POLITEKNIK UNGKU OMAR

COLLECTION OF DATA RELATED TO MANPOWER AND PLANT ORDER BY WEB APPLICATION

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(01BCT21F3008)

CIVIL ENGINEERING DEPARTMENT

SESSION II 2023/2024

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A project report/thesis submitted in partial fulfillment of the requirement for the award of the Bachelor of Civil Engineering Technology with Honours

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DECLARATION OF ORIGINAL AND OWNERSHIP

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B. In front of me, PN MAZZIYATOL FARIZZA BINTI MAT) ……
as project supervisor on date: …….) (PN MAZZIYATOL FARIZZA BINTI MAT)

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LIST OF ABBREVIATIONS

Abbreviation	Word
8MD3	The Proposed Construction and Completion of Residential Towers and Other Ancillary Works at Plot 8MD3, Precinct 8, Putrajaya
FYP	Final Year Project
WBL	Work Based Learning
TAM	Technology Acceptance Model
PIC	Person-In-Charge

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ABSTRACT

Efficient data collection is imperative for the smooth operation of high-rise construction projects. The larger the project, the more critical the data collection becomes. At TRC Synergy Sdn Bhd, data collection is currently managed by planners and QAQC teams using outdated methods, which contradicts the modern technological advancements applied on-site. This research addresses the need for innovative solutions through web applications by setting three primary objectives: first, to identify the existing problems in data collection at the 8MD3 project; second, to develop a web application to address these issues; and third, to evaluate the user acceptance of this web application using the Technology Acceptance Model (TAM). The study employs a quantitative methodology, utilizing surveys to achieve the first and third objectives. The data collected from these surveys are analyzed using the Statistical Package for the Social Sciences (SPSS) and TAM, providing a comprehensive understanding of the behaviors related to technology adoption. The second objective involves developing a web application using a suitable programming language to enhance the data collection process. The results indicate a strong need for innovation in data collection methods, demonstrating that the developed web application can effectively serve this purpose. This research not only highlights the necessity for modernized data collection techniques but also provides a viable solution that aligns with contemporary technological advancements in the construction industry.

KEYWORDS: *Data Collection, High-Rise Construction, Web Application, Technology Acceptance Model (TAM), Statistical Analysis (SPSS).*

ABSTRAK

Pengumpulan data adalah penting untuk memastikan operasi berjalan lancar. Semakin besar projek tersebut, semakin banyak pengumpulan data yang diperlukan. Secara hakikatnya, pengumpulan data dalam pembinaan bangunan tinggi berfungsi sebagai tonggak ke arah membuat keputusan yang berinformasi, pengurusan sumber yang cekap, mitigasi risiko, dan memastikan kejayaan serta kualiti projek secara keseluruhan. Di TRC Synergy Sdn Bhd, pengumpulan data diuruskan oleh perancang dan QAQC tetapi cara data dikumpulkan adalah kuno dan bertentangan dengan bagaimana tapak pembinaan moden dengan semua teknologi baru yang diterapkan. Oleh itu, terdapat keperluan untuk inovasi melalui aplikasi web. Kajian ini telah menetapkan tiga objektif iaitu untuk pertama-tama mengenal pasti masalah berkaitan pengumpulan data di projek 8MD3. Kedua, untuk mengembangkan aplikasi web untuk menyelesaikan masalah pengumpulan data di 8MD3. Ketiga, untuk menilai penerimaan pengguna aplikasi web menggunakan TAM. Kajian ini mengamalkan metodologi kuantitatif, menggunakan survei untuk mencapai objektif 1 dan 3. Data yang dikumpulkan dari survei ini dianalisis menggunakan Pakej Statistik untuk Sains Sosial (SPSS) dan Model Penerimaan Teknologi (TAM), yang menawarkan kerangka kerja yang berharga untuk memahami perilaku yang berkaitan dengan adopsi teknologi. Objektif kedua melibatkan penciptaan aplikasi web menggunakan bahasa pengaturcaraan. Hasilnya menunjukkan keperluan yang menggalakkan untuk inovasi dalam pengumpulan data. Oleh itu, produk ini boleh digunakan untuk tujuan tersebut.

Kata Kunci: *pengumpulan data, aplikasi web, penerimaan pengguna, metodologi kuantitatif, inovasi*

CHAPTER 1

INTRODUCTION

1.1 Introduction

The researcher is a Politeknik Ungku Omar student who is undergoing Work-Based Learning as a pre-requisite before graduating and finishing his undergraduate studies. The WBL itself takes 2 semesters to undergo. Students are also expected to create a Final Year Project (FYP) to present 2 weeks before the end of the semester. The final year project puts an emphasis on solving industry problems.

Work-Based Learning (WBL) is an organized educational approach that combines traditional classroom instruction with practical work experiences in real-world settings. It offers individuals, typically students or recent graduates, the chance to apply theoretical information acquired in academic contexts to real-life issues in professional settings. Work-Based Learning extends beyond conventional internships, embracing a range of experiences including apprenticeships, cooperative education, and other practical learning modalities.

1.2 Background of Study

The proposed construction and completion of residential towers and ancillary works at Plot 8MD3, Precinct 8, Putrajaya, known as the 8MD3 Project Site, is an initiative by Putrajaya Holdings Sdn. Bhd. (PJH). This project aims to enhance Putrajaya's status as a city by leveraging eco-tourism attractions, such as wetlands, to draw more visitors and establish it as a desirable holiday destination. The development

encompasses ten blocks of residential spaces, retail outlets, and a marketplace, with a total budget approaching RM500,000,000.

Figure 1.1 Overview from the Putrajaya River

The researcher oversees data collection, primarily it concerns the volume of concrete casted on the previous day and the total amount of manpower in the day. For the concrete casted the process is straightforward as orders come in through a popular low-data application that is ubiquitous in all Malaysian mobile phones, WhatsApp while for the manpower data collection, it is slightly more nuanced as the trades and level add to the level of complexity. As a report that needs to be sent daily, the expected time to complete this is before noon for manpower while the concrete volume is taken as soon as possible before 9am.

1.3 Problem Statement

While being assigned the responsibility of accomplishing each of these tasks daily. The researcher has noted that there are specific circumstance es that hinder the collection of data. The issues encompass communication disruption, the dependability of WhatsApp, and the necessity for a live data monitoring system.

As a planner, data entry is an essential task that must be accomplished. An initial issue arises when there is a breakdown in communication. This primarily happens when the researcher of the WhatsApp message inadvertently leaves out crucial parameters pertaining to data entry, such as levels, volume of the structure in different combinations,

and the state of casting. In such instances, the responsible planner will need to actively locate the individual, resulting in a delay in the finalization of the report.

The second issue is to the over dependency on WhatsApp. WhatsApp is a reliable tool for one-to-one communication. However, when it comes to collecting data passed on in a group chat, locating the important information might be challenging. An example of this is when the concrete is poured, the operator must provide real-time updates via WhatsApp, which will flood the chat. Consequently, this leads to the challenging task of quickly identifying crucial keywords, such as the concrete's condition, whether or not the concrete has been cast or if there is any cancellation.

Furthermore, the issue stems from the absence of up-to-the-minute data. Real-time workforce tracking offers numerous advantages. Real-time tracking enables project managers to continuously watch the precise whereabouts and actions of workers. This data aids in the optimization of human resources, guaranteeing that an appropriate number of employees are allocated to assignments. This might mitigate the occurrence of excessive or insufficient manpower in various sections of the construction site. Real-time tracking information enables more precise updates on project progress for clients and stakeholders. This level of transparency fosters confidence and offers a more accurate depiction of the building schedule.

1.4 Research Objectives

i. To identify problem of plant order and manpower data collection at 8MD3 project site.
ii. To develop a web application for plant order and manpower data collection
iii. To evaluate user acceptance towards the web application by using Technology Acceptance Module (TAM).

1.5 Scope of Research

The study will establish the scope by defining the limits within the 8MD3 project site. The duration of the study spans approximately 3 to 4 months. The objective is to assess the collective agreement of the employees regarding the concept of the application.

The primary aim is to identify issues pertaining to data collecting in 8MD3 project site. In order to determine this, the researcher must ascertain the underlying cause of the issue. This can be determined using a questionnaire. The distribution of the questionnaire must be done in a controlled manner, as it is specifically designed for data gathering. Therefore, only those with a background in 8MD3 project site and involvement in the data collection process are permitted to respond to the questionnaire.

The second objective is to create a web application. There are numerous language applications, such as HTML, CSS, and others. There are many criteria to consider when choosing such as the skill of the programmer and how intuitive it is to use. Thus, Python will be utilized to effectively develop the web application due to how beginner friendly it is to people who have no background on programming.

The third step involves assessing the user approval of the web application by employing the Technological approval Model (TAM). The Technology Acceptance Model (TAM) is a highly regarded theoretical framework that has been extensively employed to comprehend and forecast user acceptance of technology. The questionnaire is grounded in a widely recognized theoretical framework that centers on users' perceptions and attitudes towards technology, with a specific emphasis on their perceived ease of use and perceived usefulness.

1.6 Significance of the Research

The process of data collection is crucial in ensuring the reliability and efficiency of subsequent studies in the dynamic field of data-driven decision-making. Conventional manual techniques of data collecting, which were formerly common, are gradually being overtaken by automated systems that have numerous benefits. This essay examines the factors that contribute to the superiority of automated data collecting

over traditional techniques. For TRC Synergy Bhd., this could be the start where the process of menial work and basic data collection be able to be partially automated.

Acquiring real-time data is of the utmost importance in the contemporary, fast-paced industrial context. The utilization of automated data collection systems grants organizations the ability to make decisions in a timely and well-informed manner by supplying current information. This is especially crucial in industries characterized by constant change and rapidity of response are required.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature reviews play a vital role in academia by providing academics with essential guidance and insight into existing research, as well as pointing them towards new avenues of discovery. This literature study aims to thoroughly examine the existing body of knowledge regarding data collecting. Through an extensive exploration of various scholarly literature, our objective is to identify the fundamental themes, patterns, and deficiencies that influence the conceptual framework encompassing data management. This review aims to synthesize previous findings and highlight emergent views and unresolved concerns as we navigate through existing research. With this exploration, our aim is to make a meaningful contribution to the existing academic discourse and to encourage future research into the intricate aspects of the use of web application to collect data pertaining to plant order and manpower.

2.2 Manpower

Manpower management resources in the construction sector is a crucial element of project design and implementation. The study conducted by Wong et al. (2011) emphasizes that the demand for construction personnel is driven by a range of economic parameters. This highlights the significance of precise forecasting models for predicting the need for construction labour. Zhao et al. (2021) performed a comprehensive analysis of manpower forecasting models in the construction sector, with a particular focus on the importance of employing reliable predictive methods. In addition, Biruk et al. (2022) introduced a simulation-based approach to manpower planning in construction companies. Their method offers a conceptual framework to improve strategies for managing manpower.

Recent substantial advancements in infrastructure, coupled with heightened demand for both public and private residential spaces, have led to a scarcity of proficient quantity surveyors. This research endeavours to project the requirement for skilled quantity surveyors in Hong Kong over the period from 2013 to 2015, as evidenced by the work of Ho (2013). This emphasizes the necessity for customized strategies in predicting workforce needs, taking into account the distinct demands of various construction positions. In addition, Parthasarathy et al. (2017) conducted a thorough analysis of the elements that influence the efficiency of labour and equipment in the construction of tall buildings. They highlighted the complex connection between personnel management and project productivity.

The literature demonstrates an increasing focus on empirical research to comprehend the intricacies of workforce development in the construction industry. Dang et al. (2021) provided empirical evidence about the correlation between management techniques that promote encouragement and the growth of manpower in construction enterprises, emphasizing the necessity for tactics that are supported by evidence. This is consistent with the overall trend of incorporating empirical knowledge into the existing body of research on construction workforce management.

In conclusion, the literature on construction manpower management underscores the significance of accurate demand forecasting, tailored planning methods, and empirical insights to optimize manpower utilization and productivity. The studies reviewed collectively emphasize the need for a comprehensive and systematic approach to manpower management in the construction industry, considering the diverse factors influencing manpower demand and development.

2.3 Web Development

Web development encompasses the activities involved in the creation and upkeep of websites or web applications for the Internet or an intranet. It involves a wide array of responsibilities, such as designing websites, developing both the user-facing and server-side components, managing servers, administering databases, and implementing diverse technologies to guarantee the functionality and interaction of websites.

Front-end Development, also referred to as client-side development, encompasses the creation of a website's user interface and user experience (UI/UX). It emphasizes the visual components that consumers immediately engage with, such as arrangement, aesthetics, and user responsiveness. Front-end development often involves the utilization of technologies such as HTML, CSS, and JavaScript.

Back-end Development, also referred to as server-side development, encompasses the construction and upkeep of the server, database, and application logic that drive the functionality of a website. It encompasses server programming, database administration, and managing server-side logic. Back-end developers frequently utilize programming languages such as PHP, Python, Ruby, Java, or Node.js.

2.3.1 Web Development in Construction Industry

The history of web development has been influenced by numerous variables, including worker productivity, resource allocation, and technology improvements. Wong et al. (2011) stressed the importance of predicting the need for construction workers, emphasizing the theoretical relationship between economic indicators and labour demand. This historical viewpoint offers valuable insights into the development of labour management in construction projects.

