i.) Research and planning
- ii.) Prototyping
- iii.) User Acceptance Testing

4.3.1 Research and planning

It is important for the author to understand the sign-off documents management practices in project-based software industry before the prototyping begin.

Firstly, the author analyzes the level of access (LOA) to SOMs. After analyzing LOA of sign-off documents in project team, the author start to plan the login access of the SOMs which admin and approver. Besides, she also start to plan the details that need to be included in the sign-off checklist based on the nature of a sign-off documents which she captured during the semi-structured interview.

The system architecture has been decided as well. A framework of user interaction design is rapidly drafted based on the information gathered in the requirement planning phase to describe the system fundamental functions and relationship. This includes the design of the information and operation flows within the system and to figure out the desired system input, process and outputs. The figure below shows the use case diagram for SOMs prototype I.

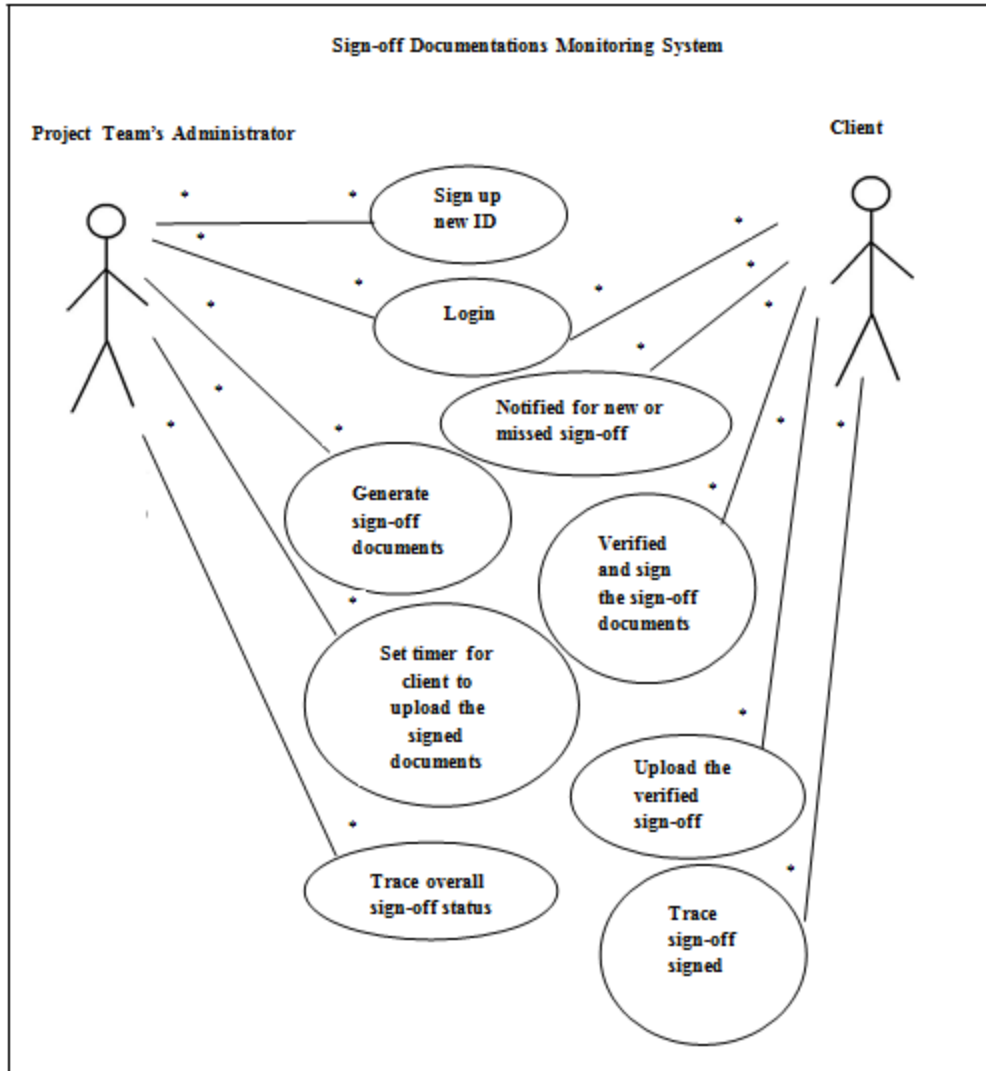


Figure 16: Use-case diagram for SOMs prototype I.

4.3.2 Prototyping

At this phase, the development of SOMs began. The development of SOMs is divided into three stages:

i.) SOMs login Interface

As SOMs is targeted for project team, the author decided to create a simple login interface which is user-friendly. The basic components for SOMs are created. These components included home, contact us, username, and password and forget your password.

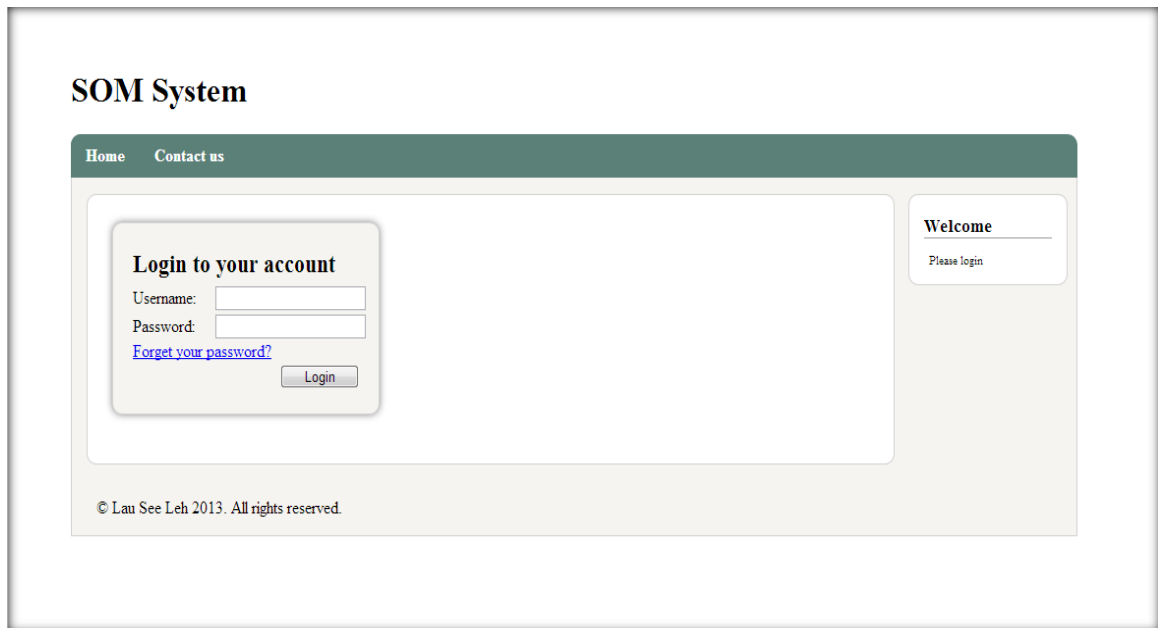


Figure 17: Interface for user login page SOMs prototype I

ii.) SOMs administrator's page

As for the admin page, the basic components that involved are Home, Project Manager, User Manager, Report, Profile and Contact Us.

a.) Project Manager Functionalities for SOMs prototype I.

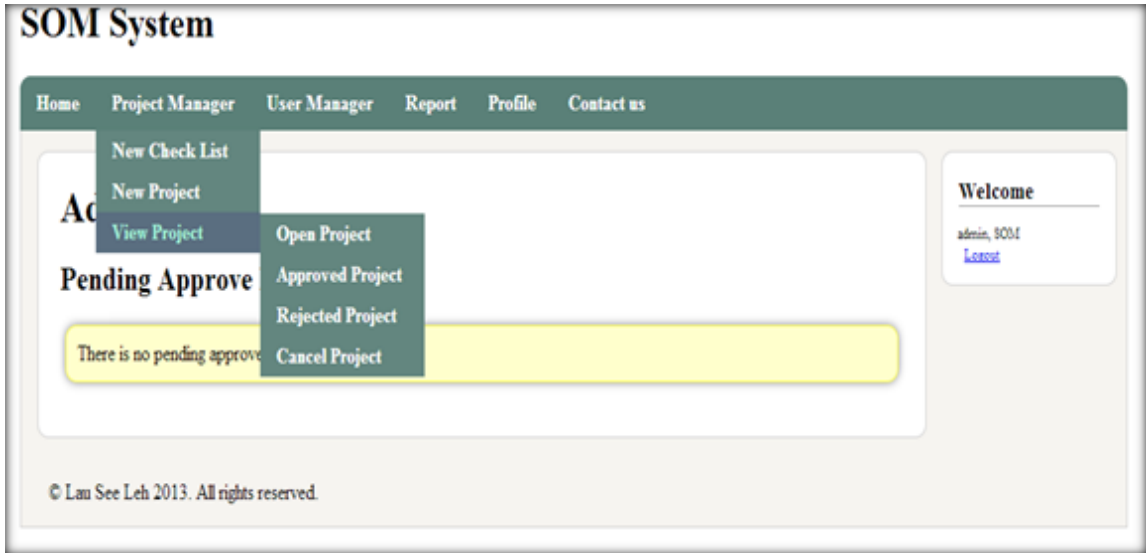


Figure 18: Interface for Project Manager Functionalities for SOMs prototype I

b.) Create New Check List Functionalities for SOMs prototype I.

Create New Check List

Define new sign off check list

Check List ID:

Check List Title:

1. Fill in your check list description into the box at below.
 2. press 'Add' button to insert the information into table.

No	Item Description	Edit

[Note] The check list after release will no longer edible.

Figure 19: Create new project functionalities for SOMs prototype I

Create new project

New Project

Project ID:	<input type="text" value="ABC1234567"/>		
Project Title:	<input type="text" value="Testing 1"/>		
Sign off Due Date:	<input type="text" value="2013-07-31"/> x ↕ ▼	Create Date:	<input type="text" value="2013-07-25"/>
Project Admin:	<input type="text" value="Admin"/>	Admin Email:	<input type="text" value="admin01@soms.com"/>
Approver Name:	<input type="text" value="Approver"/> ▼	Approver Email:	<input type="text" value="approver@gmail.com"/>

Upload your document

Only allow upload pdf format file and file size no more then 1MB.

