

**IMPLEMENTATION OF INTEGRATED MANAGEMENT SYSTEM IN
CONSTRUCTION ORGANIZATIONS IN MALAYSIA**

By

NOR FAZIRA BINTI RAMLI

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Master of Science**

February 2024

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment
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An Integrated Management System (IMS) combines different management systems into one complete system. IMS has been acknowledged as one way to reduce Management System Standards (MSS) limitations and sustain industries with the new MSS technique. This study investigates strategies to enhance IMS implementation in Malaysian construction companies. The total number of companies registered in the Construction Industry Development Board (CIDB) with grades three to seven in Klang Valley is 8843. Based on the study done, only 78 companies are implemented with IMS. This number is because most companies still implement different types of MSS separately. Other than that, surveys in November 2021 revealed limited studies on IMS across various platforms, suggesting potential for further research. This study used quantitative and qualitative study methods. The study takes place on the construction company in Klang Valley that implemented the IMS. A survey was conducted for the quantitative research to check the company's understanding regarding the intention and effectiveness of the IMS implementation. The results show that the companies implementing the IMS aim to meet customer requirements with a 0.979 Relative

Important Index (RII) value. After the implementation, they acknowledged that IMS helps companies to increase productivity with a 0.961RII value.

Meanwhile, the semi-structured interview session was conducted with five subject matter experts (SMEs) implementing IMS for the qualitative study. The interview is done to validate the entire study, including the validation of the research process and the framework's effectiveness. As a result, all respondents 100% agree on the research process, framework functionality, and industry relevance. The study will probably cause more research to help construction companies acquire more knowledge about IMS, and consequently, it may lead to more companies implementing IMS. This assumption is supported by the available data and the implementation guidelines that would encourage more companies to adopt IMS.

Keyword: Construction Management, Integrated Management System (IMS), Management System Standard (MSS)

SDG: SDG 9: Industry, Innovation, and Infrastructure, SDG 11: Sustainable Cities and Communities

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PELAKSANAAN SISTEM PENGURUSAN BERSEPADU DALAM
ORGANISASI PEMBINAAN DI MALAYSIA**

Oleh

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Februari 2024

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Sistem Pengurusan Bersepadu (IMS) menggabungkan sistem pengurusan yang berbeza menjadi satu sistem yang lengkap. IMS telah diakui sebagai salah satu cara untuk mengurangkan had Piawaian Sistem Pengurusan (MSS) dan mengekalkan industri dengan teknik MSS baharu. Kajian ini menyelidiki strategi untuk meningkatkan pelaksanaan IMS dalam syarikat pembinaan Malaysia. Jumlah keseluruhan syarikat yang berdaftar di Lembaga Pembangunan Industri Pembinaan (CIDB) dengan Gred tiga hingga tujuh di Lembah Klang ialah 8843. Berdasarkan kajian yang dibuat, hanya 78 syarikat yang dilaksanakan dengan IMS. Jumlah ini adalah kerana kebanyakan syarikat masih melaksanakan pelbagai jenis MSS secara berasingan. Selain itu, tinjauan pada November 2021 mendedahkan kajian terhadap mengenai IMS merentas pelbagai platform, mencadangkan potensi untuk kajian lanjutan. Kajian ini menggunakan kaedah kajian kuantitatif dan kualitatif. Kajian itu dijalankan ke atas syarikat pembinaan di Lembah Klang yang melaksanakan IMS. Satu kaji selidik telah dijalankan untuk kajian kuantitatif untuk menyemak kefahaman syarikat berkenaan hasrat dan keberkesanan pelaksanaan IMS. Keputusan

menunjukkan bahawa syarikat-syarikat yang melaksanakan IMS bertujuan untuk memenuhi keperluan pelanggan dengan nilai Indeks Penting Relatif (RII) 0.979. Selepas pelaksanaannya, mereka mengakui bahawa IMS membantu syarikat untuk meningkatkan produktiviti dengan nilai 0.961RII.

Sementara itu, sesi temubual separa berstruktur telah dijalankan dengan lima pakar bidang (PKS) yang melaksanakan IMS bagi kajian kualitatif tersebut. Temu bual ini dilakukan untuk mengesahkan keseluruhan kajian, termasuk pengesahan proses penyelidikan dan keberkesanan rangka kerja. Hasilnya, semua responden 100% bersetuju dengan proses penyelidikan, fungsi rangka kerja, dan kaitan industri. Kajian ini mungkin akan menyebabkan lebih banyak penyelidikan untuk membantu syarikat pembinaan memperoleh lebih banyak pengetahuan mengenai IMS, dan akibatnya, ia boleh membawa kepada lebih banyak syarikat melaksanakan IMS. Andaian ini disokong oleh data yang ada dan garis panduan pelaksanaan yang akan menggalakkan lebih banyak syarikat untuk menerima pakai IMS.

Kata kunci: Pengurusan Pembinaan, Piawaian Sistem Pengurusan (MSS), Sistem Pengurusan Bersepadu (IMS)

SDG: SDG 9: Industri, Inovasi dan Infrastruktur, SDG 11: Bandar dan Komuniti Lestari

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

ABMS	Anti-Bribery Management System
BSIA	British Standards Institution Americas
CARS	Corrective Action Requests
CIDB	Construction Industry Development Board
CIMS	Centralized Information Management System
COVID-19	Coronavirus Disease 2019
DOE	Department of Environment
EMS	Environmental Management System
FPPCP	Framework Planning of Promoting Cleaner Production
HVAC	Heating, Ventilation, and Air Conditioning
IIAM	Integrated Internal Audit Management
IMS	Integrated Management System
IQA	Internal Quality Audits
ISMS	Information Security Management System
ISO	International Organization Standardization
M&E	Mechanical and Electrical
MCO	Movement Control Order
MS	Management System
MSS	Management System Standards
OHSMS	Occupational Health and Safety Management
PDCA	Plan, Do, Check and Act
PRISMA	Preferred Report Items for Systematic Reviews and Meta-analyses
QMS	Quality Management System
RII	Relative Importance Index
RMS	Risk Management System

SME	Subject Matter Experts
SPSS	Statistical Package for the Social Science
SSI	Semi-Structured Interview
WFH	Work From Home



CHAPTER 1

INTRODUCTION

The research on improving the implementation of the Integrated management system (IMS) in construction organizations starts with an introductory section. This chapter will consist of the background of this study, the statement of the main problems, and the research gap that is important to start this research. Furthermore, the research questions and objectives that are important to develop are highlighted in this study. Finally, the scope of the research and its significance are discussed in this chapter. Therefore, this introductory chapter outlines the thesis as a whole.

1.1 Background of the Study

Management Systems and Standards (MSS) are methods the organization uses to ensure the aims and targets for their business have been achieved by directing the reciprocal parts of the aims. The aims can be relevant to the nature of the industry, such as quality, environment, safety and health, product services, and efficiency (Magd and Karyamsetty, 2020).

Companies normally implement Management Systems and Standards (MSS) individually based on the type of MSS that is relevant and necessary for their business culture (Magd and Karyamsetty, 2020). Table 1.1 shows the limitations and causes of limitations for different management system standard implementations for the company and the need for integrated management system implementation.

Table 1.1: Limitation and cause of limitation for MSS

Limitation	Researcher	Cause of Limitation
Less productivity	Fonseca and Carvalho, 2019	• Due to internal needs or industry constraints, many businesses use a variety of MSS. • The MSS requirement varies based on management systems, including environmental, quality, occupational safety, health, and company situations. As a result, the procedures disintegrated and were transferred to multiple management and staff teams.
	Lanerolle et al., 2023	• Most companies hire a specialized manager to accomplish the target for implementing different MSS. • The result of this situation is that all of the managers will have disagreements with one another because they each tried to achieve their unique goals rather than core business objectives.
Client Needs	Fonseca and Carvalho, 2019	• Several Portuguese and international MSS have been released. They are leading in knowledge development, which requires more work since companies must implement changes carefully and with varying degrees of importance. • As a universal part of organizational management systems, a single MSS meets the needs and presumptions of various stakeholders, but more work needs to be done.
Cost	Talapatra et al., 2019	• The purpose of integrating the audit process (internal and external) is to confirm the enhancement of the audit results, reduce costs, and avoid power-related duplication. • The majority of businesses have begun to consider the integrated process to make the process simple. Even the beginning procedure requires additional labor; however, the documentation integration process is advantageous for the future.
	Karkalikova and Strhan, 2018	• The cost savings, decreased documentation, increased system efficiency, and elimination of repetition led to the integration of the management system. • Compared to implementing a single MSS, the integration process will help the organization lower the risk and cost associated with leadership.

Based on Magd and Karyamsetty (2020), implementing an Integrated Management System (IMS) is profitable for the organization because it helps achieve further improvement and is a practical system that suits the companies' self-assessments and

standards. The factors that help increase an organization's productivity are improved management systems, competitiveness, efficient use of sources, practical design, enhanced staff training, excellent cooperation, a simplified management system, and decreased bureaucracy (Magd and Karyamsetty, 2020).

There are several challenges in adopting the Integrated Management System (IMS) despite the advantages of overcoming the limitations of implementing the single Management Systems and Standards (MSS). These key challenges faced by the companies during the implementation are shown in Figure 1.1 (Khatatbeh, 2022).

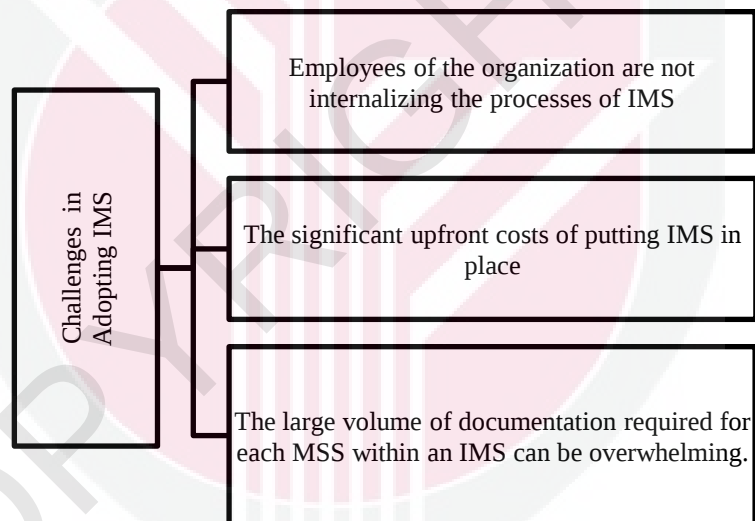


Figure 1.1: Challenges in adopting IMS

Nonetheless, the obstacles and methods for enhancing Integrated Management System (IMS) deployment are necessary to speed up the adoption process. Important strategies found by the study are outlined in Figure 1.2 (Ispas and Mironeasa, 2022).

One of the examples based on the strategies is government support, as seen in China, which is essential to encouraging the use of Integrated Management System (IMS). There is a rising awareness of the usefulness of IMS in China due to the major improvements and planning innovations brought about by the adoption of IMS in numerous enterprises. Interestingly, businesses that prioritize environmental management activities receive active backing from the Chinese government. For example, the government of Shanghai launched the "Framework Planning of Promoting Cleaner Production" (FPPCP), intending to give financial support to businesses that have a stable financial position and good competitive skills (Ispas and Mironeasa, 2022).



Figure 1.2: Strategies for IMS improvement

1.2 Problem Statement

An Integrated Management System (IMS) is a management system that assimilates every module in the business into a solitary clear system to support its resolution and operation. The decision that affects the organization's consequences is considered a part of the management system. Hence, elements such as environment, quality, personnel, health and safety, security, finances, and other essential features need to be considered based on the current situation known as IMS. Therefore, in IMS, all documents and processes described must be integrated (Acuna, 2019).

Integrated Management System (IMS) is important because most companies implement different management systems individually. Therefore, one method to lessen the restrictions is the IMS. IMS was created to assist companies in developing their corporate culture through the integrated system (Magd and Karyamsetty, 2020). It is important for businesses to comprehend the advantages of IMS adoption completely; they must assess the efficiency of the IMS applied in their business. Even though IMS benefits most industries, there still needs to be improvement in certain areas to enhance its effectiveness and adoption, especially in construction companies in Malaysia.

The integrity and relationships of the different management systems create an Integrated Management System (IMS) that satisfies all of the requirements of the various management systems (Karkalikova and Strhan, 2018). The management system is crucial since small and medium-sized construction companies will face obstacles in multiple industries currently dominated by more established, well-known businesses.

The main objective of this study is to investigate strategies to enhance the implementation of Integrated Management System (IMS) among construction organizations in Malaysia. The study aims to analyze the factors contributing to the low adoption of IMS, assess the effectiveness of IMS implementation, and identify important considerations for promoting IMS adoption within the construction industry. Firstly, the number of companies that implemented with Integrated Management System (IMS) could be much higher because some contractors still need to be made aware of the importance of these things in their organization and business culture. Based on the number of construction companies registered in the Centralized Information Management System (CIMS) of the Construction Industry Development Board (CIDB) that focuses on Klang Valley. This area has been chosen to understand the landscape of construction companies and their potential for IMS adoption. The companies are categorized from grades one to seven based on the CIMS grading system. This study's samples only focus on companies from grades three to seven.

The total number of companies in Centralized Information Management System (CIMS) grade three to grade seven are 8843 (CIMS, 2022). Of all the companies, the number of companies with a website is 476. Therefore, based on the website, only 78 companies have implemented IMS. The companies with the websites are chosen from the overall companies because the companies are accessible via the Internet, and all relevant information about the companies is shown on their company website, especially information related to the Management Systems and Standards (MSS) certification.

Most businesses use various Management Systems and Standards (MSS) due to the heavy workload, intensifying global competitiveness, and growing demands from top management. Therefore, having an Integrated Management System (IMS) for businesses is only logical and practicable if they want the highest MMS implementation efficacy. However, the research on IMS must still be enhanced to recognize the primary problems influencing IMS, the motivations and goals behind IMS adoption, and the efficacy of the MSS combination. The concepts are crucial for capturing the interest and curiosities of practitioners, academics, regulators, and businesses, but surprisingly, the investigations still need to be finished (Ronalter and Bernado, 2023).

The number of documents in Integrated Management System (IMS) still needs to be more prominent since the adoption of the standard still needs to be improved. Therefore, the integrations between the Management Systems and Standards (MSS) need to be stressed. Companies need to understand the benefits of the integrated approach due to the establishment of environmental concerns, quality, and staff protection. Then, the requirement to follow the combined standards is accentuated (Magd and Karyamsetty, 2020).

While conducting a survey across various search engines in November 2021, it was observed that the number of studies conducted using the keywords or search strings "Integrated Management System" OR "Combination Management System" appeared to be relatively limited. The findings from this survey revealed the following numbers of studies: Emerald Insights (120,000 studies), IEEE Xplore (61,653 studies), Sage Journals (111 studies), Science Direct (1,321 studies), Scopus (1,488 studies), and

SpringerLink (837,967 studies). The number of studies could be much higher, considering the vast number of studies on these platforms.

Therefore, the benefit of this study is that it assists construction organizations in getting a better understanding of the Integrated Management System (IMS) and helps them with the implementation and adoption process. The companies will understand their intention to implement the IMS and its effectiveness after adopting the IMS systems.

1.3 Research Question

The research question has been identified based on the vague problem statements for implementing an Integrated Management System (IMS) in construction organizations. Therefore, the main research question is, “How can the number of construction organizations in Malaysia increase to implement IMS?” This question is directed to analyze the issues that help to solve the following question;

- a. Why must an Integrated Management System (IMS) be implemented in construction organizations?
- b. How is the effectiveness of the Integrated Management System (IMS) implemented in construction organizations measured?
- c. What steps should be taken to improve the functionality and adoption of the Integrated Management System (IMS) in construction organizations?

1.4 Research Objectives

The main objective of this research is to investigate strategies to enhance the implementation of Integrated Management Systems (IMS) among construction

organizations in Malaysia. Therefore, to achieve the target to solve this research question, the specific research objective has been identified;

- a. To determine the intention of the Integrated Management System (IMS) being implemented in the construction organization
- b. To evaluate the effectiveness of the Integrated Management System (IMS) implemented in the construction organization
- c. To develop a framework that functionally improves the Integrated Management System (IMS) implementation and adoption in the construction organization

1.5 Scope of the Study

This research study is focused on the crucial things in the Integrated Management System (IMS). For this study, IMS consists of Quality Management System (QMS), Occupational Health and Safety Management (OHSMS), Environmental Management System (EMS), and Anti-Bribery Management System (ABMS). All these types of management systems are essential in the construction industry like contractor companies.

This study was conducted on construction companies in the Klang Valley area. This area is significant as it is a prominent economic hub and the main spot for construction in Malaysia. Other than that, Klang Valley covers major cities such as Kuala Lumpur, Petaling Jaya, Shah Alam, and others representing a diverse range of construction activities and businesses. Therefore, this study can grasp this area's nuances and interaction focus and provide a significant perspective for the IMS implementation within a geographically concentrated area.

The companies involved in this study are registered under the Centralized Information Management System (CIMS) of the Construction Industry Development Board (CIDB). The companies have been graded based on certain criteria fixed by the CIDB, such as financial feasibility, technical personnel qualification, and other criteria. This study focuses on companies from grades three to seven since companies from grades one and two have yet to be implemented with Integrated Management System (IMS). Besides that, the study can focus on the companies actively involved in construction projects and benefit from IMS implementation.

This research highlights the development of the Integrated Management System (IMS) framework that will be used as a guideline to improve the implementation and adoption of IMS in construction organizations. The method of performance and effectiveness of IMS will be discussed in this study. In addition, the relationship between Quality Management System (QMS), Occupational Health and Safety Management (OHSMS), Environmental Management System (EMS), and Anti-Bribery Management System (ABMS) will be addressed in this study.

