

UNIVERSITI TEKNOLOGI MARA

**EXAMINING THE EFFECTS OF
SYSTEM, METADATA AND
SERVICE QUALITY ON USER
SATISFACTION WITH THE
MEDIATING ROLE OF USAGE:
A CASE STUDY OF MYFOTO**

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MYFOTO**

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Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science in Information Management (CDIM770)

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CONFIRMATION BY PANEL OF EXAMINERS

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

Multiple dimensions of digital photo archive system quality influence users' experience and satisfaction in the public sector. This study examines the effects of system quality, metadata quality, and service quality on user satisfaction, with the mediating role of usage, in the context of MyFoto, a government digital photo archive managed by Jabatan Penerangan Malaysia (JAPEN). Grounded primarily in the DeLone and McLean IS Success Model (2003), this research conceptualizes metadata quality as a critical determinant of retrieval effectiveness in photo-centric archives. A quantitative approach is employed using a structured questionnaire administered to MyFoto users within the organizational environment of JAPEN. Data will be analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS to test both direct and mediating relationships among the constructs. The findings are expected to identify quality factors that significantly drive usage and user satisfaction, providing evidence-based insights to guide improvements in system performance, metadata governance, and service support within government visual archival systems.

Keywords: *Digital archives; government photo archives; system quality; metadata quality; service quality; usage; user satisfaction; IS Success Model; PLS-SEM; Malaysia.*

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LIST OF SYMBOLS

Symbols	Description
β	Path coefficient representing the strength and direction of relationships between constructs
R^2	Coefficient of determination representing the proportion of variance explained in endogenous constructs
f^2	Effect size indicating the relative impact of an exogenous construct on an endogenous construct
α	Cronbach's Alpha measuring internal consistency reliability
ρ_a	Composite reliability (ρ_A)
ρ_c	Composite reliability (CR)
AVE	Average Variance Extracted representing convergent validity
HTMT	Heterotrait–Monotrait Ratio used to assess discriminant validity
t	Bootstrapping t-value used for hypothesis testing
p	Significance probability value
n	Sample size
ε	Measurement error term
λ	Outer loading representing the correlation between indicator and construct
U	Usage construct
SQ	System Quality construct

LIST OF SYMBOLS

Symbols	Description
MQ	Metadata Quality construct
SVQ	Service Quality construct
SAT	User Satisfaction construct

LIST OF ABBREVIATIONS

Abbreviations

AVE	Average Variance Extracted
CR	Composite Reliability
HTMT	Heterotrait–Monotrait Ratio
IS	Information System
JAPEN	Jabatan Penerangan Malaysia
MQ	Metadata Quality
PLS-SEM	Partial Least Squares Structural Equation Modelling
R ²	Coefficient of Determination
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
SQ	System Quality
SVQ	Service Quality
SAT	User Satisfaction
U	Usage
TAM	Technology Acceptance Model
EUCS	End-User Computing Satisfaction
SERVQUAL	Service Quality Model

LIST OF ABBREVIATIONS

Abbreviations

D&M IS Model	DeLone and McLean Information System Success Model
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LIST OF NOMENCLATURE

Nomenclatures

β	Path coefficient representing the strength of relationships between constructs
f^2	Effect size indicating the impact of an exogenous construct on an endogenous construct
R^2	Coefficient of determination representing the explained variance of endogenous constructs
α	Significance level used in hypothesis testing
ρ_a	Composite reliability (ρ_A)
ρ_c	Composite reliability (ρ_C)
λ	Indicator loading (outer loading) representing the relationship between an indicator and its latent construct
n	Number of respondents in the sample
p-value	Probability value used to determine statistical significance
t-value	Test statistic obtained from bootstrapping in PLS-SEM
AVE	Average Variance Extracted indicating convergent validity of constructs

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The digital transformation of Malaysia's public sector represents a critical step in realizing the nation's vision of becoming a digitally empowered government and society. This transformation has been driven by strategic frameworks such as the Malaysia Digital Economy Blueprint (MyDigital, 2021), which outlines the government's roadmap toward digital governance, data-driven decision-making, and citizen-centric services. Complementing this initiative, the National Cloud Computing Policy (2021) promotes secure, scalable, and integrated cloud infrastructures across ministries and agencies, while the Data Sharing Act 2025 (Act 864) provides a legal foundation for inter-agency data interoperability, governance, and ethical information exchange. Together, these policies form the backbone of a connected and intelligent public sector that leverages technology to enhance efficiency, accountability, and accessibility.

Within this national framework, government photo archives play an increasingly strategic role in preserving and communicating Malaysia's visual heritage. Far beyond their traditional function as storage facilities, these archives serve as repositories of national memory that document political milestones, cultural events, and administrative progress which collectively shape the identity of the nation. The shift from analog to digital archiving has redefined how such visual records are managed, retrieved, and disseminated, reflecting a paradigm in archival practice that emphasizes accessibility, interoperability, and user engagement.

In this context, the Jabatan Penerangan Malaysia (JAPEN), through its Pusat Sumber & Fotografi (PSF), plays a pivotal role in leading the government's visual documentation efforts. JAPEN manages the MyFoto system, a centralized digital photo archive developed to support the acquisition, cataloguing, preservation, and dissemination of official photographic materials. MyFoto facilitates the systematic documentation of government events, media engagements, and national initiatives, ensuring that visual information is preserved and retrievable for reference, publication, and communication purposes. This initiative aligns with JAPEN's core mission to deliver timely, credible, and visually documented information to the public, thereby enhancing government communication effectiveness and transparency.

MyFoto signifies JAPEN's transition from conventional photographic management characterized by manual cataloguing and physical storage to a data-driven, cloud-enabled digital archive. It serves as both a documentation tool and an information management system, enabling officers, photographers, and editors to upload, tag, retrieve, and share photographic assets. However, the system's long-term success relies heavily on the quality of the system, the accuracy and consistency of metadata, and the reliability of user support services.

The relevance of evaluating MyFoto becomes evident when examined through the lens of the DeLone and McLean Information Systems (IS) Success Model (2003). The model posits that system success is shaped by the interplay of three key quality dimensions, namely system quality, information quality, which is operationalised in this study as metadata quality, and service quality, all of which influence system usage and user satisfaction. In a digital photo archive environment, metadata quality is particularly critical because descriptive metadata directly determines search precision, retrieval efficiency, and users' confidence in the system. Therefore, evaluating MyFoto's system, metadata, and service quality, and understanding how these qualities drive usage and user satisfaction, is necessary for strengthening the sustainability and credibility of Malaysia's government-managed digital visual archives.

1.2 Problem Statement

The transformation of Malaysia's public sector toward digital governance has created unprecedented opportunities for information accessibility and institutional transparency. However, while national policies such as the Malaysia Digital Economy Blueprint (MyDigital, 2021), the Data Sharing Act 2025 (Act 864), and the National Cloud Computing Policy (2021) have accelerated system integration and data sharing, the effectiveness of specialized digital repositories, particularly those operating within photographic archival contexts, remains underexamined.

Within this ecosystem, JAPEN manages MyFoto as an official digital photo archive for storing and retrieving government photographs. Despite its strategic importance, limited empirical evidence exists on how effectively MyFoto meets users' operational and informational needs. Operational observations and internal feedback have indicated persistent issues such as incomplete metadata entries, inconsistent tagging standards across units, limited search precision, and occasional system lags that hinder efficient retrieval of photographic materials. These challenges may reduce system usage and negatively affect user satisfaction, ultimately diminishing the discoverability and long-term value of visual records used for institutional reference and public dissemination.

Previous studies have established that system quality, information/metadata quality, and service quality are key determinants of IS success, influencing both system usage and user satisfaction. Nevertheless, many existing studies focus on digital libraries, repositories, or general e-government portals rather than government photo archives. Photo archives differ significantly because they are metadata-dependent and require semantic consistency for effective retrieval, making it crucial to contextualise IS success measures within visual archival workflows.

Additionally, while the DeLone and McLean model recognizes the relationship between quality dimensions, use, and satisfaction, the mediating role of usage is not always explicitly tested in government visual archive settings. Without empirical testing of usage as a mediating mechanism, decision-makers have limited guidance on whether improvements in quality dimensions translate into satisfaction primarily through increased usage behavior.

Therefore, this study addresses a significant gap by examining the effects of system quality, metadata quality, and service quality on user satisfaction with the mediating role of usage in the MyFoto digital photo archive. The findings are expected to provide evidence-based insights to guide enhancements in MyFoto's system performance, metadata governance practices, and service support mechanisms, aligning with broader national aims of strengthening digital public sector information management.

1.3 Research Questions (RQ)

Based on the identified research problem and guided by the DeLone and McLean IS Success Model (2003), this study is guided by the following research questions:

- a) **RQ1:**
How do system quality, metadata quality, and service quality influence the usage of the MyFoto system?
- b) **RQ2:**
To what extent does usage mediate the relationship between system quality, metadata quality, service quality, and user satisfaction?
- c) **RQ3:**
How does usage influence user satisfaction in the context of system quality, metadata quality, and service quality?

1.4 Research Objectives (RO)

In alignment with the research questions, the objectives of this study are as follows:

- i. **RO1:**
To examine the effects of system quality, metadata quality, and service quality on the usage of the MyFoto system.
- ii. **RO2:**
To investigate the mediating role of usage in the relationship between system quality, metadata quality, service quality, and user satisfaction.
- iii. **RO3:**
To determine how usage influences user satisfaction within the context of system quality, metadata quality, and service quality.

1.5 Research Hypotheses

Based on the theoretical framework and research objectives, the following hypotheses are proposed:

- 1) **H1:** System quality has a significant positive effect on usage.
- 2) **H2:** Metadata quality has a significant positive effect on usage.
- 3) **H3:** Service quality has a significant positive effect on usage.
- 4) **H4:** Usage mediates the relationship between system quality and user satisfaction.
- 5) **H5:** Usage mediates the relationship between metadata quality and user satisfaction.
- 6) **H6:** Usage mediates the relationship between service quality and user satisfaction.
- 7) **H7:** Usage has a significant positive effect on user satisfaction.

1.6 Context and Scope of the Study

This study is situated within the operational environment of JAPEN, focusing specifically on the MyFoto system managed by PSF. The scope is limited exclusively to evaluating MyFoto as a government digital photo archive system. While other platforms such as Open File Access (OFA) by Arkib Negara Malaysia and NeuCanvas-based systems are acknowledged for contextual understanding, they are excluded from empirical analysis to ensure methodological precision and dataset homogeneity.

The study examines five constructs: system quality, metadata quality, service quality, usage, and user satisfaction. The population comprises registered MyFoto users

within JAPEN, including system administrators, photographers, editors, and information officers who engage with uploading, metadata entry, searching, retrieval, and dissemination activities.

1.7 Methodology Overview

This study adopts a quantitative, cross-sectional survey design using a structured questionnaire to capture users' perceptions and experiences with the MyFoto system. Data analysis will employ Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS, as it is suitable for testing complex models with multiple constructs and mediation effects. The analysis will proceed in two stages:

1. **Measurement Model Assessment:** to evaluate reliability and validity of constructs (e.g., indicator reliability, internal consistency reliability, convergent validity, and discriminant validity).
2. **Structural Model Assessment:** to test direct relationships (H1–H3, H7) and mediating effects (H4–H6) using bootstrapping procedures for significance testing.

This approach enables simultaneous examination of the relationships between quality dimensions, usage, and user satisfaction within a government digital photo archive context.

1.8 Significance of the Study

The significance of this study lies in its dual contribution to academic knowledge and organizational practice, particularly within the evolving landscape of Malaysia's public sector digital transformation. By evaluating the impact of system, metadata, and service quality on user satisfaction through system use, this research provides insights that are directly applicable to the operational and strategic objectives of the Jabatan Penerangan Malaysia (JAPEN).

1.8.1 Theoretical Significance

From a theoretical standpoint, this study extends existing information system success models by contextualizing them within a government-managed digital photo archive environment.

While the DeLone and McLean IS Success Model (2003) has been widely applied in e government, library, and educational settings, its application to a specialized system such as MyFoto introduces a new perspective on how system, metadata, and service quality influence use and satisfaction in a photo-centric archival context.

By integrating constructs from the Technology Acceptance Model (Davis, 1989), End-User Computing Satisfaction (Doll & Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988) frameworks, this study develops a multidimensional model of user satisfaction that captures both technical efficiency and service responsiveness. This integrated framework ii contributes to the academic discourse on information quality and digital heritage systems, offering empirical validation of relationships that have received limited attention in Malaysia's government information management domain.

1.8.2 Practical Significance

Practically, this research provides evidence-based recommendations for improving the MyFoto system and strengthening JAPEN's role in Malaysia's digital information ecosystem. Findings from this study can inform the Pusat Sumber and Fotografi (PSF) and JAPEN's ICT Division in enhancing metadata accuracy, interface usability, and user support mechanisms. Improved user satisfaction will not only increase MyFoto's operational efficiency but also elevate the credibility and accessibility of government photographic documentation.

Moreover, the study aligns with Malaysia's Data Sharing Act 2025 (Act 864), the National Cloud Computing Policy (2021), and the Pelan Strategik Kementerian Digital 2024–2025, which collectively emphasize interoperability, data governance, and open access to government information. Strengthening MyFoto through data-driven insights supports these national objectives by promoting transparent, sustainable, and efficient management of visual data assets.

Finally, this study holds cross-sectoral relevance beyond JAPEN. Its findings can serve as a reference model for other public institutions such as the Arkib Negara

Malaysia (ANM), Radio Televisyen Malaysia (RTM), and the Kementerian Pertahanan (MINDEF), which operate similar digital image repositories, including systems such as OFA and NeuCanvas. The results may assist these agencies in benchmarking user satisfaction metrics and refining their metadata standards to ensure better interoperability and discoverability across Malaysia's digital archival systems.

In sum, the study not only contributes to the advancement of information system evaluation theory but also provides actionable insights to improve the governance, accessibility, and trustworthiness of Malaysia's digital photo archive systems, beginning with JAPEN's MyFoto as a national case study.

1.9 Theoretical Foundations and Justification of the Study

The theoretical foundation of this study is built upon established frameworks in information systems (IS) research that collectively explain how system quality, metadata quality, service ii quality, use, and user satisfaction interact within a digital information environment. The integration of multiple theories, namely the DeLone and McLean IS Success Model (2003), the Technology Acceptance Model (Davis, 1989), the End-User Computing Satisfaction Model (Doll and Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988), ensures that both the technical and human dimensions of system performance are comprehensively examined.

1.9.1 DeLone and McLean IS Success Model (2003)

The DeLone and McLean IS Success Model (D&M Model) provides the core theoretical structure for this study. It conceptualizes information system success through six interrelated dimensions: system quality, information quality, service quality, use, user satisfaction, and net benefits. This model has been widely adopted to evaluate e-government, digital library, and institutional repository systems due to its holistic approach to assessing both technological and behavioral aspects of system success (DeLone & McLean, 2003).