Filename: No file chosen

Figure 20: Interface for new project functionality SOMs prototype I

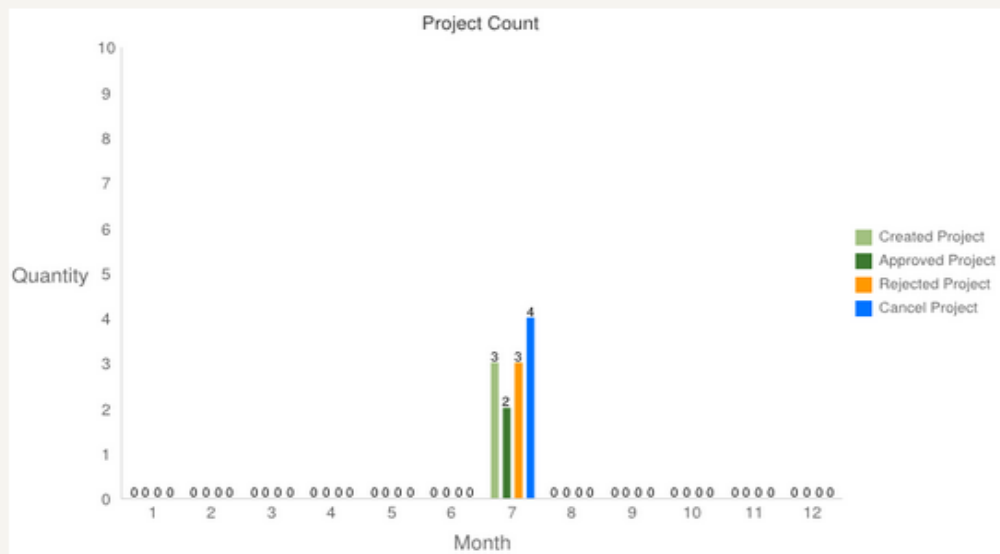
c.) **Report functionality for SOMs prototype I.**

Report

Project Count Year 2013

id	Month	Created Project	Approved Project	Rejected Project	Cancel Project
1	7	3	2	3	4

Project Count in Chart



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Figure 21: Interface of report for SOMs prototype I

d.) **Email notification to administrator for SOMs prototype I.**

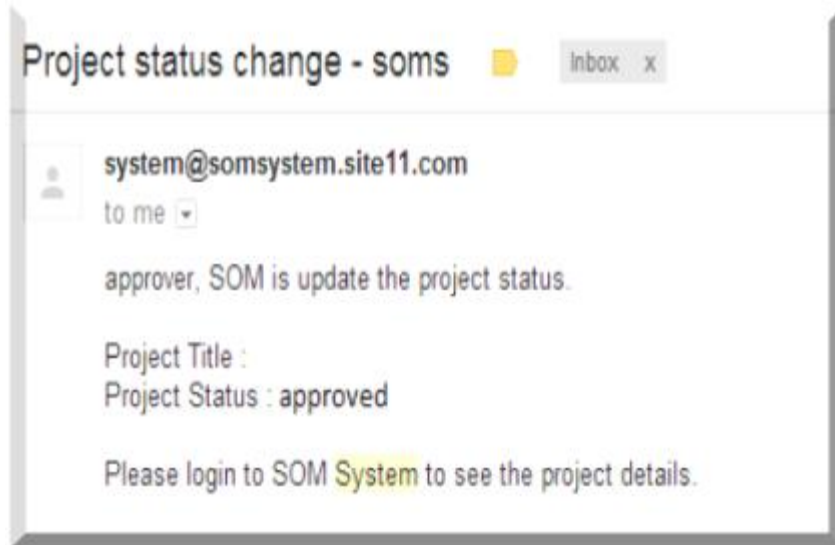


Figure 22: Sample of email notification for administrator for SOMs prototype I

iii.) **SOMs approver’s page**

a.) **Home Page of Approver’s account for SOMs prototype I**

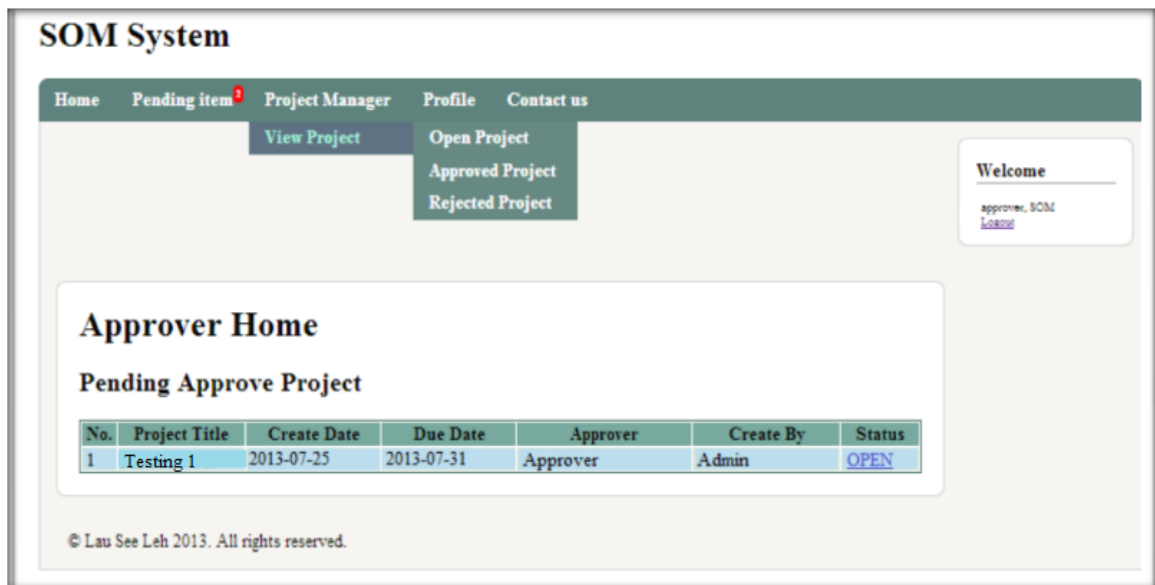


Figure 23: Interface of approver account for SOMs prototype I

b.) **Sign-off received by approver for SOMs prototype I.**

Approve Project

Approve Project

Project ID:

Project Title:

Sign off Due Date: Create Date:

Project Admin: Admin Email:

Approver Name: Approver Email:

Project document:

Status:



Sign Off item



No	Description	Status	Remark
1	SOM system document must have icon	<input type="radio"/> Yes <input type="radio"/> No	<input checked="" type="checkbox"/> Add
	<input type="text" value="SOM system document must have at least 3 icons."/>		
2	SOM system user can change log in password in profile	<input type="radio"/> Yes <input type="radio"/> No	<input type="checkbox"/> Add
3	SOM system document report	<input type="radio"/> Yes <input type="radio"/> No	<input type="checkbox"/> Add

Figure 24: Interface of sign-off received by approver for SOMs prototype I

c.) Reminder at the approver's dashboard for SOMs prototype I

Notifications

 **First REMINDER: 3 days to the due date: Please sign-off TESTING 1.** 

 **Second REMINDER: 2 days to the due date. Please sign-off TESTING 1.** 



 **LAST WARNING: TESTING 1 due today! Please sign-off NOW!** 

Figure 25: Sample of reminder notification at approver's dashboard for SOMs prototype I

c.) Email reminder to approver for SOMs prototype I.

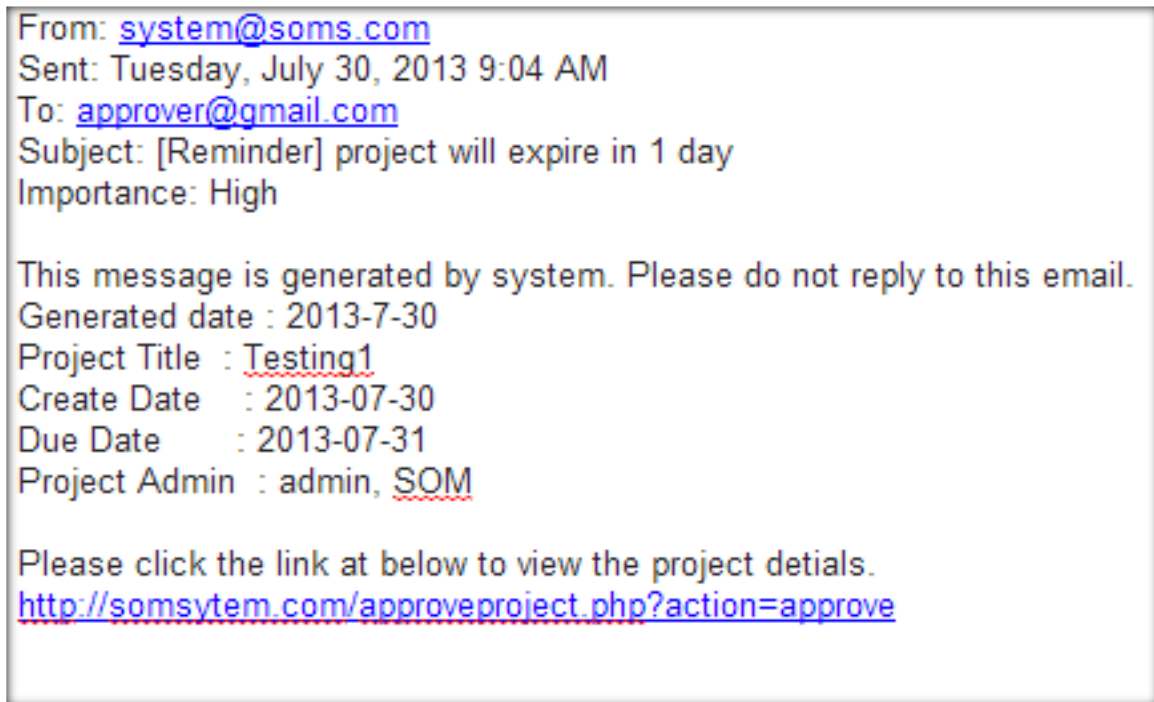


Figure 26: Sample of email reminder to approver for SOMs prototype I

4.3.3 User Acceptance Testing (UAT)

For the SOMs prototype I UAT, the author implemented questionnaires survey together with semi-structured interview to evaluate various aspects of SOMs prototype I. This survey targeted on the project-based software industry practitioners.

a.) Questionnaires survey

The evaluation questionnaire was designed based on the following objective:

- i.) To evaluate the performance of SOMs prototype I and user satisfactions.
- ii.) To access the relevancy of SOMs to project-based software industry's sign-off documents management practice.
- iii.) To get the constructive comments and recommendation to improve the prototype.