1.6 Significant of the Study

This study will contribute to closing the gaps in the existing studies. This study stresses two gap analyses: the types and number of management systems in the IMS and the single factors used in the current IMS study. Therefore, four management systems are suggested in the Integrated Management System (IMS) to close the gap analysis. The four types of management systems are the most relevant to construction companies. Not only that, but the factors that have been focused on in this study combine two

factors. The two factors are the integration and implementation of IMS and the type of management system standard use.

This study is significant to the construction industry because it assists the construction organization in getting a better understanding of the Integrated Management System (IMS) and helps them with the implementation and adoption process. The companies will understand their intention to implement the IMS and its effectiveness after adopting the IMS systems. The framework has been developed based on the data received from the survey, which functionally improves the implementation of IMS. This framework helps companies to have a clear idea of the step-by-step implementation process.

Other than that, this study is essential for academia because the fundamental study will verify the concept and progress of the information study. The insights gleaned from the study will offer researchers valuable knowledge, facilitating further exploration of the topic. This contribution is particularly significant for expanding the research related to the subject matter in management systems and construction management.

1.7 Gap Analysis

The gap analysis is organized to determine the recommended conditions and aspects for more study and assessment. Based on the gap analysis, the view that needs more study can be analyzed (Sharon et al., 2020). The gap analysis determined in this study is shown below in Table 1.2.

Table 1.2: Gap analysis

Current State	Future State	Gap	Action to Closed Gap
1. The current Integrated Management System (IMS) studies design focuses on two or three different types of management systems.	Due to the revolutions and the company's requirement for management systems standards (MSS) is changes and need variation type of management system.	The different types of MSS are useful and reasonable for a different organization.	In this research, five types of MSS are considered relevant for IMS, offering more comprehensive and flexible approaches, particularly for construction companies to contemplate during implementation. By offering a broader range of options, companies can choose the most suitable MSS based on specific criteria, such as organizational goals, industry regulations, stakeholder expectations, and resource capabilities.
2. The factor of the Integrated Management System (IMS) studies for the existing studies are focusing more on a single factor like: a. Integration and Implementation b. Empirical Study c. Management System Standard	More factor needs to discover related to the IMS implementation in the industry.	The factor discover can vary in different states or combinations for the current factor for IMS implementation.	For this research study, two factors adopted are integration and implementation related to the aims of the effectiveness for the IMS implementation. The second factor is management system standard, where four different management systems are introduced for the construction organization. More factors proposed aim to broaden the scope of IMS research, chosen for their critical importance in shaping the effectiveness and success of IMS implementation within the construction industry.

1.8 Content of the Thesis

The comprehensive research study of implementing the Integrated Management System (IMS) in construction organizations in Malaysia has been organized into five chapters, as shown below in Table 1.3.

Table 1.3: Content of the overall thesis

Chapter	Content
Chapter 1: Introduction	The introduction chapter introduces and gives a guideline to the overall research framework and point of view on the research question and the complete objectives of the thesis.
Chapter 2: Literature Review	A related literature review has been searched and evaluated to present the theoretical outline of this research. The discussion on the information relevant to the topic narrows down to the identity of the key focus area of this study.
Chapter 3: Research Methodology	The systematic process flow of the research is explained. It contained the whole process of the study, starting from the research question and the theoretical analysis received after the data collection.
Chapter 4: Result and Discussion	This chapter shows the discoveries and outcomes of research from the data collected during the survey and interview. The specific results are presented in text, figures, graphics, and charts to answer the research questions and justify the research objectives.
Chapter 5: Conclusion and Future Recommendation	As a conclusion of the comprehensive research summarised to give the reader a long-term piece of information, future action recommendations based on the significance of the research outcomes will provide significant implications for future use.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review chapter will overview the critical discussions pertinent to the thesis study, focusing on implementing Management System Standards (MSS) and Integrated Management Systems (IMS) within construction companies.

2.2 Definitions

This subtopic discussed the definition of key terms pertinent to the research study.

2.2.1 Management System

The management system is characterized as the organization's procedure to run its business. The principle is to set up the organization to complete its goals, plan, mission, and target. The organization must involve its procedure, behaviors, and assets hired to achieve the aims. Any issues or factors influencing the outcomes will cover the system (Lanerolle et al., 2023).

2.2.2 Management System and Standards (MSS)

Management System Standards (MSS) are voluntary regulations, procedures, or rules the organization implements. It is the function to detail, standardize, and regulate a

varied management process set. It will also be categorized from technological criteria and specs based on the procedure or product concern to be satisfied. There are various types of MSS, such as Quality Management System (QMS), Environmental Management System (EMS), Occupational Health and Safety Management (OHSMS), and others. These standards typically consist of an identical technique related to the formation, framework, and application procedure and will be controlled and guided by the mediator (Barbosa et al., 2021).

2.2.3 International Organization Standards (ISO)

International Organization Standardization (ISO) is an ancestor of the international body that started as the designer of concessions in industrialized and technical standards. Compliance is the fundamental framework for increasing the modern worldwide economy. Therefore, ISO is regularly considered a word compared to an acronym. ISO standards include elements relevant to the organization, such as environmental, quality, safety and health, and security. Companies certified by the ISO prove that they fulfill the needs and expectations of the best international practices (Blind and Laer, 2022).

2.2.4 Integrated Management System (IMS)

The British Standards Institution Americas (BSIA) defines an Integrated Management System (IMS) as a comprehensive framework incorporating various organizational systems and processes to guarantee that it operates as a single segment with integrated goals. The practical and organized setup of an organization makes up IMS. Figure 2.1 (Acuna, 2019) depicts the IMS Venn Diagram comprising the three fundamental MSS.

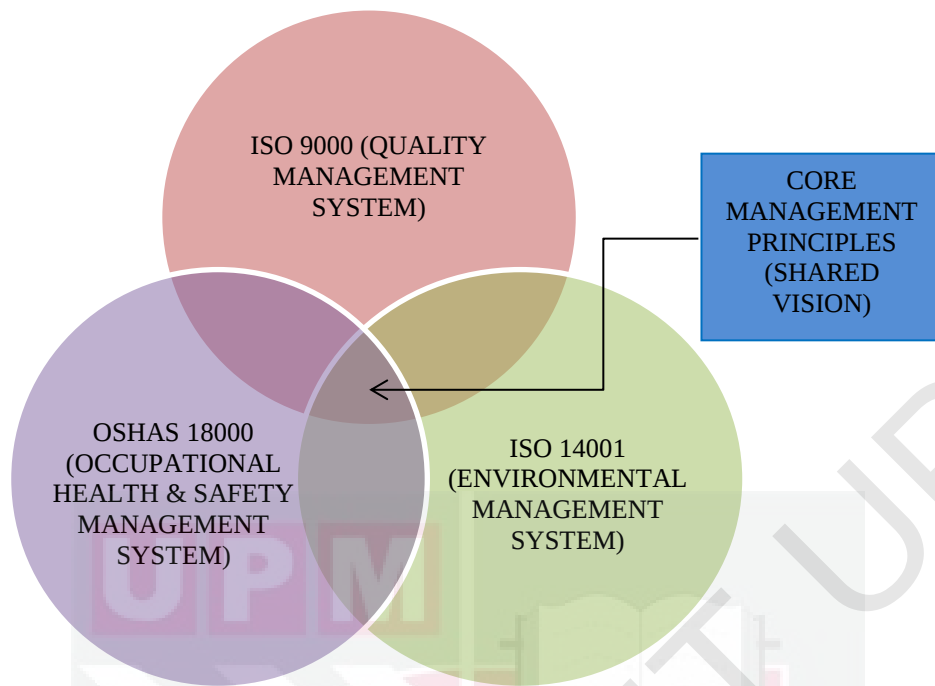


Figure 2.1: Venn Diagram of IMS

The term "Integration Management Systems" (IMS) refers to combining various complicated management system functions into a single, highly effective IMS. Regardless of the unsettled state of Quality Management Systems (QMS) in the field, IMS comprises a management system that correlates to quality and reviews through the combination procedure. The main attributes that can be acknowledged in integrating management systems are application policy, combination technique, stage of integration, and assessment integration (Barbosa et al., 2021).

2.2.5 Quality Management System (QMS)

Abbasi and Al-Nagrash (2022) define Quality Management Systems (QMS) as an assortment of associations, the public, resources, and actions that execute the quality policy of an association. It is known as a high assumption of client quality level.

Processing and quality specifications of received materials need to meet requirements consistently. The practice that solves the Corrective Action Requests (CARs) is the need to report dissimilarity in resources, materials, or facilities. In other words, QMS is an inclusive viewpoint for the whole organization (Abbasi and Al-Nagrash, 2022).

A Quality Management System (QMS) is an education learned through a continuously improving process to develop better products and services that will retain customers present. This situation will welcome new clients and win back the lost clients. Three crucial factors can increase the practicality and efficiency of QMS in the construction industry. First, enhancing and integrating quality improvement processes in the organization management system is necessary. The management team needs to ensure their effort is high; all staff must be trained and prepared for Internal Quality Audits (IQA) despite their level. Meanwhile, IQA needs to be done frequently (Idris et al., 2018).

A Quality Management System (QMS) is an ongoing development procedure that includes all business characteristics. Before the mistake happens, preventive action must be taken as the inclusive target of QMS. The strategies to certify the planning quality are all relevant parties involved, such as subcontractors, suppliers, and consultants, who must be involved in the project's quality planning. Then, QMS resolves to define and establish the struggle required to revise copies of documents that need to be reduced during the planning step. A team for QMS is vital to set development and effective plans. Lastly, quality planning must be continuously attentive to customer necessities (Sharmin et al., 2021).

2.2.6 Occupational Health and Safety Management System (OHSMS)

The Occupational Health and Safety Management System (OHSMS) is an established correlated component that the OH&S policy has supported. The primary target of this element is to improve the efficiency of health and safety risks in the organization. The critical components for a successful OHSMS are shown in Figure 2.2 (Mambwe et al., 2021).

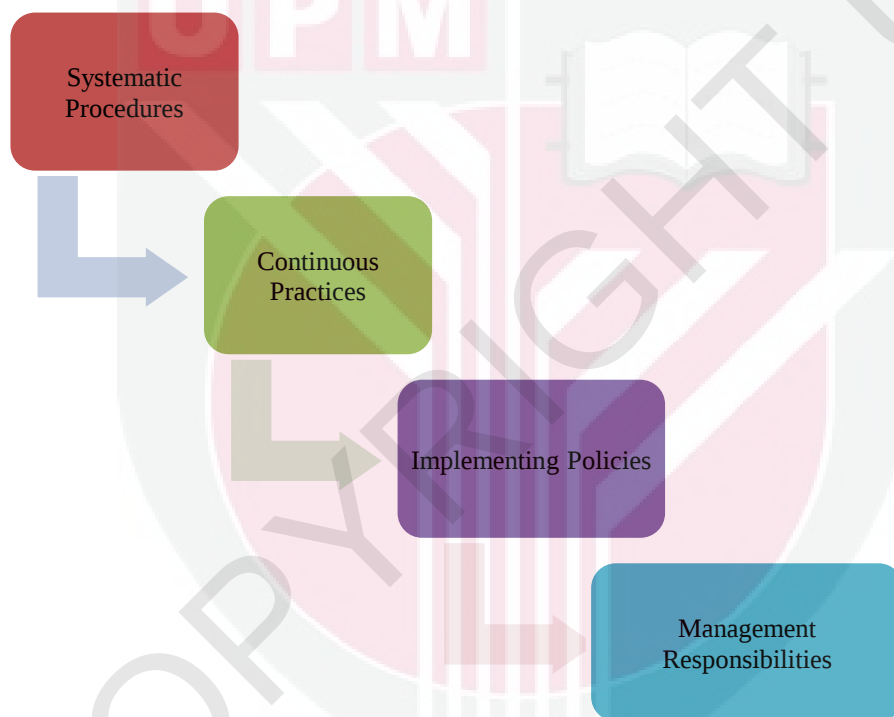


Figure 2.2: Key components for a successful in OHSMS
(Mambwe and et al., 2021).

Occupational Health and Safety Management System (OHSMS) enhancement in the construction industry is a crucial target for all contractors. OHSMS takes care of all possibilities and accidents that will put all the workers at risk and reduce the options. Hence, it is imperative to analyze suitable safety schedules and policies to minimize potential issues related to OHSMS. Besides that, OHSMS provides more practical and

acceptable solutions related to health and safety issues. Consequently, it improves productivity and minimizes cost due to better resource allocation. OHSMS will help toughen organizational culture and establish corporate due diligence (Alhammadi et al., 2022).

2.2.7 Environmental Management System (EMS)

An Environmental Management System (EMS) is the key to company structure, event schedule, procedures, practices, and responsibilities. It also includes resources and developments for developing, applying, revising, accomplishing, and preserving an environmental policy. The International Organization for Standardization (ISO) defined this based in Geneva, Switzerland, in 2000. EMS is a management tool after ISO 14000 was established on 1 September 1996 (Blyde, 2022).

2.2.8 Anti-Bribery Management System (ISO 37001:2016)

Anti-Bribery Management Systems (ABMS) or ISO 37001:2016 is an effective device for handling corruption. It was implemented by the Italian National Standards Institute (UNI) and adopted by all states. ABMS outlines the requirement to assist the organization with precaution and recognition and to counter corruption. Apart from that, to fulfill the anti-corruption legislation and other voluntary assurances appropriate to its actions. The regulation is not strictly relevant to cartels, fraud, further competition violations, money laundering, and other corruption practices (Nurisyal and Norhaninah, 2020).

2.3 Concept of Management System and Standards (MSS)

Subtopic 2.3 will explain the concept of Management System and Standards (MSS) in terms of the implementation practice and process of the adoption by the companies.

2.3.1 Implementation Practice of Management System and Standards (MSS)

The objective of implementing the Management System and Standards (MSS) is to help the organization control the risks related to the services and products delivered to the stakeholders and their customers. Other than that, the key objective of management in implementing MSS is to grow a sustainable routine within the board and the organizational structure. Management needs to be holistic and straightforward to build the continued achievement of organizations, successful business promotion, and value formation to complete the key objective (Fiore et al., 2021).

The target for implementing the Management System and Standards (MSS) can vary since different types of MSS are relevant to the industries. The organization will decide on the best and most relevant MSS to implement based on the organization's target.

Table 2.1 shows the target of implementing different types of MSS.

Table 2.1: Target of MSS implementation

Management System and Standards (MSS)	Target of Implementation	Citation
ISO 9001:2015 Quality Management System (QMS).	Fulfill the needs and requirements of the customer and maintain continuous improvement of the organization	(Sharmin et al., 2021)
ISO 45001:2018 Occupational Health and Safety Management System (OHSMS).	To lessen the risk of injury and illness by ensuring the workplace and environment are safe and healthy for the staff and stakeholders.	(Athauda et al., 2023)
ISO 14001:2015 Environmental Management System (EMS).	To protect the environment and prevent pollution from occurring from business activities within the natural environment.	(Ushakov, 2022)
ISO 37001:2016 Anti-Bribery Management System. (ABMS)	To comply with anti-corruption laws and other commitments related to its activities based on the guidelines in ABMS that help to prevent, detect, and respond to corruption.	(Nurisyal and Norhaninah, 2020).

There are common universal reasons for the organization's management system and standards (MSS) implementation, such as increased efficiency, fulfillment of customer requirements, and improved product and service quality. MSS implementation helps increase efficiency because all the MSSs offer a systematic approach to control developments, fewer faults, and enhanced resource application. All these offers will produce high productivity and efficiency in the organization (Barbosa et al., 2021).

The next reason is to fulfill the customer requirement by setting the company procedures and practices to meet the needs and expectations of the customers. The requirements can vary regarding the safety, quality, and reliability of the product or service delivered (Magd and Karyamsetty, 2020). The process can be done to improve the product and service quality during MSS implementation by launching strong procedures and standards. Therefore, all the staff and stakeholders will acknowledge their responsibilities and roles. This procedure will produce fewer errors, dependable quality, and higher customer satisfaction (Karkalikova and Strahan, 2018).

Management System and Standards (MSS) implementation in Malaysia and worldwide can be based on criteria such as regulatory compliance, certification bodies, accreditation, integration with business practice, and government support. Table 2.2 compares the implementation practice of MSS in Malaysia and universally.

Table 2.2: Comparison of MSS implementation in Malaysia and Universal

Criteria	Malaysia	Universal
Regulatory Compliance	The implementation of MSS is based on government regulations, industry requirements, and customer needs. (Blind and Laer, 2022)	The implementation of MSS depends on the country's government and industry's strict regulations. (Ispas and Mironeasa, 2022)
Certification Bodies and Accreditation	Certification bodies that are accredited by the Department of Standards Malaysia (DSM), such as Malaysia Standard Accreditation, and international accreditation standards, such as ISO/IEC 17021 (Azlina et al., 2020)	International accreditation standards such as ISO/IEC 17021 (Jadwiga, 2022).
Integration with Business Practice	Implementing only specific elements of the standards and single MSS implementation. The integrated approach of MSS implementation starts to rise. (Nuri et al., 2019)	Implementing an Integrated Management System by combining different elements of standards. (Nuri et al., 2019)
Government and Support	Government agencies focus more on collaboration with industries to promote guidelines, programs, and financial incentives for implementation. (Karkalikova and Strhan, 2018)	Offer financial incentives, grants, and subsidies for the company to implement with MSS. The government will provide advisory amenities, regulatory outlines, and technical support. (Ispas and Mironeasa, 2022)

2.3.2 Process of Management System and Standards (MSS)

The process can be described as a sequence of efficient processes that aims to complete the targets. Based on Juran and Godfrey (1999), the process model is divided by input and output. The inputs are the target, and the essential work emphasizes. Meanwhile, the outcome is characterized as acquiring the appropriate emphasis to fulfill the client's

requests (Juran and Godfrey, 1999). The process is a commonly recognizable and overused phrase in management. The process gradually converts an input into a beneficial output for the client or final user (Laureani and Antony, 2021).