In addition, Hire et al. (2021) did a bibliometric assessment on the implementation of Building Information Modelling (BIM) in the construction sector, highlighting the technical progress that has revolutionized construction methods. The implementation of BIM has not only affected construction procedures but has also had an impact on safety viewpoints, demonstrating the incorporation of technology into safety administration in the construction industry.

Daniyal et al. (2021) examined the competence and suitability of supervisors in carrying out Health and Safety (H&S) orientation training for site workers, within the framework of manpower planning and supervision. The historical evolution of labour management methods highlights the importance of effective communication and monitoring in guaranteeing safety and productivity on construction sitesThis highlights

the historical development of labour management strategies in the context of intricate construction projects.

Ultimately, the progression of web development in the realm of building projects has been influenced by various elements, including labour demand prediction, technology improvements, safety considerations, productivity, and resource distribution. The many effects together lead to a full understanding of the historical path of labour management and how it affects construction techniques.

2.3.2 Web Hosting

Web hosting is fundamental for establishing an online presence, requiring careful consideration of various factors. The literature provides valuable insights into web hosting, focusing on security measures, performance standards, and technological strategies.

Khare and Badholia (2022) analyse self-hosted and cloud-hosted services by examining security measures such as key generation, authentication, secure logging, spam filtering, and CAPTCHA implementation. Ensuring robust security in web hosting is crucial for protecting data and maintaining website integrity.

Parfonov and Kolgatin (2022) evaluate the performance metrics of applications on web hosting platforms, highlighting the necessity of selecting a service that meets application demands. Optimal performance is essential for fast website loading times and efficient functionality.

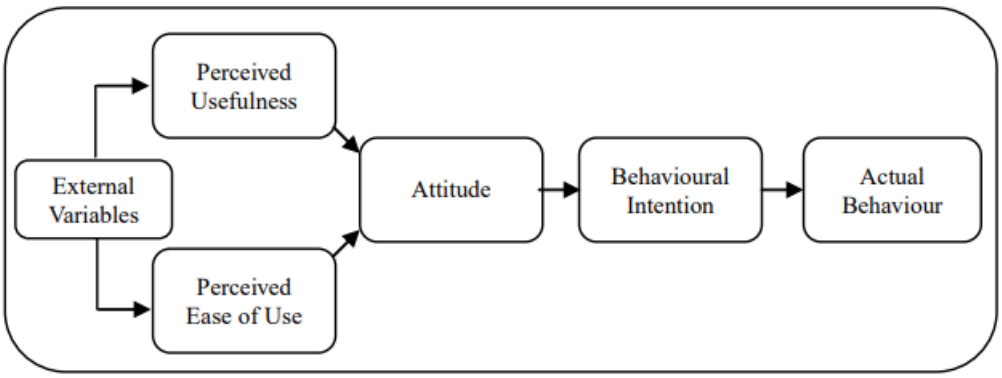
Ren et al. (2022) introduce a novel approach for hosting and sharing MATLAB Web Apps, with a focus on scalability and software deployment. Scalability in web hosting is vital for accommodating increasing traffic and data as websites grow.

Burgess et al. (2009) investigates the range of web hosting options, illustrating how different choices can affect website features. A thorough understanding of these options is crucial for businesses to choose the most appropriate hosting service for their needs.

Overall, the literature review emphasizes the significance of security, performance, scalability, and comprehending hosting options when selecting a web hosting service. By considering these factors, individuals and businesses can make informed decisions to ensure their websites are secure, perform optimally, and fulfil their specific requirements. For this research, the one provided by MyHost since it is provided by the expert.

2.4 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a prevalent theoretical framework that evaluates and elucidates the acceptance and implementation of novel information technologies by individuals within an organization. The model was initially formulated by Fred Davis in 1986 and subsequently enhanced by Davis and Richard Bagozzi. The Technology Acceptance Model (TAM) is based on the principles of behavioural psychology and aims to forecast and comprehend users' inclination to adopt a specific technology. The fundamental elements of the Technology Acceptance Model are. Perceived Ease of Use (PEOU) refers to the subjective assessment of how easy a particular system or technology is to use. Usability refers to the user's subjective evaluation of the ease with which a specific system can be utilized.



Source: Davis *et al*. (1989)

Figure 2.1 The Technological Acceptance Model

2.4.1 Conducting a TAM Survey

Performing a Technology Acceptance Model (TAM) survey entails creating a questionnaire to collect data from consumers regarding their perceptions and attitudes

towards a certain technology. Below is a comprehensive, sequential tutorial on how to carry out a TAM survey.

Specify the demographic or user segment that the technology is intended for. Consider variables such as population characteristics, occupational positions, and familiarity with comparable technologies.

Create inquiries that revolve around the fundamental elements of Technology Acceptance Model (TAM). Perceived Ease of Use (PEOU) refers to inquiries regarding the perceived level of simplicity and ease when interacting with the technology. regarded Usefulness (PU) refers to inquiries regarding the regarded advantages and worth of using the technology to accomplish specified objectives. Behavioural Intention to Use (BI) refers to inquiries on the user's inclination or readiness to utilize the technology. System Behaviour Inquiries on the user's practical utilization or firsthand encounter with the technology.

Integrate Likert scales to collect replies. Participants have the ability to assess their level of agreement or disagreement with statements using a numerical scale (e.g., 1 to 6), which allows for a quantitative evaluation of their perspectives.

Then proceed to the demographic question. Collect data about participants' demographic characteristics, including age, gender, educational background, and occupational position. This data is valuable for assessing responses according to various user attributes. Next is to choose the survey distribution, for convenience Google Form is used to distribute the survey and finally to analyse the results by using SSPS.

2.5 Python

Python, an adaptable and advanced programming language, is notable for its extraordinary ease of use for beginners. The clear and accessible syntax of this programming language reduces the need for complicated code, making it easier for beginners to quickly understand essential ideas. The broad community support and comprehensive documentation of Python provide important tools for learners, creating a collaborative atmosphere. Due to its extensive library ecosystem and clear structure, it enables fast development and efficient problem-solving. Python's adaptability encompasses several domains like web development, data analysis, automation, and

more, making it an excellent choice for beginners venturing into the field of programming. Python's combination of a gradual learning curve and robust features makes it a language that is both accessible and empowering for individuals at all levels of experience, from beginners to experienced professionals.

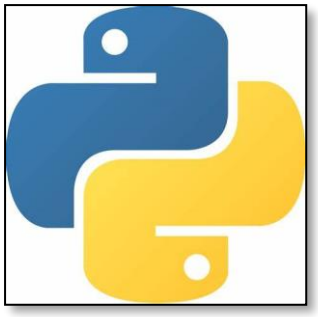


Figure 2.2 Python Logo

The use of Python in this project will be imperative in the success of this project as it is used to mainly code on alongside using a shell called Visual Studio Code. An expert help will be required on the back end and front end of the web development of the application.

2.6 Statistical Package for the Social Sciences (SPSS)

Figure 2.3 SPSS by IBM

SPSS, an acronym for Statistical Package for the Social Sciences, is a comprehensive software application extensively utilized for statistical analysis in social scientific research. Furthermore, it is widely employed in various domains including health sciences, marketing, surveying, data mining, and others. IBM SPSS is renowned for its

intuitive interface, enabling users to effortlessly execute intricate data manipulation and statistical analysis using straightforward commands.

SPSS is highly regarded in research due to its capacity to manage extensive datasets and conduct a diverse array of statistical analyses. It streamlines data analysis procedures and is particularly valuable for researchers who may lack considerable statistical expertise. SPSS is utilized in educational research, psychology, and health sciences to examine survey data, evaluate hypotheses, and predict trends.

SPSS is a robust statistical analysis program that is renowned for its user-friendly interface, extensive data management features, and reliable support system. The widespread acceptance and use of this instrument in both academic and industrial settings guarantee its continued relevance and value for researchers and analysts in various fields. SPSS is a dependable platform that improves the productivity and efficacy of data analysis projects, whether they involve simple data administration duties or complicated multivariate analysis.

SPSS is used to obtain the paired t test. The paired t-test is a statistical method used to compare the means of two related groups. This test is particularly useful when the same subjects are measured under two different conditions or at two different times. The primary function of the paired t-test is to determine whether there is a statistically significant difference between the paired observations.

For example, in a study comparing traditional and web application documentation methods, a paired t-test could be used to compare the mean scores of user satisfaction or performance metrics before and after implementing the web application method. This helps in assessing the impact of the new method on the same group of users, thereby controlling for individual variability.

It is also used to get Cronbach’s Alpha. Cronbach's alpha is a measure of internal consistency, which assesses the reliability of a set of scale or test items. It indicates how well the items in a test measure the same underlying construct or concept. Cronbach's alpha is particularly important in the development and evaluation of questionnaires and surveys used in research.

2.7 Cronbach Alpha

Cronbach's Alpha is a statistical metric primarily employed to evaluate the reliability or internal consistency of a collection of scale or test items. Put simply, it quantifies the extent to which a group of items (such as questions or indicators) accurately assesses a single underlying dimension. Cronbach's Alpha is a vital tool in assessing the validity of scales used in psychological testing, educational assessments, and other sectors that employ questionnaires. Cronbach's Alpha is mostly used to assess the degree of interrelatedness among the items in a scale, indicating the potential for reliable combination into a single scale. A greater value of Cronbach's Alpha indicates stronger correlations among the items, indicating a higher level of reliability for the scale. The primary function of Cronbach's alpha is to evaluate the reliability and internal consistency of a multi-item scale. A higher Cronbach's alpha value (generally above 0.6) suggests that the items have relatively high internal consistency and are likely measuring the same underlying construct. To obtain this SPSS will be used in the regression function.

2.8 Perceived Usefulness

According to Sun et al. (2009), PU (Perceived Usefulness) is defined as "the extent to which a person believes that using a particular system will enhance his or her job performance." As a result, it has to do with the idea that technology improves performance (Liu et al., 2010). PU improves a person's aim in both required and voluntary settings, according to the TAM and its expanded models from other studies (Verkasalo et al., 2010). Nevertheless, prior studies have shown an opposing outcome about the impact that PU has on an individual's use behavior of a novel technological system (Verkasalo et al., 2010). The degree to which an individual accepts social media is raised by these inconsistent findings, as the subject of study on PU and social media adoption is yet in its infancy. PU is tied to social media in the following ways for the purposes of this study: According to Rainiar et al. (2014), it indicates the extent to which

a user of social media believes that it will help them achieve their objective of incorporating it into the process of innovation.

2.9 Perceived Ease of Use

One of the core ideas of the Technology Acceptance Model (TAM) is perceived ease of use, which has a big impact on how users accept and utilise technology. This concept, which Davis (1989) defined as "the degree to which a person believes that using a particular system would be free from effort," highlights the idea that consumers are more likely to adopt and employ a technology if it is simple to use. Studies show that intentions to use are directly impacted by perceived ease of use, and that perceived usefulness has a moderating effect on these intentions as well (Venkatesh and Davis, 2000). Research in a wide range of fields, including as information technology, healthcare, and education, has repeatedly emphasised the significance of perceived ease of use. For example, Chuttur (2009) research in the context of software systems shows that user happiness and perceived utility are both predicted by ease of use, and that both factors influence adoption choices. Perceived simplicity of use has been shown to be a crucial element affecting educators' adoption of e-learning technologies in the educational sector (Ngai, Poon, and Chan, 2007).

Moreover, actual results from a study conducted in 2003 by Legris, Ingham, and Collerette indicate that reducing system complexity and streamlining the user interface might improve perceived usability and raise the possibility that technology will be adopted. Zhou (2012) observed that, especially in mobile apps and web-based platforms, user-friendly and intuitive designs are important factors in driving technological adoption, which supports this.

These findings underline the need of concentrating on user-centric design principles in technology development and are crucial for building systems that are not only functionally competent but also accessible and simple for end users to adopt.

2.10 Perceived Behaviour Control

One of the main tenets of Icek Ajzen's Theory of Planned Behaviour (TPB) is perceived behavioural control (PBC) (1991). This construct captures the degree to which people

feel they can control carrying out a certain behaviour, which in turn affects their perception of control and intention to carry out that behaviour. PBC is important because it considers both the availability of necessary resources and opportunities as well as the expected barriers to action, which has a direct impact on both intended and actual behaviour.

PBC plays a key role in understanding how users' perceptions of control over technology affect their desire to accept it in the context of technology adoption. The TPB model was extended by Taylor and Todd's (1995) research, which showed that in information systems settings, perceived behavioural control might predict use behaviour as well as intentions. They discovered that people are more inclined to accept and use technology when they feel they have a great degree of control over it and when they think it is practical and easy to use.

Additional empirical study by Mathieson (1991) shown that the desire to utilise computer systems is substantially predicted by PBC, subjective norms, and attitudes towards utilising technology. This suggests that increasing users' control over the technology—by providing resources, assistance, and training—can boost adoption rates.

The original TPB components have been modified for the online setting in recent research, as shown by Pavlou and Fygenson's (2006) findings, which indicate that PBC is a strong predictor of online buying behaviour. They stressed that consumers' willingness to participate in e-commerce is highly influenced by their perception of control over online transactions, particularly control over security and privacy.

These revelations highlight how crucial PBC is to the development and use of technical solutions. Developers and organisations may encourage greater adoption rates and more efficient use of technology by making sure users feel knowledgeable and in charge of it.