The questionnaire for SOMs prototype I UAT was in Likert- type scale and divided into three sections. All the 24 respondents are given the choice to choose the answer among the 5 choices: 1(poor), 2 (fair), 3(satisfy), 4(good) and 5 (excellent) for all sections.

Section 1: SOMs performance

This section focuses on the user satisfaction towards SOMs prototype I.

Section 2: SOMs relevancy to industry

This section focuses on the user’s perception regarding the applicability of SOMs to their workload.

Section 3: General

This section focuses on the user’s satisfaction towards the interface of SOMs.

b.) Semi- structured interview

The interview is done in groups which comprises of 5 respondents. The respondents are asked to give comments regarding the benefits, weaknesses SOMs prototype I and the recommendations to improvise it.

4.3.4 UAT evaluation analysis for SOMs prototype I

a.) Questionnaires survey analysis

This section reports on the feedbacks from the industry practitioners towards SOMs prototype I and the constructive comments to improvise SOMs.

The table below shows the result of the UAT evaluation for SOMs prototype I.

Table 4: UAT evaluation result for SOMs prototype I.

		Poor		Fair		Satisfy		Good		Excellent	
		1	%	2	%	3	%	4	%	5	%
SOMs Performance (overall)			0.0		12.0		44.0		42.0		2.0
1	How effective SOMs in managing sign-off documents?		0.0	5	25.0	9	45.0	6	30.0		0.0
2	Is the sign-off		0.0	2	10.0	8	40.0	10	50.0		0.0

	checklist in SOMs useful in real life?										
3	How well does SOMs reduce the sign-off management workload?		0.0		0.0	8	40.0	12	60.0		0.0
4.	How well SOMs reduce the cost and human resource burden compared to the existing practice?		0.0	5	25.0	5	25.0	8	40.0	2	10.0
5.	How well the reminders represent the emergency of the sign-off?		0.0		0.0	14	70.0	6	30.0		0.0
SOMs industry relevancy (overall)			0.00		6.7		25.0		58.3		10.0
6.	How effective SOMs to your company?		0.0		0.0	5	25.0	13	65.0	2	10.0
7.	How effective will SOMs reduce the delay in getting sign-off?		0.0	4	20.0	6	30.0	10	50.0		0.0
8.	Is it applicable to project-based software industry?		0.0			4	20.0	12	60.0	4	20.0
General (overall)			0.0		0.0		22.5		67.5		15.0
9.	Is SOMs user-		0.0		0.0	4	20.0	12	60.0	5	30.0

	friendly?										
10.	What is your overall rating on SOMs' interface?		0.0		0.0	5	25.0	15	75.0		0.0

Generally, SOMs prototype I get a positive feedback from the respondents in system performance, relevancy and general rating. Throughout the survey, the author actually carries out chit-chatting session with the respondents to get some constructive comments regarding SOMs prototype I.

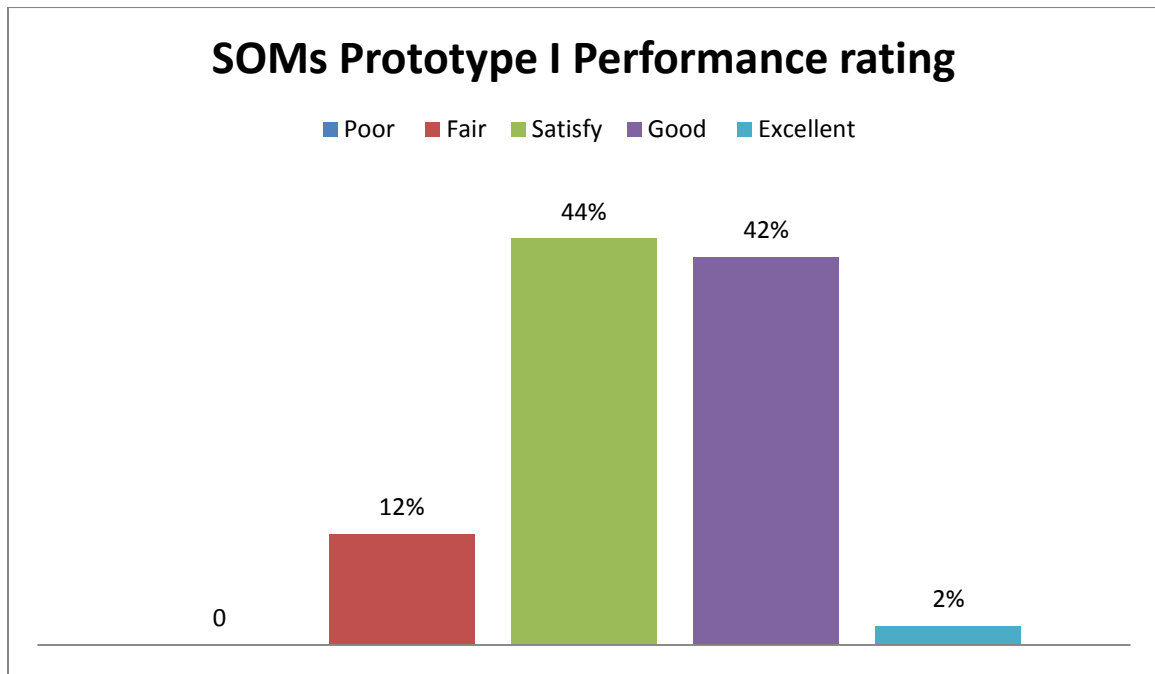


Figure 27: SOMs Prototype I Performance rating

Figure 24 shows that 88% of the respondent had given a satisfying rate on the performance of SOMs prototype I. This is because this idea actually provides an easier way for them to manage their sign-off documents management. They also added this system is definitely a better one if the author further improves it in terms of level of access and reminders. There are only 12% of the respondent were little satisfying with SOMs prototype I. Their reason is that SOMs prototype I is not solid enough. This

system should offer two level of access for administrator for example team lead and team members instead of only administrator.

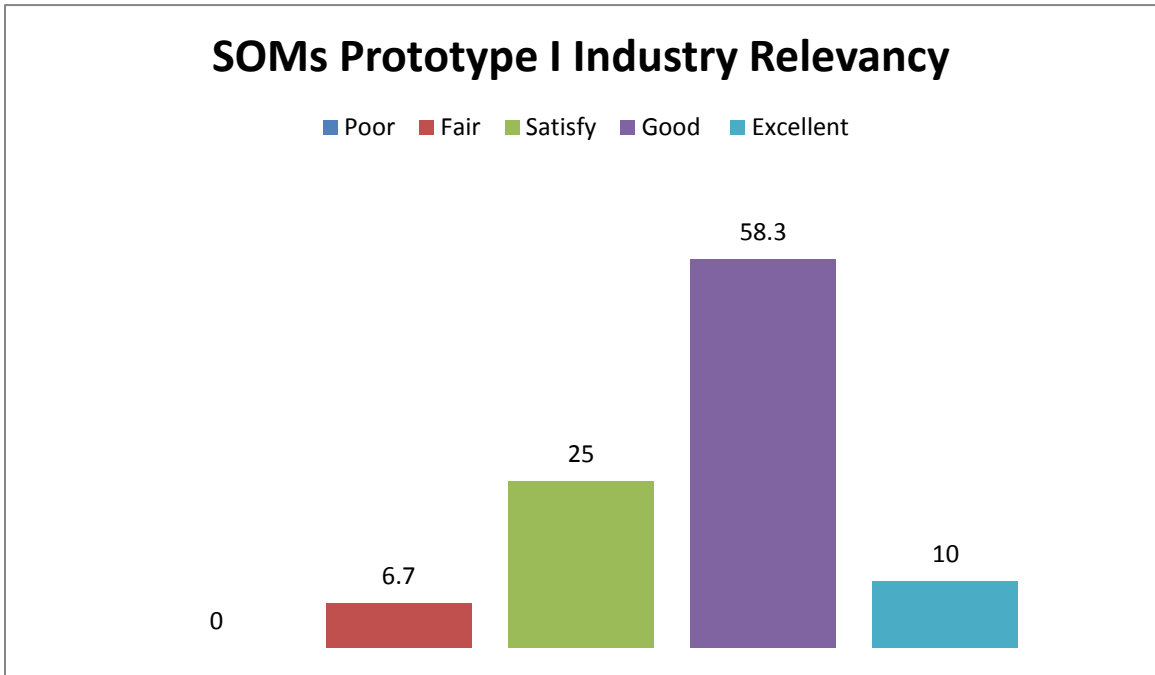


Figure 28: SOMs Prototype I Industry Relevancy evaluations

For the Industry relevancy, 93.3% of the respondents had given a satisfying rate to SOMs. Most of the respondents believed that SOMs is better in managing sign-off documents than the existing manual practices. They also agreed that software industry will accept SOMs and employ it in the future as it is able to reduce the human resource burden, cost and most importantly able to improve productivity. The 6.7% of the respondents claimed that some of the approver may just ignore all sort of reminders and in the end manual calling is still more useful. Since most of the respondents (93.3%) agreed that SOMs have a good potential in software industry, SOMs is likely to expand in the future.

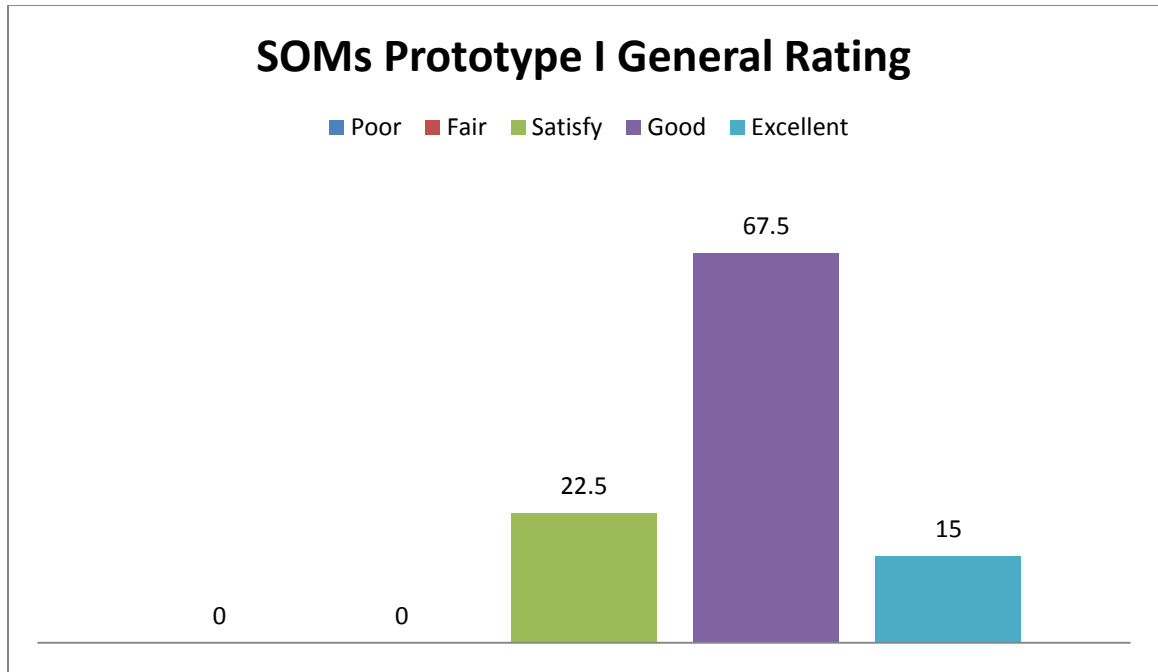


Figure 29: SOMs Prototype I General Rating

Others than that, the rating of general evaluation of SOMs prototype I was fall in the positive categories: satisfy (22.5%), good (67.5%), excellent (15%). Overall, the respondents are happy with the interface design of SOMs which they claim is user-friendly and comfortable.

b.) Semi-structured interview

For this section, respondents were requested to give their opinion on the benefits of the SOMs and the way to improve it. All the respondents had given their own opinion as shown in the table below.