Laureani and Antony (2021) defined a process specific to ISO 9000 as a series of linked or relatable plans that convert inputs to outputs. Then, it will change to the case of the company's procedure prepared and accomplished with specific restrained settings to increase the value (Laureani and Antony, 2021).

The company will mainly implement the Plan, Do, Check, Act (PDCA) method to enhance the organization's development. It is a comment technique used for standard implementation of management systems. Every organization needs to form a cross-action group to identify precise enhancement chances (Shone, 2020).

PDCA Cycle has several names that refer to the same concept: Deming Cycle, Shewhart cycle, and Deming wheel for the continued enhancement spiral. The PDCA Cycle establishes two kinds of curative plans, which are permanent and impermanent. The permanent remedial plan includes analysis and removing the main reason. Therefore, continual improvement will be the aim of the corrective action. The impermanent movement targets undertaking and adjusting the issues (Didin and Hibarkah, 2022).

The PDCA cycle is essential in management procedures and constructs to function as a dynamic pattern. It shows that the accomplishment from one complete process flows into the starting of the following process. Figure 2.3 demonstrates the PDCA Cycle

with the continuous improvement development application (Krzysztof et al., 2022). Regarding Juran and Godfrey (1999), several styles separate the reaction loop into basics and stages. Particular has less than six and certainly has more than six elements (Juran and Godfrey, 1999).

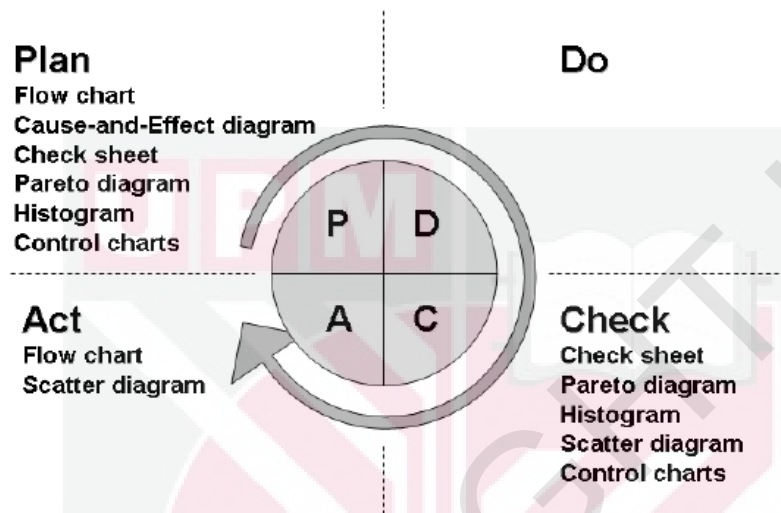


Figure 2.3: The PDCA Cycle

2.4 Concept of Integrated Management System (IMS)

According to the International Organizations Standard (ISO), most businesses worldwide have adopted and certified various standardized Management Systems (MS). As a result, more organizations are joining the MS regularly. This difficulty is because different interested parties' needs were met while innovating on their efficacy. The value of their invention can be increased based on the organization's capacity to continuously advance and revolutionize the results and practices of the MS (Bravi et al., 2019).

In contrast, the management will face obstacles as the various Management Systems (MS) are implemented. As a result, Integrated Management Systems (IMS) will develop an effective way to systematize all of the methods, including Quality Management System (QMS), Social Accountability, Occupational Safety and Health Management System (OSHMS), Environmental Management System (EMS), and other systems (Bravi et al., 2019).

This situation shows that Integrated Management Systems (IMS) is crucial in solving the issues by merging and restructuring the different management systems. IMS ensures reliability, productivity, and efficiency through several purposes. IMS also assists the organization's general performance and accomplishes its target more efficiently (Marhavilas et al., 2022).

Various critical ideas are identified during the theoretical framework development for the management system standards (MSS) implemented as a part of Integrated Management Systems (IMS). Firstly, the development of IMS with a combination of different MSSs is due to legal compliances (Nurisyal and Norhaninah, 2020). In this study, the Quality Management System (QMS) is part of the IMS because, for construction industries in Malaysia, companies need to be registered and comply with the requirements of the Construction Industry Development Board (CIDB).

Other than that, a combination of the Environmental Management System (EMS) as part of the integrating process due to the requirement from the Department of Environment (DOE) of Malaysia to ensure that the environment does not affect the construction process. The same goes for the combination of the Occupational Health and Safety Management System (OHSMS); companies need to comply with the

Occupational Safety and Health Act 1994 (Act 514) to secure the welfare of the staff during work activities.

The next critical issues from the theoretical framework are risk assessment and policy with procedure development (Khatun et al., 2021). Based on the study done, these two issues are related mutually. During the implementation process, companies need to analyze the risks that will occur based on the work process procedure and company policy. After that, the company must identify, evaluate, and mitigate the risks relevant to the management system standard (MSS) chosen to be implemented.

The last critical issue is continuous improvement, which is important for the organization to maintain a consistent management process and continue the certification process. The organization needs to look for opportunities to enhance the implementation process, especially considering the risks that have been identified. The main concern for continuous improvement is always to enhance the organization's general performance to maintain relevance by complying with the standards and regulations.

2.4.1 Advantages and Disadvantages of Integrated Management System (IMS)

The Integrated Management System (IMS) is a management system that aids the organization's ability to make informed decisions, boost process productivity, enlarge corporate structure, and enhance employee procedures and practices. The benefits of using IMS are shown in Tables 2.3 and 2.4 (Ronalter and Bernado, 2023).

Table 2.3: Internal advantages from IMS implementation

Internal Advantages	Explanation
Functional	• Reduce paperwork, avoid duplication, and reduce documentation • Higher level of productivity at work • Justify the processes and systems. • Time must be reduced and optimized while applying for management systems. • Integration of audits and training Mutual improvement plan • Enhances all organizational processes • Relationship between MSS
Financial	• Reductions in the costs of operations, procedures, and insurance premiums. • Assimilation costs can be reduced, and there are fewer audits overall. • Reduction of accreditation fees
Organizational	• Well-structured human resource management • Improve the global organizational strategy • An organization's knowledge and progress are advanced by wise resource allocation. • Effective resource use • Direct task classification • Boost internal advancements inside the organizations • Function to achieve long-term success • Strategically planning • Better departmental communication
Other	• Encourages collaboration • Enhanced choices to include new systems • Bolster the self-assurance and compassion of employees • Cultural evolution • Improvement of environmental, quality, and health standards

Table 2.4: External advantages from IMS implementation

External Advantages	Explanation
Commercial	• Increased customer satisfaction • Satisfied with the recipients • Improved corporate image • In advance for your benefit
Statutory	• A necessity for business • Better in terms of quality, environment, and health and safety

For the addition of Management System Standards (MSS) in the organization, various parameters are required other than capability, resource accessibility, proficiency, and change implementation. Other parameters are the category and nature of the company, the intricacy of business, type of combination, the kind of business processes, and procedures of the companies targeting to do various MSS. The disadvantage is that the

mix of MSS and Integrated Management System (IMS) applications shown in Table 2.5 and Table 2.6 is divided by internal and external weaknesses (Karanikas and Steele, 2020).

Table 2.5: Internal disadvantages in IMS implementation

Internal Disadvantages	Explanation
Regulations and Resources	• Finance and human resources need to be increased. • insufficient expertise, knowledge, and direction • Time constraints combined with time suspensions • Absence of organizational and managerial support • Lack of a strategic arrangement • Insufficient competent assessors and inadequate audit processes
Public	• Lack of the proper mindset and awareness • Lack of inspiration among the workforce • The staff's rejection of the new system
Public	• Staff members clash over the loss of particular roles. • Not being conscious
Application	• MSS of many types - Individual systems that contrast • Every MSS is arranged differently, with various combination ideas and no strategies. • Reduced adaptability following implementation Increase in manners following weaving together • The possibility of a function for every MSS needed to meet the objectives.

Table 2.6: External disadvantages in IMS implementation

External Disadvantages	Explanation
Economics	• Advantages and a lack of motivation • The value of IMS is unpredictable.
Social and constitutional	• Insufficient detail and breadth • There are no IMS data. • Various requests from various investors • Frequently changing the tactics and process • Inability to access the IMS process • No publicly available statistics
Ethnic	• Need for a social revolution • Less collaboration and dialogue • Values are evolving, and nature is diverse

2.4.2 Nature of Integrated Management System Studies

Integrated Management System (IMS) has been studied by many researchers who are interested in the concept applied by the IMS. IMS is a method to incorporate multiple management systems' mechanisms into one complete, straightforward approach. That way, it simplifies the organization to comprehensively describe and achieve its mission and objective with the support for sustainable progress of business procedures (Ronalter and Bernado, 2023). Table 2.7 shows the design of IMS that another researcher has studied to give a clear picture of IMS. The studies have a wide scope of IMS, including a different type of management system relevant to the organization.

Table 2.7: The design of IMS in literature

QMS	EMS	OSHMS	OTHERS	RESOURCES
/	/		- ESG performance - Corporate sustainable performance	❖ (Ronalter et al., 2022)
	/	/		❖ (Mudhher and Zahraa, 2021) ❖ (Paulikova et al., 2022)
/	/	/		❖ (Ding et al., 2021) ❖ (Ispas and Mironeasa, 2022) ❖ (Barbosa et al., 2021) ❖ (Chountalas and Tepaskoualos, 2018) ❖ (Norrazman et al., 2021) ❖ (Ronalter and Bernado, 2023) ❖ (Silalahi et al., 2023) ❖ (Karkalikova and Strhan, 2018)
/	/	/		❖ (Noor Aishah et al, 2019) ❖ (Acuna et al, 2019) ❖ (Fonseca and Carvalho, 2019) ❖ (Wang and Liu, 2022) ❖ (Talapatra and Santos, 2019) ❖ (John and Keith, 2023) ❖ (Biggeri et al, 2023)
/	/	/	Corporate Risk Management	❖ (Daneshjo et al., 2021)
/	/	/	Energy Management System (EnMS)	❖ (Fadzilah, 2019)
/	/	/	Risk management	❖ (Ramos et al., 2022)
/	/	/	- Quality management - Customer satisfaction - Risk management	❖ (Anas Nasir et al., 2020)

Table 2.8: Continued

QMS	EMS	OSHMS	OTHERS	RESOURCES
			Information Security Management System	
/	/	/	Risk Management System (RMS)	❖ (Masuin and Latief, 2019)
/	/	/	Total Quality Management	❖ (Agus et al., 2020)
/	/	/	Food Management System	❖ (Magd and Karyamsetty, 2020)

Table 2.8 shows, the works of literature have been classified based on different factors. Generally, three elements can be identified, starting with Integrated Management System (IMS) integration and implementation process. Barbosa studied the map and evaluated the body of research on how IMS affects organizational effectiveness. The study was based on a sample of scientific publications from online databases. The methodology adhered to the Preferred Report Items for Systematic Reviews and Meta-analyses (PRISMA) standards. The findings demonstrated significant advantages of the IMS and a broad acceptance of its integration (Barbosa et al., 2021).

Table 2.9: Factor of IMS studies

Factor	Title	Author
Integration and Implementation	The Identification of Common Models Applied for the Integration of Management Systems: A Review	(Ispas and Mireneasa, 2022)
	ISO 9001 and Organizational Excellence Models in Small and Medium Sized Enterprises: Current State and Comparative Analysis	(Fabio et al., 2020)
	Integrated Management System and Corporate Risk Management	(Daneshjo et al., 2021)
	Integrated Management Systems: Their Organizational Impacts	(Barbosa et al., 2021)
	The Influence of Integrated Management System (IMS) on Innovation Performance in Malaysia Construction Industry	(Norrazman et al., 2021)
	Integrated Management Systems and Sustainability – A Review on Their Relationships A Conceptual Framework for Integrating QSHE in Construction	(Ronalter and Bernado, 2023) (Silalahi et al., 2023)
Empirical Study	An Integrated Management System for Quality, Health and Safety, and Environment: A Case Study	(Ding et al., 2021)
	Quality and Environmental Management Systems as Business Tools to Enhance ESG Performance: A Cross-Regional Empirical Study	(Ronalter et al., 2022)
	Selective Integration of Management Systems: A Case Study in Construction the Industry	(Chountalas and Tepaskoualos, 2019)
	Integrated Internal Audit in Management System: A Comparative Study of Manufacturing Firms in Malaysia	(Noor Aishah et al, 2019)
Management System Standards	Developing A Guideline for An Integrated QMS, EMS, OHSMS and EnMS.	(Fadzilah, 2019)
	International Management System Standards Related to Occupational Safety and Health: An Updated Literature Survey	(Marhavilas et al., 2022)
	The Effect of Implementation Integrated Management System ISO 9001, ISO 14001, ISO 22000 and ISO 45001 on Indonesian Food Industries Performance	(Agus et al., 2020)

The second factor is based on empirical research done through surveys and case studies. For example, Noor Aishah (2019) did their study on accommodated internal assessments in managing systems: a comparative study of industrial companies in Malaysia. The main idea of her study is to explore the application of Integrated Internal Audit Management (IIAM) and link it with the operation of IIAM by Malaysian companies with dissimilar management system accreditations. This study involves three companies that chose to learn about integrated internal audit methods. Data was analyzed using qualitative research methodology (Noor Aishah et al, 2019).

Fadzilah's (2019) study on developing a parameter file for participating occupational health and safety, environmental, quality, and energy management systems for manufacturing productions in Malaysia. The last factor classified is IMS as the system of systems or as a method to entertain and combine all potential Management System Standards (MSS). The findings show that the business is implementing several plans since it is realistic for its business structure events and procedures, considering the vacancy of national or international standards as a parameter for Integrated Management System (IMS) (Fadzilah, 2019). Table 2.13 shows the factors of IMS studies.

2.5 Theoretical Framework Development

Theoretical framework development starts with the study of the concept of management system standards (MSS). This study starts with understanding the meaning of MSS and the different types of MSS offered by the International Organizational Standard (ISO). Then, the company's needs should be analyzed to

implement different types of MSS relevant to their business nature and to fulfill the customer's needs. After that, the process of the MSS implementation is related to the Plan-Do-Check-Act (PDCA) cycle as a process flow.

After that, the implementation process is done, and here, it focuses on how the company implements different types of Management System Standards (MSS) individually to fulfill the requirement. From here, it shows the limitation of implementing different types of MSS individually since the whole process, such as document preparation, auditing process, and others, needs to be prepared individually based on the MSS. This statement proves that implementing different MSS individually is less productive and costly. All the processes are redundant and increase the workload for the staff. Here are the ideas for the cause of the MSS limitation.

From the cause of the individual implementation of different types of Management System Standards (MSS), the study goes deeper to discover the concept of the Integrated Management System (IMS). IMS is the best solution to solving problems the single MSS implementation raises. IMS simplified the implementation process of different types of MSS individually into a single system. The application process of IMS is more productive and reduces the redundancy of the work that needs to be done.

The study will start by understanding the implementation and application of Integrated Management System (IMS) to achieve research objectives number one and two. Research objective one is to determine the intention of the IMS being implemented in the construction organization, and research objective two is to evaluate the effectiveness of the IMS implemented in the construction organization.

2.6 Summary of Chapter

A related literature review showed that several researchers had studied the different Management Systems and standards (MSS). Therefore, all the findings based on the literature have been summarised in this chapter. From here, it shows that our Quality Management System (QMS), Occupational Health and Safety Management (OHSMS), Environmental Management System (EMS), and Anti-Bribery Management System (ABMS) are necessary to the construction industries. The critical ideas of the implementation process of the Integrated Management System (IMS) are discussed in this chapter.

Other than that, the works of literature have been classified based on different factors. However, three factors identified commonly are Integrated Management System (IMS) integration and implementation process, based on empirical research done by survey and case study, and IMS as the system of systems or as a method to entertain and combine all potential MSS. Therefore, this study aims to improve the implementation and effectiveness of IMS in the construction industry.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The research methodology chapter is summarised in the flowchart as a methodological framework and guidelines for the study, shown in Figure 3.1. Mixed research methods have been chosen for this research study to achieve the research objectives. The descriptive and exploratory research design was used. In this study, the research design used includes the research problems and research questions, sampling design, method of data collection and data analysis.

The research problem statements in this research are lack of research on a project based on an Integrated Management System (IMS) that consists of a Quality Management System (QMS) and Occupational Health and Safety Management (OHSMS), Environmental Management System (EMS), an Anti-Bribery Management System (ABMS). The second problem statement is that most companies still prefer implementing different Management Systems and standards (MSS). Lastly, the number of companies that implemented IMS is small due to less awareness of the importance and effectiveness of IMS in their organization and business culture.

Therefore, the main idea of this study is to increase the number of construction organizations in Malaysia that implement the Integrated Management System (IMS). The framework model does this idea for IMS that can be used to improve the implementation and adoption in construction organizations in Malaysia.