2.11 Behaviour Intention

There is a wealth of empirical data that BI is important for anticipating technology usage. By including extra theoretical concepts like subjective norm and cognitive instrumental processes, Venkatesh and Davis (2000) expanded TAM to TAM2, which further

clarified the factors influencing BI and its relationship to technology use. Their long-term research verified that, over time, BI functions as a trustworthy predictor of real system utilisation.

BI has also been explored in non-technological situations to comprehend health, marketing, and environmental behaviour. For instance, Ajzen's TPB, which takes into account BI as impacted by attitudes towards the behaviour, subjective norms, and perceived behavioural control, has shown to be a useful tool in the prediction of a variety of behaviours, including recycling and quitting smoking.

In order to evaluate how BI interacts with other psychological concepts, more recent research has included it into multi-dimensional frameworks. For example, Zhang et al.'s (2012) study looked at how trust and social influence drive BI to use online banking services, and it found that these variables greatly improve the predicted accuracy of conventional TAM models.

Furthermore, BI has been investigated in intricate situations involving cutting-edge technologies like blockchain and artificial intelligence, where users' intents to adopt are impacted by ethical and privacy concerns in addition to practical features. In behavioural science, behavioural intention is still a crucial metric, especially for comprehending and forecasting the uptake of new technologies. It is crucial for creating user-centered technologies as well as for developing policies and interventions meant to boost technology adoption and dissemination because of its function as a mediator between several antecedents (such as perceived utility, ease of use, and subjective standards) and actual use.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will provide a full explanation of the methodology and procedural methods used to construct the system. This will outline the techniques used for identifying problems and the methodical strategy used throughout the project's lifetime. The purpose of this strategy is to achieve the project's goals and get the most favourable outcomes. This study will provide a detailed explanation of the unique research approach used. Moreover, this chapter will clearly delineate every essential element involved in carrying out the study, such as the population, population frame, and the sample strategies used for interviews. Furthermore, it will provide a comprehensive elucidation of the selected mode of analysis and the methods used for data collecting.

System efficacy will be evaluated via observations during task execution in this chapter. Furthermore, the design modelling will be thoroughly explained. In order to augment the project's worth, a combination of primary and secondary sources was used for research purposes. Primary sources included the use of surveys and observations, whilst secondary sources depended on the gathering and examination of data. A procedural route, which is crucial to this project and can be implemented in the on-site work environment, will be included to this chapter. The feasibility of the web application will be assessed by observations made during task performance. This section also covers the topic of concept simulation. The use of primary and secondary sources serves to enhance the project's worth, with thorough investigations carried out using various sources.

During this stage, the web application is subjected to audience testing in order to assess their level of satisfaction with the solution. Any highlighted areas for improvement are addressed in order to further develop the web application. A survey is

scheduled to be conducted among the staff management, including positions such as site engineer, site general manager, and other workers who are accountable for auditing. System efficacy will be evaluated by observations conducted during task execution.

Feasibility studies have been done to enhance the project's value, using both primary and secondary sources. The main sources used were the administration of questionnaires.

The primary sources consisted of observations, while the secondary sources included data collecting and processing. The objective of the questionnaire is twofold: firstly, to collect impressions and knowledge that are important to the researcher's study, and secondly, to obtain comments that have the potential to improve the application. Moreover, the questionnaire seeks to get input from specific users on their level of agreement or disagreement with the researcher's concept for creating this website.

3.2 Research Design

Design research involves the selection of several research methodologies and procedures by a researcher to create a framework. This framework allows researchers to concentrate on methodologies that are appropriate for the topic matter, therefore establishing studies for optimal outcomes. This method is very crucial in the process of preparing any observation. By monitoring the actions taken during implementation, it becomes possible to spot any potential concerns that may develop during the process. Modifications are needed in the event of severe issues that may result in the failure of task execution. Therefore, it is essential to incorporate control mechanisms in order to maintain a consistent workflow.

Design research essentially functions as a systematic method for organizing and carrying out targeted research initiatives. It is of utmost importance as it incorporates four essential factors: developing a theoretical framework, choosing the issues and topics for examination, and determining the instruments and procedures for gathering and analyzing data. The main objective of design research is to clarify and explain the researcher's technique, providing a study plan that allows for precise evaluation in performing usability utilizing the web application.

3.3 Development of Research

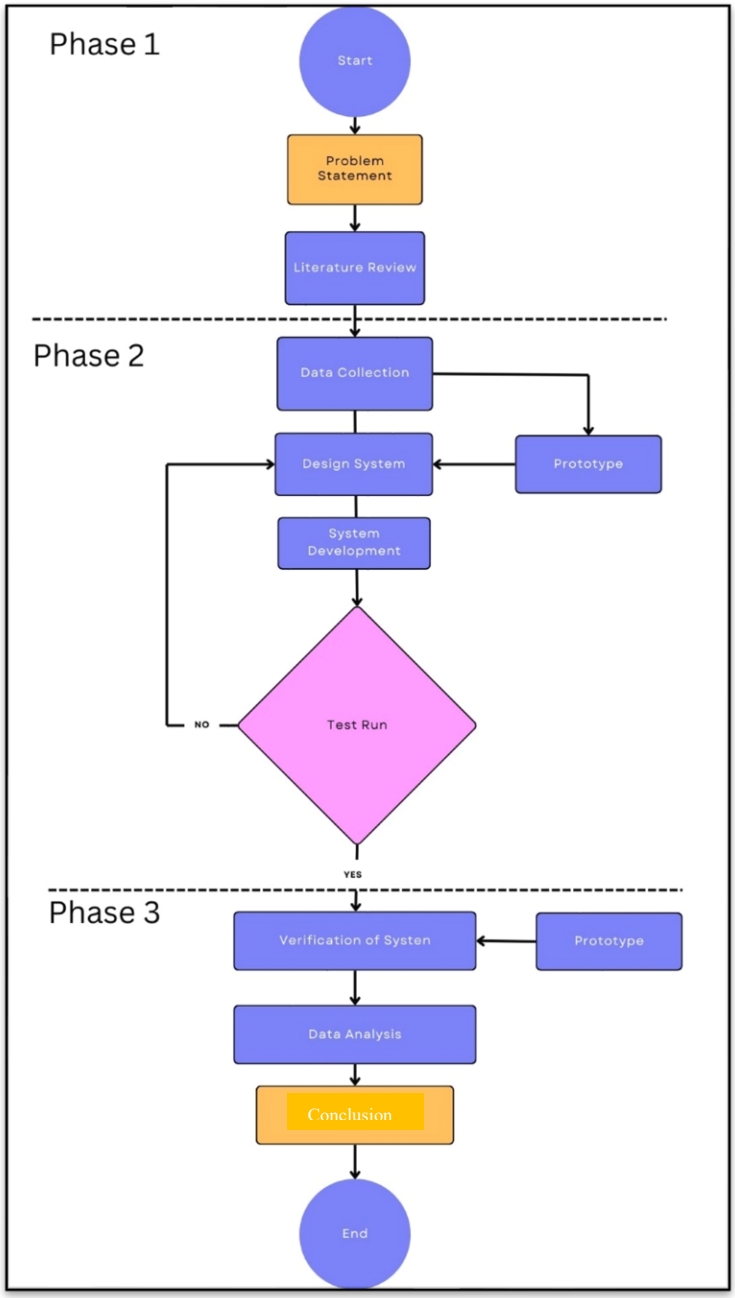


Figure 3.1 Work Flowchart for the development of the web application

The project commences with the initiation phase, marking the formal start of the project lifecycle. The first step involves articulating the problem statement. This statement identifies and defines the specific challenges the project aims to address, focusing on the inefficiencies currently experienced in manpower management and order handling processes within construction or related industries.

Following the problem statement, a thorough literature review is conducted. This review serves to ground the project in the existing body of knowledge, allowing for a comprehensive understanding of the current technological solutions and methodologies employed in similar contexts. The literature review helps in identifying gaps in the current practices and suggests potential areas where the new web application could offer significant improvements.

The second phase begins with data collection, which involves gathering detailed information about the existing workflows, user requirements, and technical specifications. This may include collecting data through surveys, interviews with PICs, and analysis of existing documentation, all aimed at ensuring the design meets the actual needs of the users.

The system design follows data collection. During this stage, the initial designs of the web application are crafted, including detailed plans for the user interface and system architecture. Key functionalities that address the project goals are outlined, with a focus on enhancing usability and efficiency. A prototype is then developed based on this design, offering a preliminary model to visualize and test the application's basic functions.

System development proceeds once the prototype is evaluated. This step involves the actual construction of the web application, integrating the front-end and back-end components, establishing databases, and ensuring all parts work in unison. The system undergoes rigorous testing in the test run stage, where functionality, user acceptance, and bug fixes are addressed. The development cycle may iterate between testing and development until the application meets the desired standards.

Upon successful testing, the system undergoes a final verification to confirm that all aspects of the web application align with the project requirements and user expectations. If necessary, the system may loop back to the prototyping stage for further refinements.

Data analysis is then conducted to assess the performance of the application against predefined metrics such as efficiency, user satisfaction, and its impact on the

project's objectives. This analysis is critical in understanding how well the application resolves the identified inefficiencies.

The project concludes with a comprehensive evaluation, with a conclusion phase. This final stage involves summarizing the project outcomes, discussing the implications of the findings, and proposing future directions for the application. Recommendations for further improvements or additional functionalities that could enhance the system's performance in real-world settings are also provided.

3.4 Data Collecting Method

The process of data collection is as follows. Initially, the Project Management Team will allocate tasks to the subcontractors who are participating in the project. Subsequently, the subcontractor will be supervised by a person-in-charge (PIC) designated by the project management to ensure the accuracy of the reports and headcounts. After that, the PICs will submit the report within the designated WhatsApp group. Then, the individual responsible for overseeing the planning department will proceed to manipulate the data to render it in a visually appealing format. All of this must be prepared by 11am every day on a daily basis.

Regarding plant ordering, in the meantime. The engineer or site supervisor will utilize WhatsApp to issue an order to the factory through a WhatsApp group. The given order will include specific information regarding the casting location, volume, grades, structure, time, cubes, and the subcontractor responsible.

The primary objective of this web application (WA) is to effectively gather data using an automated system. The additional data being gathered pertains to the volume of concrete. Whether it is a multi-million-ringgit project or a small-scale project, it is crucial to monitor the usage of concrete in order to make accurate cost predictions and minimize waste. Tracking concrete enables the identification of completed or pending concrete structures, facilitating adjustments in project management tasks. Furthermore, it will be utilized for record-keeping purposes while conducting an analysis of previous endeavours.

The data collecting technique is a systematic process used to obtain relevant information for research or analysis within a methodology. By using techniques such as surveys, interviews, or observations, this approach guarantees the attainment of precise and dependable data. An optimally planned data gathering procedure is in accordance with the study goals, incorporates ethical issues, and optimizes efficiency. The approach outlines the stages and tools used to gather significant insights, regardless of whether quantitative or qualitative methodologies are applied. It plays a crucial role in establishing the basis for thorough analysis and well-informed decision-making in the overall study or project framework.

For this research data is collected through the spread of Google Form links to people with appropriate background and demography which is connected to the gathering of data for manpower and whomever uses the plant order. The data obtained will be parsed with SPSS

3.5 Navigating through the Web Application

Once the web application is ready it is then hosted and once the site is hosted it will take about 2-3 weeks before gathering the target audience's opinion.

Figure 3.2 Login Page of the Web Application

The login page for web application. The user can choose to log in to key in data or just peruse with the guest login feature which will be beneficial to stakeholders.

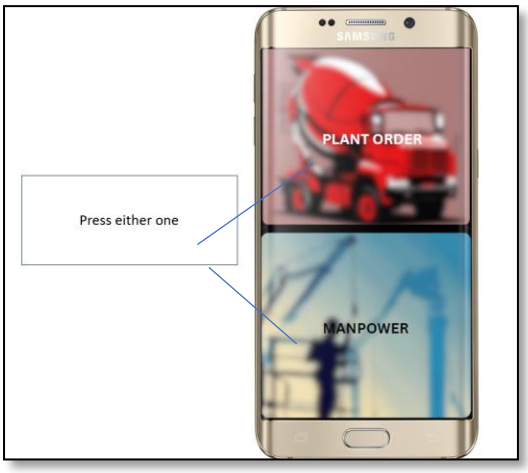


Figure 3.3 Selection Screen

From here on the user will pick between the function of plant order or manpower. Depending on the current needs

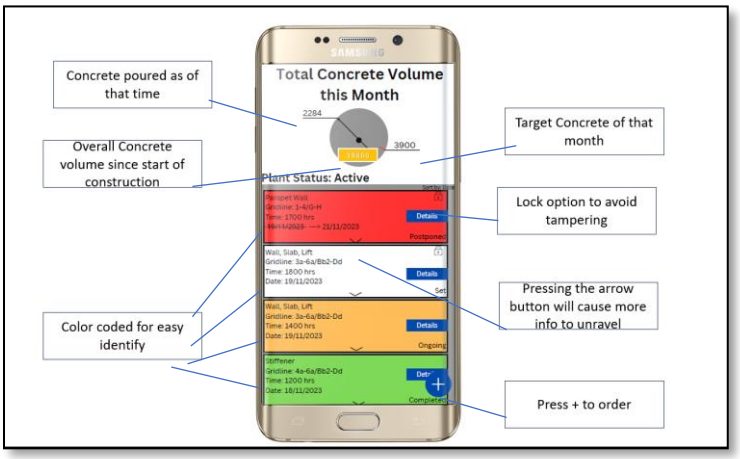


Figure 3.4 Overall View for Plant Order Section

When the user presses on “PLANT ORDER” in the previous page it will bring them to this page which details the order that is ongoing, postponed, set and completed. The orders will also be color coded to be easier to identify.