Table 5 : Benefits and recommendations of SOMs based on prototype I.

Benefits of SOMs	
1.	Electronic sign-off documents is able to reduce the problematic condition that caused by manual practices. (Reduce the calling and filing part)
2.	It will be easier to trace back the sign-off records and make a reference when needed.
3.	More organize than paper based sign-off documents keeping.
4.	Indirectly pressure the approver to alert about the sign-off through the

	reminders.
5.	Can save paper cost.

Recommendations	
1.	Make more level of access for administrator: team leader and members.
2.	The reminder at the approver dashboard can be improvised, make it more professional.
3.	One project can have many sign-off. For now, SOMs create new project for every new sign-off. This is not realistic.
4.	It will be better if SOMs improve in term of security.

From the analysis of the feedback given above, most of the respondents see the benefit of SOMs and also gave some constructive comments to improve the system. The recommendations are taking into consideration for SOMs prototype II.

4.4 Improved SOMs Prototype II:

From the UAT analysis of SOMs Prototype I, the author studied again all the requirements and factors of good SOMs by taking all the recommendations and comments from UAT analysis of SOMs Prototype I.

The development of the improved SOMs Prototype II involves three phases as below:

- i.) Research and planning
- ii.) Prototyping
- iii.) User Acceptance Testing

4.4.1 Research and planning

From the UAT analysis of SOMs Prototype I, the respondents commented that there should be more level of access (LOA) for administer for SOMs. The author analyzes the suggestion and come out with a new framework of user interaction design to describe the system fundamental functions and relationship. The figure below shows the improved use case diagram for SOMs prototype II.

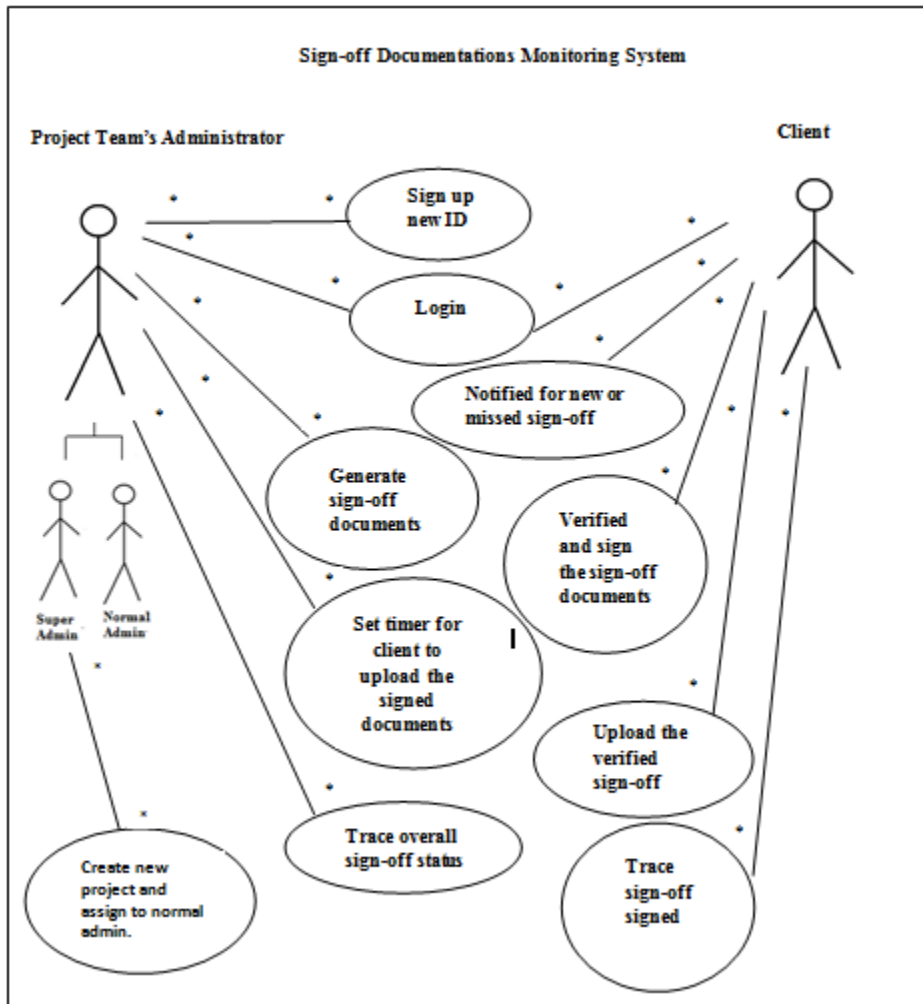


Figure 30: Use case diagram for SOMs prototype II.

4.4.2 Prototype II of SOMs application

At this phase, the improvement SOMs prototype began. The author improvises the SOMs by taking consideration on the recommendations from UAT of prototype I. The below describe the application of SOMs resulted from improvement of SOMs prototype

i.) SOMs login Interface

The author implemented Completely Automated Public Turing test to tell Computers and Human Apart (CAPTCHA) as a security testing to determine whether the user is human or not. This improvement is based on the recommendation earlier on when the author carry out UAT for SOMs prototype I.

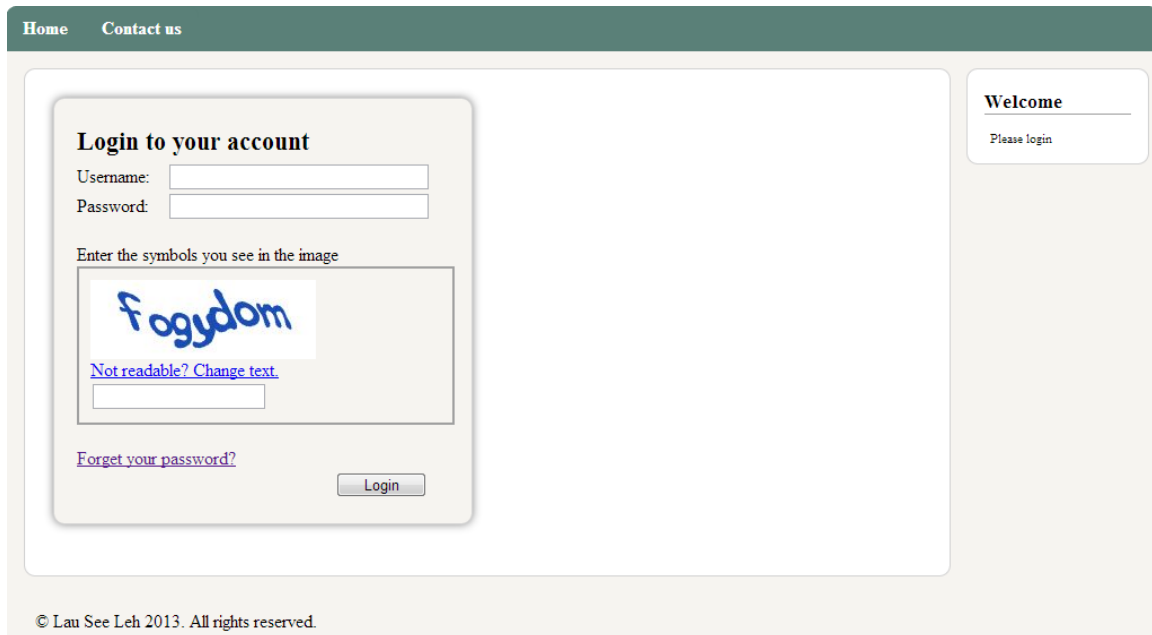


Figure 31: Interface of login page for improved SOMs prototype II

ii.) SOMs super administrator's page

In order to fulfill the requirement of level of access for administrator of project team, the author come out with the role-based access control at which there will be three different type of ID assigned. As for the administration side, the ID will be divided into Superadmin ID and normal ID. Superadmin ID enables the ID holder to access to all the information in SOMs , create new project and assign project to normal admin and also allow the ID holder to create new ID for normal admin. Figure XX shown below is the dashboard for SOM's Superadmin Home page.

SOM System

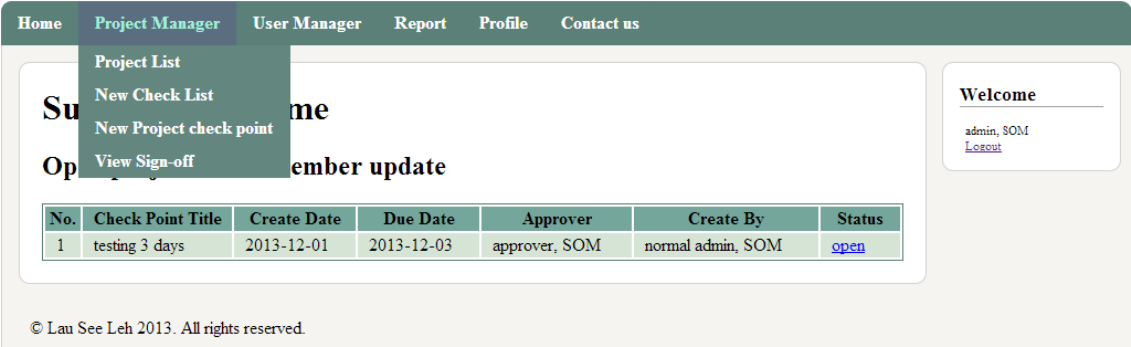


Figure 32: Interface of superadmin homepage for improved SOMs prototype II

Main Menu for SOMs super administrator’s page. Once the super administrator ID’s holder successfully login, user can enter to the super administrator’s account as show in Figure XX. From here, user can perform the following functions:

- a.) **View project list** – To view the created project records under ID’s holder.