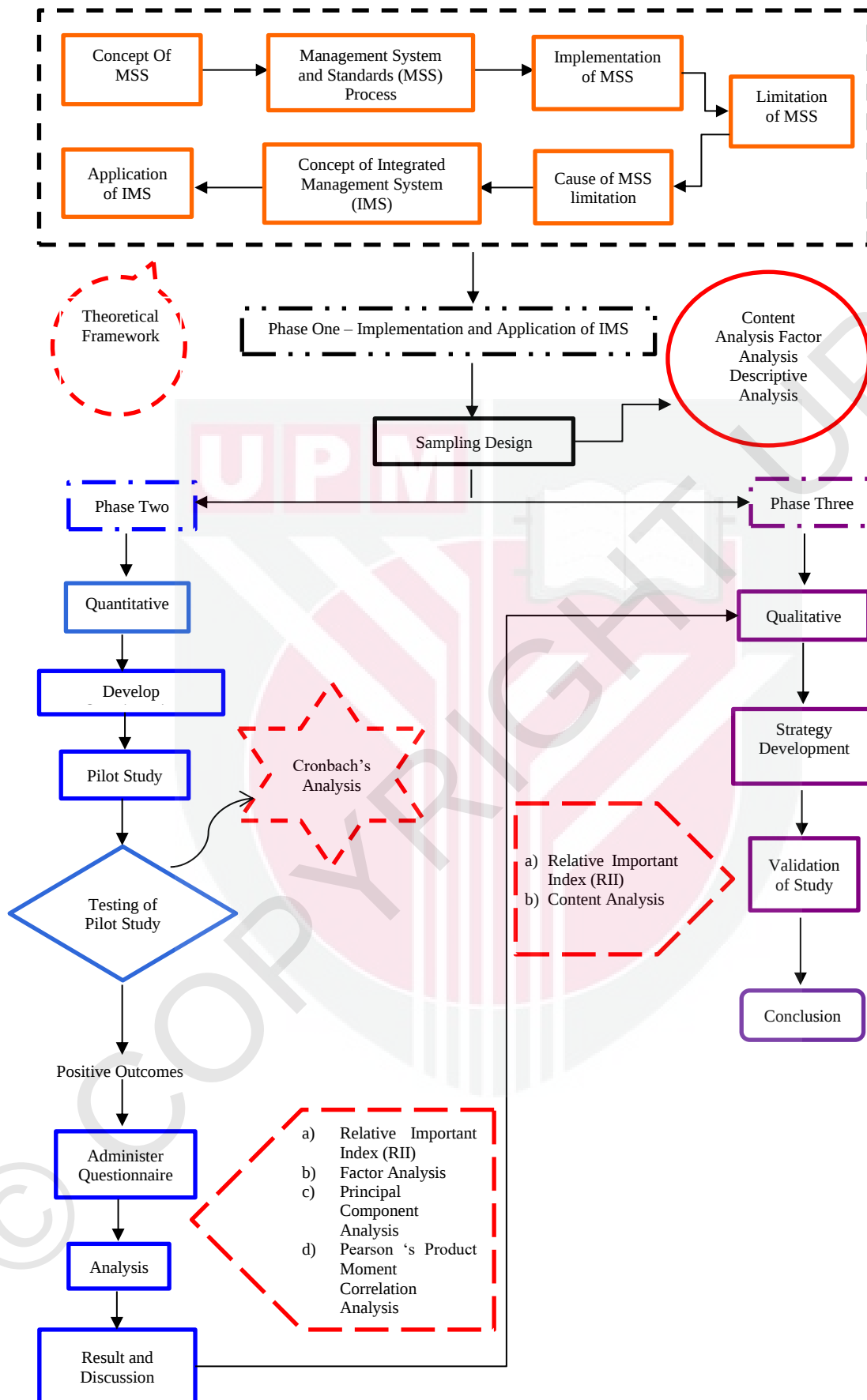


Figure 3.1: Research methodology process

3.2 Theoretical Framework

The theoretical framework starts with the taxonomy literature review step that Cooper introduced in 1984. Thus, a dynamic literature review will be produced by organizing a thorough, efficient and thorough review (Klotz, 2019). Cooper has been developing the taxonomy literature review based on six characteristics, shown in Table 3.1. The characteristics allow the research fusion to be different from the others. Table 3.1 shows the aspect of the taxonomy based on Cooper and the practical part of this study (Carole et al., 2022).

Table 3.1: Taxonomy literature review

Characteristics	Cooper's Categories	Authors' selection
Focus	Research outcomes	Research outcomes
	Research methods	Research methods
	Theories	Theories
	Applications	Applications
Goal	Integration	Integration
	Criticism	
	Central issues	
Organization	Historical	Conceptual Methodological
	Conceptual	
	Methodological	
Perspective	Neutral representation	Neutral representation
	Espousal of position	
Audience	Specialized scholars	Specialized scholars
	General scholars	General scholars
	Practitioners	Practitioners
	General public	General public
Coverage	Exhaustive	Exhaustive and selective
	Exhaustive and selective	
	Representative	
	Central/pivotal	

The literature review was based on the four steps of the search strategy. The first one is the recognition of the main terms in the research question. It is followed by recognizing the relevant words, honoring the word's acronyms and synonyms, and modifying the words based on the vocabulary used in the database. Lastly, the words

mix using the operator such as "and" and "or" (Carmen and Sussy, 2020). The databases or search engines selected for this search strategy are Emerald Insights, IEEE Xplore, Sage Journals, Science Direct, Scopus, and SpringerLink. The search strategy and the number of results found are shown in Table 3.2.

Table 3.2: Search strategy and number of results

Keyword or Search String	Database or Search Engine	No. of Result
“Management System Standard” OR “Management System”	Emerald Insights	141,000
	IEEE Xplore	396,442
	Sage Journals	21,054
	Science Direct	182,450
	Scopus	199,960
	SpringerLink	1,435,519
“Management System Standard” AND “International Organization Standard”	Emerald Insights	98,000
	IEEE Xplore	2,748
	Sage Journals	0
	Science Direct	0
“Management System Standard” AND “International Organization Standard”	Scopus	0
	SpringerLink	466,891
“Quality Management System” OR “ISO 9001”	Emerald Insights	2,000
	IEEE Xplore	49,843
	Sage Journals	1,052
	Science Direct	11,805
	Scopus	8,428
	SpringerLink	8,121
“Occupational, Health and Safety Management System” OR “Occupational Health and Safety Assessment Series”	Emerald Insights	2,000
	IEEE Xplore	257
	Sage Journals	20
	Science Direct	484
	Scopus	334
	SpringerLink	15,578
“Environmental Management System” OR “Eco-Management and Audit Scheme”	Emerald Insights	5,000
	IEEE Xplore	21,978
	Sage Journals	382
	Science Direct	6,239
	Scopus	3,944
	SpringerLink	16,632
“Anti-Bribery Management System” OR “ISO 37000”	Emerald Insights	0
	IEEE Xplore	2
	Sage Journals	0
	Science Direct	8
	Scopus	8
	SpringerLink	1

Table 3.3 shows the data extraction strategy used in this study. The inclusion and exclusion of specific criteria were selected for the data extraction, such as date of the

research study, exposure of interest, geographic location of studies, language, peer review, study design, and type of publication.

Table 3.3: Data extraction strategy

Criteria	Inclusion	Exclusion
Date	All time studies record	No specific time
Exposure of Interest	Content related to management system standard studies	No specific subject areas
Geographic Location of Studies	Worldwide	No specific area
Language	English	Non-English or translated to English
Peer Review	Peer Review Articles	Not Peer Review Articles
Study Design	Academic theoretical and empirical research	Vague research study
Type of Publication	All literature must publish in one of the below publishers: a) Emerald Insights b) IEEE Xplore c) Sage Journals d) Science Direct e) Scopus f) SpringerLink	Literature not published in the selected publishers.

3.3 Phase One

Phase One is a process of understanding information gathering on implementing and applying Integrated Management Systems (IMS). This phase consists of data collection and data analysis process.

3.3.1 Data Collection

Data collection starts with identifying the keywords for implementing and applying Integrated Management Systems (IMS). Then, place the Boolean Operator that will be used to receive the information needed. The databases or search engines selected for this search strategy are Emerald Insights, IEEE Xplore, Sage Journals, Science Direct,

Scopus, and SpringerLink. The search strategy and the number of results found are shown in Table 3.4.

Table 3.4: Search strategy and number of results Phases One

Keyword or Search String	Database or Search Engine	No. of Result
“Integrated Management System” OR “Combination Management System”	Emerald Insights	120,000
	IEEE Xplore	61,653
	Sage Journals	111
	Science Direct	1,321
	Scopus	1,488
	SpringerLink	837,967
“Integrated Management System” OR “Multiple Management System”	Emerald Insights	120,000
	IEEE Xplore	87,920
	Sage Journals	112
	Science Direct	1,353
	Scopus	1,522
	SpringerLink	837,967
“Integrated Management System” OR “Different Management System”	Emerald Insights	120,000
	IEEE Xplore	112,064
	Sage Journals	114
	Science Direct	2,730
	Scopus	2,175
	SpringerLink	837,967

3.3.2 Data Analysis

Phase One of data analysis consists of three types. Table 3.5 shows the analysis method used in the phase, explaining each study's aims. The table also shows the research objective relating to the analysis used.

Table 3.5: Methods of analysis in Phase One

Method of Analysis	Aims	Research Objective
1. Content Analysis	To determine, identify, examine and describe the raw data	RO1 and RO2
2. Factor Analysis	To categorize, tabulate and summarize data from raw data	RO1 and RO2
3. Descriptive Analysis	To present, organize, and summarize the data in their characteristic and simplest way	RO1 and RO2

Content analysis is chosen to achieve research objectives one and two because this analysis helps understand the content of the data relevant to the Integrated Management System (IMS) implementation process. All the data from the content analysis will be organized and simplified based on the required criteria: the intention of IMS implementation and effectiveness. The descriptive analysis assists in catering a clear idea of the data, recognizing dominant tendencies, and stressing crucial characteristics applicable to both research objectives.

3.4 Phase Two – Quantitative Study

Phase Two is receiving information regarding the intention and effectiveness of implementing the Integrated Management Systems (IMS) from the feedback from the questionnaire survey. Phase Two study consists of four processes: a pilot study, sampling design, data collection, and data analysis.

3.4.1 Pilot Study

A draft of questionnaires on the intention and effectiveness of implementing the integrated management system (IMS) in construction organizations in Malaysia has been created. A pilot study is a process of trivial analysis to assess the research etiquettes, data assortment devices, sample recruitment approaches and other research practices for a more prominent study (Garg et al., 2019). The questionnaire is the best technique chosen for this research study.

According to Smith (2022), a detailed sample size suggestion is needed for the feasibility objectives. The sample size will be based on the structure of the result depending on the approximation. The sample size can be less than 10–15 per group, occasionally adequate (Smith et al., 2022).

The questionnaire consists of two sections: section A is for the general info of the correspondent, and section B is for the specific details of the research study. In section A, the question is related to the details of the job position, working experience in construction industries and with IMS, and the categories of the company in the construction industries.

The types are based on the company registration with the Construction Industry Development Board (CIDB). Once the company is registered with CIDB, the company's information will be recorded in the Centralized Information Management System (CIMS) in Klang Valley. The CIMS contains four company categories in construction industries: building, mechanical and electrical, civil engineering, and facility management. Table 3.6 shows the description of the company categories based on the requirements and registration procedures for contractors with the CIDB (CIDB, 2022).

Table 3.6: Category of construction company

Company Category	Description
Building	- Specialize in the construction of buildings such as residential, commercial, and institutional structures. - Activities include architectural design, structural construction, interior finishing, and landscaping.
Civil Engineering	- Specialize in infrastructure projects such as roads, bridges, highways, tunnels, dams, and utilities. - Involved in the design, construction, and maintenance of public works and large-scale infrastructure systems.
Mechanical and Electrical	Focus on installing and maintaining mechanical, electrical, and plumbing systems in buildings and infrastructure projects.

Table 3.7: Continued

Company Category	Description
Mechanical and Electrical	• Activities include HVAC (heating, ventilation, and air conditioning), electrical wiring, plumbing, fire protection systems, and security systems installation. • Ensure that buildings and infrastructure have functional and efficient M&E systems to support their operation and use.
Facility Management	• Primarily involved in the management and maintenance of built assets such as buildings, infrastructure, and facilities. • Services may include building maintenance, cleaning, security, waste management, energy management, and space planning. • Ensure that facilities are operated efficiently, maintained properly, and provide a safe and comfortable environment for occupants.

Meanwhile, section B is separated into three different parts. Part 1 is on the intention of Integrated Management System (IMS) implementation in construction organizations. Then, Part 2 is on the effectiveness of IMS implementation in construction organizations. The draft questionnaire was circulated to 15 correspondents. This survey tests the effectiveness of the question and the understanding of the correspondence on the question. This step is essential to spot any mistakes in question and precise them before proceeding with the primary survey (Aldarabseh, 2019).

3.4.2 Sampling Design

The sample size is the essential value in the sampling design. Different styles can be used to identify this value, such as a published table, formula, or imitation of sample size for similar studies. This study uses the standard formula based on Krejcie and Morgan (1970) to determine the sample size shown below in Equation 1 (Aidoo, 2020).

$$\text{Sample size, } n = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

Where,

n = Sample size

N = Population size

p = Proportion of Population (if unknown = 0.5)

e = Acceptable sampling error

X^2 = Chi-square for the desired confidence level at 1 degree of freedom

Equation 1: Sample size formula

3.4.3 Data Collection

The questionnaire was designed based on three fundamentals that regulate the question: choose the type of question and the best wording to use and create the questionnaire stage with the best layout. The questionnaire is divided into sections for the overall design: Section A and Section B. Section B will be separated into Parts 1 on the intention of Integrated Management System (IMS) implementation in the construction organization and Part 2 on the effectiveness of IMS implementation in the construction organization.

Section A used the demographic inquiry to comprehend the correspondent's background better. The respondents' employment history, Integrated Management System (IMS) implementation, and corporate types are addressed in the questions. The demographic question is utilized when the questionnaire asks a single question and calls for several possible solutions (Cameron and Stinson, 2019).

The Likert scale is the most appropriate method in Section B for the two distinct portions. The Likert scale is a set of questions used to determine whether a scenario is real or hypothetical and, therefore, needs to be researched. Based on their comprehension of the concerns, the correspondent used a metric scale of one to five to rank their response to the question (Lailatul et al., 2023). The metric scale runs from strongly disagree to agree for both segments strongly.

3.4.4 Data Analysis

Table 3.7 shows the analysis method used in the quantitative research study's second phase. It shows the three different methods of analysis used in these studies: Cronbach's Alpha test, principal component analysis, and Pearson product-moment correlation coefficient, with their persistence and research objective related to the analysis. These analyses can be calculated using the Statistical Package for the Social Science (SPSS) Software, which is appropriate for managing data and statistical analysis.

Table 3.8: Methods of analysis

Method of Analysis	Aims	Research Objective
1. Cronbach's Alpha Test	To measure the consistency and reliability of the data when using the Likert Scale during pilot study	RO1 and RO2 (Pilot Study)
2. Relative Important Index (RII)	To regulate the comparative ranking of the quality aspects participating.	RO1, RO2 and RO3
3 Principal Component Analysis	To extract the critical data from the statistical data and signify it into the new principal components. To show the comparison between the observations and variables as facts in the table.	RO1 and RO2

Table 3.9: Continued

Method of Analysis				Aims	Research Objective
4	Factor Analysis			To disclose the core structure of the data and clarify the variance in the data	RO1 and RO2
5	Pearson	Product Moment	Correlation Coefficient	To measure the linear relationship between two variables and draw a line of that fixed in the data of two variables.	RO1 and RO2

Cronbach's alpha quantifies the core uniformity or consistency among numerous matters, capacities or assessments. It will evaluate how dependable the interview has been. It is also a channel or assessment appraised by topics that will specify the tools' solidity (John and Keith, 2023).

The rate of Cronbach's alpha series from zero to one with the complex values indirect the objects that compute the identical measurement. Contradictory, when Cronbach's alpha rate is low or near zero, some or all items are not calculated in the same dimension (Farahiyah et al., 2019). Cronbach's alpha formula is shown in Equation 2. Descriptive analysis is the revolution from raw information into a simplified and straightforward system to comprehend and read by reorganizing, gathering, and operating data to create descriptive information (Liow and Wong, 2021). This analysis will show the overall result of this qualitative study.

$$\alpha = \frac{N.C}{V + (N - 1).C}$$

Where:

N = Number of items

C = Average inter-item covariance among the items

V = Average Variance

Equation 2: Cronbach's Alpha formula

Based on Farahiyah (2019), Cronbach's Alpha Rule of Thumb is used to interpret the Cronbach's Alpha and shown in Table 3.8 (Farahiyah et al., 2019).

Table 3.10: Rule of Thumb measures for Cronbach's Alpha.

Cronbach's Alpha	Internal Consistency
$\text{Alpha} \geq 0.9$	Excellent reliability
$0.8 \leq \text{Alpha} \leq 0.9$	Good reliability
$0.7 \leq \text{Alpha} \leq 0.8$	Acceptable reliability
$0.6 \leq \text{Alpha} \leq 0.7$	Questionable reliability
$0.5 \leq \text{Alpha} \leq 0.6$	Poor reliability
$\text{Alpha} \leq 0.5$	Unacceptable reliability

3.5 Phase Three – Qualitative Study

Phase Two validates the entire study and the strategy development for the Integrated Management Systems (IMS) implementation process. The interview session was conducted with respondents from different backgrounds in the construction sector, such as engineering, management, quality surveying, and other domains. This phase is essential to understand better the framework created for the instigation strategies on the factors that influence the implementation of IMS.

3.5.1 Sampling Design

For the sampling design, interviews were identified as the most suitable method for this qualitative research study. All the questions during the interview are shown in Appendix B. The main ideas of the question about choir are related to the Integrated Management System (IMS) application. The ideas include improving performance, eliminating redundancies, accountability, establishing consistency, reducing

bureaucracy, cost reduction, optimizing processes and resources, reducing maintenance, integrated audits, and facilitating decision-making. Therefore, the correspondence will have an idea for each topic that will be asked about based on their experience.

3.5.2 Data Collection

The interview is a technique where the researcher will approach the correspondent with knowledge and skill in the current association using various methods to gain an answer relatable to their studies. This data collection can be done by checking personal or official documents, reflecting, discovering the past, investigating questionnaires and analyzing prevailing works (Serrat, 2019).

Five respondents from diverse backgrounds and professional experiences will be questioned about their understanding of Integrated Management Systems (IMS) in this study. Face-to-face, phone, and online meetings are all part of the interview process. The information about the letter, including name, degree of education, field, place of employment, and work history, is listed in Appendix C.

3.5.3 Data Analysis

The Relative Importance Index (RII) is necessary for this research to regulate the comparative ranking of the quality aspects participating. Equation 3 shows the equation for the RII formula (Nor Syahirah et al., 2019). The weightage of the Likert scale used is shown in Table 3.9.