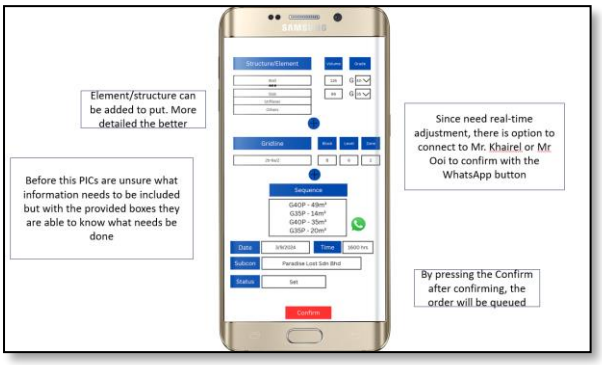


Figure 3.5 Ordering Menu for Plant Order

To order concrete, this page will detail what needs to be done and what kind of sequence needed. It highlights every data needed to know. There is also an option to connect to WhatsApp since concreting might require real-time adjustments.

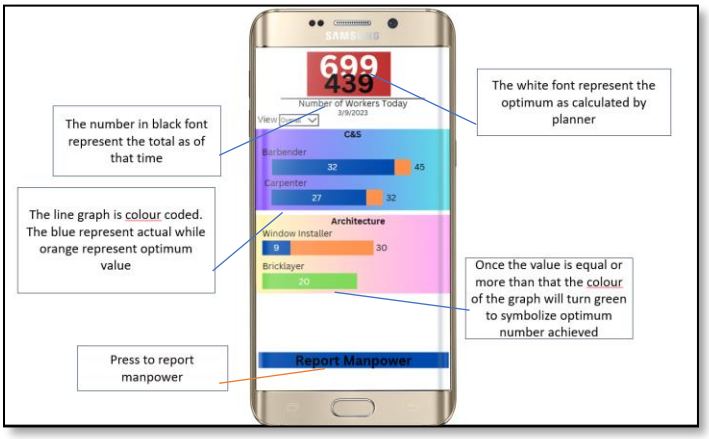


Figure 3.6 Manpower Overview

To order concrete, this page will detail what needs to be done and what kind of sequence is needed. It highlights every data needed to know. There is also an option to connect to WhatsApp since concreting might require real-time adjustments.

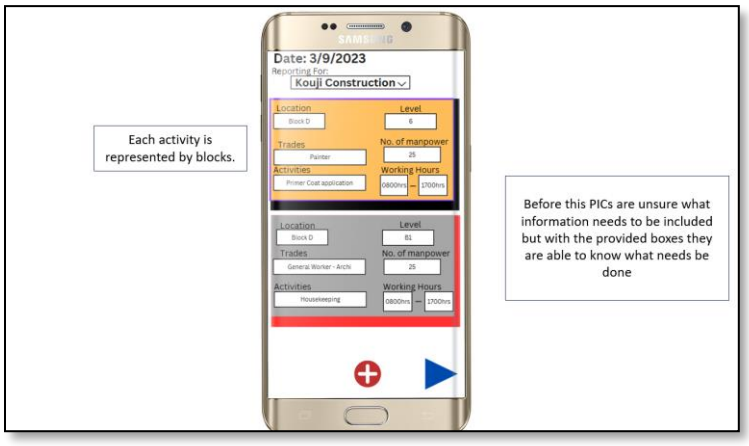


Figure 3.7 Key in data for Manpower

To order concrete, this page will detail what needs to be done and what kind of sequence is needed. It highlights every data needed to know. There is also an option to connect to WhatsApp since concreting might require real-time adjustments.

CHAPTER 4

DATA AND ANALYSIS

4.1 Introduction

In this chapter, the researcher outlines the anticipated outcomes of the project. This forms a critical part of the pre-project planning phase, where researchers meticulously assess the data that will be generated during the project's execution. The goal is to ensure that the collected data will effectively support the achievement of their objectives. Additionally, the chapter provides a detailed description of the demographic information of the survey respondents. A quantitative method was employed, involving the distribution of a questionnaire to 50 respondents, with the feedback processed using Excel. The results were then analysed using SPSS.

4.2 Data Collection

This study presents the findings of a quantitative method pre-test questionnaire using google form to respondents, who included project managers, engineers, site supervisors, assistant managers, quantity surveyors, and other to determine the acceptance of users. Section A is based on demographics. While section B,C,D and E is based on Technology Acceptance Model (TAM)

4.3 Demographic Data

Section A has 4 questions which relates to the gender, age, department and work experience.

4.3.1 Gender

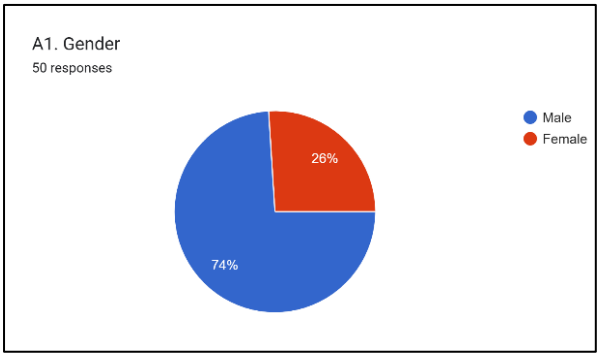


Figure 4.1 Pie Chart of Gender

In the context of the construction industry, this gender distribution is quite reflective of the typical workforce demographics. The construction sector has traditionally been male dominated, which is evident from the higher percentage of male respondents in the survey. 74% of the respondents are male (represented in blue) while 26% of the respondents are female (represented in red).

4.3.2 Age

The departmental distribution of 50 survey respondents for the 8MD3 construction project highlights the diverse roles involved in such a complex undertaking. The largest groups are Planners and Quantity Surveyors, each constituting 22% of respondents, emphasizing the importance of planning and financial management. Mechanical and Electrical (M&E) professionals, making up 18%, are critical for integrating essential building services.

Quality, Safety, Health, and Environment (QSHE) professionals, though only 6% of respondents, play a crucial role in maintaining regulatory and safety standards. Architects (8%) and Infrastructure specialists (12%) ensure that both design and foundational work meet required standards. Operations personnel, representing 10%, manage day-to-day activities on the construction site, ensuring smooth progress. Lastly, Land Surveyors (4%) provide essential land measurement and mapping services. This distribution underscores the necessity of diverse expertise and coordination across various departments to successfully execute the high-rise 8MD3 project.

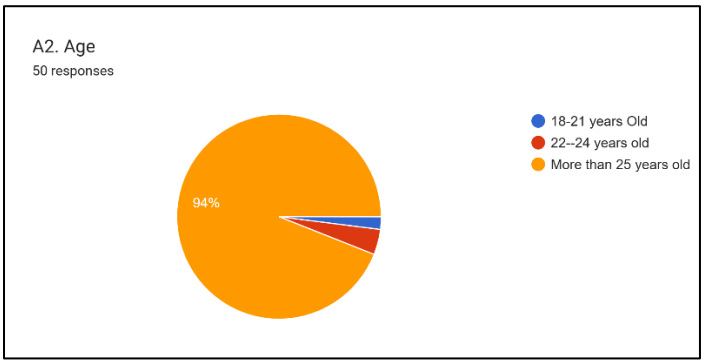


Figure 4.2 Pie Chart of the Demographic

4.3.3 Department of Works

The departmental distribution of 50 survey respondents for the 8MD3 construction project highlights the diverse roles involved in such a complex undertaking. The largest groups are Planners and Quantity Surveyors, each constituting 22% of respondents, emphasizing the importance of planning and financial management. Mechanical and Electrical (M&E) professionals, making up 18%, are critical for integrating essential building services.

Quality, Safety, Health, and Environment (QSHE) professionals, though only 6% of respondents, play a crucial role in maintaining regulatory and safety standards. Architects (8%) and Infrastructure specialists (12%) ensure that both design and foundational work meet required standards. Operations personnel, representing 10%, manage day-to-day activities on the construction site, ensuring smooth progress. Lastly, Land Surveyors (4%) provide essential land measurement and mapping services.

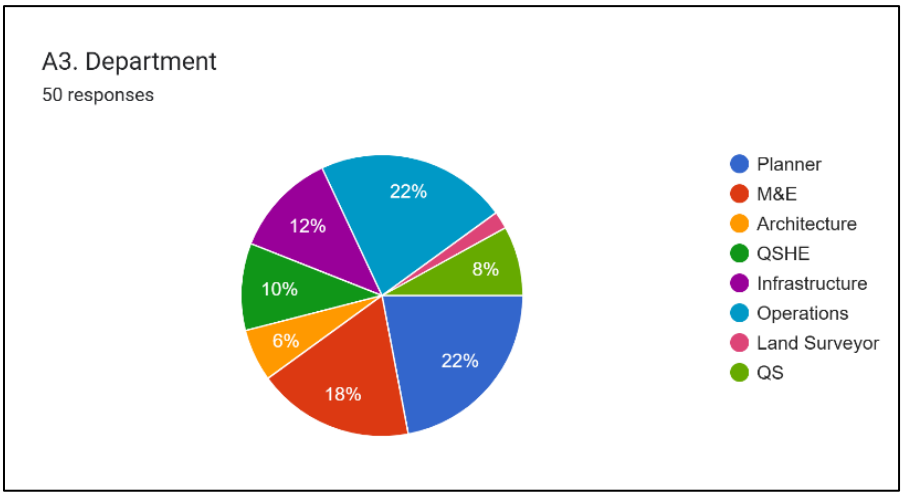


Figure 4.3 Pie Chart of Department of the Audience

4.3.4 Work Experience

The pie chart illustrates the work experience distribution among 50 respondents in a survey for a final year project, aimed at gauging user acceptance of a new system in the 8MD3 construction project. The survey included 44% moderately experienced professionals (3-5 years), 26% highly seasoned experts (more than 10 years), 20% mid-career professionals (6-10 years), and 10% entry-level professionals (less than 2 years). This diverse work experience distribution ensures comprehensive feedback, capturing insights from seasoned experts to newer entrants. Such diversity enhances the reliability of the survey results, helping identify the system's strengths and weaknesses to ensure it meets the needs of all users within the construction project.

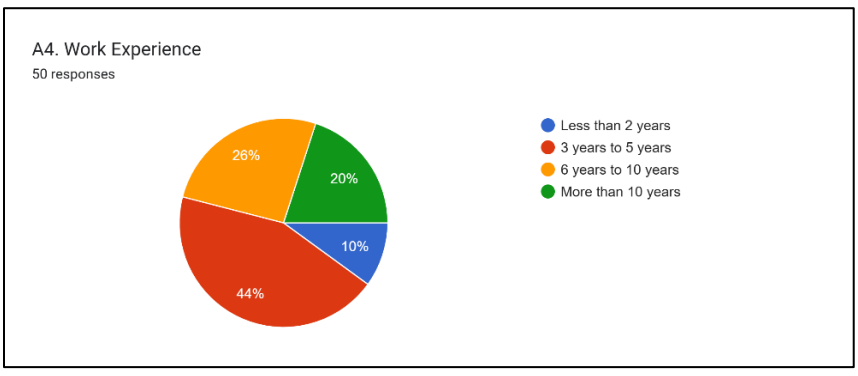
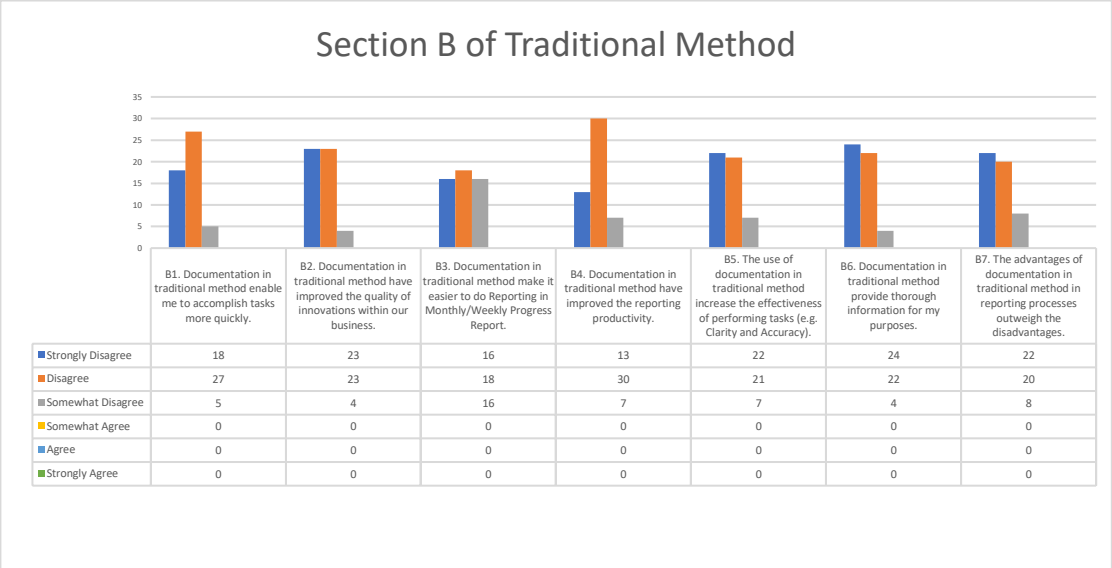


Figure 4.4 Pie Chart of Work Experience of the Audience

4.4 Perceived Usefulness

Perceived usefulness is one of the core components of the Technology Acceptance Model (TAM), a theoretical model that explains how users come to accept and use a technology. In TAM, perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance their job performance or productivity. This belief plays a crucial role in influencing the decision to accept and use new technology.