In the context of Jabatan Penerangan Malaysia (JAPEN), this model is particularly relevant because MyFoto functions as a socio-technical system that depends not only on its software performance but also on user engagement and satisfaction. The model's emphasis on system quality, service quality, and use aligns directly with the

constructs examined in this research. Furthermore, the inclusion of metadata quality in place of information quality provides a more appropriate lens for evaluating a digital photo archive, where descriptive metadata rather than textual content defines information retrieval accuracy and completeness.

1.9.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) (Davis, 1989) supports the behavioral aspect of system usage by explaining how users' perceptions of ease of use and usefulness influence their actual engagement with a system. In this study, TAM provides a behavioral foundation for understanding how officers and staff at JAPEN interact with the MyFoto system. While D&M emphasizes system performance outcomes, TAM explains the psychological mechanisms that encourage or hinder system adoption. The integration of TAM strengthens the conceptual framework by recognizing that system and metadata quality can shape perceived usefulness and ease of use, which in turn affect actual use behavior and satisfaction.

1.9.3 End-User Computing Satisfaction Model (EUCS)

The End-User Computing Satisfaction Model (EUCS) (Doll & Torkzadeh, 1988) focuses specifically on measuring users' satisfaction with computing systems based on five dimensions: content, accuracy, format, ease of use, and timeliness. EUCS is incorporated into this study to operationalize user satisfaction as a measurable construct. In the context of MyFoto, these dimensions are reflected in users' evaluation of photo retrieval accuracy, metadata presentation, and interface usability. Thus, EUCS contributes a validated measurement perspective to quantify satisfaction in relation to JAPEN's digital photo archive performance.

1.9.4 SERVQUAL Framework

The SERVQUAL model (Parasuraman et al., 1988) introduces the service dimension of system success by assessing user perceptions of tangibility, reliability, responsiveness, assurance, and empathy. This framework is particularly relevant for the MyFoto environment, where continuous technical assistance and support from JAPEN's ICT team play a critical role in ensuring user satisfaction. Integrating SERVQUAL ensures that this study captures not only technological attributes but also the quality of

service interactions that sustain system trust and continuity in government information systems.

1.9.5 Justification for the Integrated Model

The combination of these four models produces a comprehensive and multidimensional framework suitable for evaluating MyFoto as both a technical and human-centered system. The D&M Model provides the structural foundation; TAM explains user behavior; EUCS measures satisfaction quantitatively; and SERVQUAL captures service effectiveness. This integration is justified by the complex operational nature of MyFoto, which involves metadata-driven processes, user-system interaction, and ongoing technical support.

Such an integrative approach aligns with prior digital government and archival information studies (e.g., Setyawan & Santi, 2023; Desmal et al., 2022; Stvilia et al., 2014) that demonstrate how combining system, service, and information quality perspectives yields deeper insights into user satisfaction and system utilization. The framework thus not only strengthens the theoretical robustness of this study but also ensures contextual relevance for JAPEN's digital transformation objectives under the Malaysia Digital Economy Blueprint (MyDigital, 2021) and the Data Sharing Act 2025 (Act 864).

1.10 Significance of the Study

The significance of this study lies in its dual contribution to academic knowledge and organizational practice, particularly within the evolving landscape of Malaysia's public sector digital transformation. By examining the effects of system quality, metadata quality, and service quality on user satisfaction with the mediating role of usage, this research provides insights that are directly applicable to the operational and strategic objectives of the Jabatan Penerangan Malaysia (JAPEN).

1.10.1 Theoretical Significance

From a theoretical standpoint, this study extends information systems success evaluation by contextualising the DeLone and McLean IS Success Model (2003) within

a government-managed digital photo archive environment. While the DeLone and McLean model has been widely applied in e-government, digital library, and repository settings, its application to a specialised system such as MyFoto provides a refined perspective on how quality dimensions operate within a metadata-dependent, photo-centric archival workflow. In particular, by operationalising information quality as metadata quality, the study highlights the unique role of descriptive integrity, semantic consistency, and completeness in supporting discovery and retrieval of visual records.

Importantly, this study strengthens the theoretical explanation of system success by explicitly testing usage as a mediating mechanism that links system, metadata, and service quality to user satisfaction. This mediation perspective contributes to IS success literature by clarifying how quality improvements translate into satisfaction through actual system engagement, rather than assuming a direct relationship alone. Therefore, the study contributes to a more behaviourally grounded understanding of system success in government archival contexts, where sustained usage is often shaped by both system performance and organisational support structures.

1.10.2 Practical Significance

Practically, this research provides evidence-based recommendations for improving the MyFoto system and strengthening JAPEN's role in Malaysia's digital information ecosystem. Findings from this study can inform the Pusat Sumber and Fotografi (PSF) and JAPEN's ICT Division in enhancing metadata accuracy, interface usability, and user support mechanisms. Improved user satisfaction will not only increase MyFoto's operational efficiency but also elevate the credibility, discoverability, and accessibility of government photographic documentation.

In addition, the study offers actionable insights by identifying whether improvements in system quality, metadata quality, and service quality influence user satisfaction primarily through increased usage. This is particularly valuable for decision-makers, as it provides a clearer basis for prioritising interventions such as interface enhancement, metadata standardisation policies, user training, and improvements in service responsiveness, thereby targeting not only satisfaction outcomes but also the behavioural pathways that drive them. Furthermore, the findings align with Malaysia's Data Sharing Act 2025 (Act 864), the National Cloud Computing Policy (2021), and the Pelan Strategik Kementerian Digital 2024 – 2025, which

collectively emphasise interoperability, governance, and sustainable management of government information systems.

Finally, while this study focuses on JAPEN's MyFoto, the proposed quality – usage – satisfaction relationships may serve as a useful benchmarking reference for other public institutions managing similar visual repositories, supporting broader efforts to strengthen Malaysia's digital heritage management ecosystem.

1.11 Theoretical Foundations and Justification of the Study

The theoretical foundation of this study is anchored primarily in the DeLone and McLean Information Systems (IS) Success Model (2003), which provides a comprehensive and widely validated framework for evaluating the effectiveness of information systems in organisational contexts. The model conceptualises IS success through the interrelationships among system quality, information quality, service quality, system use, and user satisfaction, making it particularly suitable for assessing complex, socio-technical systems such as government digital archives.

In the context of this study, the DeLone and McLean model serves as the core theoretical framework, guiding the selection of constructs and the formulation of research questions and hypotheses. System quality, metadata quality (as a contextualised form of information quality), and service quality are treated as antecedent variables that influence usage, which in turn affects user satisfaction. By positioning usage as a mediating variable, this study aligns with the model's behavioural logic that system benefits and satisfaction are realised through actual system interaction rather than system quality alone.

The justification for adopting the DeLone and McLean model lies in its proven applicability across e-government systems, digital libraries, and institutional repositories. However, this study extends the model by contextualising it within a government digital photo archive environment, where metadata accuracy and consistency play a more critical role than textual information content. By operationalising information quality as metadata quality, the study ensures conceptual alignment with the functional realities of photo-centric archival systems such as MyFoto.

While the DeLone and McLean model provides the structural foundation of this research, several complementary models are incorporated in a supporting role to strengthen construct operationalisation and measurement. The Technology Acceptance Model (TAM) (Davis, 1989) is utilised to support the behavioural interpretation of system usage, particularly in understanding how perceived ease of use and usefulness influence users' engagement with the MyFoto system. However, TAM is not treated as an independent theoretical framework in this study; instead, its concepts inform the measurement of usage-related perceptions within the overarching IS success structure.

Similarly, the End-User Computing Satisfaction (EUCS) Model (Doll & Torkzadeh, 1988) is employed as a measurement basis for the user satisfaction construct. EUCS provides validated dimensions for capturing users' affective and cognitive evaluations of system performance, which are directly applicable to assessing satisfaction with MyFoto's retrieval accuracy, interface format, and timeliness. The model supports the empirical measurement of satisfaction without altering the theoretical direction established by the DeLone and McLean framework.

In addition, the SERVQUAL framework (Parasuraman et al., 1988) is referenced to inform the conceptualisation and measurement of service quality. In the MyFoto environment, service quality relates to technical support, responsiveness, reliability, and assurance provided by JAPEN's ICT and system administration units. SERVQUAL is therefore utilised as a supporting lens to operationalise service-related attributes that influence usage and satisfaction, rather than as a standalone service theory.

The integration of these supporting models is deliberately constrained to avoid theoretical overlap and redundancy. Detailed discussions of TAM, EUCS, and SERVQUAL, as well as their empirical applications in digital archives and government information systems, are presented in Chapter 2 (Literature Review). This approach ensures that Chapter 1 remains theoretically focused and conceptually coherent, while allowing deeper model justification and comparison to be addressed systematically in the literature review.

Overall, the theoretical framework adopted in this study is justified by its ability to capture both the technical quality dimensions and user behavioural mechanisms that determine system success in a government digital photo archive. By centring the DeLone and McLean IS Success Model (2003) and explicitly examining the mediating

role of usage, this study provides a robust and contextually appropriate foundation for evaluating MyFoto's effectiveness and user satisfaction within JAPEN's digital transformation agenda.

1.12 Chapter Summary

This chapter introduced the study titled "Examining the Effects of System, Metadata, and Service Quality on User Satisfaction with the Mediating Role of Usage: A Case Study of MyFoto." It situated the research within Malaysia's public sector digital transformation and described the role of MyFoto as a government digital photo archive managed by JAPEN. The chapter presented the problem statement, revised research questions and objectives, and the hypotheses reflecting usage as a mediating mechanism. It also outlined the study scope and provided a methodology overview, including the use of PLS-SEM via SmartPLS for testing the proposed relationships. The next chapter will review relevant literature and develop the conceptual framework underpinning the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive and critical review of the existing body of literature that underpins the conceptual and theoretical foundation of this research. The focus is directed toward the evolution, application, and evaluation of digital photo archives within the Malaysian public sector, with particular emphasis on MyFoto, a centralized digital photographic management system developed and operated by the Jabatan Penerangan Malaysia (JAPEN) through its Pusat Sumber and Fotografi (PSF). The overarching purpose of this chapter is to establish the academic context and rationale for examining the interrelationships between System Quality, Metadata Quality, Service Quality, System Usage, and User Satisfaction, conceptualized within an integrated Information Systems (IS) Success Framework.

The digitalization of government information infrastructure has become a national priority in Malaysia, driven by multiple high-impact policies and strategic frameworks. The Malaysia Digital Economy Blueprint (MyDigital, 2021) outlines the nation's aspiration to become a digitally driven, high-income economy through integrated data systems, smart governance, and citizen-centric digital services. Complementing this is the National Cloud Computing Policy issued by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU, 2021), which mandates a “cloud-first” approach in public administration to ensure interoperability, scalability, and cost-effective management of government data. More recently, the Data Sharing Act 2025 (Act 864) provides the legal foundation for cross-agency data sharing, strengthening governance and trust in public-sector information management. These initiatives collectively represent a national transformation in digital governance, aligning with the broader Pelan Strategik Kementerian Digital Malaysia (2024 – 2025) which emphasizes inclusivity, efficiency, and open access to digital information resources.

Within this national framework, digital photo archives play a pivotal role as repositories of collective memory and visual heritage. They preserve photographic documentation of governmental, cultural, and historical events while serving as authentic evidence of national development. In Malaysia, JAPEN's MyFoto system exemplifies this mission by functioning as a centralized repository for official photographic materials, facilitating acquisition, cataloguing, preservation, and controlled dissemination of government-related visual content. Through the integration of metadata standards, search functionalities, and preservation protocols, MyFoto contributes not only to administrative continuity but also to knowledge dissemination and national image management. This role positions JAPEN as both a custodian of visual heritage and a key actor in the country's digital communication ecosystem.

Parallel to JAPEN's initiatives, other government agencies have implemented complementary digital archival platforms. The Open File Access (OFA) portal under Arkib Negara Malaysia aims to digitize and make accessible up to 50 percent of archival materials by 2025 (Arkib Negara Malaysia, 2023; Berita Harian, 2023). Similarly, platforms built upon NeuCanvas infrastructure—such as those managed by Radio Televisyen Malaysia (RTM), Kementerian Pertahanan (MINDEF), and the Department of Wildlife and National Parks (MyWildlifeLense)—extend the nation's digital archival capacity. These initiatives reflect Malaysia's broader objective of establishing an interconnected ecosystem of interoperable repositories, thereby ensuring metadata consistency, preservation integrity, and accessibility across public institutions.

Given this extensive transformation, the evaluation of system performance and user satisfaction within such digital archival environments has become increasingly vital. Empirical assessment of systems like MyFoto is not merely a technical exercise but an organizational necessity that informs strategic planning, enhances user engagement, and supports accountability in digital governance. This study therefore situates MyFoto within the broader discourse of Information Systems Success and User Experience, examining how the interplay of technical (system), informational (metadata), and human-service (support) qualities influences both usage behaviour and satisfaction outcomes among JAPEN officers and staff.

To ground this investigation in scholarly rigor, the chapter draws upon a wide range of empirical and theoretical literature in information systems, digital archives, and user

satisfaction research. Foundational models, including the DeLone and McLean IS Success Model (2003), the Technology Acceptance Model (Davis, 1989), the End-User Computing Satisfaction Model (Doll and Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988), are critically reviewed and synthesized. Each model contributes distinct yet complementary perspectives. The DeLone and McLean framework provides the multidimensional structure for information systems success evaluation; the Technology Acceptance Model explains technology adoption behaviour; the End-User Computing Satisfaction Model operationalizes satisfaction measurement; and SERVQUAL conceptualizes the key dimensions of service quality. Their integration offers a robust analytical lens for understanding the technical, informational, and experiential facets of MyFoto's performance.

In summary, this chapter establishes the conceptual foundation necessary for the subsequent methodological and analytical sections. It begins by presenting an overview of Malaysia's government-managed digital photo archives, focusing on their structure, purpose, and alignment with national policies. It then synthesizes empirical findings from prior research concerning system quality, metadata quality, service quality, system usage, and user satisfaction in archival and information-system contexts. The chapter concludes by articulating the theoretical framework and developing the conceptual model that underpins this study—thus providing a systematic bridge between policy reality, scholarly theory, and empirical validation.

2.2 Overview of Government Digital Photo Archives in Malaysia

Digital photo archives constitute a vital component of Malaysia's broader information management infrastructure, serving as official repositories for the preservation, classification, and dissemination of visual materials documenting the nation's political, administrative, and cultural history. These repositories not only preserve institutional memory but also function as evidence for governance, heritage education, and public transparency. According to Arkib Negara Malaysia (2023), national archival agencies are accelerating the digitisation of heritage collections to achieve at least 50 percent digital conversion by 2025 (Berita Harian, 2023). This initiative directly supports the aspirations of the Malaysia Digital Economy Blueprint

(MyDigital, 2021), which promotes open data access, cross-agency interoperability, and the use of digital technologies to enhance citizen engagement.