Table 3.11: Likert-Scale weightage

Classification	Rating
Strongly disagree	1.00 – 1.99
Disagree	2.00 – 2.99
Moderate	3.00 – 3.99
Agree	4.00 – 4.99
Strongly Agree	5.00 – 5.99

$$RII = \frac{\sum W}{A \cdot N}$$

Where:

W = Weightage as assigned on Likert-Scale

A = Higher weight

N = Total number on the sample

Equation 3: Relative Importance Index (RII) formula

3.6 Validation of Entire Study

Validation of the entire study refers to the procedure where the study's central ideas are verified to agree with the explanation of acquaintance philosophies (Eisenmann et al., 2021). For this research study, the main research idea is to develop a framework that can be used to improve the implementation and adoption of Integrated Management System (IMS) in construction organizations. Therefore, the framework of the final study has been used to validate the whole study. The five experts did this validation based on their experience with construction IMS.

A Semi-Structured Interview (SSI) is suitable for this final step. This process is due to the process where the interviewer will query only a few fixed questions. Meanwhile,

the balance of the questions is unplanned because they will be questions based on the answers given by the correspondent view (Emily, 2021). Therefore, the interview process and feedback received from this stage will show the success of the entire study. Furthermore, all research methodologies can be further improved. This target is to enhance the research process and ensure the study is more effective and all the research objectives will be achieved.

3.7 Summary of Chapter

The methodology chapter explains the details of the entire study. The whole study has been divided into phases: one, the qualitative study, and two, the quantitative study. The quantitative study uses the semi-structured interview technique to understand the Integrated Management System (IMS) application in the construction industry before the whole study proceeds further. Furthermore, different analysis practices have been chosen to analyze the result from the Semi-Structured Interview (SSI), such as content analysis, Cronbach's Alpha Test, principal component analysis, and descriptive analysis.

The result from stage one will proceed to stage two, a quantitative study. A set of questionnaires has been established to understand the implementation process, effectiveness, and application of Integrated Management System (IMS) in construction organizations. In the same process as stage one, the result was analyzed using the same technique, with the addition of Pearson Product-moment correlation analysis. The result from this stage will use the framework's development process to improve the implementation and adoption of IMS in construction organizations.

The final stage is validating the entire study, where the framework has been created.

This stage will be validated by the expertise experienced in the Integrated Management System (IMS). This step is essential to approve the entire study's quality and effectiveness.



CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

Chapter four presents the results and outcomes of the study. The results are divided into three sections. Section 4.2 will deliver the results for Phase One and show the works of the scoping review. Section 4.3 shows the findings for Phase Two, where the quantitative study was done for the pilot study and actual data collection. Lastly, section 4.4 shows the result from validating the fundamental research of the framework development for the construction organization's Integrated Management System (IMS) implementation. The result is presented as figures and tables to make it more presentable.

This chapter also contains a discussion based on the study's results and outcomes. The conference is divided into two sections. Section 4.5 will explain the whole debate for each research objective. Section 4.6 clarifies and explains the validation of the entire study.

4.2 Result of the Phase One

This section shows the findings from implementing and applying the Integrated Management System (IMS) used in the Phase One study.

4.2.1 Descriptive Analysis

Descriptive analysis evaluates and signifies the content and factor analysis data. Data on the effectiveness and intention of Integrated Management System (IMS) implementation in the construction organization has been systematized, compiled, and displayed into coherent data. This systematic data is the central part of the questionnaire survey in Appendix A and Appendix B. The information for the intention of IMS implementation is summarized in Figure 4.1, and the effectiveness of IMS implementation is shown in Figure 4.2.

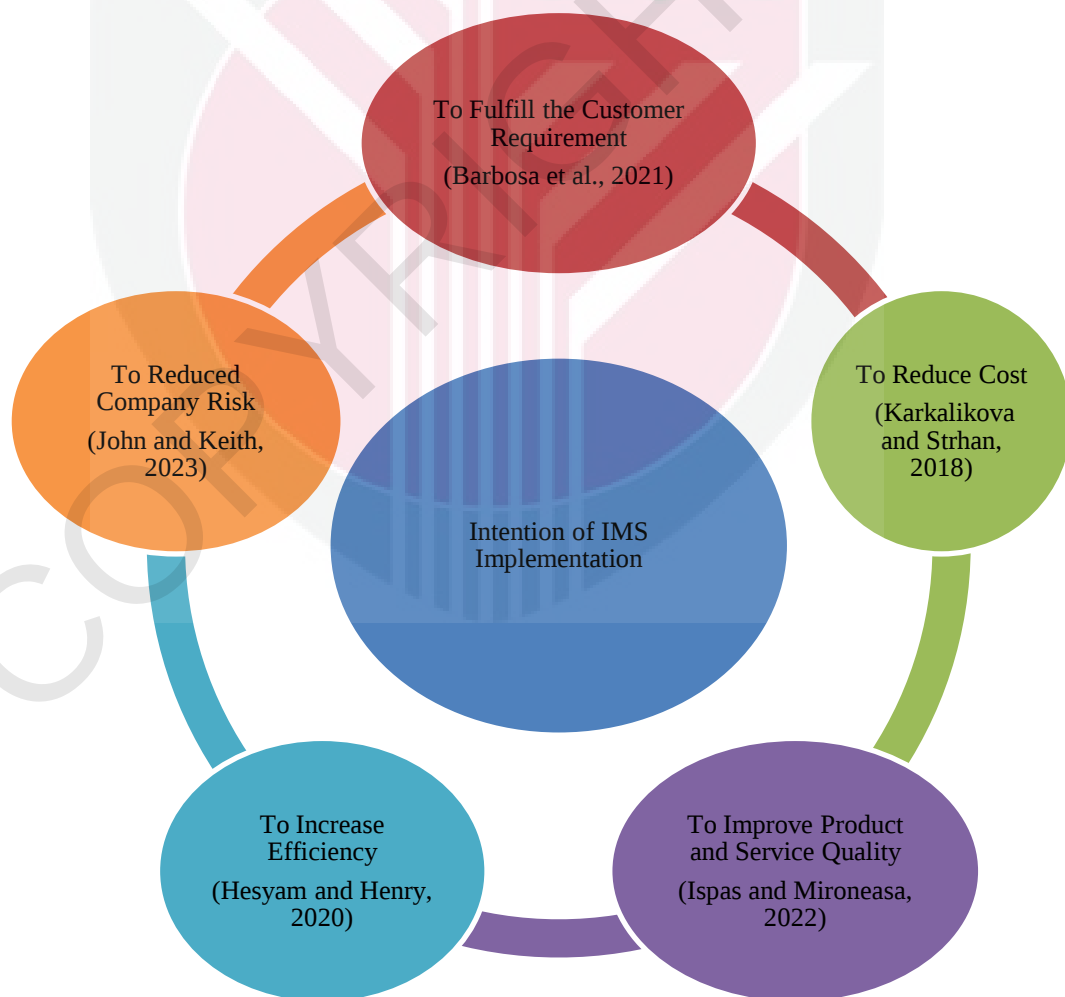


Figure 4.1: The intention of IMS implementation

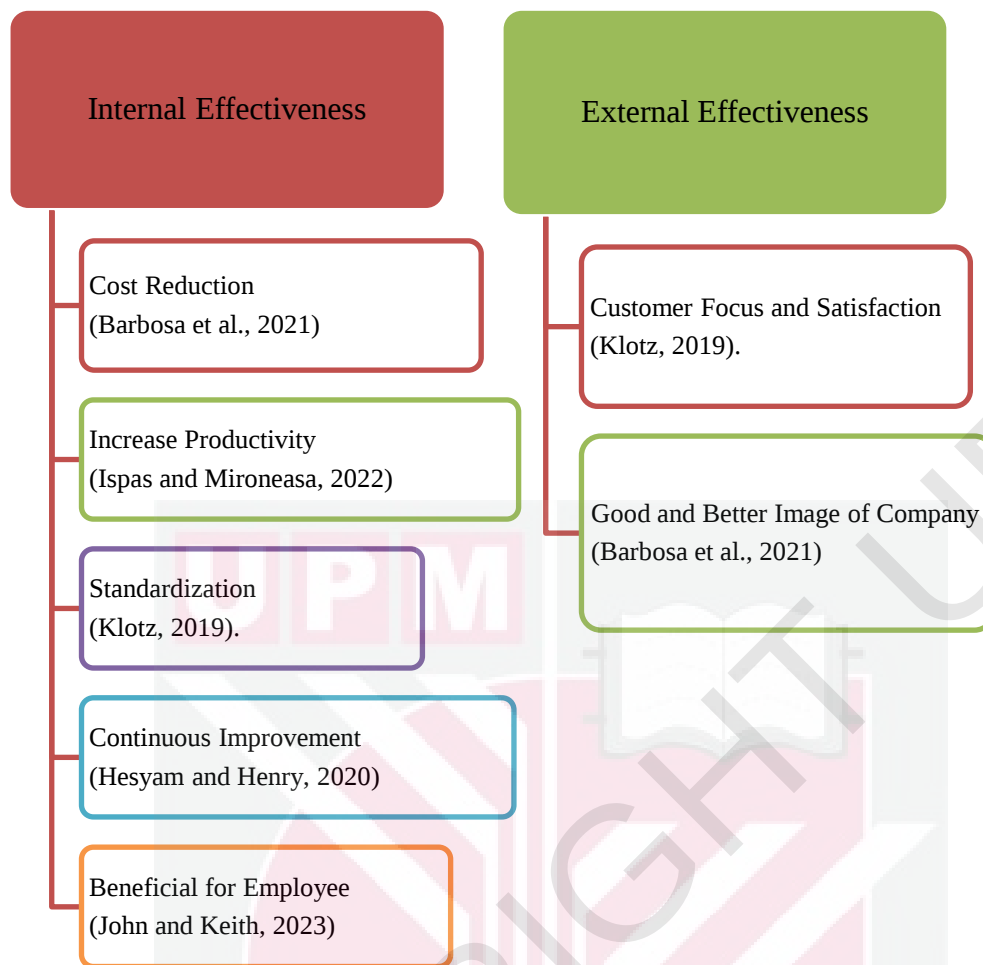


Figure 4.2: The effectiveness of IMS implementation

4.3 Result of the Phase Two – Quantitative Study

The result of Phase Two includes the general results of the respondents' demographic characteristics and reliability analysis of the intention and effectiveness of implementing the integrated management system (IMS).

4.3.1 Demographic Characteristics of Respondents

This study starts with the local construction companies with Grade 3, Grade 4, Grade 5, Grade 6 and Grade 7 of the grade of contractor firm. All these companies are

registered under the Centralized Information Management System (CIMS) of the Construction Industry Development Board (CIDB).

The area chosen for this company is a company registered in Klang Valley. The total number of companies that are written is 8843 companies. From here, the companies that have a company website are 476 companies. Meanwhile, only 78 companies implemented the Integrated Management System (IMS) based on the data from their website and additional verification methods, which are direct communication methods. Table 4.1 shows the summary of the number and the percentage of the total and implemented IMS companies.

Table 4.1: The summary data of the company's details

Grade of Company	Total Number of Company	Company with Website	Company that Implemented with IMS
Grade 7	2559	307	58
Grade 6	499	23	1
Grade 5	1712	58	11
Grade 4	1008	23	3
Grade 3	3065	65	5
Total	8843	476	78

There are various types of management systems involved in Integrated Management System (IMS) implementation. The popular types of management systems are Quality Management Systems (QMS), Occupational Safety and Health Management Systems (OSHMS), Environmental Management Systems (EMS), and Anti-Bribery Management systems (ABMS). Figure 4.3 shows the percentage of different management systems in IMS implementation.

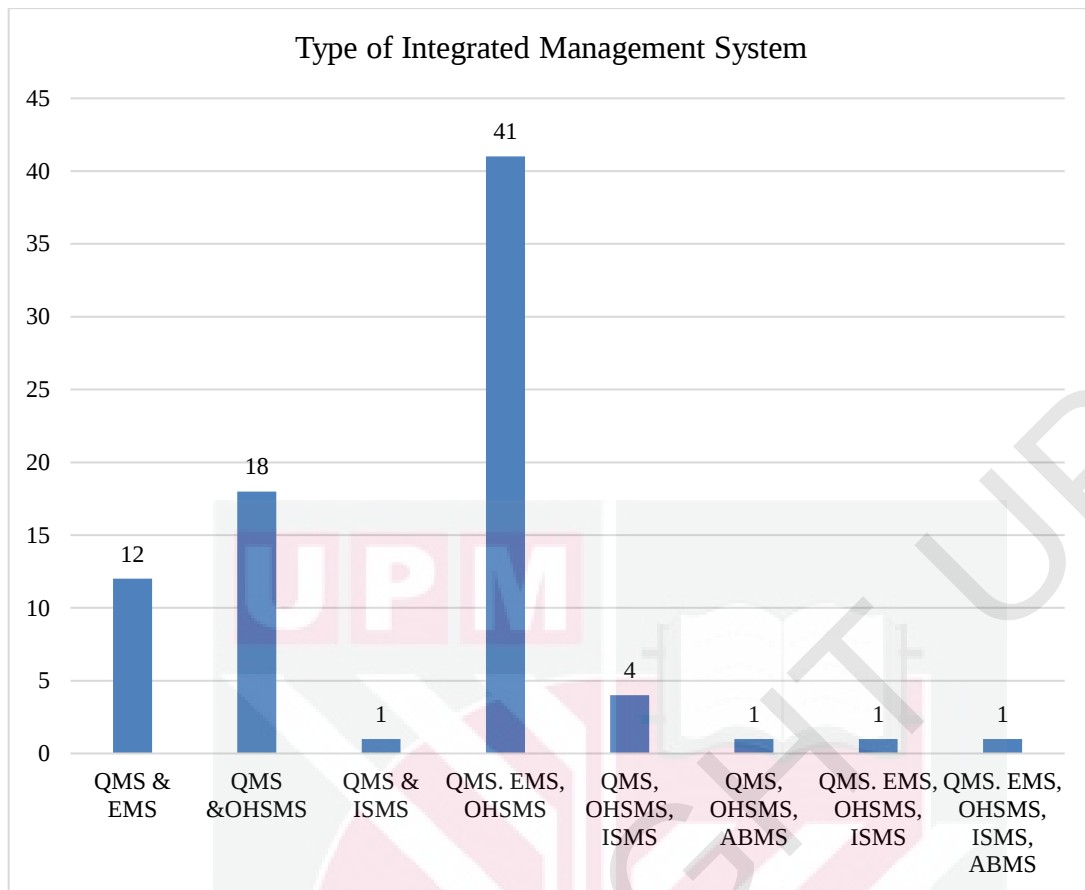


Figure 4.3: The percentage of different types of management systems in IMS implementation

The total number of 78 companies implementing the Integrated Management System (IMS) will be the total population. The minimum sample size of the respondents acceptable for this study is shown in Equation 4 based on the formula from Krejcie and Morgan (Aidoo, 2020). Therefore, the minimum sample size is 65 respondents.

Sample size,
n

=

n=

n=

65

$$\begin{aligned}
 &= \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)} \\
 &= \frac{(1.96)^2 (78)(0.5)(1 - 0.50)}{(0.05)^2(78 - 1) + (1.96)^2 (0.50)(1 - 0.50)}
 \end{aligned}$$

Equation 4:

Sample size calculation

The qualitative study's respondents are staff accountable for managing the Integrated Management System (IMS) implementation within their companies. The questionnaire forms are circulated to the respondents, and different backgrounds of the respondent's job positions, company categories, working experience, and working experience with IMS are involved. Descriptive statistics interpret the various circulation of variables from the respondents' details. Table 4.2 shows the frequency distribution of respondents' demographic characteristics in the questionnaire survey.

Table 4.2: The frequency distribution of respondent's demographic characteristics

	Item	Frequency	Percentage (%)
Job Position	General Manager	7	10.61
	Manager	22	33.33
	Senior Executive	22	33.33
	Executive	14	21.21
	Non-Executive	1	1.52
Category of Company	Building	11	16.67
	Civil Engineering	29	43.94
	Mechanical & Electrical	18	27.27
Category of Company	Facility Management	8	12.12
Working Experience	< 5 Years	17	25.76
	5-10 Years	21	31.82
	> 10 Years	28	42.42
Working Experience with IMS	< 1 Year	9	13.64
	1-5 Years	53	80.30
	> 5 Years	4	6.06

Table 4.2 contains the contextual information of the respondents involved in the questionnaire. The highest number for the job position categories is senior executive and manager (33.33%). The non-executive level is the lowest number, which is only 1.52%.

The company category shows that 43.94% of respondents have come from civil engineering companies, mechanical & electrical companies 27.27%, building companies 16.67%, and the least from facility management companies, only 12.12%.

Nevertheless, the respondent's working experience in the construction industry shows that 42.42% have spent more than ten years, only 31.82% for 5 to 10 years, and 25.76% have less than five years of working experience.

Moreover, the respondents working experience with Integrated Management System (IMS) are 80.30% for those with 1 to 5 years of knowledge. While 6.06% of respondents have more than five years of working experience with IMS, and 13.64% only for respondents have less than one year of experience. Based on the respondents' criteria, all respondents are adequate and proficient in replying to the questionnaire form.

4.3.2 Reliability Analysis

This section shared the result of the reliability analysis for the Phase Two study. The reliability analysis includes part one, the intention of Integrated Management System (IMS) implementation, and part 2, the effectiveness of IMS implementation. The reliability analysis used Cronbach's Alpha Coefficient to test out the reliability.

4.3.2.1 Part 1: Intention of IMS Implementation

This analysis is essential to determine the reliability of the questions through the scale consistency and reliability of the input. Table 4.3 shows the reliability analysis of the intention of Integrated Management System (IMS) implementation using Cronbach's alpha test. The value for the five items tested is presently based on the result. The scale consistency and reliability of the input results are 0.769, which is good since it exceeds 0.70. The internal surface is acceptable based on the rule of thumb in Cronbach's Alpha.