SOM System

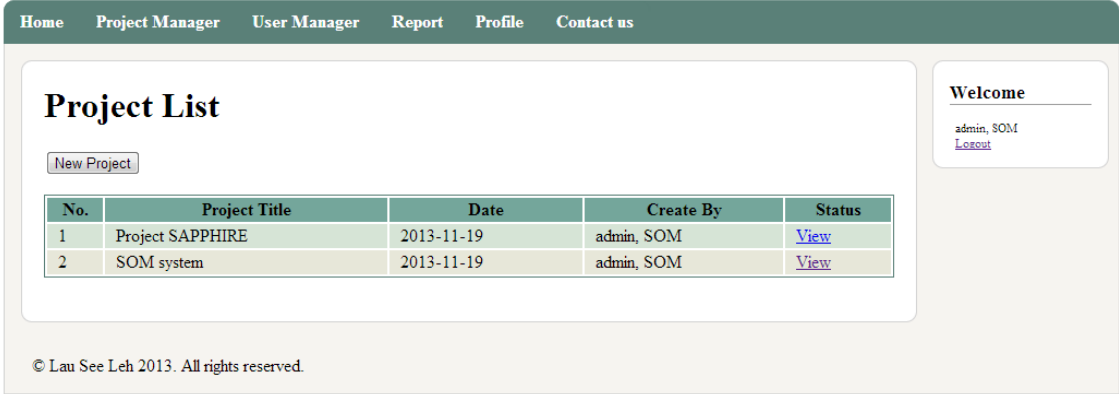


Figure 33: Interface of view project list for improved SOMs prototype II

b.) **View project Details** – To view the details of particular project records.

View Project

View Project Details

Project ID:	C8F12845-C9E2-404B-AC87-9CBE4D74B692
Project Title:	Project SAPPHIRE
Create Date:	2013-11-19
Create by:	admin, SOM

Project Team Member

No	Admin Name	Role	Status
1	normal admin, SOM	admin	
2	admin, SOM	superadmin	

Project Check Point

No.	Project Title	Create Date	Due Date	Approver	Create By	Status
1	testing 1	2013-12-01	2013-12-02	approver, SOM	admin, SOM	open
2	testing 3 days	2013-12-01	2013-12-03	approver, SOM	normal admin, SOM	open
3	testing 2	2013-12-01	2013-12-08	approver, SOM	admin, SOM	open
4	Project Sapphire training set	2013-11-21	2013-11-28	approver, SOM	normal admin, SOM	open
5	Testing	2013-11-20	2013-11-22	approver, SOM	admin, SOM	approved
6	training data	2013-11-20	2013-11-27	approver, SOM	admin, SOM	approved
7	Project SAPPHIRE data cleansing	2013-11-19	2013-11-26	approver, SOM	normal admin, SOM	open
8	Data cleansing	2013-11-19	2013-11-26	approver, SOM	admin, SOM	approved

Figure 34: Interface of view project details for improved SOMs prototype II

c.) **Create new Project:** To allow super administrator to create new project and add team members (normal administrator) who are responsible for it.

SOM System

Home Project Manager User Manager Report Profile Contact us

Create new Project

New Project

Project ID: 967590E6-8581-4A6B-A222-1FC42B83A2E0

Project Title: Enter a valid project title

1. Select the user name.
2. press 'Add' button to insert the member.

normal admin, SOM Add

No	Admin Name	Role	Status
1	admin, SOM	superadmin	

Release

Welcome
admin, SOM
[Logout](#)

Figure 35: Interface of create new project for improved SOMs prototype II

- d.) **Create new Project Check Point** – To allow the administrator to send new sign-off for the project created.

Create new Project Check Point

New Project Check Point

Project Title:

Check Point ID:

Check Point Title:

Sign off Due Date: Create Date:

Project Admin: Admin Email:

Approver Name: Approver Email:

Upload your document

Only allow upload pdf format file and file size no more than 1MB.

Filename:

Sign Off item

Select the sign off check list: -

No	Item Description
1	Is the data accurate?

Figure36: Interface for create new project check point for improved SOMs prototype II.

e.) **View sign-off:** To view the sign-off record.

The view sign-off function is supported by four sub- functions:

1.) Opened sign-off

View Project Check Point

View Open Project Check Point

No.	Check Point Title	Create Date	Due Date	Approver	Create By	Status
1	Project SAPPHIRE data cleansing	2013-11-19	2013-11-26	approver, SOM	normal admin, SOM	open
2	som interface	2013-11-19	2013-11-26	approver, SOM	admin, SOM	open
3	Project Sapphire training set	2013-11-21	2013-11-28	approver, SOM	normal admin, SOM	open
4	testing 1	2013-12-01	2013-12-02	approver, SOM	admin, SOM	open
5	testing 3 days	2013-12-01	2013-12-03	approver, SOM	normal admin, SOM	open
6	testing 2	2013-12-01	2013-12-08	approver, SOM	admin, SOM	open

Figure 37: Interface for view project check point for improved SOMs prototype II

2.) Approved sign-off

View Project Check Point

View Approved Project Check Point

No.	Check Point Title	Create Date	Due Date	Approver	Create By	Status
1	Testing	2013-11-20	2013-11-22	approver, SOM	admin, SOM	approved
2	Data cleansing	2013-11-19	2013-11-26	approver, SOM	admin, SOM	approved
3	training data	2013-11-20	2013-11-27	approver, SOM	admin, SOM	approved

Figure 38: Interface of view approved project check point for SOMs prototype II

3.) Rejected sign-off

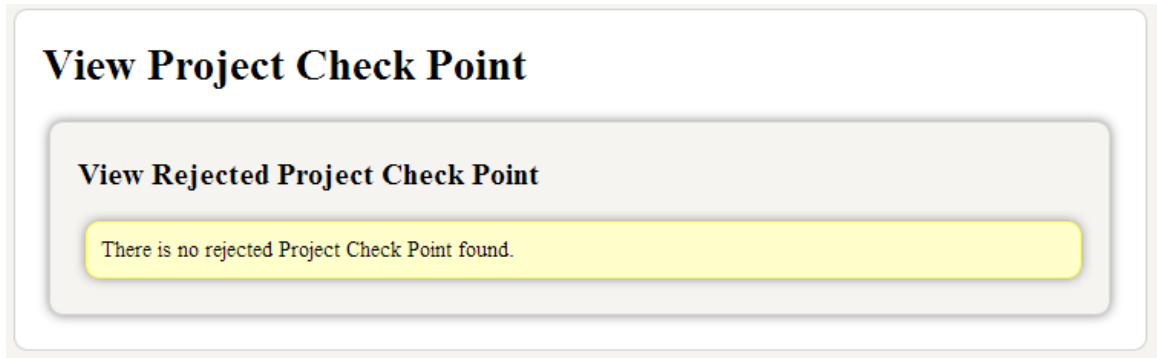


Figure 39: Interface of view rejected project check point for SOMs prototype II

4.) Cancel sign-off

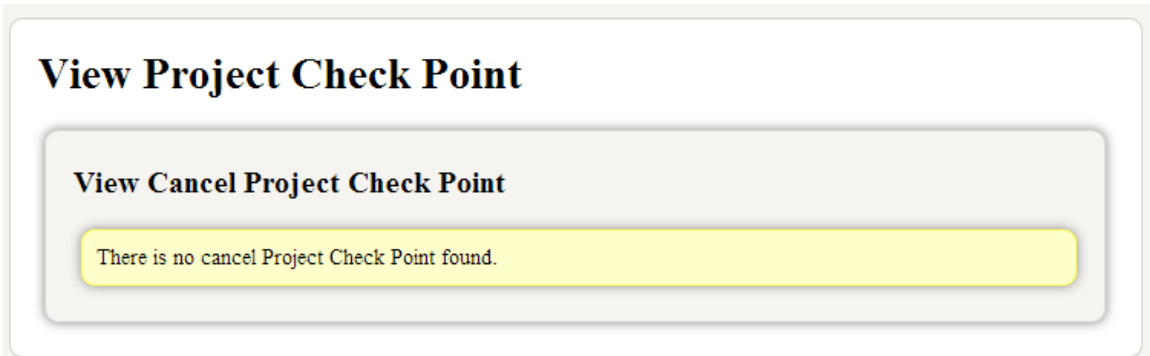


Figure 40: Interface for view project check point for SOMs prototype II.

f.) User manager- To allow the superadmin to create new account for normal admin and approver.

Admin user list

[New admin](#)

No.	Name	User Name	Email	Phone
1	normal admin, SOM	NADMIN	normal.somsystem@gmail.com	0171234567

Figure 41: Interface of normal admin user list create new admin user for improved SOMs prototype II.

Approver user list

New approver

No.	Name	User Name	Email	Phone
1	approver, SOM	APPROVER	seeleh623@gmail.com	0128811212

Figure 42: Interface of approver user list and create new approver user for improved SOMs prototype II

g.) **Full graphical report:** To have an overview of sign-off in monthly basis.