	B1. Documentation in traditional method enable me to accomplish tasks more quickly.	B2. Documentation in traditional method have improved the quality of innovations within our business.	B3. Documentation in traditional method make it easier to do Reporting in Monthly/Weekly Progress Report.	B4. Documentation in traditional method have improved the reporting productivity.	B5. The use of documentation in traditional method increase the effectiveness of performing tasks (e.g. Clarity and Accuracy).	B6. Documentation in traditional method provide thorough information for my purposes.	B7. The advantages of documentation in traditional method in reporting processes outweigh the disadvantages.
Strongly Disagree	18	23	16	13	22	24	22
Disagree	27	23	18	30	21	22	20
Somewhat Disagree	5	4	16	7	7	4	8
Somewhat Agree	0	0	0	0	0	0	0
Agree	0	0	0	0	0	0	0
Strongly Agree	0	0	0	0	0	0	0

Figure 4.5 Section B of Traditional Method

In the realm of accomplishing tasks swiftly (B1), a substantial proportion of the respondents 90% expressed disagreement (both "Disagree" and "Strongly Disagree") with the statement that traditional methods enable quicker task completion. This significant percentage underscores a general dissatisfaction with the speed of operations facilitated by traditional documentation, suggesting inefficiencies inherent in these methods.

Similarly, when assessing the impact of traditional methods on the quality of innovations within businesses (B2), the combined disagreement was equally notable at 92% This indicates that nearly half of the surveyed individuals do not perceive traditional documentation as beneficial in enhancing the quality of innovations, reflecting a potential stifling of creative and innovative processes within organizations employing these methods.

Regarding the ease of reporting in monthly or weekly progress reports (B3), the data reveals that half of the respondents (68% combining "Disagree" and "Somewhat Disagree") find traditional documentation methods cumbersome. This suggests that traditional methods may not support the dynamic needs of regular reporting, potentially complicating rather than streamlining these essential business processes.

The perception of productivity improvement through traditional documentation methods (B4) also receives significant critique, with 86% of participants disagreeing with the statement. This reflects a critical view of the productivity enhancements—or lack thereof offered by traditional documentation, highlighting a need for more efficient systems that can truly enhance reporting productivity.

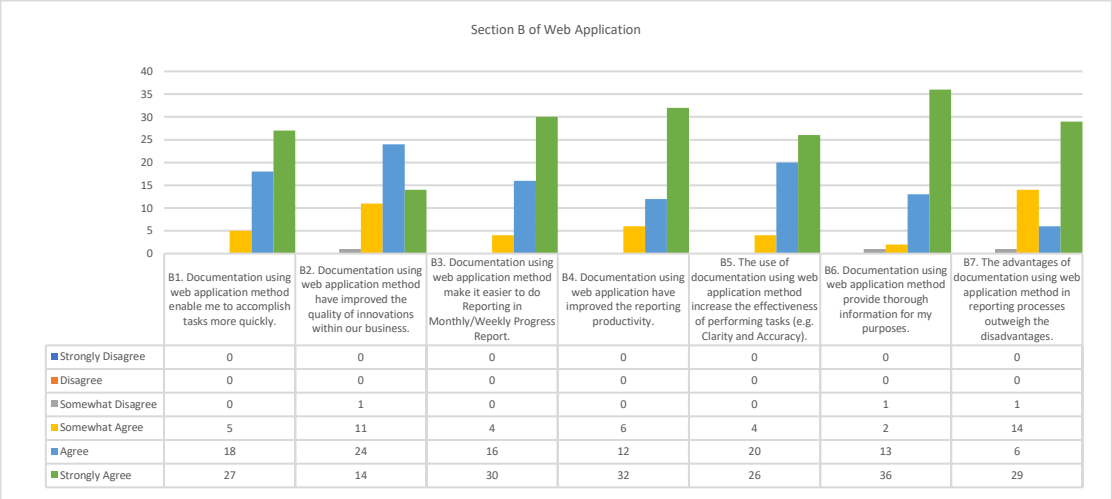
In terms of task effectiveness, including clarity and accuracy (B5), 43% of respondents disagreed that traditional documentation methods increase the effectiveness of performing tasks. This lack of endorsement for the clarity and accuracy provided by traditional methods points to significant deficiencies in quality control aspects of documentation.

The ability of traditional methods to provide thorough information (B6) was also under scrutiny, with 92% of the responses indicating disagreement. This portrays a significant gap in the ability of traditional methods to meet the comprehensive information needs of users, suggesting inefficiencies in content coverage and detail.

Lastly, the overall advantages of traditional documentation methods compared to their disadvantages (B7) were questioned, with 16% expressing disagreement to some degree while the rest is 74% disagree completely This highlights a predominant belief that the disadvantages of traditional methods in reporting processes outweigh any potential advantages.

The overall analysis of Figure 4.5 clearly demonstrates a pervasive dissatisfaction with traditional documentation methods across multiple facets of business operations. The data indicates that these methods may be impeding efficiency, innovation, and effectiveness, leading to a significant number of respondents who disagree with their continued use. This strong consensus calls for a reevaluation of traditional documentation methods, pushing towards more modern, efficient, and flexible solutions that can better meet the contemporary needs of businesses and organizations. The results serve as a compelling argument for the adoption of newer technologies and systems that

can provide enhanced clarity, accuracy, productivity, and overall effectiveness in documentation processes.



	B1. Documentation using web application method enable me to accomplish tasks more quickly.	B2. Documentation using web application method have improved the quality of innovations within our business.	B3. Documentation using web application method make it easier to do Reporting in Monthly/Weekly Progress Report.	B4. Documentation using web application have improved the reporting productivity.	B5. The use of documentation using web application method increase the effectiveness of performing tasks (e.g. Clarity and Accuracy).	B6. Documentation using web application method provide thorough information for my purposes.	B7. The advantages of documentation using web application method in reporting processes outweigh the disadvantages.
Strongly Disagree	0	0	0	0	0	0	0
Disagree	0	0	0	0	0	0	0
Somewhat Disagree	0	1	0	0	0	1	1
Somewhat Agree	5	11	4	6	4	2	14
Agree	18	24	16	12	20	13	6
Strongly Agree	27	14	30	32	26	36	29

Figure 4.6 Section B of Web Application

A significant highlight from the graph is the strong endorsement of web applications for speeding up task completion (B1), with 90% of respondents expressing agreement (including "Agree" and "Strongly Agree"). This overwhelming approval points towards the efficiency of web applications in streamlining tasks, potentially through features that automate routine tasks and facilitate quicker data processing and accessibility.

Regarding the impact on the quality of innovations within businesses (B2), 80% of respondents acknowledged improvements, with almost 30% expressing strong agreement. This suggests that web applications not only facilitate but enhance innovative processes, possibly by providing tools that allow for better collaboration, real-time updates, and more structured data analysis, thereby fostering a more innovative working environment.

The data also reveals that 26 out of 50 participants found that web applications make it easier to compile monthly or weekly reports (B3), with a significant 64% strongly agreeing. This indicates that web applications are particularly effective in meeting the needs of regular reporting through user-friendly interfaces and automated data aggregation capabilities.

Similarly, 92% of respondents felt that reporting productivity had improved due to the adoption of web applications (B4). This high level of agreement underscores the role of these applications in enhancing productivity, likely due to their ability to integrate seamlessly with other digital tools, automate data entry and processing, and thereby reduce the time and effort required for report generation.

A large majority, 92% of respondents, agreed and strongly agred that web applications increase the effectiveness of performing tasks, such as improving clarity and accuracy in documentation (B5). This perspective likely stems from the advanced features of web applications that ensure data integrity, provide clear user instructions, and reduce errors through automated checks.

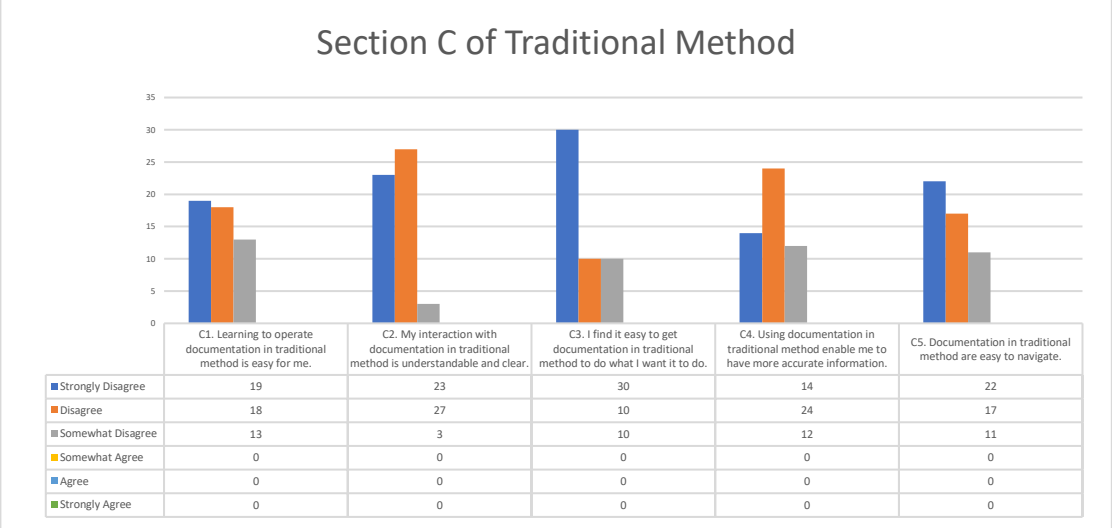
Additionally, from the graph, it is analysed that the highest number of people answered strongly agree with a staggering 36 participant for B6. The capability of web applications to serve as comprehensive repositories of information, enhanced by powerful search functionalities and well-organized data structures, contributes to this high level of satisfaction.

Finally, the overwhelming consensus is that the advantages of using web application methods in reporting processes far outweigh the disadvantages (B7), with only 1 participant out of 50 somewhat disagree for this question. This high level of agreement reflects a robust endorsement of web applications, highlighting benefits such as scalability, accessibility, and enhanced security, which are considered to significantly outweigh any potential drawbacks.

The analysis of Figure 4.6 conclusively shows a strong preference for web application documentation methods across various facets of business operations. The data not only emphasizes the high levels of functionality and user satisfaction associated with these tools but also indicates a critical shift towards digital solutions in modern business practices. As organizations increasingly look towards enhancing efficiency, accuracy, and innovation in their operations, web applications stand out as pivotal tools that align well with contemporary needs and challenges. The findings advocate for an expanded adoption and deeper integration of web application methods, suggesting that they are indispensable in driving forward the digital transformation of business documentation and reporting processes.

4.5 Perceived Ease of Use

Perceived Ease of Use pertains to the user's personal evaluation of the anticipated level of simplicity linked to the utilization of a technology. Users are more inclined to adopt and participate with a technology if they view it as user-friendly, regardless of its objective measures of usability. The underlying principle for this is that user-friendly technologies alleviate cognitive burden on users, thereby enhancing the probability of their acceptance.



	C1. Learning to operate documentation in traditional method is easy for me.	C2. My interaction with documentation in traditional method is understandable and clear.	C3. I find it easy to get documentation in traditional method to do what I want it to do.	C4. Using documentation in traditional method enable me to have more accurate information.	C5. Documentation in traditional method are easy to navigate.
Strongly Disagree	19	23	30	14	22
Disagree	18	27	10	24	17
Somewhat Disagree	13	3	10	12	11
Somewhat Agree	0	0	0	0	0
Agree	0	0	0	0	0
Strongly Agree	0	0	0	0	0

Figure 4.7 Section C of Traditional Method

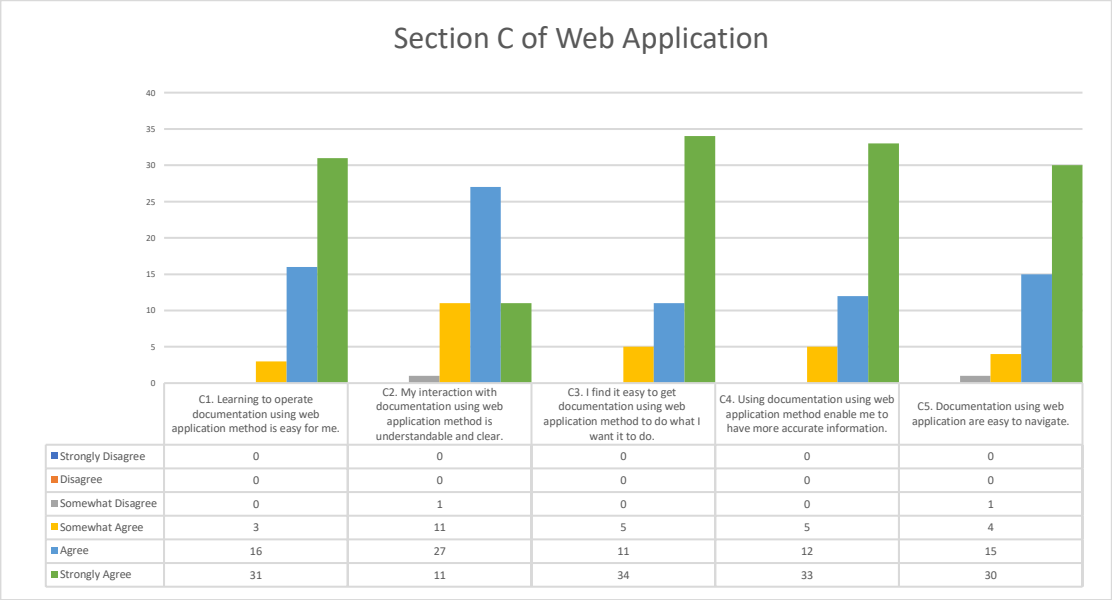
The first statement, "Learning to operate documentation in traditional method is easy for me," reveals profound difficulties. Half of the respondents (50%, 25 out of 50) express disagreement (either disagree or strongly disagree) about the ease of learning these systems. An additional 26% (13 respondents) somewhat disagree. This substantial portion of users finding traditional methods difficult to learn suggests a critical barrier to adoption and effectiveness, highlighting a significant usability flaw in these systems.