Table 4.3: Reliability analysis of the intention of IMS implementation

The intention of Implementation	IMS of Customer Requirement [A1]	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Square multiple correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha Coefficient
To Fulfill the Requirement [A1]	Customer	18.000	2.857	0.612	0.667	0.716	
To Reduce Cost [A2]		18.870	2.552	0.272	0.200	0.886	
To Improve Product and Service Quality [A3]		18.070	2.781	0.586	0.792	0.717	0.769
To Increase Efficiency [A4]		18.130	2.410	0.817	0.880	0.638	
To Reduced Company Risk [A5]		18.130	2.552	0.702	0.595	0.677	

4.3.2.2 Part 2: Effectiveness of IMS Implementation

Table 4.4 shows the reliability analysis of the Integrated Management System (IMS) implementation's effectiveness using Cronbach's alpha test. The values for the seven items tested are presently based on the result. The scale consistency and reliability of the input results are promising, with a mark of 0.700. This result achieved the minimum acceptable value for the reliability coefficient, 0.70. Therefore, internal consistency is relatively high. Therefore, the inner surface is suitable based on the rule of thumb in Cronbach's Alpha.

Table 4.4: Reliability analysis of the effectiveness of IMS implementation

Effectiveness of IMS Implementation	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha Coefficient
Cost Reduction [B1]	27.930	4.495	6.170	0.781	0.700
Increase Productivity [B2]	26.930	4.638	0.497	0.646	
Standardization [B3]	26.800	4.600	0.597	0.629	
Continuous Improvement [B4]	26.670	5.095	0.480	0.664	
Beneficial for Employee [B5]	27.330	4.238	0.358	0.690	
Customer Focus and Satisfaction [B6]	26.800	4.600	0.597	0.629	
Good and Better Image of Company [B7]	26.800	4.600	0.597	0.629	

4.3.3 Data Analysis

This section shared the result of the data analysis for the Phase Two study. The reliability analysis includes part one, the intention of Integrated Management System (IMS) implementation, and part 2, the effectiveness of IMS implementation. The data

analyses used were the Relative Importance Index (RII), factor analysis, Principal Component Analysis, and Pearson's Product Moment Correlation Analysis.

4.3.3.1 Part 1: Intention of IMS Implementation

Then, the questionnaire results are analyzed using SPSS software to understand the data received. Respondents rated the intention of Integrated Management System (IMS) implementation on a Likert scale, and their frequency (f) and weightage (W) are shown in Table 4.5. Table 4.6 shows the item statistics on the intention of IMS implementation. The mean, standard deviation, Relative Important Index (RII), and ranking of the most popular definitions of IMS implementation are validated.

Table 4.5: Likert scale weightage on the intention of IMS implementation

Intention of IMS Implementation	SD		D		N		A		SA	
	f	W	f	W	f	W	f	W	f	W
[A1]							7	28	59	295
[A2]	1	1	5	10	11	33	17	68	32	160
[A3]							10	40	56	280
[A4]							10	40	56	280
[A5]					2	6	8	32	56	280

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Table 4.6: Item statistics on the intention of IMS implementation

The intention of IMS Implementation	Mean	Std. Deviation	RII	Ranking
[A1]	4.89	0.31	0.979	1
[A2]	4.12	1.045	0.824	5
[A3]	4.85	0.361	0.970	2
[A4]	4.85	0.361	0.970	3
[A5]	4.82	0.461	0.964	4

Based on the data shown in Table 4.6, the results are transferred into a bar chart in Figure 4.4 to more clearly validate the agreed percentage on the intention of Integrated

Management System (IMS) implementation. It shows that fulfilling the customer requirement has a higher mean value of 4.89 and a 100% agreed rate. However, the lowest mean value for reducing cost is only 4.12, and the 74.2% agreed percentage.

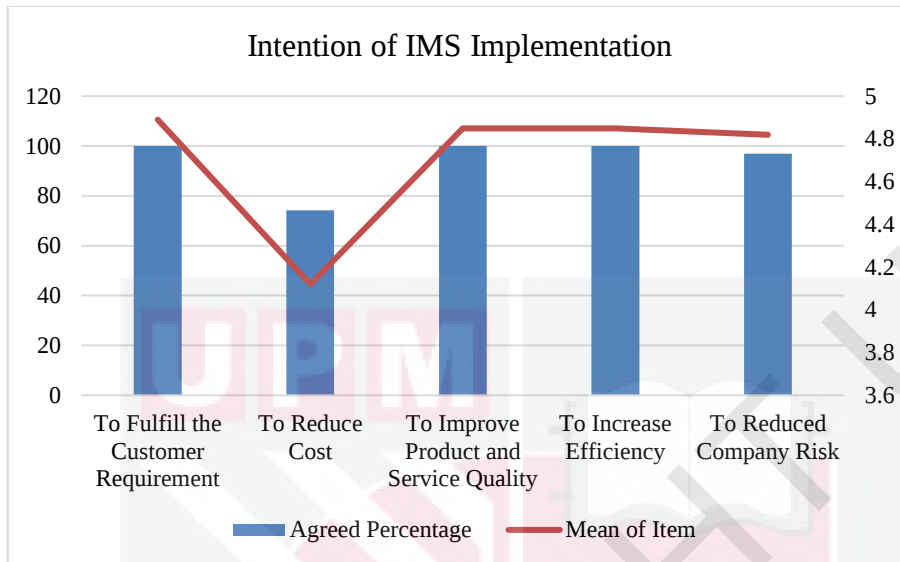


Figure 4.4: Bar chart of agreed percentage on the intention of IMS implementation

Communalities values are the proportion of each variable's variance that the factors can explain. Table 4.7 shows the communalities of items on the intention of Integrated Management System (IMS) implementation. Variables with high extraction values represent the variables in the common factor space. For example, from the table, reduced company risk has the higher extraction value, which is 0.825, and the most negligible extraction value is reduced cost, which is only 0.354. Extraction values below 0.4 show that the variables do not contribute much to the underlying factors.

Table 4.7: Communalities of items on intention of IMS implementation

The intention of IMS implementation	Initial	Extraction
[A1]	1.000	0.580
[A2]	1.000	0.354
[A3]	1.000	0.759
[A4]	1.000	0.819
[A5]	1.000	0.825

The total variance can decide how many factors or variables are comprehended to retain. For example, Table 4.8 shows the total variance explained on the intention of Integrated Management System (IMS) implementation, where it has the initial eigenvalues and extraction sums of squared loadings. The initial eigenvalues show that component 1, or fulfilling the customer requirement, has more than one total value. That means the variables represent a real underlying factor. Therefore, only component 1 can have the extraction sums of squared loadings.

Table 4.8: Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.338	66.763	66.763	3.38	66.763	66.763
2	0.802	16.043	82.806			
3	0.429	8.577	91.383			
4	0.231	4.627	96.010			
5	0.199	3.990	100.000			

Table 4.9 shows the Correlation Matrix on the Intention of Integrated Management System (IMS) implementations. The determinant value is relevant to the volume of the space engaged by the significant data points displayed by the raw scores on the measures involved. The standard factor value must be below one. In this study, the determinant value used is 0.53. The overall result from Pearson's Product Moment Correlation Analysis is a positive value and close to one. The result shows a statistically significant relationship between all of the constructs. The strongest association is between increasing efficiency and improving product and service quality, with the results closest to one, 0764.

Table 4.9: Correlation matrix of the constructs on the intention of IMS implementations

	[A1]	[A2]	[A3]	[A4]	[A5]
[A1]	1.000	0.230	0.541	0.678	0.616
[A2]	0.230	1.000	0.416	0.416	0.525
[A3]	0.541	0.416	1.000	0.764	0.756
[A4]	0.678	0.416	0.764	1.000	0.756
[A5]	0.616	0.525	0.756	0.756	1.000

Determinant = 0.53

4.3.3.2 Part 2: Effectiveness of IMS Implementation

Respondents rated the effectiveness of Integrated Management System (IMS) implementation on a Likert scale, and the frequency (f) and weightage (W) are shown in Table 4.10.

Table 4.10: Likert scale weightage on the effectiveness of IMS implementation

Effectiveness of IMS Implementation	SD		D		N		A		SA	
	f	W	f	W	f	W	f	W	f	W
[B1]			7	14	29	87	14	56	16	80
[B2]					1	3	11	44	54	270
[B3]							9	36	57	285
[B4]							8	32	58	290
[B5]					11	33	21	84	34	170
[B6]							8	32	58	290
[B7]							9	36	57	285

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

In addition, the mean, standard deviation, Relative Important Index (RII), and ranking of the most chosen variables on the effectiveness of IMS implementation are validated and shown in Table 4.11. The popular variables for the effectiveness of IMS implementation are continuous improvement, customer focus and satisfaction, and a sound and better company image. The minor variable selected by the respondent is cost.

Table 4.11: Item statistics on the effectiveness of IMS implementation

Effectiveness of IMS Implementation	Mean	Std. Deviation	RII	Ranking
[B1]	3.59	0.976	0.718	7
[B2]	4.80	0.437	0.961	5
[B3]	4.86	0.346	0.973	3
[B4]	4.88	0.329	0.976	1
[B5]	4.35	0.754	0.870	6
[B6]	4.88	0.329	0.976	2
[B7]	4.86	0.346	0.973	4

Figure 4.5 shows the bar chart of the agreed percentage on the effectiveness of Integrated Management System (IMS) implementation. The 100% agreed rate included the agree and strongly agree on categories. Standardization, continuous improvement, customer focus and satisfaction, and an adequate and better company image have the most agreed percentage, which is 100%. Nevertheless, the least agreed rate is for cost reduction, which is 45.5% agreed percentage, followed by beneficial for the employee with 83.3%.

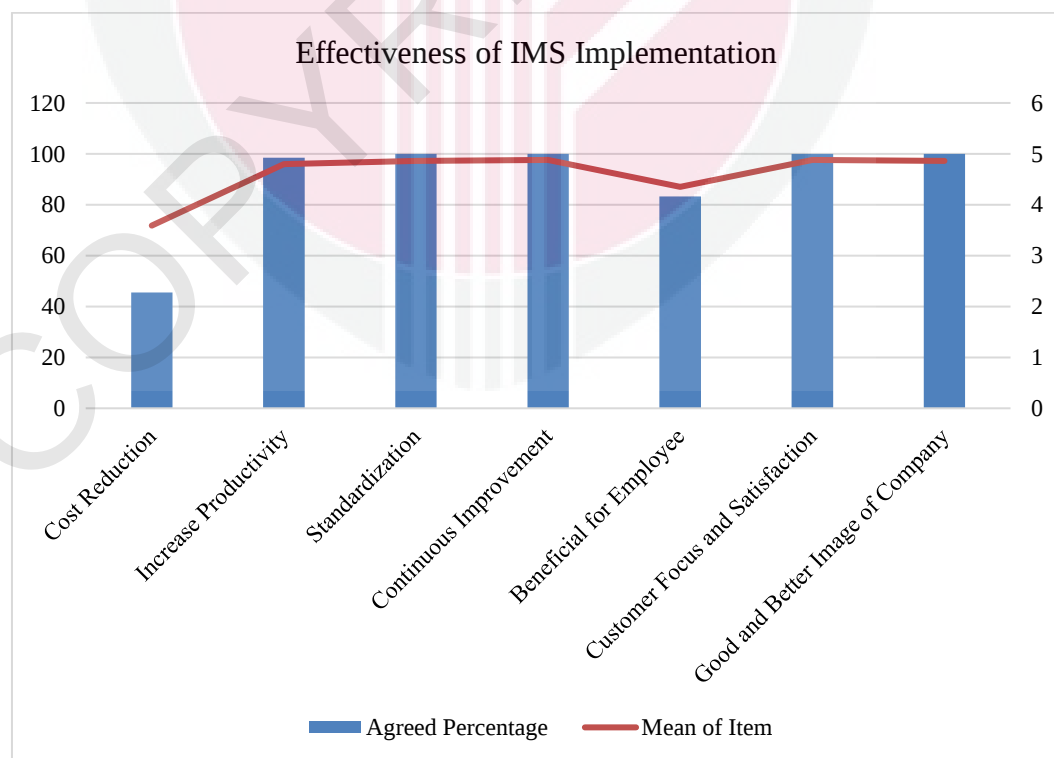
**Figure 4.5: Bar chart of agreed percentage on the effectiveness of IMS implementation**

Table 4.12 shows the communalities of items on the effectiveness of Integrated Management System (IMS) implementation. For example, from the table of standardization and a good and better company image, the higher extraction value is 0.955. Meanwhile, the most negligible extraction value is to increase productivity, which is only 0.666. Extraction values are the percentage of variance in the variables explained by the retained factor. The variables represent many underlying factors since all the extraction values are more than 0.4.

Table 4.12: Communalities of items on effectiveness of IMS implementation.

Effectiveness of IMS implementation	Initial	Extraction
[B1]	1.000	0.786
[B2]	1.000	0.666
[B3]	1.000	0.955
[B4]	1.000	0.768
[B5]	1.000	0.754
[B6]	1.000	0.931
[B7]	1.000	0.955

Extraction Method: Principal Component Analysis.

Table 4.13 shows the total variance explained in the effectiveness of Integrated Management System (IMS) implementation. The initial eigenvalues show that components 1 and 2 have more than one absolute value. It shows that they represent a real underlying factor. Therefore, only two elements can have the extraction sums of squared loadings. The Eigenvalues after Varimax rotation showed that component 1 has 60.829 % of the variance and component 2 has 22.246%. These two components explain the 83.074% factor structure of the total conflict among the items.

Table 4.13: Total variance explained on effectiveness of IMS implementation.

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.370	62.424	62.424	4.370	62.424	62.424
2	1.446	20.650	83.074	1.446	20.650	83.074
3	0.487	6.957	90.032			
4	0.410	5.851	95.883			
5	0.224	3.194	99.077			
6	0.065	0.923	100.000			
7	-2.994E-16	-4.277E-15	100.000			

Extraction Method: Principal Component Analysis.

Table 4.14 shows the effectiveness of the rotated component matrix in Integrated Management System (IMS) implementation. The Varimax Rotational Matrix shows the correlation of each component with eigenvalues greater than 1. This value is vital to determine the strength of the relationship between each variable.

Table 4.14: Rotated component matrix on effectiveness of IMS implementation

Variables	Component	
	1	2
[B1]		0.877
[B2]	0.812	
[B3]	0.965	
[B4]	0.872	
[B5]	0.389	0.776
[B6]	0.959	
[B7]	0.965	

Extraction Method: Principal Component Analysis.
2 components extracted.

These components are involved in the rotated component matrix. The two parts share the same high correlations with six variables: standardization and a good and better company image. The second component has high correlations with two variables: cost reduction and benefits for the employee.

Table 4.15 shows the correlation matrix for the effectiveness of Integrated Management System (IMS) implementation. The overall Pearson's Product Moment Correlation Analysis result shows that this matrix is not definite. In this study, the determinant value used is 0.00. This result is not positive or substantial since there is a negative value between the constructs.

Table 4.15: Correlation matrix of the constructs on effectiveness of IMS implementation

	[B1]	[B2]	[B3]	[B4]	[B5]	[B6]	[B7]
[B1]	1.000	0.133	0.014	0.083	0.510	0.035	0.014
[B2]	0.133	1.000	0.735	0.580	0.237	0.614	0.735
[B3]	0.014	0.735	1.000	0.799	0.244	0.935	1.000
[B4]	0.083	0.580	0.799	1.000	0.235	0.858	0.799
[B5]	0.510	0.351	0.244	0.235	1.000	0.297	0.244
[B6]	0.035	0.687	0.935	0.858	0.297	1.000	0.935
[B7]	0.014	0.735	1.000	0.799	0.244	0.935	1.000

a. Determinant = 0.000

b. This matrix is not positive definite.

The strongest statistically significant relationship is between Standardization and a Good and Better Image of the Company, with a result of 1.000. Meanwhile, the negative statistically substantial values are for all factors.

4.4 Result for the Phase Three – Qualitative Study

The result of Phase Three includes the general results of the respondents' demographic characteristics and validation of the entire study.

4.4.1 Demographic Characteristics of Respondents

The total number of companies that implemented the Integrated Management System (IMS) based on data from their website is 78. Therefore, five company Subject Matter Experts (SMEs) were called for an interview session. SMEs are identified based on experience, knowledge, contributions, recognition, and qualification criteria.

The contextual information of the five respondents involved in the interview session is shared in this section. The interview session is conducted with two general managers (40%), one manager (20%), and two senior executives (40%).

The category of the company shows that two of the respondents (40%) have come from building companies, one respondent (20%) from civil engineering, one respondent (20%) from mechanical & electrical and one respondent (20%) from facility management.

Nevertheless, the respondents' working experience in the construction industry shows that 80% have spent more than ten years, while only 20% have 5 to 10 years of working experience.

Moreover, the respondents working experience with Integrated Management System (IMS) are 40% for those with 1 to 5 years of knowledge. While 40% of respondents have more than five years of working experience with IMS, and 20% have less than one year of working experience with IMS. Respondents with less than one year of working experience with IMS are still categorized as Subject Matter Experts (SME) because of the respondent's knowledge and qualifications related to the management system. Respondents also have the credibility to answer all the questions and acknowledge the sharing session associated with IMS. Therefore, based on the respondents' criteria, all respondents are acceptable and experts to be involved in the interview session.

4.4.2 Validation of Entire Study

Validation of the entire study for this study is done with the semi-structured interview session with the five Subject Matter Experts (SME). All the SMEs are experienced enough with the construction industries and Integrated Management Systems

(IMS). The interview session is separated into two parts: the validation of the whole study process, like the sampling design, method of data collection, method of data analysis, and the process of result and contribution of the study.