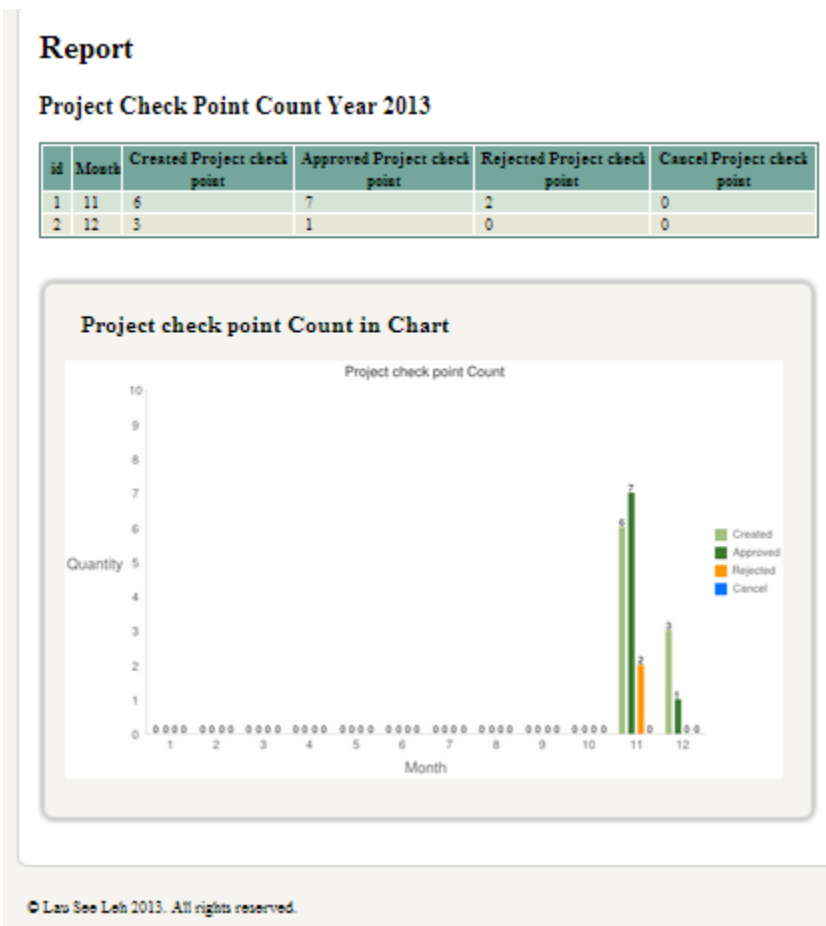


Figure 43: Interface of Report for improved SOMs prototype II

iii.) **SOMs normal administrator's page**

As for the normal admin ID, it the ID holder is only allowed to access to the project assigned to it and all the information in the normal admin page is limited as compared to the Superadmin. The normal admin ID is able to create new checklist (sign-off) for its project.

SOM System

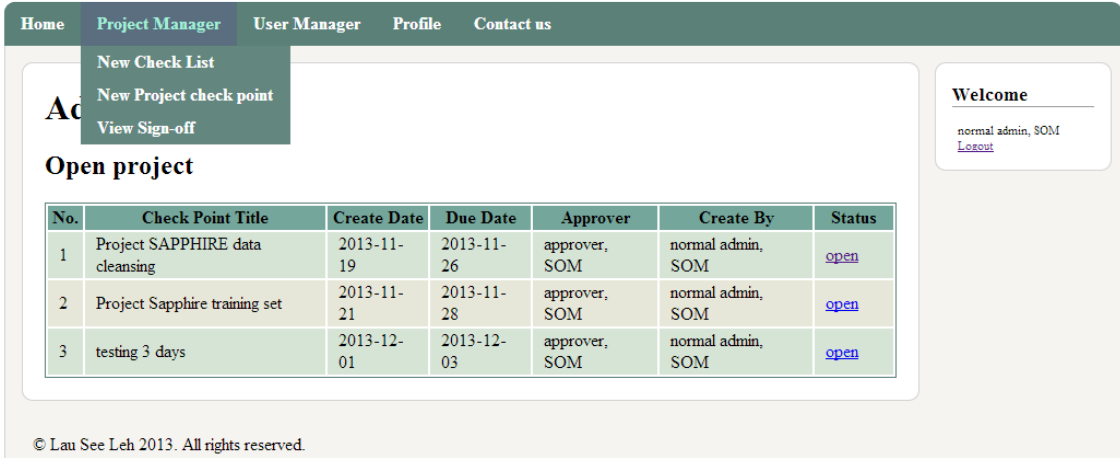


Figure 44: Interface for normal administrator’s home page for improved SOMs prototype II

Once the normal administrator ID’s holder successfully login, user can enter to the normal administrator’s account as show in Figure XX. From here, user can perform the following functions:

- a.) **View sign-off checklist** – To view the record of released checklist

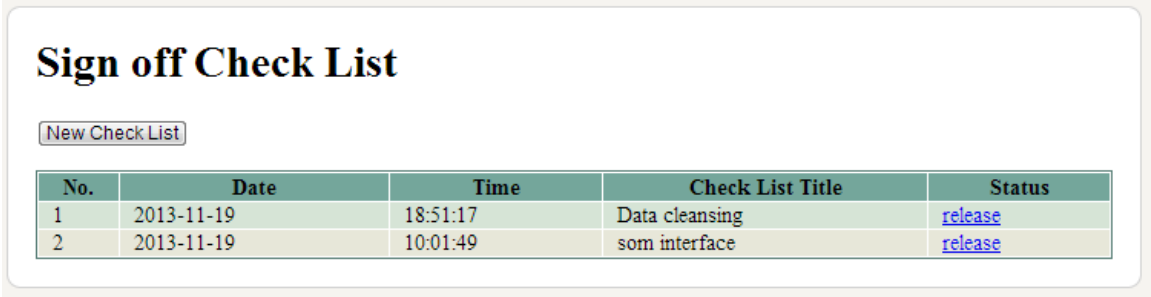


Figure 45: Interface of Normal admin's sign-off check list for improved SOMs prototype II

- b.) **Create New check list** – To create new checklist.

Create New Check List

Define new sign off check list

Check List ID:

Check List Title:

1. Fill in your check list description into the box at below.
 2. press 'Add' button to insert the information into table.

No	Item Description	Edit
[Note] The check list after release will no longer edible.		

Figure 46: Interface of Normal admin’s create new check list for improved SOMs prototype II

c.) **View sign-off** – To trace the record of sign-off

The view sign-off function is supported by four sub- functions similarly to super administrator’s page:

- 1.) Opened sign-off
- 2.) Approved sign-off
- 3.) Rejected sign-off
- 4.) Cancel sign-off

d.) **User manager**- To allow normal administrator to add account for approver.

Approver user list

No.	Name	User Name	Email	Phone
1	approver, SOM	APPROVER	seeleh623@gmail.com	0128811212

Figure 47: Interface of approver user list and add approver functionality for improved SOMs prototype II

e.) **Reminder** – email notification for normal admin when the status of sign-off is updated by the approver.

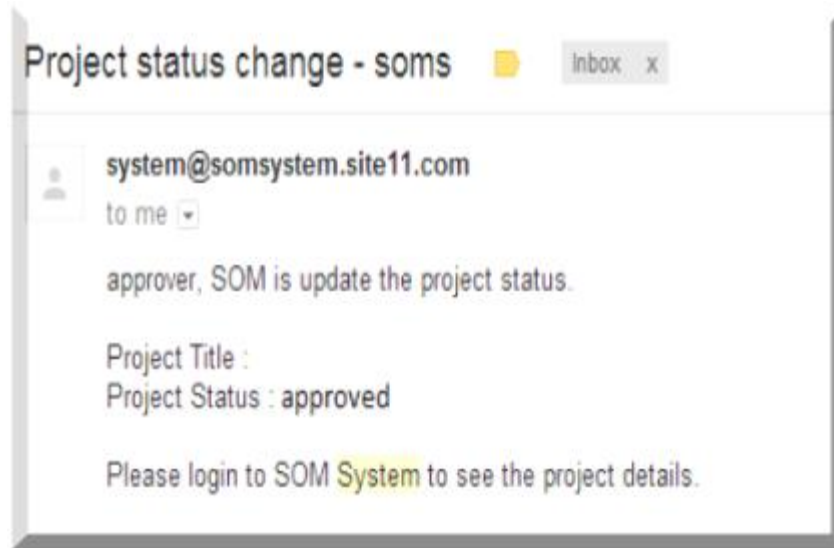


Figure 48: Sample of email notification for administrator for improved SOMs prototype

II

iv.) SOMs approver's page

As for the client or approval ID, it only allows the ID holder to receive and send verified sign-off. Approval's ID is unable to create sign-off

Home Pending item ⁵ Project Manager Profile Contact us

Approver Home

Pending Approve Sign-off

No.	Check Point Title	Create Date	Due Date	Approver	Create By	Status
1	Project SAPPHIRE data cleansing	2013-11-19	2013-11-26	approver, SOM	normal admin, SOM	open
2	som interface	2013-11-19	2013-11-26	approver, SOM	admin, SOM	open
3	Project Sapphire training set	2013-11-21	2013-11-28	approver, SOM	normal admin, SOM	open
4	testing 1	2013-12-01	2013-12-02	approver, SOM	admin, SOM	open
5	testing 3 days	2013-12-01	2013-12-03	approver, SOM	normal admin, SOM	open
6	testing 2	2013-12-01	2013-12-08	approver, SOM	admin, SOM	open

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Welcome

approver, SOM
[Logout](#)

Figure 49: Interface for Approver's dashboard for improved SOMs prototype II

Once the approval ID's holder successfully login, user can enter to the approval's account as show in Figure XX. From here, user can perform the following functions:

- a.) Perform sign-off verification.

Approve Sign-off

Approve Sign-off

Project ID:

Project Title:

Sign off Due Date: Create Date:

Project Admin: Admin Email:

Approver Name: Approver Email:


Project document:

Status:

Sign Off item

No	Description	Status	Remark
1	Is the header color meet the requirement?	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="checkbox"/> Add

Enter the symbols you see in the image



[Not readable? Change text.](#)

Figure 50: Interface of sign-off verification for improved SOMs prototype II

b.) **Pending items** – To receive reminder notifications regarding the sign-off.

SOM System

The screenshot shows the SOM System dashboard with a navigation bar (Home, Pending item 5, Project Manager, Profile, Contact us) and a sidebar with navigation links (App, Pen). A large notification panel on the left displays several 'Overdue' and 'Last Warning' messages. A table in the center lists pending items with columns for No., Due Date, Approver, Create By, and Status.

No.	Due Date	Approver	Create By	Status
1	2013-11-26	approver, SOM	normal admin, SOM	open
2	2013-11-26	approver, SOM	admin, SOM	open
3	2013-11-21	approver, SOM	normal admin, SOM	open
4	2013-12-01	approver, SOM	admin, SOM	open

Figure 51: Interface of reminder notifications at approval's dashboard for improved SOMs prototype II

The image shows a sample email reminder with the following content:

From: system@soms.com
 Sent: Tuesday, July 30, 2013 9:04 AM
 To: approver@gmail.com
 Subject: [Reminder] project will expire in 1 day
 Importance: High

This message is generated by system. Please do not reply to this email.
 Generated date : 2013-7-30
 Project Title : Testing1
 Create Date : 2013-07-30
 Due Date : 2013-07-31
 Project Admin : admin, SOM

Please click the link at below to view the project details.
<http://somsytem.com/approveproject.php?action=approve>

Figure 52: Sample of email reminder for approval for improved SOMs prototype II

4.4.3 User Acceptance Testing (UAT)

For the SOMs prototype II UAT, the author implemented questionnaires survey to evaluate various aspects of SOMs prototype II. This survey targeted on the project-based software industry practitioners.

a.) Questionnaires survey

The evaluation questionnaire was designed based on the following objective:

- iv.) To evaluate the performance of SOMs prototype II and user satisfactions.
- v.) To access the relevancy of SOMs to project-based software industry's sign-off documents management practice.
- vi.) To get the constructive comments and recommendation to improve the prototype.