Within this national transformation, the Jabatan Penerangan Malaysia (JAPEN) occupies a particularly strategic position. Through its Pusat Sumber dan Fotografi (PSF), JAPEN has developed and maintains MyFoto, a centralised digital repository created to manage, preserve, and disseminate official photographs documenting government activities, national programmes, and ceremonial events. MyFoto consolidates decades of visual documentation into an accessible platform that supports both administrative workflows and cultural preservation. It provides structured access for authorised internal users such as communication officers, archivists, and photographers, while simultaneously serving the public indirectly through the publication of curated materials for media and educational purposes. In this sense, MyFoto embodies the dual mission of institutional continuity and public transparency.

Parallel to JAPEN's initiative, other government bodies have adopted similar digital photo archive infrastructures. The Open File Access (OFA) platform managed by Arkib Negara Malaysia represents a landmark national effort to democratise archival access by providing online retrieval of digitised records. Likewise, agencies such as Radio Televisyen Malaysia (RTM), Kementerian Pertahanan (MINDEF), and the Department of Wildlife and National Parks (PERHILITAN) operate repositories built upon NeuCanvas cloud-based architecture—an infrastructure also used by JAPEN's MyFoto. This shared technological backbone facilitates metadata interoperability, system integration, and scalability across ministries, reflecting the objectives of the National Cloud Computing Policy (MAMPU, 2021) and the Data Sharing Act 2025 (Act 864), which collectively emphasise the consolidation of information assets and secure cross-agency collaboration.

2.2.1 Core Components and Functions

1. Metadata Schema and Standardisation

Digital photo archives rely on standardised metadata frameworks such as Dublin Core, IPTC Photo Metadata Framework, and localised descriptors defined by Arkib Negara Malaysia. Metadata fields commonly include photographer name, date, event title, location, and descriptive keywords. These structured data enable precise retrieval, contextual understanding, and long-term preservation. Stvilia et al. (2014) emphasise

that metadata completeness, consistency, and contextual accuracy directly determine retrieval efficiency and user confidence.

2. Search and Retrieval Functionality

The search engine and retrieval interface form the operational core of systems like MyFoto and OFA. Functionalities typically include keyword search, faceted browsing, and image-based filtering. Late, Ruotsalainen and Kumpulainen (2023) found that inconsistent metadata often limits search precision in open photographic archives, highlighting the importance of standardisation. Within MyFoto, enhancing search algorithms and metadata mapping is therefore essential for achieving higher user satisfaction and task efficiency.

3. Access Control and User Roles

Security and privacy considerations require tiered access privileges. MyFoto employs role-based authentication to ensure that sensitive or restricted photographs are accessible only to authorised JAPEN staff, while public access to curated collections is facilitated through official publications and press releases. This controlled access upholds data governance and aligns with the Data Sharing Act 2025 principles on confidentiality and traceability.

1. Preservation and Storage Infrastructure

Long-term preservation strategies involve checksum verification, periodic file-format migration, redundant storage, and adherence to the Open Archival Information System (OAIS) reference model. These measures guarantee the authenticity, integrity, and continuity of digital assets. Arkib Negara Malaysia (2023) identifies such practices as prerequisites for sustainable digital stewardship within government agencies.

2. Integration with National Digital Agendas

MyFoto's objectives align with the Dasar Arkib Negara 2030, which promotes sustainable archival management and interoperability across repositories. Additionally, the Pelan Strategik Kementerian Digital Malaysia (2024–2025) situates photographic archives within Malaysia's broader vision for a "connected government" where data, images, and records function as shared national resources. By adhering to these

frameworks, JAPEN contributes directly to the realisation of the MyDigital blueprint's targets for digitisation, efficiency, and transparency.

2.2.2 Challenges and Opportunities

Despite considerable progress, several operational and strategic challenges persist. Metadata inconsistency across agencies hampers efficient federated searching and data exchange. Stvilia et al. (2010) noted that inconsistent metadata semantics diminish reusability and inter-system trust. Similarly, user engagement remains limited by restricted accessibility and inadequate interface personalisation, issues highlighted in regional studies such as Setyawan and Santi (2023), who found that continuous user feedback loops are essential for sustaining satisfaction in digital archive systems. Moreover, technical sustainability, including funding for server maintenance, software updates, and digital preservation training, remains a recurring concern identified in both local policy documents and international archival literature.

Nevertheless, these challenges also represent opportunities. Advances in artificial intelligence (AI) and machine learning (ML) technologies can automate image classification, facial recognition, and keyword generation, enhancing metadata completeness and retrieval efficiency. The integration of AI-assisted tagging has already been explored in MyFoto's prototype updates and in the NeuCanvas ecosystem (Yusof et al., 2023). These innovations are consistent with the objectives of the Kementerian Digital Malaysia to modernise archival management through emerging technologies.

2.2.3 Summary of the Malaysian Digital Archival Landscape

In summary, Malaysia's digital photo archives, exemplified by JAPEN's MyFoto and the OFA system, form a networked ecosystem that reflects both technological advancement and institutional heritage preservation. These systems are underpinned by legal, technical, and governance frameworks that promote data integrity, accessibility, and accountability. While foundational infrastructures have been established, continued assessment of system performance, metadata accuracy, service responsiveness, usage behaviour, and user satisfaction is critical to ensure that digital archives remain relevant, trusted, and aligned with national digitalisation goals. This ongoing evaluation provides the impetus for the present study, which seeks to quantify and interpret these factors within JAPEN's operational context.

2.3 Evaluating Digital Archive Usage, Effectiveness, and Satisfaction

Evaluating the performance and effectiveness of a digital photo archive requires the integration of both technical and human-centred perspectives. From a technical standpoint, the archive must ensure reliability, accuracy, and accessibility of stored visual materials; from a behavioural standpoint, it must support user tasks and deliver positive experiences that motivate continued system usage. These dual dimensions align with the holistic understanding of information system success articulated by DeLone and McLean (2003), who proposed that Usage and User Satisfaction are central outcome constructs linking quality dimensions to overall system success.

The operational definitions of the key constructs examined in this study are presented in **Table 2.1**.

Table 2.1: Operational Definitions of the Key Constructs

Construct	Definition	Source
System Quality	Technical performance including usability, reliability, response time	DeLone & McLean (2003)
Metadata Quality	Accuracy, completeness, consistency and usefulness of metadata	Stvilia et al. (2014)
Service Quality	Responsiveness, technical assistance, user support	Parasuraman et al. (1988)
Usage	Degree of interaction with system functionalities	DeLone & McLean (2003)
User Satisfaction	Users' overall evaluation of system performance	Doll & Torkzadeh (1988)

In the context of JAPEN's MyFoto, Usage encompasses all observable interactions with the system, such as uploading, cataloguing, retrieving, tagging, and distributing official photographic records, performed by officers and staff in their daily operations. User Satisfaction, in contrast, captures subjective evaluations of these interactions, including the ease of navigation, reliability of search results, and adequacy of metadata descriptions. When analysed together, usage behaviour and satisfaction provide a multidimensional assessment of MyFoto's success as a government digital archive.

2.3.1 Usage as a Measure of System Effectiveness

According to the Technology Acceptance Model (TAM) proposed by Davis (1989), an individual's actual system usage is primarily influenced by perceived usefulness and perceived ease of use. In archival environments, usefulness reflects the degree to which the system supports retrieval and record-management tasks efficiently, while ease of use pertains to intuitive navigation and accessibility. Studies of digital repositories demonstrate that when users perceive tangible benefits in terms of time savings and search accuracy, they are more inclined to increase their usage consistently (Xu & Du, 2018; Li & Theng, 2012).

For MyFoto, this implies that officers will actively engage with the system when they find that metadata fields are logically structured, search filters return accurate results, and upload processes are streamlined. Conversely, complex navigation or prolonged loading times may discourage frequent usage, leading to underutilisation of JAPEN's digital investment. Petter, DeLone and McLean (2008) reinforce that a system's usability and response time are pivotal determinants of sustained system usage, establishing a strong theoretical link between System Quality and Usage.

2.3.2 User Satisfaction as an Indicator of System Success

Doll and Torkzadeh (1988) conceptualised User Satisfaction as an end-user's affective and cognitive evaluation of an information system, operationalised through five dimensions: content, accuracy, format, ease of use, and timeliness. Within the public-sector context, Desmal et al. (2022) observed that user satisfaction in e-government platforms is influenced by interface accessibility, reliability of content, and perceived consistency of services. Applying this lens to JAPEN's MyFoto, satisfaction can therefore be interpreted as the extent to which the system's functionalities and metadata accuracy fulfil officers' informational needs while supporting JAPEN's communication objectives.

Furthermore, Setyawan and Santi (2023) demonstrated that service responsiveness and metadata completeness significantly predict satisfaction levels. Their findings underscore the interdependence between Service Quality, Metadata Quality, and User Satisfaction, implying that even a technically advanced system may fail to achieve

positive user outcomes if service mechanisms or metadata governance are weak. Similarly, Late, Ruotsalainen and Kumpulainen (2023) highlighted that inconsistent or incomplete metadata reduces retrieval accuracy and leads to frustration and diminished trust in the archival system.

2.3.3 Linking Usage and Satisfaction

The interplay between Usage and User Satisfaction is cyclical. DeLone and McLean (2003) argued that increased system usage enhances familiarity, which subsequently strengthens satisfaction, while high satisfaction promotes continuous or expanded usage. In the MyFoto environment, officers who experience seamless retrieval of past event images or efficient uploading of new records are likely to perceive the system as valuable, thereby reinforcing engagement.

Empirical research validates this bidirectional relationship. Kim (2011) found that satisfaction supports mediated pathways between system qualities and behavioural outcomes in digital library systems. Evidence in public-sector IS implementations similarly indicates that satisfaction fostered by stable performance and clear information presentation predicts sustained usage behaviour. For JAPEN, this means that improving satisfaction through user-centric training, responsive technical support, and continuous system enhancement will likely strengthen usage and data integrity over time.

2.3.4 Implications for JAPEN and the Present Study

Understanding the dual constructs of Usage and User Satisfaction provides JAPEN with a diagnostic framework for assessing MyFoto's effectiveness. Measuring usage helps identify whether the system integrates seamlessly into officers' workflows, while satisfaction highlights experiential and service gaps. These outcomes collectively enable JAPEN to make evidence-based improvements aligned with its institutional mandate to preserve and disseminate Malaysia's visual heritage. The subsequent sections of this chapter build upon these concepts by reviewing prior empirical research on the quality dimensions that shape usage behaviour and user satisfaction in digital archives and similar information systems.

2.3.5 Digital Photo Archives and Image Retrieval Effectiveness

Digital photo archives differ from textual information systems because their retrieval effectiveness is highly dependent on the quality and structure of descriptive metadata. Unlike text-based documents where keyword searching can rely on full-text indexing, image retrieval systems require accurate metadata tagging to support semantic discovery and contextual interpretation of visual materials. Research on open photograph archives indicates that image search behaviour is strongly influenced by metadata richness, controlled vocabularies, and consistency of indexing practices (Hollink et al., 2004).

Studies examining open image collections further highlight that incomplete or inconsistent metadata significantly reduces search precision and increases retrieval time, particularly in institutional and government archival environments where users rely on images for official documentation and reporting purposes (Jørgensen, 2010). These findings suggest that metadata governance is not merely a technical cataloguing function but a strategic determinant of archival usability and system success.

In the Malaysian public sector context, digital image repositories such as MyFoto perform operational roles that require high metadata accuracy to ensure rapid retrieval of photographs used in government communication and media reporting. Consequently, evaluating metadata quality alongside system and service quality provides a more contextually appropriate approach to assessing information system success in photo-centric archival platforms.

2.4 Previous Studies on Quality Dimensions, Usage, and User Satisfaction in Digital Archives

A large body of research in information systems and digital library studies has examined how the quality dimensions of information systems, namely System Quality, Metadata Quality, and Service Quality, influence both Usage and User Satisfaction. These dimensions are central to evaluating the effectiveness of government-managed repositories such as JAPEN's MyFoto system, which operates within the ecosystem of digital photo archives designed for knowledge preservation and national communication.

Previous empirical studies reveal that system effectiveness depends not only on technical reliability but also on metadata accuracy and the responsiveness of supporting services (Petter, DeLone, & McLean, 2008; Stvilia et al., 2014; Desmal et al., 2022). For MyFoto, this triad of quality measures reflects the interaction between technology, information structure, and service delivery, which together influence the extent of usage and the overall satisfaction of JAPEN officers and staff. The following subsections synthesise empirical studies and conceptual insights related to each dimension, focusing on their relationships with Usage and User Satisfaction in the context of digital archives and government information systems. The empirical patterns relevant to this study are summarised in *Table 2.2*.

Table 2.2: Summary of Empirical Studies Supporting the Proposed Relationships

Focus: empirical evidence directly supporting relationships among System Quality, Metadata Quality, Service Quality, Use, and User Satisfaction — in digital archives, digital libraries, or government information systems.)

Author(s)	Aim of Study	Variables Examined	Method	Key Findings
Setyawan & Santi (2023)	To assess user satisfaction and service quality in university archival systems (UGM).	System Quality, Service Quality, Metadata Quality, User Satisfaction.	Quantitative survey (n=120); multiple regression analysis.	Service responsiveness and metadata completeness were strongest predictors of user satisfaction; system quality indirectly affected satisfaction through use.
Late, Ruotsalainen & Kumpulainen (2023)	To explore user interaction and metadata barriers in an open photographic archive.	Metadata Quality, Retrieval Effectiveness, User Experience.	Qualitative interviews and log analysis.	Metadata inconsistency reduced retrieval accuracy; standardized metadata improved satisfaction and search success.
Stvilia, Gasser, Twidale & Smith (2014)	To propose and test a model for evaluating metadata quality in Metadata Quality (accuracy, completeness, consistency, value-in-use). Conceptual model and metadata analysis. Identified four key metadata dimensions	Metadata Quality (accuracy, completeness, consistency, value-in-use).	Conceptual model and metadata analysis.	Identified four key metadata dimensions affecting discoverability ii federated digital collections. and trust in digital repositories.

	affecting discoverability ii federated digital collections.			
Desmal, Al Kahtani & Al Dossari (2022)	To propose and validate a user satisfaction model for mobile government services.	System Quality, Service Quality, Information Quality, User Satisfaction.	Quantitative study using PLS-SEM (n=300).	Service quality and accessibility strongly predicted satisfaction; information quality mediated effects on user trust.
Dawson, Bakhshi & Heath (2009)	To analyse the actual use of online archival images and related user motivations.	System Usability, Metadata Richness, Use Behaviour.	Quantitative usage log and survey triangulation.	Rich metadata and contextual annotation increased frequency of use and satisfaction.
Kim (2011)	To test the mediating effect of user satisfaction in digital library use.	System Quality, Use, User Satisfaction.	Structural Equation Modelling (SEM).	User satisfaction fully mediated the link between system quality and continued use; reliability was the key predictor.
UiTM Melaka (2013)	To evaluate the effectiveness of Malaysia's School Management Information System (SMIS) using the IS Success Model.	System Quality, Information Quality, User Satisfaction.	Quantitative survey (n=210); regression analysis.	Found that system reliability, accuracy, and timeliness were critical in determining satisfaction and use educators.