Table 4.16 displays the Likert scale weightage for validating the process study, while Table 4.17 presents item statistics regarding the verification of the process study. The data in Table 4.17 indicates that the respondents broadly expressed satisfaction with the study's results and contributions, ranking it as the number one choice among the total statistics. Based on these findings, future studies can consider improving the sampling design method, as suggested by some respondents.

Table 4.16: Likert scale weightage on the validation of the process study

Description	SD		D		N		A		SA	
	f	W	f	W	f	W	f	W	f	W
Sampling Design					1	3	4	16		
Method of Data Collection							3	12	2	10
Method of Data Analysis							2	8	3	15
Result and Contribution of Study							1	4	4	20

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Table 4.17: Item statistics on the validation of the process study.

Description	Mean	Std. Deviation	RII	Ranking
Sampling Design	3.80	0.447	0.760	4
Method of Data Collection	4.40	0.548	0.880	3
Method of Data Analysis	4.60	0.548	0.920	2
Result and Contribution of Study	4.80	0.447	0.960	1

The second part validates the framework model that can be used to improve the implementation and adoption of Integrated Management System (IMS) in construction organizations. The interview session takes a position on a few factors, such as practicability, simplicity, accuracy, convenience, and contribution of the model to the

industry. Since it is a semi-structured interview session, various questions are asked to the correspondent for further improvement of the study and the framework model based on the answers given. Table 4.18 shows the result of the validation of the framework model.

Table 4.18: Result of the validation of the framework model.

Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Practicability of model					
Scale	2	3			
Performance	3	2			
Long Term Support	3	2			
Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. Simplicity of model					
Reliability	4	1			
Interpretability	4	1			
Executability	4	1			
Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. Accuracy of model					
Accuracy	1	4			
Precision	1	4			
Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4. Convenient of model					
Offer the right intensive	4	1			
Focus on the company need	4	1			
Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. Contribution of the model to the industry					
Functional to simplify the work process	4	1			
Save costs	2	3			
Organizationally productive	4	1			

4.5 Discussion

This section shared the discussion for the result that has been shared. The discussion will be explained based on the research objectives.

4.5.1 Research Objective 1 - To determine the intention of the Integrated Management System (IMS) being implemented in the construction organization

Three analysis methods have been used to research the results and findings from the literature studies. First, objective one has been analyzed during the theoretical framework to understand the intention of implementing the Integrated Management System (IMS) in the construction organization. The analysis used is content analysis, factor analysis and descriptive analysis.

Based on the literature studies, there is five common intention that the other authors have discussed. the intentions are (1) to fulfill the customer requirement, (2) to reduce cost, (3) to improve product and service quality, (4) to increase efficiency and (5) to reduced company risk. the studies' primary intentions are to reduce costs and fulfil customer requirements.

Meanwhile, the survey done on the construction companies implemented with Integrated Management System (IMS) contradicts the main intentions in theoretical studies. From the survey, the ranking for the purposes chosen by the respondents is (1) to fulfill the customer requirement, (2) to improve product and service quality, (3) to increase efficiency, (4) to reduced company risk and (5) to reduce cost.

According to the survey, most businesses implement Integrated Management System (IMS) in response to client requests. Most clients in particular industries concentrate on businesses that use the IMS. This outcome demonstrates that the companies have a strong foundation, which is attributable to their practical management approach. It

indicates that the business's financial picture is secure. Comparatively speaking, companies with IMS accreditation are worth more than those without.

As per a study by Ispas and Mironeasa (2022), companies need to focus on and follow the customer's needs during the strategy development, implementation, and continuous improvement process of Integrated Management System (IMS) implementation. This situation is necessary to achieve customer satisfaction and the stakeholders' expectations.

The respondents' focus on improving product and service quality and enhancing efficiency through Integrated Management System (IMS) implementation stems from the integrated nature of the process. Streamlining procedures and operations, IMS optimizes workflows for all stakeholders, including top management, employees, and clients. This efficiency boost not only ensures smoother operations within the organization but also translates to enhanced customer satisfaction and overall business performance.

Implementing an Integrated Management System (IMS) can foster interconnection across various departments, ensuring that operations, human resources, strategic planning, and logistics work harmoniously to balance efficiency, safety, quality, and productivity. This approach highlights the importance of integrating systems within the larger organizational framework for optimal functionality and effectiveness so the company can improve product and service quality as mention by Karanikas and Steele (2020).

The intention to implement the Integrated Management System (IMS) for cost reduction differs from the respondents' perspective. According to them, the implementation of IMS initially results in increased costs. This assumption is because the initial stages of IMS implementation require significant financial investment, including costs associated with training, process redesign, and acquiring necessary resources. Therefore, the notion that IMS implementation leads to immediate cost reduction may be misinterpreted, as the focus is more on long-term efficiency gains rather than immediate cost savings.

According to a study by Karkalikova and Strhan (2018), cost reduction is the primary intention for Integrated Management System (IMS) implementation. These intentions align and reflect the core concept of IMS, which involves integrating various management systems into one cohesive system. This integration leads to streamlined workflows, reduced documentation, optimized workforce utilization, and simplified audit processes compared to implementing multiple individual management systems. Consequently, it can be inferred that IMS implementation is beneficial in saving time and reducing costs.

4.5.2 Research Objective 2 - To evaluate the effectiveness of the Integrated Management System (IMS) implemented in the construction organization

Research objective number 2 has been analyzed during the theoretical framework to measure the effectiveness of the Integrated Management System (IMS) implemented in the construction organization. The same analysis has been used as research objective number 1. In addition, the results from the literature studies, content analysis, factor analysis, and descriptive analysis have been used.

The researcher's top ideas for the Integrated Management System (IMS) effectiveness from the theoretical framework are cost reduction, customer focus, and satisfaction. Based on the literature studies, seven critical points of the effectiveness of IMS implementation have been studied in different studies. There is cost reduction (1), increase productivity (2), standardization (3), continuous improvement (4), beneficial for employees (5), customer focus and satisfaction (6), good and better image of the company (7).

Aside from that, the result from the survey for the Integrated Management System (IMS) effectiveness are continuous improvement (1), customer focus and satisfaction (2), standardization (3), good and better image of the company (4), increase productivity (5), beneficial for employee (6) and cost reduction (7).

There are common findings from this study with another researcher. Firstly, the conclusions of this study are similar to those of the survey by Talapatra (2019), where the good and better company image is chosen mainly by the respondents. The company will be known as an organization that achieves good productivity and is more effective than implementing single management systems. The organization also develops its connection with the shareholders and its external image.

This study aligns with the findings of Talapatra (2019), affirming that the effectiveness of Integrated Management System (IMS) implementation is suitable for a company to have a positive image. By embracing IMS, organizations can improve their reputation and create an impression of efficiency and effectiveness. These findings highlight the significance of IMS in supporting organizational standing and reputation among stakeholders and the wider public.

Vice versa, the result from this study contradicts specific researchers on some factors. From literature studies, cost reduction is the number one factor discussed by another researcher (Barbosa et al., 2021). The result is different from the findings in this study, where the cost reduction is less agreed upon for Integrated Management System (IMS) implementation effectiveness. One of the reasons is that some difficulties occurred during the implementation. For example, the number of experts capable of composing the management system that the company requires is smaller. Other than that, insufficient distribution of funds to the structure also brings higher costs needed to implement the IMS.

Meanwhile, small or new organizations planning to implement Integrated Management System (IMS) will face cost issues as the price will be high. This issue is because the cost will differ for each organization and be pricier based on certain factors. These factors include the size and category of the company, the business background, the difficulty of activities, and the services or products of the company. There is a provision for enhancing operations, and more specifically for continuous improvement, in the International Organizational Standards (ISO) standards. According to study results, constant improvement is the efficacy of Integrated Management System (IMS) that people prefer the most. Due to the implementation process, which requires businesses to continuously improve their management procedures to maintain their certification process, the majority of respondents selected this as the primary effectiveness. Companies' implementation processes must continue for progress to be organized and sustained.

The survey's findings on the second effect of Integrated Management System (IMS) adoption are customer satisfaction and focus. It simplifies the process for companies to meet consumer needs and emphasizes their needs and satisfaction. Customers are the primary driving force behind the business adoption of IMS; as processes are streamlined and organized, businesses can better implement management systems. Most of the client's criteria are satisfied by the IMS's specifications.

The respondents' consensus on the effectiveness of cost reduction is the lowest. Because the cost of implementing the Integrated Management System (IMS) method could be higher, the respondent is against it. This predicament arises as a result of the shortage of IMS-capable consulting firms. The need for IMS consultants in businesses is very significant. Hence, the firm's fee is a little higher. In addition, despite integrating the IMS, there is only one management system certification, regardless of the management system used. Because there are more credentials, the certification body's expenses are higher.

4.5.3 Research Objective 3 - To develop a framework that functionally improves the Integrated Management System (IMS) implementation and adoption in the construction organization

Research objective three was done using the qualitative research method, a semi-structured interview session. The interview session is done with the construction industry's five Subject Matter Experts (SMEs) and work experience with Integrated Management System (IMS). The study done on research objective number one shows that the primary intention of implementing the IMS is to fulfill customer requirements. Meanwhile, research objective two shows that the company notices the main benefit after the implementation is continuous improvement.

Therefore, from research objectives one and two, we can conclude that most companies implement the Integrated Management System (IMS) just for their customers. After the implementation, they noticed that IMS helped their company with continuous improvement. However, with the performance of IMS, most companies are aware of its effectiveness in their organization and its ability to improve the quality of the company. The company does not understand the main intention for their company to implement IMS until they implement the IMS standard as mention by John and Keith (2023). The analysis results show that the framework is practical for use in industries based on the results from the qualitative study. The framework design helps the company fully understand the needs, benefits, and processes needed to implement the IMS.

4.6 Validation of Entire Study

There is a need for the construction to improve its management system to have a proper, organized, and systematic management system, as per Oliveira (2021). This situation is necessary for the company to be relevant and excellent in the current industries. However, Table 4.6 shows that most companies intend to implement the Integrated Management System (IMS) due to their customer requirement rather than their need to improve their management system. Therefore, after the companies have implemented the IMS, they have clear ideas of the direct effects of the IMS and how to make continuous improvements.

Customer requirements or external factors primarily drive companies' implementation of Integrated Management System (IMS). However, after implementing the IMS, they

finally understood its effectiveness, started with the internal factor, and needed an ongoing process. The framework model shows the steps the construction company should take before they begin the IMS implementation until they have been certified. The framework has been developed based on the information received during the theoretical framework development stage.

In the current construction industries, this framework development will assist the company in having clear ideas of what they need to do before implementing the Integrated Management System (IMS). This framework will make the job easier for companies because they need to follow the exact steps to have a successful IMS implementation and be certified by the organization's body.

The framework model development, as shown in Figure 4.6, consists of 6 essential steps, which are (i)analysis, (ii)people, (iii)strategy, (iv)preparation, (v)implementation, (vi)evaluation. all these steps start with the main reason the company wants to implement the Integrated Management System (IMS), the whole process, and until certification by the certification body. this process applies to different types of management systems that are suitable for company adoption.

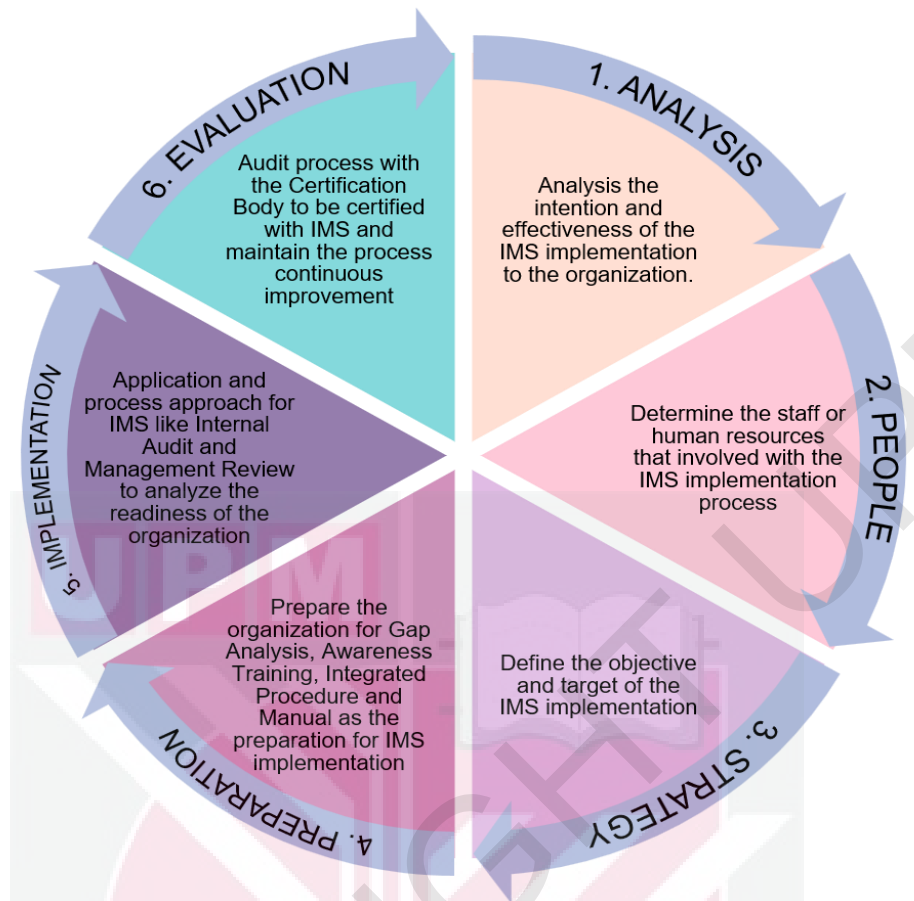


Figure 4.6: The framework of IMS implementation and adoption in the construction organization

The first step in this framework is the analysis. Companies need to analyze the intention of implementing the Integrated Management System (IMS) and the effectiveness of the company after the IMS has been implemented. This step is the study done in research objectives one and two. The company needs to understand the need for them to have the IMS, which will assist the company in achieving their target, which is the effectiveness of the IMS implementation.

The second steps from the framework model are the people. The management team must determine the staff or the human resources involved with the Integrated Management System (IMS) implementation process, such as the consultation company

and the certification body. Firstly, the management needs to identify the representative responsible for the supervisory job scope to monitor the junior-level staff and communicate with the management-level staff. They will play crucial roles in observing and guiding the company through implementation.

The company must also engage a consultant company that is familiar with the certification process. The consultant will help the company train the staff on their job scope and awareness of the Integrated Management System (IMS) implementation. They will also advise the top management on the right things to do for the implementation process and to be successfully certified by the certification body.

In this step, management is crucial in confirming that the workforce is directly involved in the implementation process. The administration needs to organize the staff number carefully to ensure all company staff acknowledge and know the process. Ensure all departments have the key person to receive the critical information from the management representative and consultant. Companies also need to pass the information to their department staff precisely to avoid misunderstandings.

The third step is a strategy, in which the organization needs to define the Integrated Management System (IMS) implementation's objective and target. The main goals of the implementation are to fulfill the external and internal factors of the company. The external factor is like the customer requirement; the inner element is continuous improvement. The management needs to set a target for the certification and the management system they plan to implement. The administration must choose the management system and implement it wisely based on the company's requirements.

The next step is preparation, where the organization prepares for the gap analysis, awareness training, integrated procedure, and manual practice. After the management has finalized the management system to implement in the Integrated Management System (IMS), the company must prepare for the gap analysis. The gap analysis is essential for the company to know the performance and what things are missing and need improvement, as per Louise (2022). Other than that, the consultant typically will provide a series of training sessions that need to be joined by the staff to ensure the team has some knowledge of the IMS process. From here, the manual and procedure will be prepared based on all the processes.

After the manual and procedure are prepared, the next step is the implementation process. First, the company must adopt all the manuals into their work process and have systematic documented information. Then, the company undergoes an internal procedure, such as an internal audit process and a management review. The internal audit is where the staff does the audit process to audit their colleagues from different departments. Staff will understand the auditing process and how to prepare for the external audit process. The results of the internal audit findings will be presented to the top management during the management review process. Then, the administration will decide on the necessary action to improve the implementation process before proceeding with the auditing process with the certification body.

The final step is an evaluation where the external audit process will be done with the certification body to be certified with Integrated Management System (IMS) and maintain the process for continuous improvement. The company will undergo an external audit after the management is satisfied with the internal audit process. There

are several types of the audit process with the certification body. First, the company will experience the Stage One audit process for the first-timer. The certification body audits to see whether the company is ready for the management system they want to add.

After the result is satisfied with no non-conforming result, the certification body will recommend that the company undergo the Stage Two audit, which is the overall audit for the Integrated Management System (IMS). If the result is good from this audit, they will certify the company with the IMS certificates. The certificates will be valid for three years. After that, the company must follow up with the certification body to maintain the credentials by undergoing a yearly surveillance audit. During the surveillance audit, the certification body will decide whether the certification is still valid or not. Then, after three years, the company must undergo the recertification audit process to get a new certificate that will be valid for another three years. The cycle will be repeated if the company wants to proceed with the certification.

Using this framework model will help the organization in general in the Integrated Management System (IMS) implementation process and solve all the related issues. This framework is beneficial for everyone in the company. The first benefit is for the organization. The systematic guidelines on what action should be taken by the company will help the company have a better and proper system for the implementation process, as per Harrison (2021). The move is complete, starting from the earlier steps, like the analysis for the company to realize the intention and the effectiveness of the IMS implementation until the certification is successful and continuous improvement is achieved.

The next benefit of the framework is for the shareholders and the top management. The implementation process's cost will be less with the framework's proper guidelines, as per Ding (2021). The price is more effective since the management fully understands the right things they need to do and what should be done. From here, the administration also understood the main intention of implementing the Integrated Management System (IMS) and not just applying for the implementation. Thus, they will acknowledge the process that is not necessary and cut the cost of the action.