The questionnaires for SOMs prototype I UAT was reused in UAT for SOMs prototype two. All the 24 respondents are given the choice to choose the answer among the 5 choices: 1(poor), 2 (fair), 3(satisfy), 4(good) and 5 (excellent) for all sections.

Table 6: UAT evaluation result for SOMs prototype II.

		Poor		Fair		Satisfy		Good		Excellent	
		1	%	2	%	3	%	4	%	5	%
SOMs Performance (overall)			0.0		0.0		12		65		23
1	How effective SOMs in managing sign-off documents?		0.0		0.0	3	15	14	70	3	15
2	Is the sign-off checklist in SOMs useful in real life?		0.0		0.0	2	10	8	40	10	50
3	How well does SOMs reduce the		0.0		0.0	3	15	12	60	5	25

	sign-off management workload?										
4.	How well SOMs reduce the cost and human resource burden compared to the existing practice?		0.0		0.0		17	85	3	15	
5.	How well the reminders represent the emergency of the sign-off?		0.0		0.0	4	20	14	70	2	10
SOMs industry relevancy (overall)			0.00		0.0		8.3		68.3		23.3
6.	How effective SOMs to your company?		0.0		0.0		13	65	7	35	
7.	How effective will SOMs reduce the delay in getting sign-off?		0.0		0.0	5	25	13	65	2	10
8.	Is it applicable to project-based software industry?		0.0		0.0		15	75	5	25	
General (overall)			0.0		0.0		20		75		5
9.	Is SOMs user-friendly?		0.0		0.0	3	15	15	75	2	10
10.	What is your overall rating on SOMs' interface?		0.0			5	25	15	75		

Generally, SOMs prototype II get a positive feedback from the respondents in system performance, relevancy and general rating. This may due to the author actually include the recommendations from the industry practitioners during UAT prototype I in developing SOMs prototype II. Throughout the survey, the author actually carries out chit-chatting session with the respondents to get some recommendations regarding SOMs prototype II for future development.

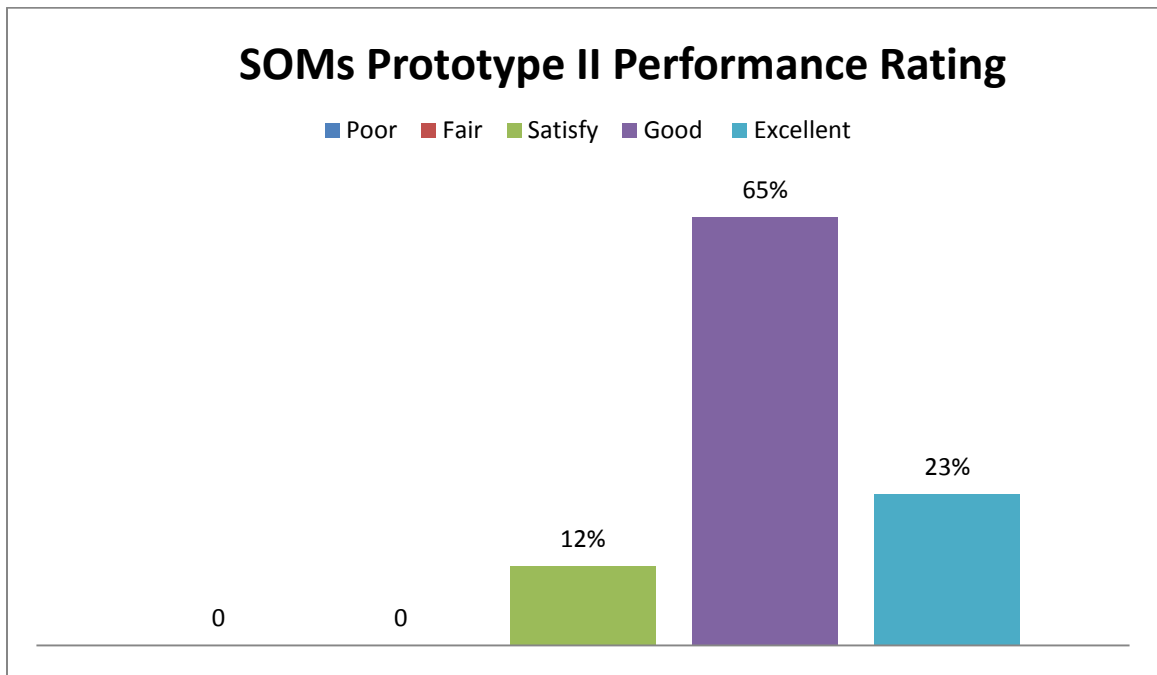


Figure 53: SOMs prototype II Performance Rating

Figure 50 shows that 88% of the respondent had given a positive rate on the performance of SOMs prototype II which range from good to excellent. This is because SOMs prototype II is actually more customized for their need as compared to prototype I. They also mention that they are happy with the two level of access for administrator.

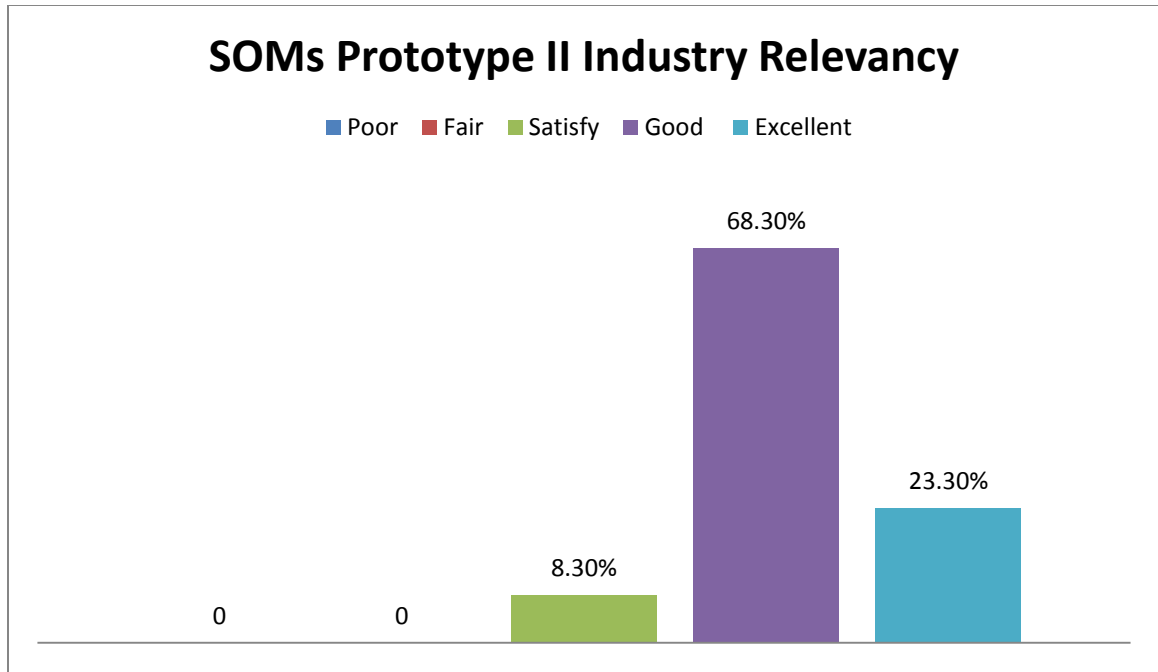


Figure 54: SOMs prototype II Industry relevancy evaluation.

For the Industry relevancy, 23.3 % of the respondents rate SOMs as excellent. Most of the respondents believed that SOMs is better in managing sign-off documents than the existing manual practices. They also agreed that software industry will accept SOMs and employ it in the future as it is able to reduce the human resource burden, cost and most importantly able to improve productivity. The 8.3% of the respondents claimed that the reminders is powerful but some time the human behavior is the main problems as some of the approver may just ignore all sort of reminders and in the end manual calling is still more useful. As a result of the analysis, SOMs is likely to be adopted by the industry relevant to the industry since 100% of the respondents satisfied with SOMs and support the facts that it is very useful.

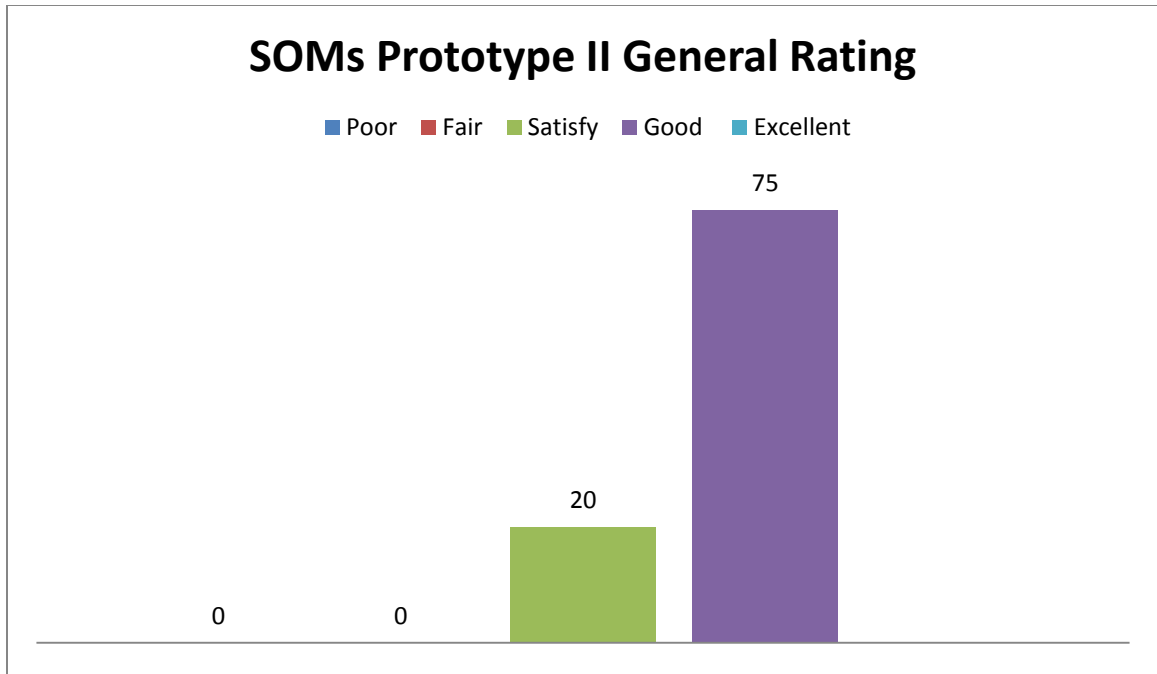


Figure 55: SOMs prototype II General rating.