As summarised in **Table 2.2**, prior studies consistently support the relevance of quality dimensions and their relationships with usage behaviour and satisfaction outcomes, strengthening the rationale for examining these constructs in the MyFoto context.

2.4.1 System Quality

System Quality refers to the desirable characteristics of an information system that determine how effectively users can interact with it, including usability, reliability, accessibility, response time, and overall system performance (DeLone & McLean, 2003). In organisational information systems, system quality reflects the technical capability of the system to support users' operational tasks efficiently and consistently. A system that is easy to use, stable, and responsive is more likely to be accepted and utilised by users in their daily work processes.

In the context of digital archival systems, system quality becomes particularly critical because retrieval and documentation tasks are often time-sensitive and closely integrated with institutional workflows. Users rely on the system to perform accurately and efficiently when searching for, retrieving, or managing digital records, especially in environments where information supports official communication and reporting functions.

Previous empirical studies in information systems consistently demonstrate that system usability, reliability, and response time significantly influence users' engagement behaviour and frequency of system interaction (DeLone & McLean, 2003; Setyawan & Santi, 2023). Systems that exhibit technical stability and intuitive navigation are more likely to foster user trust, perceived usefulness, and continued interaction. In digital archive environments, research on institutional repositories further indicates that users' sustained usage is strongly affected by perceived system stability and navigation efficiency, which shape their confidence in the system's ability to support work-related tasks (Desmal et al., 2022). Therefore, system quality serves as a foundational technological enabler that determines whether a digital archive system can effectively support knowledge retrieval, documentation, and organisational information management activities.

2.4.2 Metadata Quality

Metadata Quality refers to the accuracy, completeness, consistency, clarity, and usefulness of descriptive information associated with digital resources. In digital libraries and archival systems, metadata functions as the primary mechanism for organising, indexing, and retrieving information objects. Unlike text-based information systems that rely heavily on full-text indexing, image-based archives depend substantially on metadata descriptors to represent the content and context of visual materials.

High-quality metadata enhances search precision, improves resource discoverability, and reduces retrieval ambiguity, thereby enabling users to locate relevant information more efficiently. Conversely, incomplete, inconsistent, or inaccurate metadata can significantly hinder retrieval effectiveness, increase search effort, and negatively affect user perceptions of system usefulness.

Metadata quality has been widely recognised as a key factor influencing digital library and archive performance. Empirical studies indicate that well-structured and comprehensive metadata improves retrieval accuracy and supports meaningful user interaction with digital collections (Stvilia et al., 2014). In visual archive systems, metadata quality assumes an even greater role because descriptive elements such as event names, dates, locations, subjects, and institutional context function as the primary indexing mechanism for image retrieval. Studies on open image archives show that users often evaluate the usefulness of digital photo systems based on the completeness and consistency of metadata descriptions rather than on interface features alone (Hollink et al., 2004). This suggests that metadata quality operates as a behavioural driver of system usage by enabling efficient and reliable search and retrieval experiences.

2.4.3 Service Quality

Service Quality refers to the level of support provided to users during their interaction with an information system, encompassing technical assistance, responsiveness of support personnel, availability of training, and clarity of usage guidance. In organisational information systems, service quality plays an important role in facilitating system adoption and continued use, particularly when users possess varying levels of technical expertise.

Effective service support reduces operational uncertainty, assists users in resolving technical issues, and enhances confidence in system usage. In government environments, where information systems are embedded within formal procedures and regulated workflows, consistent and reliable service quality is essential to ensure continuity of system operations and user engagement.

Service quality in digital archival systems includes not only technical troubleshooting but also user training, documentation, and proactive guidance. Prior information systems success research indicates that effective service support reduces user uncertainty and enhances system adoption, particularly in organisational contexts (Parasuraman et al., 1988; DeLone & McLean, 2003). Government information systems require structured service support mechanisms to accommodate diverse user roles and competencies. Empirical evidence suggests that training programmes and responsive support services increase user confidence and competence, thereby strengthening the

relationship between perceived system quality and actual usage behaviour (Desmal et al., 2022).

2.4.4 Usage

Usage in information system evaluation refers to the degree and manner in which users engage with system functionalities (DeLone & McLean, 2003). In the context of MyFoto, usage includes logging in, searching, uploading, tagging, retrieving, and downloading images for official communication and record-keeping. Analysing usage patterns provides insight into whether the system fulfills its intended purpose and whether users perceive it as integral to their work processes.

Dawson et al. (2009) examined the actual usage of online archival images and found that system usability and metadata richness increased retrieval frequency and engagement, implying that metadata quality translates directly into behavioural usage. Kim (2011) further supports mediated pathways in which engagement-related constructs strengthen user outcomes in digital library contexts. Within JAPEN, usage frequency also reflects the alignment between MyFoto's design and operational workflow needs, such as preparing press releases, media briefings, and national event coverage.

2.4.5 User Satisfaction

User Satisfaction is widely recognised as a central determinant of information system success (Doll & Torkzadeh, 1988; DeLone & McLean, 2003). It represents users' affective response and overall evaluation of the system based on their interactions and perceived outcomes. In archival systems, satisfaction often depends on factors such as metadata completeness, system usability, visual presentation, and support responsiveness.

Setyawan and Santi (2023) demonstrated that metadata completeness and service responsiveness strongly predict satisfaction in archival contexts. Their findings align with Desmal et al. (2022), who observed that users of government digital services report higher satisfaction when systems are reliable, consistent, and supported by proactive service assistance. EUCS (Doll & Torkzadeh, 1988) provides a structured basis for measuring satisfaction through content, accuracy, format, ease of use, and timeliness, dimensions that map well onto MyFoto's operational context. Therefore, in this study,

satisfaction is treated as a structured outcome reflecting both the quality of system interaction and the perceived value gained through usage.

2.5 Theoretical Framework

This section establishes the theoretical foundation underpinning the present study. The framework integrates four seminal information systems and service quality models, namely: (1) the DeLone and McLean Information Systems (IS) Success Model (2003), (2) the Technology Acceptance Model (Davis, 1989), (3) the End-User Computing Satisfaction (EUCS) Model (Doll & Torkzadeh, 1988), and (4) the SERVQUAL Model (Parasuraman, Zeithaml, & Berry, 1988). Each model contributes a distinct but complementary perspective to the study of user engagement and satisfaction with digital archival systems, particularly in the context of MyFoto, the government digital photo archive managed by JAPEN.

The integration of these frameworks is essential for developing a multidimensional understanding of system success, combining technical performance, perceived usability, user satisfaction, and service responsiveness. Together, they support the identification of interrelated variables—System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction—which form the structural core of the research model. *Table 2.2* summarises the theoretical contributions of each model, while *Figure 2.1* illustrates the integrated conceptual structure proposed for this study.

2.5.1 DeLone & McLean IS Success Model (2003)

The DeLone and McLean (2003) IS Success Model is one of the most widely recognized theoretical frameworks for evaluating the performance of information systems. The model identifies six interdependent constructs: System Quality, Information Quality, Service Quality, Usage, User Satisfaction, and Net Benefits. These elements collectively represent the multidimensional nature of information system effectiveness.

In this study, System Quality refers to the technical performance of MyFoto, including system reliability, response speed, interface design, and overall usability. The traditional construct of Information Quality is adapted and refined as Metadata Quality to suit the archival environment. In a digital photo archive, metadata serves as the descriptive layer

that enables content discovery, retrieval, and interpretation; therefore, its completeness, consistency, and accuracy are fundamental to perceived information quality (Stvilia et al., 2014).

The model's inclusion of Service Quality reflects the importance of user assistance, training, and system responsiveness, factors especially critical in government agencies where users vary in digital literacy. Usage represents the frequency and intensity with which JAPEN officers access, search, and utilize the MyFoto system for official documentation and communication tasks. User Satisfaction captures their overall perception of system effectiveness and value.

The DeLone and McLean model is particularly relevant because it provides a holistic structure for assessing both technical and perceptual system outcomes. Previous studies (Petter, DeLone, & McLean, 2008; UiTM Melaka, 2013) have validated its robustness in public-sector IS contexts, confirming that high-quality systems foster greater usage and satisfaction, which subsequently yield organizational benefits.

2.5.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), introduced by Davis (1989), explains user behavior and acceptance of information systems based on two principal beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). TAM posits that these beliefs influence users' attitudes and intentions, which subsequently shape their actual system usage.

While TAM primarily addresses behavioral intention, its relevance to this study lies in its ability to explain why JAPEN officers choose to actively engage with MyFoto. If officers perceive that MyFoto simplifies workflow, enhances accuracy, and supports information dissemination, perceived usefulness increases. Likewise, when the interface and navigation are intuitive, perceived ease of use improves, reinforcing continued usage. TAM therefore complements the DeLone and McLean framework by providing a behavioural rationale linking system attributes to usage.

2.5.3 End-User Computing Satisfaction (EUCS)

The End-User Computing Satisfaction (EUCS) model, developed by Doll and Torkzadeh (1988), remains one of the most empirically validated measures of user

satisfaction in information systems research. The model defines satisfaction through five components: content, accuracy, format, ease of use, and timeliness.

In MyFoto, these dimensions translate directly into user experience: content reflects the adequacy and relevance of photographic materials; accuracy indicates the correctness of metadata and descriptions; format relates to presentation and accessibility of records; ease of use refers to intuitive system interaction; and timeliness denotes the speed at which the system retrieves images or updates records. EUCS ensures that user satisfaction is operationalised as a structured, measurable construct aligned with usage experience.

2.5.4 SERVQUAL

The SERVQUAL model (Parasuraman et al., 1988) identifies five dimensions of service quality: reliability, responsiveness, assurance, empathy, and tangibility. Within MyFoto, these dimensions can be interpreted as consistency of support, timeliness of assistance, professionalism in guidance, personalization of help, and availability of supporting materials such as manuals and helpdesk resources.

By incorporating SERVQUAL, the study acknowledges that perceived service delivery, through technical support, training, and metadata assistance, shapes both usage behaviour and satisfaction. Prior studies (Desmal et al., 2022; Setyawan & Santi, 2023) demonstrate that service quality is a major determinant of user trust and satisfaction in government information systems.

2.5.5 Synthesis and Application in this Study

Table 2.2 summarises how each theoretical framework supports the constructs and relationships examined in this study.

2.6 Conceptual Framework and Hypotheses Development

Building on the theoretical foundations discussed earlier, this study integrates constructs from the DeLone and McLean IS Success Model (2003), Technology Acceptance Model (Davis, 1989), End-User Computing Satisfaction (Doll & Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988) into a unified conceptual framework. The model postulates that System Quality, Metadata Quality, and Service

Quality collectively influence Usage, which subsequently affects User Satisfaction with the MyFoto digital photo archive system managed by JAPEN.

This framework adopts a cause-and-effect logic, where the technical, informational, and service dimensions of system quality function as independent variables, while Usage serves as a mediating variable that channels their effects toward User Satisfaction. Such integration ensures that both technical functionality and human perception are systematically assessed in determining the success of a public-sector digital photo archive.

2.6.1 Conceptual Framework

As illustrated in **Figure 2.1**, the proposed conceptual framework positions System Quality, Metadata Quality, and Service Quality as antecedents of Usage, while Usage predicts User Satisfaction. In addition, the framework specifies that Usage mediates the relationships between each quality dimension and user satisfaction, consistent with the IS Success logic that system outcomes are realised through actual engagement.

Figure 2.1: Conceptual Framework of the Study (Quality → Usage → Satisfaction)

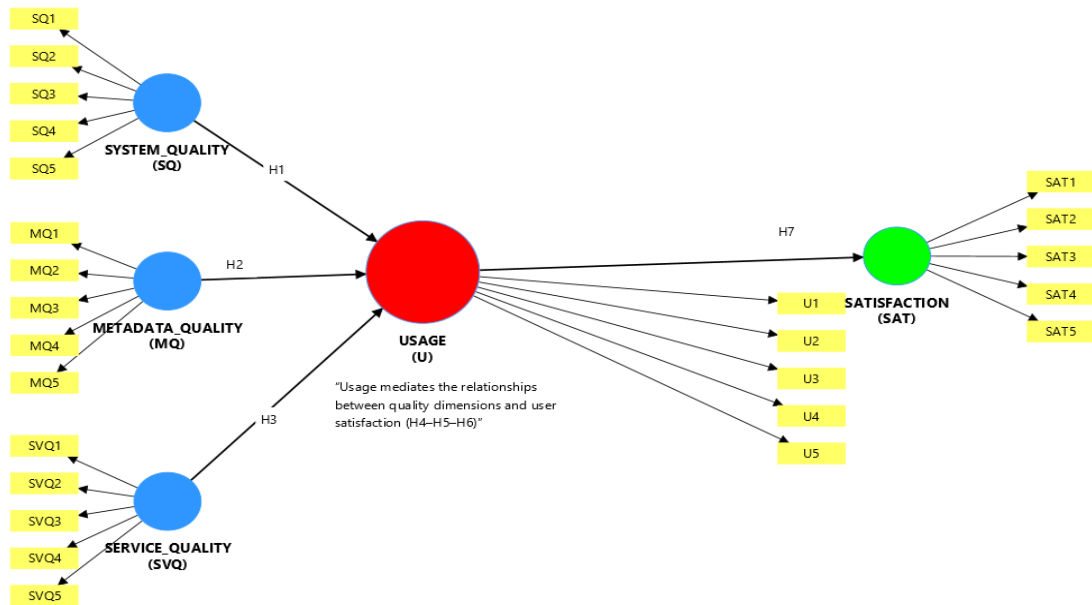


Figure 2.1: Conceptual Framework of the Study (Quality → Usage → Satisfaction Model)

Note: Usage mediates the relationships between System Quality, Metadata Quality, and Service Quality and User Satisfaction (H4–H6). The direct effect of Usage on User Satisfaction is represented by H7.

2.6.2 Hypotheses Development

The hypotheses derived from this conceptual model are grounded in theoretical reasoning and prior empirical evidence (as synthesised in *Table 2.2*). They are designed to guide the quantitative investigation of how the MyFoto system functions as a government digital photo archive, specifically in the context of JAPEN.