Similarly, user responses to the statement about the clarity and understandability of interactions with traditional methods indicate unanimous dissatisfaction. Every respondent expressed some level of disagreement, with 50% outright disagreeing. This feedback points to a serious deficiency in how traditional methods present and structure information, making it difficult for users to engage with and understand the documentation effectively.

Regarding the functionality, 80% of respondents find it challenging to get traditional documentation to perform desired tasks, with a striking 60% strongly disagreeing with the ease of functionality. This overwhelming sentiment reflects a misalignment between user needs and the capabilities of traditional systems, suggesting that these methods are inflexible and not user centric.

Accuracy is another area where traditional methods fall short. Half of the participants doubt the reliability of the information provided by these systems, with another 24% somewhat questioning its accuracy. This scepticism impacts the perceived utility and trustworthiness of the documentation, which is fundamental for effective use.

Lastly, the ease of navigation within traditional documentation methods is another significant concern. A majority of 78% of users find navigating these systems difficult, indicating a lack of intuitive design and user-friendly interface. Efficient navigation is crucial for the practical use of any documentation system, and the reported difficulties further complicate user interactions and diminish overall satisfaction.



	C1. Learning to operate documentation using web application method is easy for me.	C2. My interaction with documentation using web application method is understandable and clear.	C3. I find it easy to get documentation using web application method to do what I want it to do.	C4. Using documentation using web application method enable me to have more accurate information.	C5. Documentation using web application are easy to navigate.
Strongly Disagree	0	0	0	0	0
Disagree	0	0	0	0	0
Somewhat Disagree	0	1	0	0	1
Somewhat Agree	3	11	5	5	4
Agree	16	27	11	12	15
Strongly Agree	31	11	34	33	30

Figure 4.8 Section C of Web Application Method

The data on ease of learning reveals that an impressive 94% of users (47 out of 50) find web applications easy to learn and operate, with 62% (31 users) strongly agreeing with this sentiment. This high level of positive feedback highlights the user-friendly nature of web applications, characterized by intuitive interfaces and streamlined processes that facilitate quick mastery. Such features are critical in reducing the cognitive load on users and enhancing their willingness to adopt and continue using the technology.

Regarding the clarity and understandability of interactions with web application documentation, 76% of respondents agree or strongly agree that their interactions are clear and straightforward. An additional 2% somewhat agree, suggesting that nearly all users find web applications to be well-designed in terms of presenting information in an accessible manner. This clarity is crucial as it directly impacts the users' ability to effectively engage with the system and perform necessary tasks without confusion.

Functionality is a vital aspect of any documentation system, and here again, web applications score highly. A total of 90% of users feel that web applications allow them to easily manipulate and control documentation to meet their specific needs, with 68% strongly affirming this capability. This flexibility indicates that web applications are equipped with robust features that support a wide range of functions, from basic data entry to complex information management, thus accommodating diverse user requirements.

Accuracy of information, as depicted in the responses, is endorsed by 90% of the participants, underscoring the reliability of web applications in providing precise and dependable data. This level of accuracy not only enhances the trust users place in the system but also ensures that decisions based on this documentation are sound and justifiable. The precision offered by web applications can be attributed to advanced data processing technologies and error-reduction algorithms that are integral to these systems.

Finally, navigational ease within web applications is highlighted by 90% of the respondents as being satisfactory. This ease of navigation is essential for efficient information retrieval and usage, contributing to overall productivity and user satisfaction. Efficient navigation systems reduce the time and effort required to locate and utilize information, thereby enhancing the overall utility of the documentation system.

The comprehensive comparison of Figures 4.7 and 4.8 clearly illustrates the advantages of web application documentation methods over traditional methods across all major usability dimensions. The data from Figure 4.8 reflects high levels of satisfaction with the ease of learning, clarity, functionality, accuracy, and navigability of web applications, which starkly contrasts the dissatisfaction evident in responses to traditional methods in Figure 4.7.

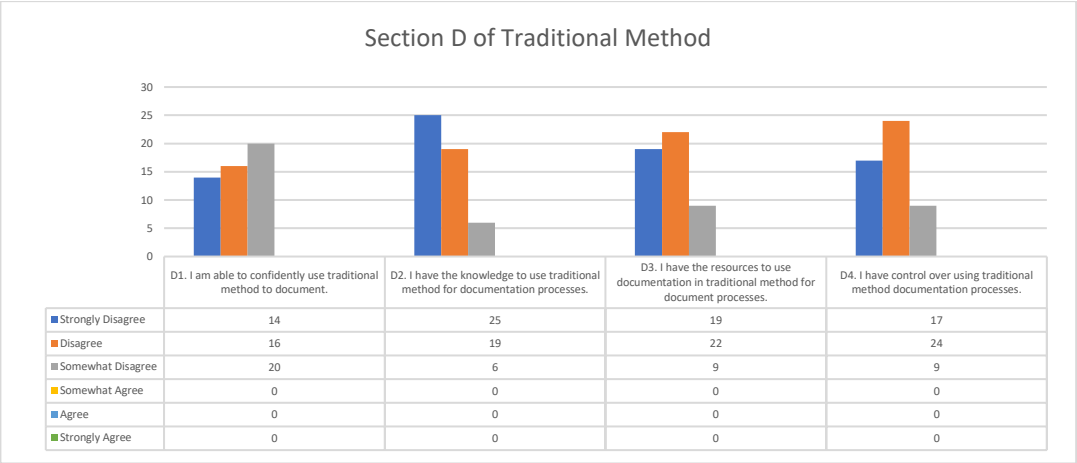
These contrasts not only highlight the challenges associated with traditional documentation systems but also underscore the benefits of adopting web-based solutions. The positive user feedback on web applications suggests that they are better suited to meet the demands of modern users, offering enhanced usability, greater flexibility, and more reliable information management.

In conclusion, organizations looking to enhance documentation practices and improve user satisfaction should consider transitioning from traditional to web application methods. Such a shift not only aligns with contemporary technological trends but also addresses the critical usability and functionality demands of today's users, thereby enhancing overall productivity and operational efficiency

4.6 Perceived Behaviour Control

Perceived Behavioral Control refers to an individual's perceived ease or difficulty of performing a particular behavior. This perception is influenced by the individual's own experiences, anticipated impediments, and available resources. It reflects the extent to which a person feels capable of enacting a behavior, which in the context of technology adoption, translates to the user's confidence in their ability to effectively use the technology.

When incorporated into technology acceptance models, perceived behavioural control assists in explaining the practical aspects of technology usage that may not be fully represented by perceived ease of use and perceived utility alone. For instance, even if a user perceives a technology as beneficial and user-friendly according to the Technology Acceptance Model (TAM), they may still exhibit resistance towards its adoption if they lack the requisite proficiency, resources, or assistance to utilise it efficiently.



	D1. I am able to confidently use traditional method to document.	D2. I have the knowledge to use traditional method for documentation processes.	D3. I have the resources to use documentation in traditional method for document processes.	D4. I have control over using traditional method documentation processes.
Strongly Disagree	14	25	19	17
Disagree	16	19	22	24
Somewhat Disagree	20	6	9	9
Somewhat Agree	0	0	0	0
Agree	0	0	0	0
Strongly Agree	0	0	0	0

Figure 4.9 Section D of Traditional Method

The responses to the first statement, "I am able to confidently use traditional method to document," show a unanimous lack of confidence among users, with 100% of respondents indicating some level of disagreement (28% strongly disagree, 32% disagree, and 40% somewhat disagree). This total absence of confidence among users suggests that traditional documentation methods may be inherently complex or poorly aligned with current user needs, presenting a significant barrier to their effective adoption and use.

Similarly, the second statement, "I have the knowledge to use traditional method for documentation processes," also reveals a stark lack of knowledge, with every respondent (50% strongly disagree, 38% disagree, and 12% somewhat disagree) expressing inadequacy in this area. This pervasive sense of unpreparedness can severely limit users' ability to perform documentation tasks efficiently, highlighting a critical gap in training or education regarding traditional methods.

Responses to the third statement, "I have the resources to use documentation in traditional method for document processes," further illustrate the challenges faced by users, with all indicating a deficiency in necessary resources (38% strongly disagree, 44% disagree, and 18% somewhat disagree). The absence of adequate resources not only hampers the execution of documentation tasks but also contributes to a lower sense of control and efficacy among users.

Finally, the responses to "I have control over using traditional method documentation processes" indicate a significant perception of lack of control (34% strongly disagree, 48% disagree, and 18% somewhat disagree). This overwhelming sentiment of

helplessness reflects a system that does not empower its users but instead complicates their ability to manage and execute documentation tasks effectively.

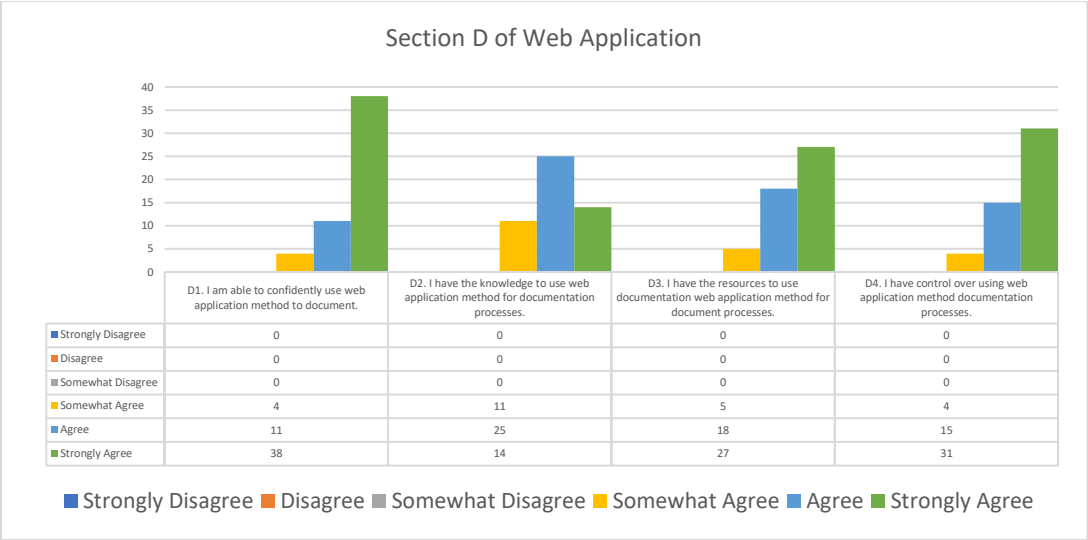


Figure 4.10 Section D of Web Application Method

The data reveals that an overwhelming majority of users, 98% to be precise, feel confident in their ability to utilize web application methods for documentation, with 76% of them strongly affirming this confidence. This high level of assurance among users underscores the user-friendly and intuitive design of web applications, which are evidently structured in ways that facilitate easy adoption and foster a sense of competence among users.

All respondents express having sufficient knowledge to use web application methods effectively for documentation. This unanimity in positive responses indicates that users perceive these platforms as straightforward and easy to understand, or that adequate training is provided. Such a perception not only enhances user engagement but also improves the efficiency with which documentation tasks are performed.

The survey also highlights that 100% of participants acknowledge having the necessary resources to utilize web applications for documentation purposes. This indicates strong organizational support in terms of infrastructure and access to technology, which are crucial for the successful implementation and operation of web-based documentation systems.