Others than that, the general evaluation of SOMs prototype II get positive feedback from the respondent: satisfy (20%), good (75%). Overall, the respondents are happy with the interface design of SOMs which they claim is user-friendly and more professional as compared to the SOMs prototype I.

b.) Recommendation from the Respondents for SOMs

During the chit-chatting session, the author managed to jot down the recommendation and comments of the respondents. In term of sign-off management work improvement, one of the respondents had commented that this system will actually help the project team to improve their productivity as SOMs reduce the human resources and cost of managing sign-off. He recommended that the author should come out with a financial analysis in documentation to make this system more convincing.

The table below summarized the comments from the respondents in term of possible contribution of SOMs to sign-off management in project team.

Table 7: Comments from the respondents based on SOMs prototype II.

Contributions	
1.	SOMs able to reduce the human resource burden.

2.	Make the sign-off management process easier and less hectic.
3.	Save their time to do everything manually.
4.	Able to reduce the delay of getting sign-off.
Recommendations	
1.	Include the progress report in the system for the team to follow up the whole project progress
2.	Include financial analysis to make the system more convincing.

4.5 Analysis on the current cost of sign-off management practice

For this session, some assumptions were made according to the information gathered from the interview earlier on. The author uses a conservative assumption that the sample company A (a medium size company) produces 10,000 documents which require approval through paper-based documents per year. A further assumption of each document is on average of 8 pages and each sign-off is made 3 copies for documentation purpose. This make the total number of paper used per year as 240,000.

4.5.1 Cost of paper

The cost of paper is relatively at RM0.02 per sheet (assume one ring of paper at RM10) for a total cost of RM4800. The usage of paper when producing sign-off documents can be broken down into four categories:

i.) Printing cost

Printing cost generally cost RM0.10 per page for a total cost of RM24, 000. This price includes the cost of the equipment, tonner and maintenance excluding the time spent waiting for the turn and sorting out the paper-jam problems.

ii.) Delivery cost

Once the sign-off documents are being printed, it has to be delivered to the person-in charge for approval. For the sample company A with 3 copies of 10,000 documents, we assume that 20% of the documents are delivered internally within the organization and this are assumed to be zero since there are no postal service involved here.50% of the documents are assumed to be delivered through mail (post express). A4

documents are fitted into C4 envelop which cost about RM0.50 per piece and the average postage cost of post express is RM4.50 per pack for post express. The total cost for postal is therefore RM75, 000 to get the documents delivered to the approval hand. The assumption also included 30% of the documents are being sent through fax (assuming the company is using fax package of RM42 for 150 pages) which cost about RM0.28 per page and to keep thing simple all the documents are assumed consisted of 8 pages, total up RM20,160.

Table 8: Delivery costs for paper-based sign-off management.

Delivery costs:		
Internal Delivery	20%	RM0
Postage	50%	RM75,000
Fax	30%	RM20,160
	Total	RM95,160

iii.) Document scanning cost

Once the sign-off documents are signed and returned, the project team required to scan all the documents into their internal system so that they can trace back the record in their internal database. The average cost per page for scanning is estimated at RM0.15 taking in consideration on the equipment, maintenance). Assume that the sample company A scans every signed document, the total cost for scanning will be RM36, 000.

Besides, the manual processes involved with scanning required an administrative staff to manage it. Assume that it takes 10 minutes per document for the staff to scan the sign-off document and the salary is on average of RM10/hour, the cost of scanning is RM1.67 per document and per year it will cost the company RM50, 100.

iv.) Document storage cost

The company not only need to retain the sign-off in internal database, they also need to retain the signed document for auditing purpose as the legislation regulations require the document to be stored for 7 to 10 years. Assume that it takes 5 minutes for the administrative staff to file the signoff documents, the cost of filing will be RM 0.84 per document and hence a cost a total of RM25,200. In the document storage cost

assumption, the cost for filing cabinet, filing folders and other miscellaneous expenses are omitted to keep the cost calculation simple.

Table 9: Total cost of paper-based sign-off management.

Paper based Sign-off documents management costs:		
Cost of paper		RM 4,800
Printing cost		RM 24,000
Posting cost		RM 95,160
Scanning cost		RM 86,100
Storage cost		RM 25,200
	Total	RM 235,260

The table above shows the total cost of the current sign-off documents delivery on 10,000 documents with 3 separate approvals which are RM235, 260 in other word RM23.53 per document.

4.6 Costs of SOMs

If the company implements SOMs, they will get to omit most of the costs mentioned above and only need to pay for the license of SOMs. SOMs enable the user to create unlimited sign-off. Let us assume that at enterprise level the cost per user is RM50 per month. Even with 100 users who are responsible to sign off the documents, the total cost will only be RM60, 000 which is only 26% of the RM235, 260 paper-based sign-off documentations.

Chapter 5: Conclusion & Recommendations

5.1 Conclusion

The path towards an on-time delivered end product practices is important to all project team. This paper shows the common denominator that many of the delay in the end product delivery are related to the delay in getting sign-off verification from the client's side. In many cases, project team often faces difficulties in getting the sign-off documents on time which caused the whole project process to be delayed. This paper also discuss on the extra costs and inefficient human resource usage that incur by the traditional method of getting sign-off documents.

As a solution to the highlighted problems, this paper proposed a Sign-off Documentation Delivering Management system (SOMs) automates and monitors the sign-off documents delivery to improve the project management flow and to provide a greater consistency in getting the verified sign-off documentations from the clients. It serves as a platform for the project team to collect the verified digital sign-off documentations from their clients. SOMs is believed to increase the productivity of the project team, promoting the paper-less culture resulting in lower printing cost and a more systematic way to cope with the tight project timeline. It is hoped that this project can provide a framework on automates and monitors the sign-off documents delivery and ultimately contribute to the organizations wellbeing.

5.2 Recommendations

The Sign-off Documentation Delivering Management system (SOMs) to automate and monitors the sign-off documents delivery is developed as a proof concept framework based on the literature reviewed over the time constrained of this project. It is undeniable that this system can be further improved in terms of performance and features in the future for a better production. The SOMs prototype has revealed a number of areas for further research and development as stated below:

- a.) Integrate the reminder notification with Short Message Service (SMS) to convey more powerful representations of the emergency of sign-off.

- b.) Integrate SOMs model with Project Management System (PMS) than enable the project team to monitor the progress of project together with sign-off progress.
- c.) Customized SOMs according to the nature of work for other industry.

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Appendix A:

A web-based project management system : Sign-off documents management system (SOMs)

Preliminary Survey Form:

Name:

Position:

Organization:

Mailing Address:

Email:

1.) Are sign-off documents important in projects that you involved?

- YES
 NO

2.) Are you using a sign-off documents management system?

- YES
 NO

3.) What are the methods practiced by your project team in delivering sign-off documents?

- Email
 Print the documents and Mail Post
 Hands on delivery
 Others
-

4.) Do you realize that your company spends a lot of money on sign-off document delivery?

- YES
 NO

5.) Project team normally will set a timeline for the client to send the verified signoff. Is it always received on time?

- YES
 NO

6.) Is the interdependency of task in your project phase relies heavily on verified sign off in order to be proceeded?

- YES
- NO

7.) In your opinion, what are the consequences of delay in getting the sign-off documents?

- Delay project delivery timeline
- Increase the production cost
- Affect the company's image
- Do not have any effect.

8.) Do you think the proposed sign-off documents management system is useful for your organization?

- YES
- NO

9.) Please tick function that you think the sign-off documents management system should cover?

- Progress status update
- Reminder Notification
- Checklist
- Others

Thank you. End of survey.

Appendix B:

SOMs Prototype II Evaluation Questionnaire:

Title: A web-based project management system: Sign-off documents management system (SOMs)

This evaluation questionnaire should be done together with a demonstration of SOMs prototype II.

(Please circle the rating that represents your best answer.)

1- Poor, 2- Fair, 3- Satisfy, 4 – Good, 5- Excellent

Questions		Rating
SOMs Performance		
1	How effective SOMs in managing sign-off documents?	1 2 3 4 5
2	Is the sign-off checklist in SOMs useful in real life?	1 2 3 4 5
3	How well does SOMs reduce the sign-off management workload?	1 2 3 4 5
4.	How well SOMs reduce the cost and human resource burden compared to the existing practice?	1 2 3 4 5
5.	How well the reminders represent the emergency of the sign-off?	1 2 3 4 5
SOMs industry relevancy		
6.	How effective SOMs to your company?	1 2 3 4 5
7.	How effective will SOMs reduce the delay in getting sign-off?	1 2 3 4 5
8.	Is it applicable to project-based software industry?	1 2 3 4 5
General		
9.	Is SOMs user-friendly?	1 2 3 4 5
10.	What is your overall rating on SOMs' interface?	1 2 3 4 5

Appendix C:

SOMs Prototype I Evaluation Questionnaire:

Title: A web-based project management system: Sign-off documents management system (SOMs) P

This evaluation questionnaire should be done together with a demonstration of SOMs prototype.

(Please circle the rating that represents your best answer.)

1- Poor, 2- Fair, 3- Satisfy, 4 – Good, 5- Excellent

Questions		Rating
SOMs Performance		
1	How effective SOMs in managing sign-off documents?	1 2 3 4 5
2	Is the sign-off checklist in SOMs useful in real life?	1 2 3 4 5
3	How well does SOMs reduce the sign-off management workload?	1 2 3 4 5
4.	How well SOMs reduce the cost and human resource burden compared to the existing practice?	1 2 3 4 5
5.	How well the reminders represent the emergency of the sign-off?	1 2 3 4 5
SOMs industry relevancy		
6.	How effective SOMs to your company?	1 2 3 4 5
7.	How effective will SOMs reduce the delay in getting sign-off?	1 2 3 4 5
8.	Is it applicable to project-based software industry?	1 2 3 4 5
General		
9.	Is SOMs user-friendly?	1 2 3 4 5
10.	What is your overall rating on SOMs' interface?	1 2 3 4 5