- **H1: System Quality positively affects Usage**

System Quality refers to the extent to which the MyFoto system performs its intended technical functions efficiently, reliably, and with minimal errors. A well-designed interface, fast response time, and seamless navigation are crucial for encouraging system interaction. According to DeLone and McLean (2003), higher system quality strengthens behavioural engagement, and evidence in public-sector contexts supports the claim that reliability and usability predict stronger usage patterns (Petter et al., 2008; UiTM Melaka, 2013). In JAPEN's context, robust MyFoto performance supports smoother uploading, searching, and retrieval, thereby promoting consistent usage.

- **H2: Metadata Quality positively affects Usage**

Metadata Quality encompasses the accuracy, completeness, consistency, and accessibility of descriptive data attached to each photograph. Metadata is fundamental in archival systems as it enables discovery, retrieval, and contextual understanding. Studies by Stvilia et al. (2014) and Late et al. (2023) demonstrate that high-quality metadata improves retrieval efficiency and user trust, leading to stronger engagement and usage behaviour. In MyFoto, officers depend on metadata fields such as event title, date, and description; therefore, metadata quality is expected to facilitate smoother retrieval and encourage continued usage.

- **H3: Service Quality positively affects Usage**

Service Quality reflects the level of responsiveness, assurance, and support provided to system users. In digital archives, users require guidance for access permissions, troubleshooting, metadata entry, and system updates, especially in government

environments with varying digital literacy. SERVQUAL (Parasuraman et al., 1988) emphasises responsiveness and reliability as key drivers of perceived service excellence. Empirical studies similarly show that support responsiveness strengthens engagement and reduces barriers to usage (Desmal et al., 2022; Setyawan & Santi, 2023). In the MyFoto environment, timely PSF support is expected to encourage system usage as part of daily operations.

- **H4: Usage positively affects User Satisfaction**

Usage refers to the extent and frequency of interaction with MyFoto features such as uploading, retrieving, or sharing photographs. DeLone and McLean (2003) emphasise that satisfaction increases when users experience system benefits through actual engagement. Frequent usage improves familiarity and perceived usefulness, contributing to more positive evaluations of system performance and value. Thus, higher usage is expected to predict higher satisfaction among JAPEN officers.

- **H5: Usage mediates the relationship between System Quality and User Satisfaction**

Even if system performance is strong, satisfaction is expected to increase primarily when users actively experience the benefits through usage. This aligns with the IS Success logic that quality dimensions drive user outcomes through behavioural engagement. Prior evidence (Petter et al., 2008; Kim, 2011) supports mediated pathways linking system attributes to user outcomes via engagement mechanisms.

This mediating pathway is illustrated in *Figure 2.1* and is consistent with empirical patterns summarised in *Table 2.2*.

- **H6: Usage mediates the relationship between Metadata Quality and User Satisfaction**

Metadata improvements increase satisfaction by enabling users to retrieve photographs more efficiently and accurately during usage. In photo archives, satisfaction is often tied to retrieval success and reduced search effort, both of which occur through engagement. Thus, the effect of metadata quality on satisfaction is expected to be channelled through usage behaviour (Stvilia et al., 2014; Late et al., 2023; Dawson et al., 2009).

This mediating pathway is illustrated in *Figure 2.1* and is consistent with empirical patterns summarised in *Table 2.2*.

- **H7: Usage mediates the relationship between Service Quality and User Satisfaction**

High-quality service support improves satisfaction by facilitating smoother and more confident usage, particularly when users face operational or technical constraints. Responsive assistance reduces disruptions, strengthens trust, and supports successful interactions with the system, thereby improving satisfaction through the pathway of usage (Parasuraman et al., 1988; Setyawan & Santi, 2023; Desmal et al., 2022).

This mediating pathway is illustrated in *Figure 2.1* and is consistent with empirical patterns summarised in *Table 2.2*.

2.6.3 Summary of Hypotheses

For clarity and alignment with the conceptual framework in *Figure 2.1*, *Table 2.3* summarises the hypotheses proposed in this study.

Table 2.3: Summary of Hypotheses

Code	Hypothesis Statement
H1	System Quality has a significant positive effect on Usage.
H2	Metadata Quality has a significant positive effect on Usage.
H3	Service Quality has a significant positive effect on Usage.
H4	Usage mediates the relationship between System Quality and User Satisfaction.
H5	Usage mediates the relationship between Metadata Quality and User Satisfaction.
H6	Usage mediates the relationship between Service quality and User Satisfaction.
H7	Usage has a significant positive effect on user satisfaction.

Collectively, these hypotheses respond directly to the identified research gap by extending IS success evaluation into a government digital photo archive setting and by

explicitly testing Usage as a behavioural mechanism linking quality perceptions to satisfaction outcomes.

2.7 Research Gap

Despite the growing body of literature on digital libraries, institutional repositories, and e-government systems, empirical research focusing specifically on government digital photo archives remains limited. Most existing studies emphasise textual information systems or general e-government platforms, where information retrieval mechanisms differ substantially from image-based archival systems that rely heavily on structured metadata for content representation.

Furthermore, although the DeLone and McLean IS Success Model has been widely validated across multiple organisational and technological contexts, the mediating role of usage is not consistently examined within archival information systems, particularly in government photo repository environments. Many studies assess system quality and user satisfaction directly without explicitly analysing how usage behaviour functions as a behavioural mechanism linking quality dimensions to satisfaction outcomes. This gap highlights the need for empirical investigation that simultaneously evaluates system quality, metadata quality, and service quality while explicitly examining usage as a mediating construct influencing user satisfaction. Addressing this gap is essential to developing a more contextually grounded understanding of information system success within government digital photo archive systems.

2.8 Chapter Summary

This chapter reviewed literature related to Malaysia's government digital photo archives and positioned MyFoto within the national digital governance landscape, including policy and infrastructure directions that emphasise interoperability, data governance, and citizen-centric digital services. The chapter then synthesised prior research concerning the core constructs of this study—System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction—within digital archives, digital libraries, and comparable government information system contexts.

Empirical evidence summarised in **Table 2.2** supports the relevance of these constructs and indicates consistent patterns where technical performance, metadata robustness,

and service support shape users' engagement and satisfaction outcomes. In parallel, the theoretical synthesis in **Table 2.2** clarifies how DeLone & McLean (2003), TAM, EUCS, and SERVQUAL provide a coherent foundation for examining system success from technical, behavioural, experiential, and service perspectives.

Building on this foundation, **Figure 2.1** presents the conceptual framework of the study, positioning Usage as a critical behavioural mechanism that links quality dimensions to satisfaction outcomes. The hypotheses proposed (**Table 2.3**) operationalise this framework by specifying both direct and mediating relationships, thereby addressing the research gap highlighted in **Section 2.7**, namely the limited empirical focus on government digital photo archives and the inconsistent testing of Usage as a mediator in archival IS settings.

The next chapter outlines the research methodology adopted to validate these hypotheses empirically, including the survey design, sampling strategy, measurement operationalisation, and the use of PLS-SEM (SmartPLS) to assess the measurement and structural models within JAPEN's operational context.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology employed to investigate the relationships between System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction within the MyFoto digital photo archive system operated by the Jabatan Penerangan Malaysia (JAPEN). The methodological framework is firmly anchored in the theoretical and conceptual foundations established in Chapters 1 and 2, particularly the DeLone and McLean IS Success Model (2003) as the principal theory guiding the causal structure of the research model, and further supported by the Technology Acceptance Model (TAM) (Davis, 1989), the End-User Computing Satisfaction (EUCS) Model (Doll & Torkzadeh, 1988), and the SERVQUAL framework (Parasuraman et al., 1988). These models collectively inform the selection of constructs, the operationalisation of variables, the development of measurement items, the formulation of hypotheses (H1–H7), and the choice of analytical techniques, ensuring that the study remains theoretically coherent and empirically robust.

Epistemologically, this study adopts a positivist and pragmatic orientation, premised on the assumption that user perceptions of MyFoto’s quality dimensions, their usage behaviour, and their satisfaction can be measured, quantified, and statistically analysed. The positivist stance supports the use of objective, standardised instruments and replicable statistical procedures, while the pragmatic orientation emphasises the production of findings that are not only statistically valid but also practically useful for JAPEN’s policy-making, service planning, and system enhancement. In line with this orientation, the research employs a quantitative, cross-sectional survey design to capture a snapshot of user experiences and perceptions at a specific period of system operation. This design is particularly suitable for testing theoretically derived causal relationships and for providing generalisable insights across a defined population of MyFoto users within JAPEN.

The methodological design therefore emphasises empirical hypothesis testing and model validation. Quantitative techniques, including descriptive statistics,

reliability and validity testing, and Structural Equation Modelling (SEM), are employed to examine the strength, direction, and significance of relationships among the study constructs. Specifically, this research applies Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS software to estimate both the measurement model (relationships between indicators and constructs) and the structural model (relationships between constructs). PLS-SEM is especially relevant in this context because the study examines multiple relationships simultaneously, accommodates complex models with mediation pathways, and supports predictive and explanatory analysis in organisational IS settings. Importantly, the use of PLS-SEM enables the rigorous assessment of the mediating role of Usage between quality dimensions (System Quality, Metadata Quality, and Service Quality) and User Satisfaction, thereby aligning with the multidimensional nature of information system success conceptualised in the theoretical framework.

Consistent with the conceptual model discussed in Chapter 2, the study tests direct effects (H1–H4) and mediation effects (H5–H7), in which Usage functions as a mediating mechanism. The mediation structure corresponds to the integrated IS Success logic presented in Figure 2.1, and the hypothesised relationships are consistent with empirical patterns summarised in Table 2.1, which collectively justify the inclusion of Usage as a mediator within the MyFoto context.

To ensure methodological transparency and coherence, this chapter systematically details the following components:

- i. **Research design:**
Outlining the overall approach, type of study, and justification for using a quantitative cross-sectional survey.
- ii. **Population, sampling strategy, and sample size justification:**
Specifying the target population of MyFoto users within JAPEN, the sampling method adopted, and the rationale for the final sample size based on statistical and practical considerations.
- iii. **Instrument design and operationalisation of variables:**
Describing the structure of the questionnaire, the development of measurement items for each construct, and the adaptation of established scales to the MyFoto context.

iv. **Pilot study procedures and reliability assessment:**

Explaining how the instrument is pre-tested, refined, and evaluated in terms of internal consistency and measurement stability.

v. **Data collection procedures:**

Detailing the steps taken to obtain organisational permission, administer the survey, and manage response rates and data quality.

vi. **Data analysis techniques:**

Presenting the statistical methods employed, including descriptive analysis, measurement validation, and SEM-PLS hypothesis testing using SmartPLS, as well as the criteria used to interpret model fit, predictive power, and parameter estimates.

vii. **Ethical considerations:**

Outlining the measures taken to protect respondents' rights, confidentiality, and data security, particularly within the context of a government agency and in compliance with relevant institutional and national regulations.

Collectively, the methodological choices articulated in this chapter are designed to ensure close alignment between the research objectives, the conceptual framework, and the practical realities of JAPEN's digital archival environment. By grounding the research process in established theory, rigorous quantitative procedures, and ethical research practice, this chapter provides a solid foundation for the empirical analysis presented in subsequent chapters.

3.2 Research Approach

This study employs a quantitative, cross-sectional, correlational research design to empirically examine the relationships among System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction within the MyFoto digital photo archive system at the Jabatan Penerangan Malaysia (JAPEN). The selection of this design is grounded in the study's objective to test theoretically informed hypotheses and to quantify the influence of specific quality-related variables on user outcomes, consistent with positivist research principles.

3.2.1 Justification for a Quantitative Approach

A quantitative approach is particularly well-suited to this study because the research seeks to:

1. Measure user perceptions of MyFoto's system, metadata, and service quality using standardised numerical scales.
2. Test relationships among latent constructs derived from well-established information systems (IS) theories through a structured model.
3. Produce generalisable findings applicable across the broader population of JAPEN officers and staff who use MyFoto, particularly for policy and system improvement purposes.

According to Creswell and Creswell (2023), quantitative designs are appropriate when the purpose is to test objective theories through examination of variable relationships using statistical procedures. Given that this study is grounded in validated theoretical frameworks—particularly the DeLone and McLean IS Success Model (2003) supplemented by TAM (Davis, 1989), EUCS (Doll & Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988), a quantitative methodology ensures that constructs are measured systematically and objectively, enabling robust hypothesis testing and inference.

3.2.2 Rationale for a Cross-Sectional Design

A cross-sectional design is adopted, whereby data are collected at a single point in time from a defined group of MyFoto users. This design is suitable because:

- MyFoto usage patterns and user perceptions are relatively stable within JAPEN's operational environment.
- It allows the researcher to capture a “snapshot” of user experience as it exists within the current system lifecycle.
- It is efficient and cost-effective for organisational settings, where longitudinal access may be restricted or impractical.

Cross-sectional designs are widely used in IS research to evaluate system performance and user satisfaction, especially in government and archival environments where

organisational structures and workflows are consistent across units (Petter, DeLone & McLean, 2008).

3.2.3 Correlational and Explanatory Nature

This study is correlational, as it seeks to determine the direction and strength of associations among the five main constructs. It does not manipulate any variables; rather, it observes how naturally occurring variations in perceived quality influence system usage and satisfaction. The research is also explanatory (Creswell, 2014), as it aims to test hypotheses derived from existing theories and to explain why certain quality dimensions may drive higher usage and satisfaction.

In this study, the explanatory logic is operationalised through a model that tests both direct and indirect effects:

- Direct effects from System Quality, Metadata Quality, and Service Quality to Usage (H1–H3).
- Direct effect from Usage to User Satisfaction (H4).
- Indirect (mediated) effects of System Quality, Metadata Quality, and Service Quality on User Satisfaction through Usage (H5–H7).

3.2.4 Deductive Logic and Theoretical Orientation

The study follows a deductive approach, progressing from theory to empirical verification. Theoretical constructs drawn from major IS frameworks are operationalised into measurable variables, which are then tested statistically. Deductive logic is appropriate because:

- The DeLone and McLean IS Success Model posits causal relationships among quality constructs, usage, and satisfaction.
- TAM suggests that system attributes shape user behavioural intention and actual system usage, reinforcing the logic of quality → usage relationships.
- EUCS provides a validated structure for assessing satisfaction-related perceptions, strengthening the measurement of the User Satisfaction construct.
- SERVQUAL informs the evaluation of support service quality that accompanies user–system interactions in organisational contexts.

By combining these theories, the study forms a unified conceptual framework that can be systematically tested using quantitative data and multivariate analysis techniques, particularly PLS-SEM as recommended by the lecturer for this research.