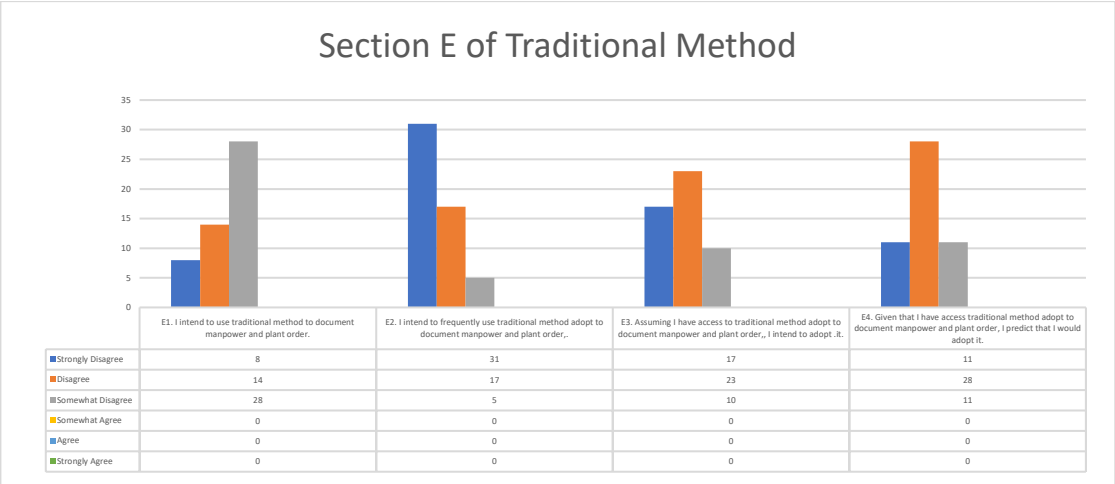
Moreover, 98% of users feel that they have substantial control over the documentation processes when using web applications. This sense of control is vital as it directly impacts users' effectiveness in managing documentation and their overall job satisfaction. It also suggests that web applications are designed to accommodate a range of user needs, offering flexibility and customization options that enhance user autonomy.

When juxtaposed with the feedback from traditional methods, as seen in Figure 4.7, the stark differences become even more pronounced. Traditional methods were marred by significant drawbacks in all areas of perceived behavioral control, with users consistently reporting low levels of confidence, knowledge, resource availability, and control. In stark contrast, web applications are viewed positively across these dimensions, indicating a significant shift in how documentation technology is perceived and utilized in modern settings.

These findings suggest that organizations should prioritize the adoption and development of web application documentation methods. Such a transition not only aligns with contemporary technological trends but also addresses critical user needs, enhancing overall efficiency, satisfaction, and productivity. By investing in web application technologies, organizations can better support their documentation processes, ensuring they meet modern standards and user expectations.

4.7 Behaviour Intention

Practically speaking, comprehending behavioural intention is essential for accurately anticipating the acceptance and utilisation of technology. When consumers regard a technology as both beneficial and user-friendly, they are more likely to have a strong intention to integrate it into their work processes. Consequently, designers and implementers of novel technologies prioritise these characteristics significantly to improve user acceptance rates. Behavioural intention serves as a link connecting the cognitive evaluation of a technology (perceived usefulness and ease of use) with the actual adoption of the technology. Therefore, it is crucial to comprehend and have an impact on users' behavioural intents to effectively introduce new technologies in any domain.



	E1. I intend to use traditional method to document manpower and plant order.	E2. I intend to frequently use traditional method adopt to document manpower and plant order,.	E3. Assuming I have access to traditional method adopt to document manpower and plant order,, I intend to adopt .it.	E4. Given that I have access traditional method adopt to document manpower and plant order, I predict that I would adopt it.
Strongly Disagree	8	31	17	11
Disagree	14	17	23	28
Somewhat Disagree	28	5	10	11
Somewhat Agree	0	0	0	0
Agree	0	0	0	0
Strongly Agree	0	0	0	0

Figure 4.11 Section E of Traditional Method

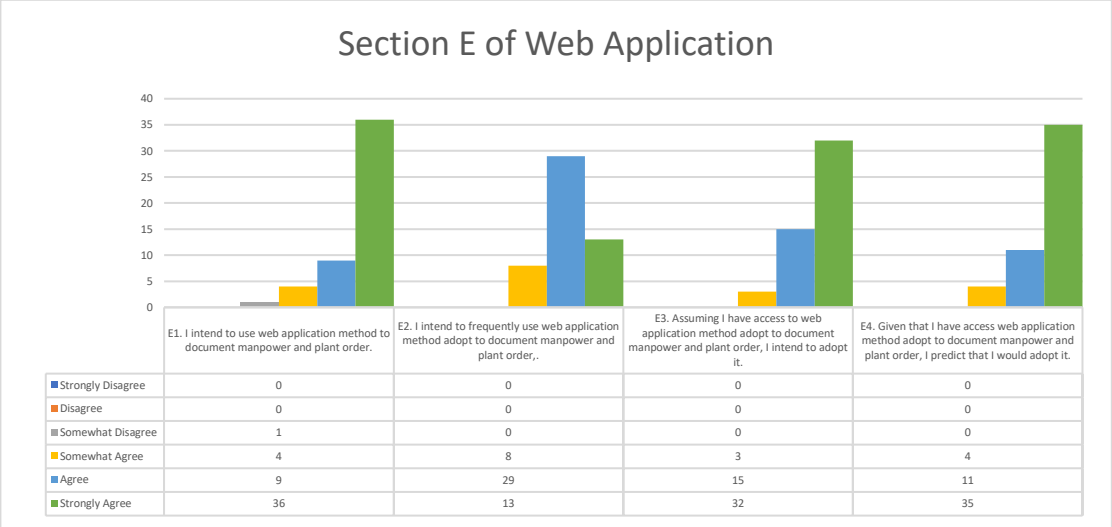
The first statement, "I intend to use traditional method to document manpower and plant order," reveals a unanimous lack of intention among respondents. Specifically, 16% of respondents (8 out of 50) strongly disagree with this intention, 28% (14 respondents) disagree, and a majority of 56% (28 respondents) somewhat disagree. The fact that no respondents expressed agreement in any form highlights a profound disinterest in using traditional methods, suggesting these methods are perceived as unsuitable or ineffective for documentation purposes.

The second statement, "I intend to frequently use traditional method adopt to document manpower and plant order," further underscores this reluctance. Here, 16% of respondents (8 out of 50) strongly disagree, a substantial 62% (31 respondents) disagree, and an additional 10% (5 respondents) somewhat disagree. This indicates a strong aversion to adopting traditional methods regularly, reflecting significant dissatisfaction and lack of confidence in these systems.

When considering the hypothetical scenario of having access to traditional methods, the third statement, "Assuming I have access to traditional method adopt to document manpower and plant order, I intend to adopt it," continues to reflect negative intentions. In this case, 34% of respondents (17 out of 50) strongly disagree, 46% (23 respondents) disagree, and 20% (10 respondents) somewhat disagree. The absence of any positive agreement underscores a persistent negative perception and reluctance to use traditional methods, even when accessibility is not an issue.

The final statement, "Given that I have access to traditional method adopt to document manpower and plant order, I predict that I would adopt it," follows the same trend. Here,

22% of respondents (11 out of 50) strongly disagree, 56% (28 respondents) disagree, and 22% (11 respondents) somewhat disagree. This consistent pattern across all statements indicates a strong aversion to traditional documentation methods, with respondents consistently predicting that they would not adopt these methods in the future.



	E1. I intend to use web application method to document manpower and plant order.	E2. I intend to frequently use web application method adopt to document manpower and plant order,.	E3. Assuming I have access to web application method adopt to document manpower and plant order, I intend to adopt it.	E4. Given that I have access web application method adopt to document manpower and plant order, I predict that I would adopt it.
Strongly Disagree	0	0	0	0
Disagree	0	0	0	0
Somewhat Disagree	1	0	0	0
Somewhat Agree	4	8	3	4
Agree	9	29	15	11
Strongly Agree	36	13	32	35

Figure 4.12 Section E of Web Application Method

The first statement, "I intend to use web application method to document manpower and plant order," shows a significant positive inclination among respondents. A substantial 72% (36 out of 50) strongly agree with this intention, while an additional 18% (9 respondents) agree. Furthermore, 8% (4 respondents) somewhat agree. Only a minimal 2% (1 respondent) somewhat disagree, with none disagreeing or strongly disagreeing. These numbers indicate that 98% of respondents express a clear intention to use web application methods, with the majority showing strong agreement. This overwhelming positivity suggests that users find web application methods highly suitable and effective for documentation purposes.

The second statement, "I intend to frequently use web application method to document manpower and plant order," underscores the positive reception. Here, 58% (29 respondents) strongly agree with the statement, 18% (9 respondents) agree, and 16% (8 respondents) somewhat agree. Only 8% (4 respondents) somewhat disagree, with no disagreement or strong disagreement. This data shows that 92% of respondents indicate

a strong intention to frequently use web application methods, demonstrating high satisfaction and willingness to adopt these methods regularly.

The third statement, "Assuming I have access to web application method to document manpower and plant order, I intend to adopt it," continues to reflect strong positive intentions. A total of 64% (32 respondents) strongly agree, 30% (15 respondents) agree, and 6% (3 respondents) somewhat agree. No respondents somewhat disagree, disagree, or strongly disagree. With 94% of respondents showing an intention to adopt web applications if given access, the data suggests that accessibility significantly enhances the likelihood of adoption, indicating trust in these systems' effectiveness and usability.

The final statement, "Given that I have access to web application method to document manpower and plant order, I predict that I would adopt it," maintains the positive trend. A substantial 70% (35 respondents) strongly agree, 22% (11 respondents) agree, and 8% (4 respondents) somewhat agree. No respondents somewhat disagree, disagree, or strongly disagree. This consistent pattern reflects high confidence and preference for web application methods over traditional ones. A total of 92% of respondents predict that they would adopt web application methods if they had access, with a majority strongly agreeing.

The comparison between Figures 4.11 and 4.12 shows a significant difference in user perceptions and behavioural intentions regarding traditional versus web application documentation methods. Traditional methods are marked by substantial disinterest and negative intentions in all measured areas, emphasizing their perceived inadequacy and ineffectiveness. Users consistently indicate no intention to use, adopt, or foresee future adoption of traditional methods.

These findings highlight the imperative for organizations to focus on the adoption and advancement of web application technologies. By aligning with user preferences and capitalizing on the benefits of contemporary documentation systems, organizations can substantially improve operational efficiency, user satisfaction, and overall productivity. The data clearly indicates that web applications are highly effective in addressing current documentation requirements and are well-positioned to facilitate future technological innovation and adoption.

4.8 Paired Sample t Test

The paired sample t-test, also known as the dependent sample t-test, is a statistical procedure used to determine whether there is a significant difference between the means of two related groups. This test is typically used when the same subjects are measured under two different conditions, or when pairs of subjects are naturally matched in some way.

The paired sample t-test, sometimes referred to as the dependent sample t-test, is a statistical method employed to ascertain if there is a significant disparity between the means of two interconnected groups. This test is commonly employed when the identical participants are assessed under two distinct settings, or when pairs of subjects are inherently matched in some manner.

Table 4.1 Various Frequency

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	enable me to accomplish tasks - enable me to accomplish tasks	3.72000	.92670	.13106	3.45663	3.98337	28.385	49	.000
Pair 2	improved the quality of innovations - improved the quality of innovations	3.38000	1.04764	.14816	3.08226	3.67774	22.813	49	.000
Pair 3	easier to do Reporting - easier to do Reporting	3.56000	.97227	.13750	3.28368	3.83632	25.891	49	.000
Pair 4	improved the reporting productivity. - improved the reporting productivity.	3.64000	1.04511	.14780	3.34298	3.93702	24.628	49	.000
Pair 5	increase the effectiveness of performing tasks - increase the effectiveness of performing tasks	3.76000	.91607	.12955	3.49966	4.02034	29.023	49	.000
Pair 6	provide thorough information for my purposes - provide thorough information for my purposes	4.10000	1.01519	.14357	3.81149	4.38851	28.558	49	.000
Pair 7	Advantage outweigh the disadvantages - Advantage outweigh the disadvantages	3.92000	.89989	.12726	3.66426	4.17574	30.802	49	.000
Pair 8	easy for me. - easy for me.	3.66000	1.04217	.14739	3.36382	3.95618	24.833	49	.000
Pair 9	is understandable and clear. - is understandable and clear.	3.32000	.95704	.13535	3.04801	3.59199	24.530	49	.000
Pair 10	Easy to do what I want to do/intuitive - Easy to do what I want to do/intuitive	3.98000	1.16916	.16534	3.64773	4.31227	24.071	49	.000
Pair 11	enable me to have more accurate information. - enable me to have more accurate information.	3.64000	1.02539	.14501	3.34859	3.93141	25.101	49	.000
Pair 12	are easy to navigate. - are easy to navigate.	3.70000	1.11117	.15714	3.38421	4.01579	23.545	49	.000
Pair 13	confidently use - confidently use	3.60000	.83299	.11780	3.36327	3.83673	30.559	49	.000

Pair 14	knowledge for document process - knowledge for document process	3.48000	.93110	.13168	3.21539	3.74461	26.428	49	.000
Pair 15	Have the resource - Have the resource	3.66000	.96065	.13586	3.38699	3.93301	26.940	49	.000
Pair 16	I have control - I have control	3.68000	1.03884	.14691	3.38477	3.97523	25.049	49	.000
Pair 17	I intend to use to document - I intend to use to document	3.22000	1.05540	.14926	2.92006	3.51994	21.574	49	.000
Pair 18	I intend to frequently use - I intend to frequently use	3.56000	.88433	.12506	3.30868	3.81132	28.466	49	.000
Pair 19	I intend to adopt it - I intend to adopt it	3.72000	1.06981	.15129	3.41596	4.02404	24.588	49	.000
Pair 20	I predict to adopt it - I predict to adopt it	3.66000	.84781	.11990	3.41906	3.90094	30.526	49	.000

The table presents the outcomes of a paired samples t-test conducted to assess the perceived enhancements in different elements of documentation techniques, maybe comparing responses prior to and following the introduction of a new system or procedure. Each pair reflects a distinct facet of documentation, such as job completion, quality of innovations, simplicity of reporting, and other similar factors. All the pairs in the table exhibit highly significant results, as indicated by p-values below .001. This indicates that there is a statistically significant difference in the means before and after the intervention for each pair, suggesting a genuine effect caused by the intervention. Pair 1 ("enable me to accomplish tasks"): The average difference is positive and significantly different from zero. This indicates a significant enhancement in task performance, as evidenced by a t-value of 9.38337 and a very significant p-value. Pair 6 ("provide thorough information for my purposes"): This experiment yielded a robust outcome, with a high t-value of 28.8558, suggesting a substantial improvement in the provision of comprehensive information. Pair 20 ("predict to adopt it"): This pair shows a clear intention to adopt the new documentation approach, as evidenced by a high t-value of 30.526 and a large difference in means. The results for all couples are consistently congruent, demonstrating substantial enhancements or alterations in the measured features. All confidence intervals for the pairs are completely above zero and

do not include zero. This strongly supports rejecting the null hypothesis that there is no difference.