Lastly, not only beneficial for the organization and the management, but the staff also benefited from the framework model as per John and Keith (2023). The work productivity will increase since the management team will organize and segregate the tasks appropriately required after the management understands the steps and actions that should be taken. The staff will also be more effective since they will provide training that helps them improve their working skills. In addition, the training provided assists the team in understanding their job scope and ensuring they will only do necessary tasks.

4.7 Summary of Chapter

This chapter shows the results of the qualitative and quantitative studies that have been done. Phase One, the theoretical framework part, shows the outcome of the content analysis, factor analysis, and descriptive analysis. After that, the results start with the management system standard (MSS) and integrated management system ideas.

Then, the result for Phase Two is quantitative studies and the outcome from the pilot study and genuine data collection. The results are shown in two parts. Part 1 is the intention of Integrated Management System (IMS) implementation, and part 2 is the effectiveness of IMS implementation. First, the findings start from the demographic characteristics of respondents and are followed by reliability analysis and data analysis.

The result from Phase Three, or the validation of the entire study, has been categorized into two and done with the semi-structured interview session with the Subject Matter Expert (SME). The first part is the finding for the validation of the study process. Meanwhile, the second part focuses on the framework developed for the construction organization's Integrated Management System (IMS) implementation. The results display the respondents' answers to the framework applications.

The discussion further discussed the findings of the quantitative and qualitative studies. Research objectives one and two discuss similar conclusions of the literature review and the results of this study. Not only that, in this chapter, the differences between both findings also explain in detail the root cause of the difference.

Research objective three is done with the qualitative study, divided into two parts: validation of process study and validation of the framework model. Based on research objective three, most companies bluntly implement the Integrated Management System (IMS) due to their customer's requirements. Therefore, companies need to fully understand the intention and effectiveness of the IMS.

In validating the framework model, the framework has been explained for every step to help the companies improve and fully understand the framework. the framework model development consists of 6 essential steps, which are (i) analysis, (ii) people, (iii) strategy, (iv) preparation, (v) implementation, and (vi) evaluation. In addition, this chapter also summarizes the benefits of the framework to the organization, shareholders, top management, and the organization's staff.



CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter summarizes the study's main findings, focusing on the construction industry's Integrated Management System (IMS). The study aims to understand why companies desire to implement IMS and assess its effectiveness post-implementation. Based on the results of these objectives, a framework design function has been prepared to aid organizations in the IMS implementation process. This framework constitutes the primary contribution of the study.

Not only that, the limitations faced during the whole research study process are also explained in this chapter. Finally, from the findings, contribution, and rules of this research study, a few recommendations for further research have been made for a new branch of study.

5.2 Main Findings of the Study

All objectives from this study have been achieved through the main findings at each research study phase. The main findings are summarized in this section based on the research objectives.

5.2.1 Research Objective 1 - To determine the intention of the Integrated Management System (IMS) being implemented in the construction organization

The first objective of this study is to determine the intention of the Integrated Management System (IMS) being implemented in the construction organization. This objective was achieved through a survey study done with the company implementing the IMS and the literature study. The literature study shows five common reasons for the company to implement the IMS.

In the literature study, the primary intention of the companies is to reduce costs. This result differs from the survey study, where the respondent's primary purpose is to fulfil the customer's requirement. Furthermore, it shows that companies must be aware of why they must implement Integrated Management System (IMS) to follow their customers and avoid losing them.

5.2.2 Research Objective 2 - To evaluate the effectiveness of the Integrated Management System (IMS) implemented in the construction organization

The second objective of this research study is to evaluate the effectiveness of the Integrated Management System (IMS) implemented in the construction organization. This objective was achieved using the same survey used for objective one. The literature study has found the seven crucial factors of the effectiveness of the IMS implementation. Based on the literature study, the primary benefit is cost reduction. This result differs from the survey study because cost reduction is the last point of the effectiveness chosen by the respondent. The immediate effect of the survey is continuous improvement.

5.2.3 Research Objective 3 - To develop a framework that functionally improves the Integrated Management System (IMS) implementation and adoption in the construction organization

The last objective of this study is to develop a framework that functionally improves the implementation and adoption of Integrated Management System (IMS) in construction organizations. Utilizing the survey results for objectives one and two, an important framework for the IMS implementation process has been created to achieve this objective. Furthermore, the framework was validated with a semi-structured interview session to confirm the whole research process and the framework.

This framework helps the company by providing benefits for the whole organization. The main advantage is the company will have an improved and appropriate system for Integrated Management System (IMS) application. Next is the advantage for the shareholders and the top management, where the implementation cost is less due to the good guidelines. Finally, the third benefit is work will be more productive for the staff since the management has organized task isolation. In this framework, there are six recommended steps to follow by the companies for IMS implementations that are:

- i. Analysis of the intention and effectiveness of the IMS implementation.
- ii. Determine the people (staff or human resources) involved in the implementation process.
- iii. Define the strategy (objective and target).
- iv. Prepare the organization for the Gap Analysis, Awareness Training, Integrated Procedure and Manual as the preparation for IMS implementation.
- v. Implementation through the application and process approach for IMS, like Internal Audit and Management Review Meetings, to analyze the organization's readiness.
- vi. Evaluation completes with the audit process by the Certification Body as a process to be certified with IMS and maintain the process of continuous improvement.

5.3 Contribution of the Study

This section elaborates on the study's contributions, encompassing practical and theoretical implications. It delves into how the research findings can inform real-world industry practices while enriching theoretical understandings in the field.

5.3.1 Practical Contribution

Management System Standards (MSS) are rules or procedures that the company willingly applies. This MSS consists of different parts or factors that the company wants to have guidelines to help them. This guideline will help the company to improve its management process. The company will choose a management system that fits different needs and business cultures. Other companies may need to have more than one management system. The implementation process of a single MSS requires much work due to the lengthy process. The certification body developed the IMS process from this long process, which combined all the MSS and simplified the process.

This research seeks to verify whether the company understands the need to implement Integrated Management System (IMS). This understanding is essential to help the company realize the main ideas for having the IMS and make it easier to arrange their resources based on their needs. Furthermore, this model will allow them to have a proper work process for the implementation. The theoretical framework study shows five reasons for the company to adopt the IMS. The respondents have chosen these five factors to see the most ideas for them to have the IMS. Therefore, this survey helps

the company understand why they need IMS in addition to fulfilling the customer's requirements.

In the survey for the effectiveness of the Integrated Management System (IMS) implementation, most companies needed to realize the different benefits they will receive from the IMS and the single Management System Standards (MSS) implementation. Through this study, once they understand their intention to have the IMS, they will realize the benefits they will receive and how to utilize the IMS implementation's effectiveness fully. For example, the company mostly chooses continuous improvement as its main advantage, and the least benefit is cost reduction. Meanwhile, along the way of the implementation process, they will realize that the cost is higher in the first year of the implementation only and will be less for the following year.

The survey results show that the company's familiarity with Integrated Management System (IMS) information must still be improved. The company must also analyze the intention and effectiveness of implementing IMS. They need to become more familiar with adopting and maintaining the IMS. Therefore, this is the main contribution of this study, where a framework has been created to assist the company in clearly understanding the IMS implementation. The framework will guide the company, starting with implementing and maintaining the IMS after they are certified with the IMS. This framework also shows the guidelines for keeping the process for continuous improvement.

5.3.2 Theoretical Contribution

The theoretical contribution of this study starts from the theoretical framework process. This process allows us to analyze the critical gap analysis for the thesis development study.

The first gap analysis is the current Integrated Management System (IMS) studies design, which focuses on two or three different types of management systems. In this situation, we can compare the information from the literature studies. It shows that from the previous research, the Management System Standards (MSS) used in this study are focused on different management systems, and the maximum number of MSSs used is three. Most of the study focuses on the three main MSS: Quality Managements System (QMS), Environmental Managements System (EMS), and Occupational Safety and Health Managements System (OHSMS). The fourth MSS is primarily different and based on the company's needs. In this study, we used Anti Bribery Managements System (ABMS) for the fourth MSS to discuss further since it is necessary for the construction industry.

Based on the theoretical framework, most studies focus more on a single factor. The common elements used in the previous research are integration and implementation, empirical study, and management system standards. In this study, we have used two factors, and they will contribute to the theoretical research, which focuses on the integration and implementation of standard management system use. The second theoretical contribution is the factor of the Integrated Management System (IMS) studies. This study is new for the MSS study, especially in the construction industry.

5.4 Recommendation for Further Research

From the overview of the whole study process, it is a valuable and significant chance to improve the research study to receive a better result. Therefore, it will be a good recommendation for future research. Firstly, the analysis can be done using a different approach, such as a case study, which can be used to compare the Management System Standards (MSS) and Integrated Management System (IMS) implementation processes in detail.

Next, the type of management system used in the Integrated Management System (IMS) can vary depending on the needs of the industries. For example, customer demands will differ in the future, and there will also be more relevant Management System Standards (MSS) use. Therefore, further research can add the Information Security Management System (ISMS) or the Risk Management System (RMS) to their study.

Lastly, the research study can be conducted in different areas such as Penang, Johor, or any other location in Malaysia instead of focusing only on the Klang Valley area. In addition, the company can include all grades from CIMS-registered companies and not be limited to a specific grade of companies. Thus, with all the recommendations, the study can be improved a lot better than now.

5.5 Limitation of the Study

During the whole process of this research study, several limitations affected the research process. Most importantly, the process takes a long time during the theoretical

framework study. Therefore, the timelines could be more specific to gain the data from the literature study. Thus, some of the data on the intention and the effectiveness of the Integrated Management System (IMS) implementation should be noticed. Predictably, some of the data needs to be present in this study.

Due to the smaller number of companies implementing the Integrated Management System (IMS) in Malaysia, this study only focused on the Klang Valley area. Even though this study was done in the Klang Valley area and applies to companies registered under the CIMS system, implementing IMS still needs improvement. Not all construction companies in CIMS implement IMS. Therefore, in this study, the respondent only considered the companies listed in G3 to G7 since the companies implemented with IMS are in this grade range only.

Other than that, the timelines of this study are done during the Coronavirus Disease 2019 (COVID-19) pandemic. The process of the survey and interview session is limited due to the Movement Control Order (MCO) announced by the government. The survey process takes a long time since most companies Work From Home (WFH), and it is hard for them to reply to the survey. Not only that, all the processes for the interview session are done by the online platform instead of through a face-to-face interview session.

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Best Regards,
Nor Fazira Binti Ramli.

Thank you for agreeing to take part in this research.

For this study, please take your time to validate the attached question about the intentions and effectiveness of an Integrated Management System (IMS) in a construction organization. All information will be confidential, anonymous, and used only for academic research. Thank you.

Section A

NAME: _____

COMPANY NAME: _____

EMAIL: _____

JOB POSITION: _____

Working Experience

< 5 Years

☐

5-10 Years

☐

> 10 Years

☐

Category of Company?

Building

☐

Civil Engineering

☐

Mechanical & Electrical

☐

Facility Management

☐

Working Experience with IMS

< 1 Years

☐

1-5 Years

☐

> 5 Years

☐

Interview Guideline

Please validate the following applications of IMS in construction organization. What is the level of agreement with the following applications of IMS?

- | | | | |
|----|-------------------|----|----------------|
| 1- | Strongly Disagree | 4- | Agree |
| 2- | Disagree | 5- | Strongly Agree |
| 3- | Neutral | | |

Part 1:

No.	Intention of IMS Implementation	1	2	3	4	5
1	To Fulfill the Customer Requirement					
2	To Reduce Cost					
3	To Improve Product and Service Quality					
4	To Increase Efficiency					
5	To Reduced Company Risk					

Please kindly state any of the intention of IMS implementation not mention above:

Part 2:

No.	Effectiveness of IMS Implementation	1	2	3	4	5
	Internal					
1	Cost Reduction					
2	Increase Productivity					
3	Standardization					
4	Continuous Improvement					
5	Beneficial for Employee					
6	Cost Reduction					
	External					
7	Customer Focus and Satisfaction					
8	Good and Better Image of Company					

Please kindly state any of the application of IMS not mention above:

Thank you for your cooperation and helpful participation.

Appendix B

Validation of Entire Study

Semi-Structured Interview Question.

Title: IMPROVING THE INTEGRATED MANAGEMENT SYSTEM (IMS) IMPLEMENTATION IN CONSTRUCTION ORGANIZATION IN MALAYSIA.

Section A – Process of Study

Research design;

The research study has been divided into three main parts. The first part is a theoretical study that is necessary to understand the actual concept relevant to the research study's interpretation. Then, to achieve the research objectives, mixed research methods have been chosen for this research study that are qualitative and quantitative. This research study is targeted at the construction companies in the Klang Valley that have implemented the integrated management system (IMS). The company's categories are building, civil, mechanical, electrical, and facility management.

Data collection and analysis;

Data for Phase one, the theoretical framework collected by the literature review studies. Then, the quantitative study data were compiled by the questionnaire survey for the Phase Two analysis. Next, the survey was sent to the construction companies implementing the IMS. Finally, the result from the study has been analyzed using Cronbach's Alpha to measure the consistency and reliability of the data when using the Likert Scale, Principal Component Analysis to identify the effectiveness of the IMS implemented in the construction organization, and Pearson Product Moment Correlation Coefficient to determine the way to improve the IMS implementation and adoption in the construction organization. Meanwhile, for the Phase Three study, data was collected using Qualitative research using interviews.

Results;

The quantitative study analysis shows that IMS implementation's primary intention is to fulfill customer requirements, improve product and service quality, increase efficiency, and reduce company risk. In addition, the slightest intention is to reduce cost. Thus, the Effectiveness of IMS Implementation is Continuous Improvement, Customer Focus and Satisfaction, Good and Better Image of the Company, Increase Productivity, Beneficial for Employees, and Cost Reduction. Most companies have been implementing IMS for around 1 to 5 years.

Interview Guideline

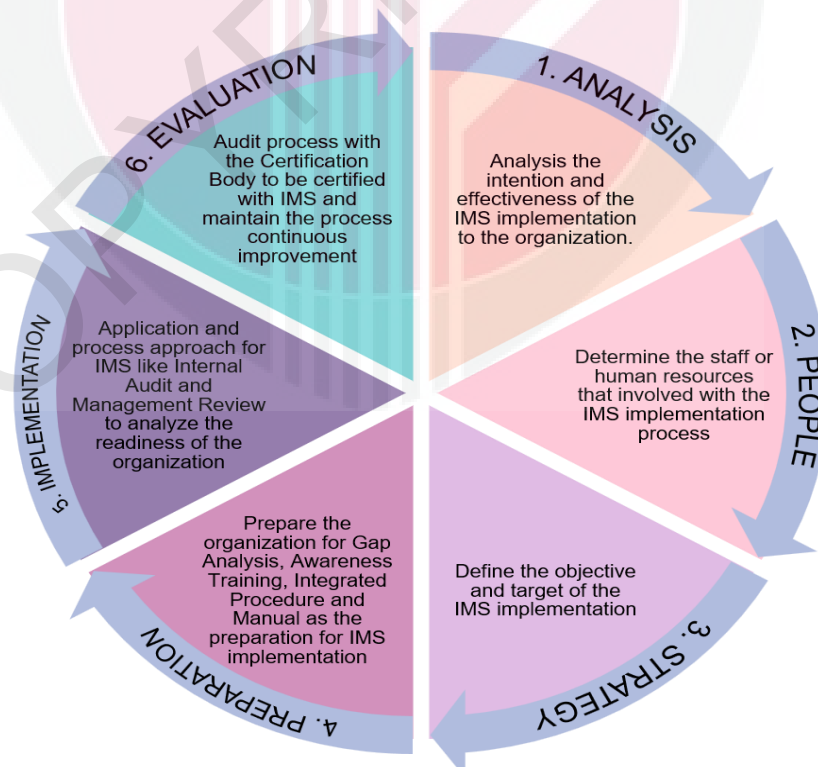
- | | |
|----------------------|-------------------|
| 1- Strongly Disagree | 4- Agree |
| 2- Disagree | 5- Strongly Agree |
| 3- Neutral | |

From the brief description of the research above, what is the level of your agreement with the research process?

No.	Process	1	2	3	4	5
1	Sampling Design					
2	Method of Data Collection					
3	Method of Data Analysis					
4	Result and Contribution of Study					

Please kindly give your comment and views:

Section B: Model Validation



From the model above, what is the level of agreement with the research model above?

No.	Factor	1	2	3	4	5
1	Practicability of model					
	a) Scale					
	b) Performance					
	c) Long Term Support					
	d) User-friendliness					
2	Simplicity of model					
	a) Reliability					
	b) Interpretability					
	c) Executability					
3	Accuracy of model					
	a) Accuracy					
	b) Precision					
4	Convenient of model					
	a) Offer the Right Incentive					
	b) Focus on the company need					
5	Contribution of the model to the industry					
	a) Functional to simplify the work process.					
	b) Save costs					
	c) Organizationally productive					

Please kindly give your comment and views:

Thank you for your cooperation and helpful participation.

Appendix C

List of Subject Matter Expert (SME) for the Semi-Structured Interview in Qualitative Study.

S/N	Name	Company Name	Job Position	Category of Company
1.	Peter Wong Chuan Keat	Berjaya EnviroParks Sdn Bhd	General Manager	Facility Management
2.	JP Lim	Temacon Engineering Sdn Bhd	Manager	Mechanical & Electrical
3.	Ir. Anuar Bin Mohamad	Dscaff Engineering Sdn. Bhd.	General Manager	Civil Engineering
4.	Stella Tan	Elabram Systems Sdn Bhd	Senior Executive	Building
5.	Noorazlin Zainal Mukhtar	OSK Construction Sdn Bhd	Senior Executive	Building

LIST OF PUBLICATIONS

Nor Fazira, R., Nuzul, A. H., Aidi, H. A. and Aizul, N. H: The Implementation of Integrated Management Systems (IMS) In Construction Organizations in Malaysia: *Malaysian Journal of Civil Engineering* (Accepted).