3.2.5 Instrumentation and Data Collection Strategy

Data collection is conducted through a self-administered structured questionnaire, chosen for several reasons:

1. **Scalability and efficiency:** It allows the researcher to reach a large group of dispersed respondents across JAPEN headquarters and state offices.
2. **Standardisation:** All respondents receive identical items, reducing interviewer bias and ensuring comparability.
3. **Suitability for latent constructs:** Likert-scale instruments are ideal for assessing perceptions, attitudes, and satisfaction levels.
4. **Alignment with SEM requirements:** SEM requires measured indicators for each latent construct, and structured Likert-type data support reliable estimation.

Respondents include MyFoto users such as photographers, editors, information officers, administrators, and communication personnel who interact with the system in real work settings, thereby strengthening the ecological validity and practical relevance of the findings.

3.2.6 Summary of Research Design

In summary, the selected research design is:

- Quantitative → to statistically test hypothesised relationships.
- Cross-sectional → to capture current perceptions and usage behaviours.
- Correlational and explanatory → to explore causal patterns among key IS constructs and mediation effects.
- Deductive → moving from theory to empirical validation using JAPEN's MyFoto context.
- Survey-based → enabling efficient data collection and SEM-based analysis.

This methodological structure ensures coherence between research questions, theoretical underpinnings, and analytical techniques, thereby producing reliable,

replicable, and actionable insights for improving MyFoto and strengthening JAPEN's digital archiving ecosystem.

3.3 Research Methodology

This study adopts a quantitative survey methodology, which is widely used in information systems (IS) research because it enables the systematic collection of standardised data from a relatively large group of respondents. The survey method is particularly suitable for this research, as the core objective is to examine the relationships between clearly defined constructs such as System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction within the MyFoto digital photo archive environment at Jabatan Penerangan Malaysia (JAPEN).

The primary data collection tool is a structured, self-administered questionnaire designed using previously validated measurement items adapted from established IS models, including the DeLone and McLean IS Success Model (2003), Technology Acceptance Model (Davis, 1989), End-User Computing Satisfaction (Doll & Torkzadeh, 1988), and SERVQUAL (Parasuraman et al., 1988). All items are measured on a five-point Likert scale, enabling respondents to indicate their degree of agreement or disagreement with statements about MyFoto's quality, their usage patterns, and their satisfaction levels.

The methodology focuses specifically on internal users of MyFoto, namely JAPEN officers and staff who are directly involved in activities such as uploading, cataloguing, retrieving, and using digital photographs for official communication and documentation. By concentrating on this group, the study ensures that all respondents possess direct, relevant experience with MyFoto, thereby enhancing the validity, relevance, and interpretability of the findings.

In methodological terms, the study applies PLS-SEM using SmartPLS as the primary hypothesis testing approach. This is aligned with the research model in Chapter 2, which involves multiple latent constructs and mediation effects (H5–H7). SmartPLS facilitates estimation of the measurement model and structural model simultaneously, including bootstrapped testing of direct effects, indirect effects, and the mediating role of Usage.

However, SPSS is still utilised for preliminary procedures such as data screening and descriptive profiling to support systematic reporting prior to SEM estimation.

3.4 Research Design

The research design serves as the blueprint for how the study is conducted, including how variables are operationalised, how data are collected, and how the hypotheses are tested. This study adopts a cross-sectional, non-experimental, descriptive–correlational design.

- It is cross-sectional because data are collected at a single point in time from MyFoto users at JAPEN.
- It is non-experimental because there is no manipulation of variables or controlled experimental conditions; the study observes naturally occurring perceptions and behaviours.
- It is descriptive–correlational because it both describes respondents’ perceptions (descriptive) and examines the associative relationships between independent variables (System Quality, Metadata Quality, Service Quality) and dependent variables (Usage and User Satisfaction).

The design aims to empirically validate the hypothesised relationships derived from the conceptual framework in Chapter 2, without altering the natural work environment of JAPEN officers and staff. The table below summarises the key design components and their application in this study.

Table 3.1: Components of Research Design and Choices in This Study

Component	Design Choice in This Study
Purpose	Explanatory: to examine the effects of quality dimensions on Usage and User Satisfaction
Time Horizon	Cross-sectional: data collected at one point in time
Setting	Natural setting: within JAPEN (PSF HQ and JAPEN divisions)
Data Type	Quantitative: numerical data from structured questionnaire

Research Strategy	Survey method: self-administered questionnaire distributed to MyFoto users
Unit of Analysis	Individual: JAPEN officers and staff who use MyFoto
Sampling Method	Purposive sampling: targeting known, active MyFoto users
Data Collection Instrument	Structured questionnaire (online via Google Form)
Analysis Techniques	Descriptive statistics (SPSS) and PLS-SEM using SmartPLS for hypothesis testing (H1–H7), including mediation

As shown in *Table 3.1*, the research design is structured to ensure alignment between the study objectives and the analytical procedures required to test the proposed research model.

3.5 Questionnaire Development

The questionnaire was systematically developed to measure all constructs identified in the conceptual framework, namely System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction, within the operational context of the MyFoto system implemented at Jabatan Penerangan Malaysia (JAPEN).

3.5.1 Construct Development and Item Adaptation

Each construct was operationalised using **five measurement items**, adapted from validated scales in prior IS research and rephrased to fit the MyFoto environment. The decision to use five items per construct is consistent with best practice in SEM measurement modelling, where multiple indicators improve construct reliability and validity.

- **System Quality** items were adapted from DeLone and McLean (2003) and Petter et al. (2008), focusing on usability, responsiveness, reliability, and interface quality.
- **Metadata Quality** items draw from metadata evaluation literature such as Bruce and Hillmann (2004), Park (2009), and Stvilia et al. (2014), emphasising accuracy, completeness, consistency, clarity, and usefulness of metadata in supporting search and retrieval.

- **Service Quality** items are adapted from SERVQUAL (Parasuraman et al., 1988) and later digital service studies, focusing on responsiveness, clarity of guidance, support availability, and trust in assistance.
- **Usage** items are based on DeLone and McLean (2003), Davis (1989), and related IS usage measures, reflecting frequency and intensity of MyFoto usage in daily tasks.
- **User Satisfaction** items are adapted from Doll and Torkzadeh (1988) and subsequent e-government studies, capturing overall satisfaction, expectation fulfilment, and continued usage support.

All items employ a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

3.5.2 Stages of Questionnaire Development

The development process involved several key stages:

1. Construct Identification

Core variables were selected based on the theoretical models discussed in Chapter 2 and aligned with the study's research questions and objectives.

2. Item Adaptation and Contextualisation

Items from previous studies were reworded to explicitly reference MyFoto and the work context of JAPEN officers and staff (e.g., "I rely on the MyFoto system in my work at JAPEN").

3. Expert Review (Content Validity)

The draft questionnaire was reviewed by:

- Academician experts from UiTM Puncak Perdana (Information Systems / Supervisor), and
- Two professional officers from JAPEN's Pusat Sumber & Fotografi (PSF). They evaluated the instrument for clarity, relevance, language suitability, and alignment with JAPEN's actual MyFoto workflows.

4. Pre-testing (Pilot)

A small pilot test with 50 MyFoto users was conducted to identify ambiguous wording, item redundancy, or technical issues in the online form. Feedback from this pilot informed refinements to phrasing, sequencing, and layout.

3.5.3 Summary of Measurement Items

The measurement items and sources used in this study are summarised in *Table 3.2*. As shown in the table, each construct is measured using five items to support the requirements of SEM measurement assessment.

Table 3.2: Summary of Measurement Items and Sources

Construct	Measurement Items (Code)	Source / Adapted From
System Quality	SQ1: MyFoto is easy to use.	DeLone & McLean (2003); Petter et al. (2008)
	SQ2: MyFoto is fast and responsive.	
	SQ3: The MyFoto interface is clear and user-friendly.	
	SQ4: MyFoto is reliable and functions without frequent errors.	
	SQ5: MyFoto features and functions support my work efficiently.	
Metadata Quality	MQ1: Metadata in MyFoto is accurate and reliable.	Bruce & Hillmann (2004); Park (2009); Stvilia et al. (2014)
	MQ2: Metadata records in MyFoto are complete and consistent.	
	MQ3: Metadata in MyFoto helps me find relevant photographs.	

Construct	Measurement Items (Code)	Source / Adapted From
	MQ4: Metadata is presented in a clear and readable format.	
	MQ5: Metadata fields in MyFoto are sufficient for effective searching and retrieval.	
Service Quality	SVQ1: MyFoto support staff respond promptly to my inquiries.	Parasuraman et al. (1988); later IS service studies
	SVQ2: Staff provide clear and helpful guidance on using MyFoto.	
	SVQ3: Technical support is available when I encounter problems with MyFoto.	
	SVQ4: I trust the assistance provided by MyFoto support staff.	
	SVQ5: Overall, I am satisfied with the support services provided for MyFoto.	
Usage	U1: I frequently use the MyFoto system in my work.	DeLone & McLean (2003); Davis (1989)
	U2: I regularly search for photographs using MyFoto.	
	U3: I use MyFoto to view or download photographs for my tasks.	
	U4: I rely on MyFoto to complete documentation and communication work.	

Construct	Measurement Items (Code)	Source / Adapted From
	U5: I use MyFoto as my primary source when I need official photographs.	
User Satisfaction	SAT1: Overall, I am satisfied with the MyFoto system.	Doll & Torkzadeh (1988); e-government satisfaction studies
	SAT2: MyFoto meets my expectations as a digital photo archive.	
	SAT3: I am pleased with my experience using MyFoto.	
	SAT4: I would recommend continued use of MyFoto to other officers.	
	SAT5: MyFoto improves my efficiency in completing work-related tasks.	

In addition, Section A (Demographics) collects contextual information such as division/unit, role, frequency of MyFoto use, and years of service (duration of employment). Furthermore, an open-ended question is included at the end of the questionnaire to capture respondents' primary purpose of using MyFoto (e.g., documentation, media communication, reporting, archival retrieval), thereby enriching contextual interpretation without altering the quantitative design.

3.6 Population, Sampling and Data Collection

This section explains the target population, sampling strategy, and data collection procedures used to obtain responses from MyFoto users within JAPEN.

3.6.1 Target Population

The target population comprises JAPEN officers and staff who actively use MyFoto as part of their official duties. This includes:

- Photographers and librarians staff at Pusat Sumber & Fotografi (PSF),
- Officers in JAPEN as information offices who access MyFoto for documentation, media, and reporting tasks.

Only respondents who have used MyFoto within the last 12 months are included, to ensure that their perceptions and experiences reflect the system's current functionality and performance. Based on internal estimates from PSF (2024), the total number of registered and active MyFoto users is approximately $N = 180$.

3.6.2 Sampling Frame

The sampling frame was compiled in collaboration with:

- PSF MyFoto system administrators, and
- Division coordinators at JAPEN Headquarters.

The frame includes the list of officers and staff with active MyFoto accounts and current responsibilities involving digital photo documentation, retrieval, or usage.

3.6.3 Sample Size Determination

Sample size was determined using two complementary approaches:

1. Krejcie and Morgan (1970) Table for Finite Populations

For $N \approx 180$, the minimum recommended sample size at a 95% confidence level is approximately **123 respondents**.

2. G*Power (Power Analysis)

An a priori power analysis was conducted using G*Power 3.1.9.7 to determine the minimum sample size required for hypothesis testing. The analysis was based on a linear multiple regression model (fixed model, R^2 deviation from zero), representing the maximum number of predictors influencing the endogenous construct of Usage.

The parameters applied were as follows:

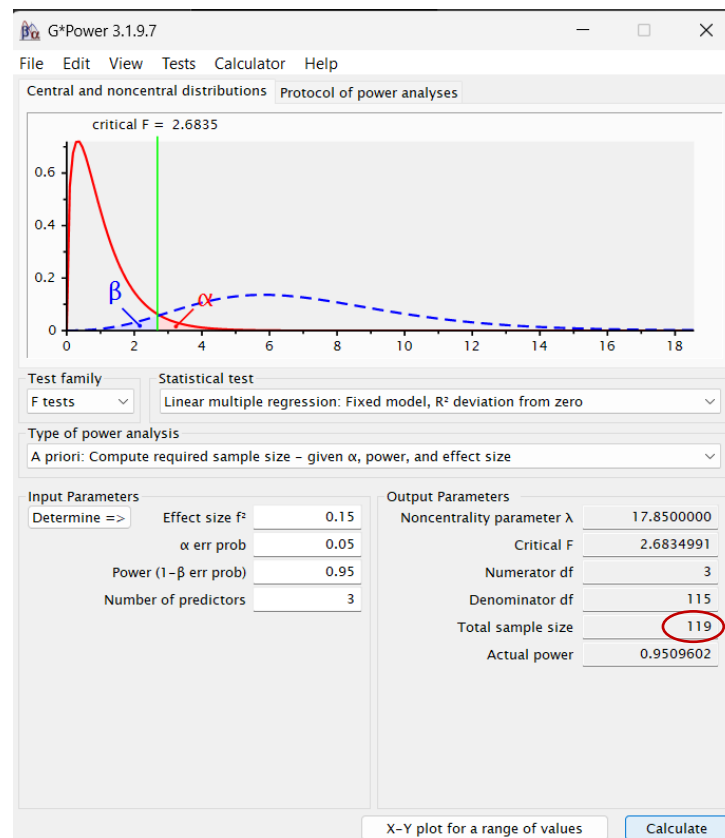
- Effect size (f^2) = 0.15 (medium effect),
- Significance level (α) = 0.05,
- Statistical power ($1 - \beta$) = 0.95,

- Number of predictors = 3 (System Quality, Metadata Quality, and Service Quality).

The analysis indicated a minimum required sample size of 119 respondents. To ensure adequate statistical power and to account for incomplete or unusable responses, the study targets at least 130 valid responses. Accordingly, the questionnaire will be distributed to approximately 140–150 MyFoto users within the defined sampling frame.

As illustrated in **Figure 3.1**, the analysis indicates a minimum required sample size of 119 respondents.

Figure 3.1: A priori power analysis using G*Power



To ensure adequate statistical power and to account for incomplete responses, the study targets at least 130 valid responses, and therefore distributes the questionnaire to approximately 140–150 respondents.

3.6.4 Sampling Technique

A purposive sampling technique is employed. This non-probability method is appropriate because:

- Only users who have direct experience with MyFoto can provide meaningful evaluation of the constructs under study.
- The research focus is on a specific system in a defined organisational context, rather than on general public opinion.

The sampling includes officers and staff from different functional roles (e.g., photographers, information officers, editors) and geographical locations (JAPEN HQ) to obtain a balanced overview of MyFoto usage across JAPEN.