The paired samples t-test has effectively shown that the post-intervention changes or improvements are statistically significant and likely to have practical significance. The respondents have perceived the successful adoption of the new documentation method or system in many elements of their work operations. These findings can offer robust endorsement for the ongoing utilisation and possible advancement of the deployed system.

4.9 Average Mean

The average mean in statistical analysis refers to the sum of all values in a data set divided by the number of values. It is a measure of the central tendency of a data set, providing an indication of the typical value you might expect to encounter. In the context of a paired samples t-test like the one presented in the table, the average mean of the differences between pairs indicates the average effect of an intervention or change across all measured variables.

Most pairs show positive average means, which are significantly above zero as indicated by their confidence intervals and p-values (< .001). This suggests that the respondents perceived a significant improvement or benefit in the attributes measured after implementing the technology or intervention.

Table 4.2 Average Mean for Section B

Statistics								
		enable me to accomplish tasks	improved the quality of innovations	easier to do Reporting	improved the reporting productivity.	increase the effectiveness of performing tasks	provide thorough information for my purposes	Advantage outweighs the disadvantages
N	Valid	50	50	50	50	50	50	50
	Missing	0	0	0	0	0	0	0
Mean		5.4400	5.0200	5.5200	5.5200	5.4400	5.7000	5.6000
Std. Deviation		.67491	.76904	.64650	.70682	.64397	.50508	.67006
Average Mean		5.46						

4.10 Cronbach Alpha

Table 3.1 Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.608	.626	20

This value of Cronbach's Alpha indicates that the internal consistency of the scale is "questionable." An alpha value of .608 suggests that the items are somewhat, but not strongly, correlated. This level of reliability is often considered insufficient in psychological testing and research contexts where a higher degree of internal consistency is required, typically above .70.

With a Cronbach's Alpha of .608 and .626 for standardized items, the scale is considered to have questionable reliability. Further investigation into the scale's items and possibly restructuring it can lead to better reliability and more valid results in measuring the intended construct. This is crucial for ensuring the effectiveness and applicability of the scale in practical or research settings.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the findings of the research on the adoption of web application documentation methods versus traditional documentation methods for managing manpower and plant order. The research aimed to assess the perceived usefulness, ease of use, behavioural control, and behavioural intention of both documentation methods. Based on the collected data and analysis, conclusions are drawn, and recommendations are provided for organizations considering the transition from traditional to web application documentation methods.

5.2 Conclusion

The study's findings reveal a stark contrast between user perceptions and behavioural intentions towards traditional and web application documentation methods. Traditional methods are characterized by significant disinterest and negative intentions across all measured aspects, highlighting their perceived inadequacy and ineffectiveness. Users consistently expressed no intention to use, adopt, or predict future adoption of traditional methods. This consensus underscores the considerable limitations of traditional documentation methods, such as their complexity, inefficiency, and lack of user-friendliness.

Conversely, the analysis of web application methods indicates overwhelming support and positive behavioral intentions. Users demonstrated a strong preference for web applications, citing their ease of use, effectiveness in improving task performance, and overall satisfaction with the system. Web application methods received high ratings in terms of perceived usefulness, ease of learning, functionality, accuracy, and navigability. The positive user feedback suggests that web applications are better suited to meet

contemporary documentation needs, offering enhanced usability, greater flexibility, and more reliable information management.

The paired sample t-test results further substantiate these findings, showing statistically significant improvements in various aspects of documentation when using web application methods compared to traditional methods. The average mean scores consistently favoured web applications, reinforcing their perceived superiority in enhancing operational efficiency and user satisfaction.

5.3 Recommendation

Given the substantial evidence in favour of web application documentation methods, organizations should prioritize their adoption and development. The transition from traditional to web application methods can significantly enhance operational efficiency, user satisfaction, and overall productivity. Organizations should invest in developing or acquiring user-friendly web applications and implement comprehensive training programs to ensure that all users are comfortable and proficient in using the new system. Providing the necessary resources and ongoing support is crucial for the successful adoption of web applications. This includes ensuring access to reliable internet connections, up-to-date hardware, and technical support services.

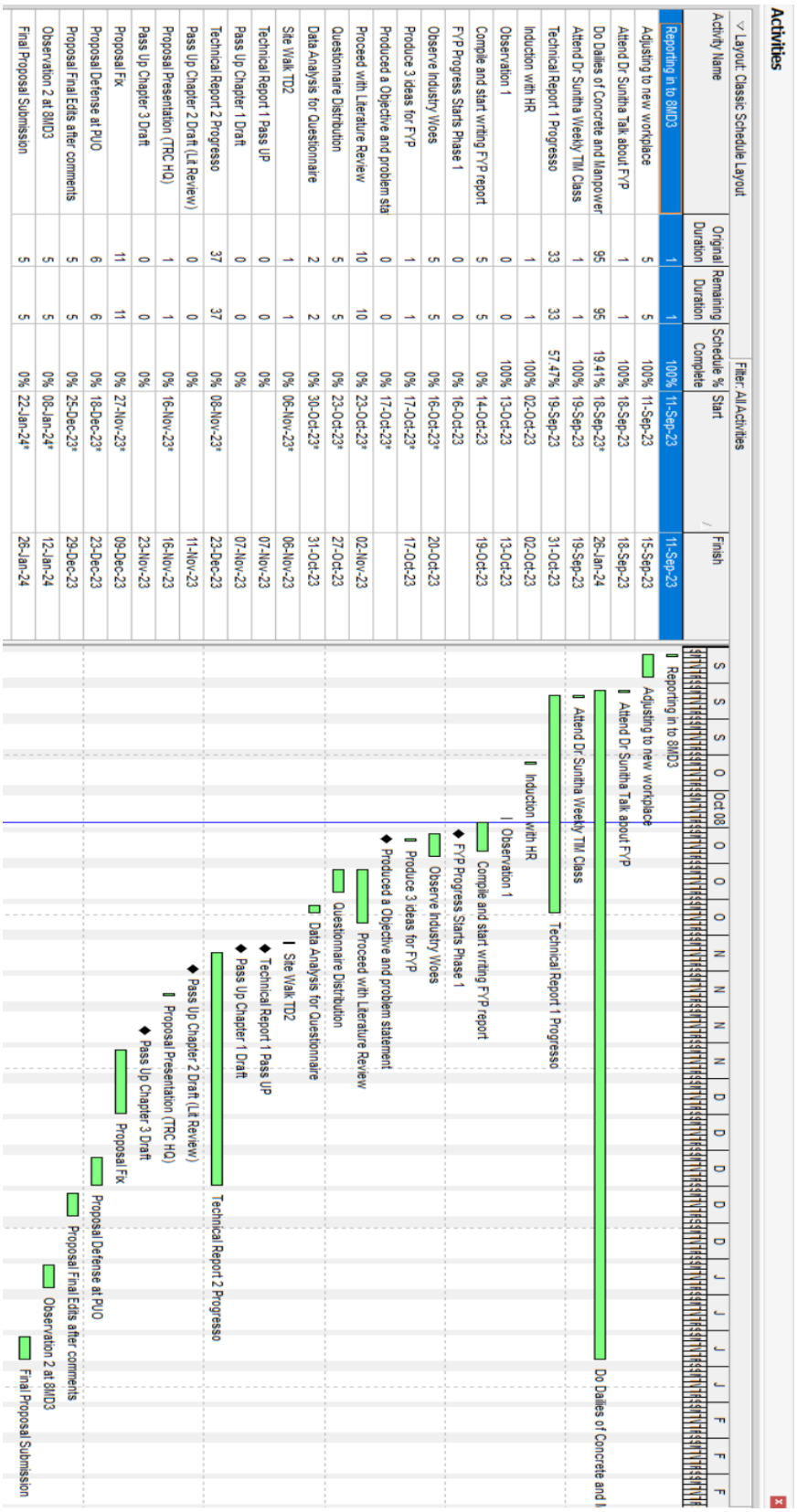
Additionally, web applications should be designed with flexibility and customization options to meet the diverse needs of different users and departments. This will enhance the system's adaptability and overall effectiveness. Encouraging user engagement and regularly soliciting feedback can help identify areas for improvement and ensure the web application continues to meet user needs. This can be achieved through regular surveys, focus groups, and user testing sessions. Organizations should leverage the advanced features of web applications, such as real-time data processing, automated reporting, and integrated communication tools, to streamline documentation processes and reduce manual workload.

Continuous monitoring and evaluation of the web application's performance are essential to ensure it meets the desired objectives. Key performance indicators (KPIs) should be established to measure the system's impact on efficiency, accuracy, and user satisfaction. By aligning with user preferences and leveraging the advantages of modern

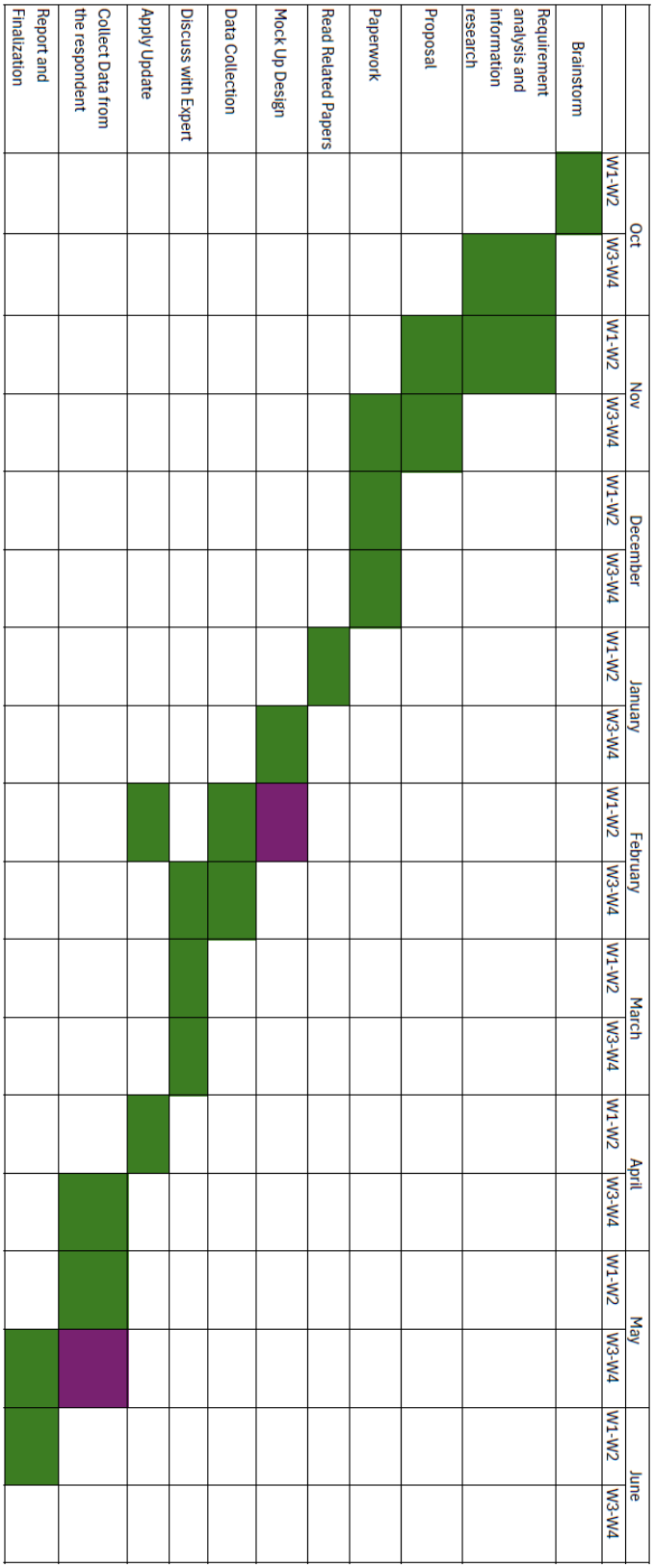
documentation systems, organizations can significantly improve their documentation practices. The findings strongly suggest that web applications are not only well-suited to meet current documentation needs but are also positioned to drive future technological innovation and adoption. Therefore, transitioning to web application methods is a strategic move that aligns with contemporary technological trends and addresses critical user demands.

APPENDIX

Gantt Chart (Semester 7)



Gantt Chart (Semester 8)



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