3.6.5 Data Collection Procedure

Data collection will utilise both online and limited hardcopy distribution to maximise response rates:

1. Online Questionnaire (Primary Method)

- The questionnaire is administered via Google Forms.
- An official invitation is sent through JAPEN's internal channels (email and, where appropriate, official WhatsApp groups).
- The invitation includes a cover letter, consent declaration, and survey link.

2. Hardcopy Questionnaire (Supplementary Method)

- Printed questionnaires may be distributed at PSF Headquarters or specific units where online access is limited or officers prefer paper-based responses.
- Completed forms will be manually entered into the dataset by the researcher.

The data collection period is planned for **four to eight weeks**, with reminder messages issued at regular intervals to encourage participation. All responses are anonymised and stored securely for analysis.

3.7 Data Analysis Strategy

The data analysis strategy is designed to answer the research questions and test the hypotheses derived from the conceptual framework. In this study, hypothesis testing is conducted primarily through **PLS-SEM using SmartPLS**, consistent with the lecturer's methodological requirement and aligned with the research model developed in Chapter 2.

3.7.1 Data Screening and Preparation

Before conducting formal analysis, the dataset will undergo several screening stages using SPSS and Excel to ensure data quality:

- **Missing Data:** Cases with more than 10% missing responses will be excluded. Minor missing values may be treated using appropriate methods (e.g., mean replacement for preliminary screening), with full reporting provided in the results chapter.
- **Outlier Detection:** Univariate outliers will be identified via z-scores ($|z| > 3$). For multivariate detection, Mahalanobis distance may be inspected as a supporting diagnostic.
- **Normality:** Skewness and kurtosis values and Shapiro–Wilk tests will be inspected descriptively. However, as PLS-SEM does not require strict multivariate normality, these checks are primarily used to report distribution characteristics and to identify extreme non-normality.
- **Common Method Bias (Procedural Control):** Since data are collected through self-reported questionnaires, procedural remedies are applied such as anonymity assurance, concise wording, and item separation by construct. Statistical checks may be performed during analysis (e.g., full collinearity VIF) to screen for potential bias where appropriate.

3.7.2 Descriptive Analysis

Descriptive statistics are used to:

- Summarise respondent demographics (e.g., division, role, years of service, and frequency of MyFoto usage), and

- Describe central tendencies and dispersion (mean, standard deviation) for each construct (System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction).

These results provide a contextual overview of MyFoto usage and user evaluation patterns within JAPEN.

3.7.3 Measurement Model Assessment (Reliability and Validity in SmartPLS)

Measurement quality is evaluated through the PLS-SEM measurement model, ensuring that each construct is measured reliably and validly:

- **Indicator Reliability (Outer Loadings):**
Items are expected to load strongly on their intended constructs (typically ≥ 0.70). Items below threshold are reviewed based on theoretical relevance and measurement performance.
- **Internal Consistency Reliability:**
Evaluated using **Composite Reliability (CR)** and Cronbach's Alpha, with values ≥ 0.70 considered acceptable.
- **Convergent Validity:**
Assessed using **Average Variance Extracted (AVE)**, where $AVE \geq 0.50$ indicates adequate convergence.
- **Discriminant Validity:**
- Examined using the **HTMT criterion**, ensuring constructs are distinct and not redundant.
- **Collinearity Diagnostics:**
Variance Inflation Factor (VIF) values are inspected to ensure collinearity does not distort estimation.

3.7.4 Structural Model Assessment and Hypothesis Testing (H1–H7)

Once the measurement model is established, the structural model is evaluated to test the hypotheses. The structural model estimation is conducted in **SmartPLS**, using bootstrapping to obtain t-values and p-values for significance testing.

The following hypotheses are tested:

1. Direct effects (Main paths):

- **H1:** System Quality significantly influences Usage of MyFoto.
- **H2:** Metadata Quality significantly influences Usage of MyFoto.
- **H3:** Service Quality significantly influences Usage of MyFoto.
- **H4:** Usage significantly influences User Satisfaction with MyFoto.

2. Mediation effects (Indirect paths via Usage):

- **H5:** Usage mediates the relationship between System Quality and User Satisfaction.
- **H6:** Usage mediates the relationship between Metadata Quality and User Satisfaction.
- **H7:** Usage mediates the relationship between Service Quality and User Satisfaction.

To interpret the structural model, the analysis reports:

- **Path coefficients (β):** direction and strength of relationships,
- **Coefficient of determination (R^2):** explained variance for Usage and User Satisfaction,
- **Effect size (f^2):** magnitude of each predictor's contribution,
- **Predictive relevance (Q^2):** model predictive accuracy, where applicable, and
- **Bootstrapping results (5,000 resamples):** significance testing for direct and indirect effects.

The mediation effects (H5–H7) are tested through the significance of indirect effects obtained via bootstrapping. The interpretation distinguishes between full mediation, partial mediation, or no mediation based on the significance of indirect effects and the behaviour of direct paths. *This mediating pathway is illustrated in Figure 2.1 and is consistent with empirical patterns summarised in Table 2.2.*

3.7.5 Software Tools

All analyses will be conducted using:

- **SmartPLS (Version 4):** for SEM estimation, measurement model evaluation, structural model testing, and mediation analysis (H1–H7).

- **IBM SPSS Statistics (Version 29):** for data screening, descriptive statistics, and preliminary checks.
- **G*Power 3.1:** for sample size calculation and statistical power justification.
- **Microsoft Excel:** for initial data cleaning and export formatting.

3.8 Research Ethics

Ethical conduct is central to the design and implementation of this study, particularly because it involves public-sector officers and an internal government system. The research adheres to:

- UiTM Research Ethics Guidelines, and
- International principles such as those outlined in the Belmont Report and APA ethical standards.

3.8.1 Ethical Principles and Actions Taken

Table 3.3: Ethical Principles and Actions Taken

Ethical Principle	Description	Action Taken
Informed Consent	Participants must voluntarily agree with full information.	A digital consent statement is provided at the start of the questionnaire, explaining the purpose, procedures, rights, and data usage.
Voluntary Participation	Participation is optional and free from coercion.	Respondents are informed that participation is entirely voluntary and they may stop at any time without consequences.
Confidentiality	Protection of identity and responses from unauthorised access.	No personally identifiable information (e.g., name, IC number) is collected. Data are coded and reported in aggregate form.

Ethical Principle	Description	Action Taken
Data Protection	Secure handling and storage of research data.	Data are stored in password-protected files; access is limited to the researcher and academic supervisor.
Right to Withdraw	Participants can withdraw without penalty.	This right is clearly stated in the survey introduction. Responses can be omitted or the survey can be exited at any point.
Ethical Clearance	Formal institutional approval for data collection.	Ethical approval is obtained from the relevant UiTM committee prior to data collection, and JAPEN's management approval is sought for access to staff.

As shown in **Table 3.3**, ethical practices are embedded throughout the research process to ensure that participation remains voluntary, confidential, and protected.

3.8.2 Risk and Harm Minimisation

The study is minimal risk. It does not collect confidential organisational data or sensitive personal information. Questions focus on professional experiences with MyFoto, quality perceptions, usage behaviour, and satisfaction. No harm or discomfort is expected.

3.8.3 Transparency and Academic Integrity

All literature, models, and measurement scales adapted in this research are acknowledged and referenced in accordance with APA citation style. The researcher commits to honest analysis, accurate reporting, and avoidance of fabrication or manipulation of data.

3.9 Mapping of Research Objectives and Research Methods

To ensure methodological coherence, this section maps each research objective to the relevant variables, data collection components, and analytical techniques. The

matrix in **Table 3.4** demonstrates direct alignment between objectives, constructs, questionnaire sections, and SEM-based hypothesis testing.

Table 3.4: Matrix Linking Research Objectives, Variables, and Methods

Research Objective (RO)	Variables Involved	Data Collection Section	Data Analysis Technique
RO1: To examine the effects of System Quality, Metadata Quality, and Service Quality on the Usage of the MyFoto system.	System Quality (IV), Metadata Quality (IV), Service Quality (IV), Usage (DV)	SQ – Section B; MQ – Section C; SVQ – Section D; Usage – Section E	Descriptive statistics; PLS-SEM path analysis (H1–H3)
RO2: To investigate the mediating role of Usage in the relationship between System Quality, Metadata Quality, Service Quality, and User Satisfaction.	System Quality, Metadata Quality, Service Quality → Usage → User Satisfaction	Sections B–F	PLS-SEM mediation testing (H5–H7), bootstrapping
RO3: To determine how Usage influences User Satisfaction in the MyFoto system.	Usage (IV), User Satisfaction (DV)	Usage – Section E; Satisfaction – Section F	Descriptive statistics; PLS-SEM path analysis (H4)

This mapping demonstrates that each research objective is systematically operationalised through clearly defined constructs aligned with the conceptual framework, corresponding measurement sections in the questionnaire, and appropriate statistical analyses conducted using SmartPLS to ensure methodological coherence between research design, measurement, and hypothesis testing.

3.10 Chapter Summary

This chapter has presented the methodological foundation of the study, designed to investigate the relationships between System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction within the MyFoto digital photo archive system at JAPEN. The chapter began by explaining the survey-based quantitative methodology

and the cross-sectional, descriptive–correlational research design, consistent with the study’s objectives and theoretical foundations established in Chapters 1 and 2.

The development of a structured questionnaire grounded in established IS models was described in detail, including construct adaptation, expert review, and pre-testing. In line with SEM measurement requirements, each construct is measured using **five items**, while demographic profiling includes **years of service** and an open-ended question capturing respondents’ primary purpose of using MyFoto. The chapter also elaborated on the population and sampling strategy, using purposive sampling to target active MyFoto users and employing sample size justification through Krejcie and Morgan’s table and G*Power analysis. Data collection procedures using both online and limited hardcopy methods were outlined to ensure accessibility across JAPEN units.

Next, the data analysis strategy was presented comprehensively, beginning with data screening and descriptive analysis and proceeding to measurement and structural model assessment using **PLS-SEM in SmartPLS**. This approach enables simultaneous estimation of relationships among constructs and rigorous testing of both direct hypotheses (H1–H4) and mediation hypotheses (H5–H7) using bootstrapping. Ethical considerations were discussed thoroughly, demonstrating adherence to institutional and international ethical standards and ensuring that participants’ rights, anonymity, and data security are safeguarded.

Overall, this methodological design provides a robust foundation for the subsequent chapter, which will present and interpret the empirical results and hypothesis testing outcomes arising from the survey of MyFoto users at JAPEN.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 Introduction

This chapter presents a detailed empirical evaluation of the proposed research framework developed in Chapters One to Three, focusing on the examination of system success within the MyFoto government digital photo archive operated by the Jabatan Penerangan Malaysia (JAPEN). Building upon the theoretical foundations, research objectives, hypotheses, and methodological design previously established, this chapter reports and interprets the statistical findings generated through Partial Least Squares Structural Equation Modelling (PLS-SEM).

As articulated in Chapter One, the central objective of this study is to investigate how System Quality (SQ), Metadata Quality (MQ), and Service Quality (SVQ) influence User Satisfaction (SAT), both directly and indirectly through the mediating role of Usage (U). These relationships are grounded in the DeLone and McLean Information Systems (IS) Success Model (2003), which conceptualises system success as a behavioural and experiential outcome realised through actual system use. In the context of MyFoto, a metadata-dependent, photo-centric archival system, this behavioural pathway is particularly critical, as system benefits can only be fully realised when users actively engage with system functionalities such as uploading, tagging, searching, and retrieving photographic records.

The empirical analysis presented in this chapter directly addresses the research questions and hypotheses formulated in Chapter One (H1–H7) and operationalised through the conceptual framework outlined in Chapter Two. While Chapter Two synthesised prior empirical evidence and theoretical justification for the hypothesised relationships, and Chapter Three detailed the research design, instrumentation, and analytical procedures, the present chapter focuses on validating these relationships using real-world data collected from MyFoto users within JAPEN.

Consistent with the methodological approach described in Chapter Three, data analysis was conducted using SmartPLS version 4, employing a two-stage PLS-SEM procedure. The first stage involves Measurement Model Assessment, which evaluates

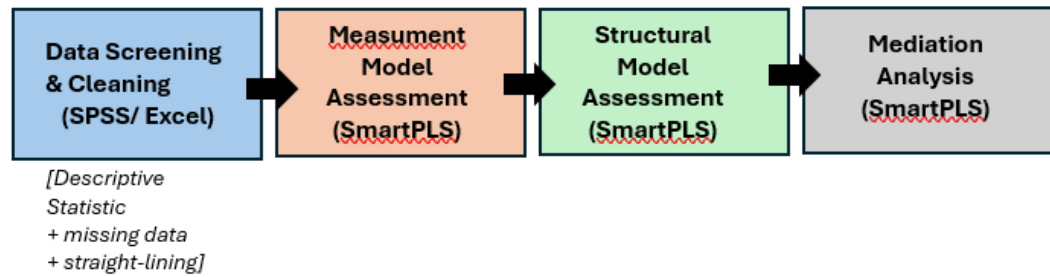
the reliability and validity of the latent constructs and their indicators. This step is essential to ensure that System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction are measured accurately and consistently before any causal interpretation is made. The second stage consists of Structural Model Assessment, which examines the explanatory power of the model, the strength and significance of hypothesised relationships, and the mediating role of Usage through bootstrapping procedures.

The choice of PLS-SEM is theoretically and methodologically justified. As discussed in Chapter Three, PLS-SEM is particularly suitable for predictive and explanatory research models involving multiple latent constructs and mediation effects, especially when the research objective is theory extension and contextual validation rather than strict model fit optimisation. In addition, PLS-SEM is robust against non-normal data distributions and performs well with moderate sample sizes, making it appropriate for the final sample of 150 respondents retained after data screening.

Importantly, this chapter does not merely report statistical outputs; rather, it interprets the empirical findings within the institutional and operational context of JAPEN's MyFoto system. The results are therefore discussed not only in terms of statistical significance but also in relation to their theoretical implications for IS success research and their practical relevance for government digital photo archive management. Particular attention is given to the role of Usage as a mediating mechanism, as this represents a key theoretical contribution of the study by empirically validating the behavioural pathway proposed by the DeLone and McLean IS Success Model in a government archival environment.

To ensure clarity and logical progression, this chapter is structured into the following major sections:

Figure 4.1: Analytical Flow (Screening → Measurement Model → Structural Model → Mediation)



1. Data Screening, Sample Characteristics, and Analytical Readiness, which confirms the suitability of the dataset for PLS-SEM analysis;
2. Measurement Model Assessment, covering indicator reliability, internal consistency reliability, convergent validity, and discriminant validity;
3. Structural Model Assessment, including evaluation of R^2 values, effect sizes (f^2), and overall explanatory power;
4. Hypothesis Testing, examining the direct effects among constructs using bootstrapping procedures; and
5. Mediation Analysis, assessing the indirect effects of System Quality, Metadata Quality, and Service Quality on User Satisfaction through Usage.

Together, these sections provide a comprehensive empirical foundation that bridges the conceptual arguments presented in Chapters One and Two with the interpretive discussion and practical implications that will be elaborated in Chapter Five. By systematically validating the proposed research framework using robust statistical techniques, this chapter establishes the credibility and explanatory strength of the study's findings in advancing both information systems theory and government digital archive practice.

4.2 Data Screening, Sample Characteristics, and Analytical Readiness

Prior to conducting the measurement and structural model assessment using Partial Least Squares Structural Equation Modelling (PLS-SEM), a comprehensive data screening process was undertaken to ensure the quality, suitability, and robustness of the dataset for subsequent analysis. Data screening is a critical preliminary step in SEM-

based research, as it ensures that the retained dataset accurately reflects meaningful respondent input and does not violate basic analytical assumptions.

4.2.1 Initial Data Collection and Response Overview

A total of 180 questionnaire responses were initially collected through an online survey administered to MyFoto users across JAPEN headquarters. All responses were obtained within the designated data collection period and were exported directly from the Google Form platform into Microsoft Excel for preliminary screening and preparation.

The summary of the data screening process is presented in *Table 4.1*.

Table 4.1: Response Overview and Data Screening Summary

Screening Category	Number of Cases
Total responses collected	180
Total removed after screening	30
Final usable sample	150

Note: *Final dataset retained for analysis consists of 150 valid responses after applying screening procedures.*

The initial dataset included responses from officers and staff with diverse functional roles (e.g., photographers, information officers, archivists, and administrative personnel), thereby reflecting the actual operational diversity of MyFoto users within JAPEN.

4.2.2 Data Cleaning and Screening Procedures

Data screening was conducted in multiple stages to ensure the integrity and analytical readiness of the dataset. The screening procedures were guided by best practices in quantitative research and PLS-SEM analysis, as outlined by Hair et al. (2022). The following criteria were applied:

1. Incomplete Responses

Responses with substantial missing data, defined as more than 10% unanswered items across key construct indicators, were removed from the dataset.

2. Response Consistency and Straight-Lining

Cases exhibiting straight-lining behaviour (i.e., identical responses across all Likert-scale items without variance) were examined and excluded, as such patterns may indicate inattentive or non-engaged responding.

3. Eligibility Verification

Only respondents who confirmed prior usage of MyFoto within the last 12 months were retained, ensuring that all analysed responses were based on recent and relevant system experience.

4. Duplicate and Invalid Entries

Duplicate submissions and technically invalid entries (e.g., corrupted timestamps or incomplete submission records) were identified and removed.

Following these screening procedures, 30 responses were excluded, resulting in a final dataset of 150 valid and usable responses for PLS-SEM analysis.

4.2.3 Final Sample Size Justification

Table 4.2: Sample Size Adequacy Assessment for PLS-SEM

Criterion	Requirement	Study Value	Source
Number of predictors	3	3	Model specification
Minimum sample (10-times rule)	≥ 30	150	Hair et al. (2022)
Power analysis ($f^2 = 0.15$)	≥ 119	150	G*Power
Final usable sample	-	150	This study

The retained sample size of $n = 150$ satisfies established minimum sample size requirements for PLS-SEM analysis. According to the “10-times rule” and more recent power-based guidelines (Hair et al., 2022), the sample size is sufficient to estimate the proposed structural model, which includes:

- Three exogenous constructs (System Quality, Metadata Quality, Service Quality),
- One mediating construct (Usage), and

- One endogenous construct (User Satisfaction).

Moreover, the sample size exceeds the minimum requirement derived from power analysis (as discussed in Chapter Three), thereby ensuring adequate statistical power to detect medium effect sizes in both direct and mediated relationships.

It should also be noted that all analyses were conducted using SmartPLS 4 (Trial License). While the original cleaned dataset consisted of 150 cases, SmartPLS Student Edition imposes a practical limitation on certain export and saving functionalities. Nevertheless, the full dataset was successfully analysed within the software environment, and all reported results in this chapter are based on the complete sample of 150 respondents, consistent with methodological decisions justified in Chapter Three.

4.2.4 Sample Characteristics

Descriptive statistics were generated to profile the demographic and professional characteristics of the respondents. These characteristics provide important contextual insight into the background of MyFoto users and support the interpretation of subsequent analytical results.

Table 4.3 summarises key sample characteristics of the retained respondents.

Table 4.3: Sample Characteristics of Respondents (n = 150)

As shown in *Table 4.3*, the respondent pool comprises users with varying lengths of service and functional responsibilities, indicating that the dataset captures perspectives from both experienced and relatively newer MyFoto users. This diversity strengthens the representativeness of the findings and enhances the external validity of the study within the JAPEN organisational context.

Table 4.3: Sample Characteristics of Respondents (n = 150)

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	80	53.3
	Female	70	46.7

Characteristic	Category	Frequency	Percentage (%)
Years of Service	Less than 1 year	11	7.3
	1–3 years	45	30.0
	4–6 years	38	25.3
	7–10 years	33	22.0
	More than 10 years	23	15.3
Primary Role	Director / Deputy Director / Senior Officer	35	23.3
	Professional / Technical Staff (Engineer, Librarian, Photographer, Designer)	60	40.0
	Administrative / Support Staff	55	36.7

As shown in Table 4.2, the respondent pool represents a balanced distribution of male (53.3%) and female (46.7%) participants. In terms of organisational experience, the largest proportion of respondents falls within the 1–3 years service category (30.0%), followed by those with 4–6 years of experience (25.3%). The sample also reflects a diverse occupational composition, including managerial officers, professional and technical staff, as well as administrative personnel, indicating that the dataset captures perspectives from multiple functional roles within the MyFoto user environment.

4.2.5 Analytical Readiness for PLS-SEM

Following data screening and descriptive profiling, the dataset was assessed for suitability for PLS-SEM analysis. All constructs were specified as reflective measurement models, consistent with the theoretical assumptions discussed in Chapter Two. Preliminary inspection confirmed that the dataset exhibited sufficient variability across indicators, with no evidence of extreme multicollinearity or data anomalies that would compromise model estimation.

Importantly, PLS-SEM does not require strict multivariate normality assumptions. Therefore, while descriptive normality indicators were examined for reporting purposes, no cases were excluded on the basis of non-normal distribution patterns. This further supports the appropriateness of PLS-SEM for the present study.

In summary, the final dataset of 150 valid responses is analytically robust and suitable for subsequent measurement model and structural model assessment. The data screening process ensures that all findings reported in the following sections are based on reliable, consistent, and meaningful respondent input, thereby strengthening the credibility of the empirical results presented in this chapter.

The data screening and preparation procedures conducted prior to PLS-SEM analysis are summarised in **Figure 4.2**.

Figure 4.2: Data Screening Workflow for PLS-SEM Analysis

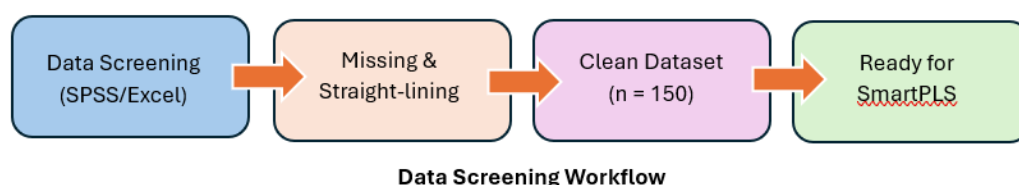


Figure 4.2: Data Screening and Preparation Workflow Prior to PLS-SEM Analysis

4.3 Measurement Model Assessment

Following the data screening and confirmation of analytical readiness, the next step in the PLS-SEM analysis involves the assessment of the measurement model. The purpose of this stage is to evaluate whether the latent constructs are measured reliably and validly before proceeding to interpret the structural relationships among constructs.

Consistent with the methodological framework outlined in Chapter Three, all constructs examined in this study, namely System Quality (SQ), Metadata Quality (MQ), Service Quality (SVQ), Usage (U), and User Satisfaction (SAT), were operationalised as reflective measurement models. The measurement model assessment was conducted in SmartPLS 4 and evaluated using four established criteria:

1. Indicator reliability (outer loadings),
2. Internal consistency reliability,

3. Convergent validity, and
4. Discriminant validity.

Each criterion is discussed in detail in the following subsections.

4.3.1 Indicator Reliability (Outer Loadings)

Indicator reliability examines the extent to which each observed indicator is strongly associated with its respective latent construct. This is assessed by evaluating the outer loading values, which represent the correlation between an indicator and the underlying construct it is intended to measure.

According to Hair et al. (2022), outer loading values of 0.70 or higher indicate that the indicator explains at least 50% of the variance of the construct and is therefore considered reliable.

The outer loading results for this study are presented in *Figure 4.3 (Outer Loadings – List)* and *Figure 4.4 (Outer Loadings – Matrix)*.

Based on the results, all indicators associated with **System Quality (SQ1–SQ5)**, **Metadata Quality (MQ1–MQ5)**, **Service Quality (SVQ1–SVQ5)**, **Usage (U1–U5)**, and **User Satisfaction (SAT1–SAT5)** achieved outer loading values exceeding the recommended threshold of 0.70, with values ranging approximately from **0.776 to 0.877**. These findings indicate that each indicator demonstrates a strong relationship with its respective latent construct and contributes meaningfully to construct measurement.

As all indicators met the recommended reliability criteria, **no measurement items were removed**, and all indicators were retained for subsequent reliability and validity assessments.

Figure 4.3: (Outer Loadings – List)

Outer loadings - List	
	Outer loadings
MQ1 <- METADATA_QUALITY_...	0.867
MQ2 <- METADATA_QUALITY_...	0.867
MQ3 <- METADATA_QUALITY_...	0.872
MQ4 <- METADATA_QUALITY_...	0.867
MQ5 <- METADATA_QUALITY_...	0.861
SAT1 <- SATISFACTION_(SAT)	0.811
SAT2 <- SATISFACTION_(SAT)	0.800
SAT3 <- SATISFACTION_(SAT)	0.790
SAT4 <- SATISFACTION_(SAT)	0.825
SAT5 <- SATISFACTION_(SAT)	0.776
SQ1 <- SYSTEM_QUALITY_(SQ)	0.848
SQ2 <- SYSTEM_QUALITY_(SQ)	0.857
SQ3 <- SYSTEM_QUALITY_(SQ)	0.818
SQ4 <- SYSTEM_QUALITY_(SQ)	0.844
SQ5 <- SYSTEM_QUALITY_(SQ)	0.850
SVQ1 <- SERVICE_QUALITY_(S...	0.853
SVQ2 <- SERVICE_QUALITY_(S...	0.854
SVQ3 <- SERVICE_QUALITY_(S...	0.877
SVQ4 <- SERVICE_QUALITY_(S...	0.867
SVQ5 <- SERVICE_QUALITY_(S...	0.822
U1 <- USAGE_(U)	0.789
U2 <- USAGE_(U)	0.790
U3 <- USAGE_(U)	0.818
U4 <- USAGE_(U)	0.842
U5 <- USAGE_(U)	0.839

Figure 4.4: (Outer Loadings – Matrix)

Outer loadings - Matrix					
	METADATA_QUALITY_(MQ)	SATISFACTION_(SAT)	SERVICE_QUALITY_(SVQ)	SYSTEM_QUALITY_(SQ)	USAGE_(U)
MQ1	0.867				
MQ2	0.867				
MQ3	0.872				
MQ4	0.867				
MQ5	0.861				
SAT1		0.811			
SAT2		0.800			
SAT3		0.790			
SAT4		0.825			
SAT5		0.776			
SQ1				0.848	
SQ2				0.857	
SQ3				0.818	
SQ4				0.844	
SQ5				0.850	
SVQ1			0.853		
SVQ2			0.854		
SVQ3			0.877		
SVQ4			0.867		
SVQ5			0.822		
U1					0.789
U2					0.790
U3					0.818
U4					0.842
U5					0.839

These results indicate that each indicator demonstrates a strong relationship with its intended construct and contributes meaningfully to construct measurement. As all indicators met the recommended criteria, no items were removed from the model. The retention of all indicators also supports content validity, as the full conceptual domain of each construct is preserved.

Table 4.4: Indicator Loadings Summary

Construct	Indicator	Outer Loading
System Quality (SQ)	SQ1	0.848
	SQ2	0.857
	SQ3	0.818
	SQ4	0.844
	SQ5	0.850
Metadata Quality (MQ)	MQ1	0.867
	MQ2	0.867
	MQ3	0.872
	MQ4	0.867
	MQ5	0.861
Service Quality (SVQ)	SVQ1	0.853
	SVQ2	0.854
	SVQ3	0.877
	SVQ4	0.867
	SVQ5	0.822
Usage (U)	U1	0.789
	U2	0.790
	U3	0.818
	U4	0.842
	U5	0.839

Construct	Indicator	Outer Loading
User Satisfaction (SAT)	SAT1	0.811
	SAT2	0.800
	SAT3	0.790
	SAT4	0.825
	SAT5	0.776

In addition to the graphical presentation in *Figure 4.3* and *Figure 4.4*, the outer loading values are summarised in *Table 4.4*. All indicators demonstrate loading values above the recommended threshold of 0.70 (Hair et al., 2022), indicating satisfactory indicator reliability. This confirms that each measurement item adequately represents its respective latent construct and supports the reliability of the measurement model.

4.3.2 Internal Consistency Reliability

Internal consistency reliability assesses the extent to which indicators of a construct consistently measure the same underlying concept. In PLS-SEM, internal consistency is commonly evaluated using Cronbach's Alpha (α), Composite Reliability (ρ_a), and Composite Reliability (ρ_c). While Cronbach's Alpha assumes equal indicator loadings, composite reliability measures are considered more appropriate in PLS-SEM as they account for different indicator loadings (Hair et al., 2022).

The internal consistency reliability results are summarised in *Table 4.5 (Construct Reliability and Validity Overview)* and visually illustrated in *Figure 4.5 (Cronbach's Alpha Bar Chart)*, *Figure 4.6 (Composite Reliability ρ_a Bar Chart)*, and *Figure 4.7 (Composite Reliability ρ_c Bar Chart)*.

Table 4.5: Construct Reliability and Validity Overview

	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)	Average variance extracted (AVE)
METADATA_QUALITY_(MQ)	0.917	0.918	0.938	0.751
SATISFACTION_(SAT)	0.860	0.864	0.899	0.641
SERVICE_QUALITY_(SVQ)	0.908	0.916	0.931	0.731
SYSTEM_QUALITY_(SQ)	0.899	0.902	0.925	0.712
USAGE_(U)	0.874	0.877	0.909	0.666

Figure 4.5: Cronbach Alpha Bar Chart

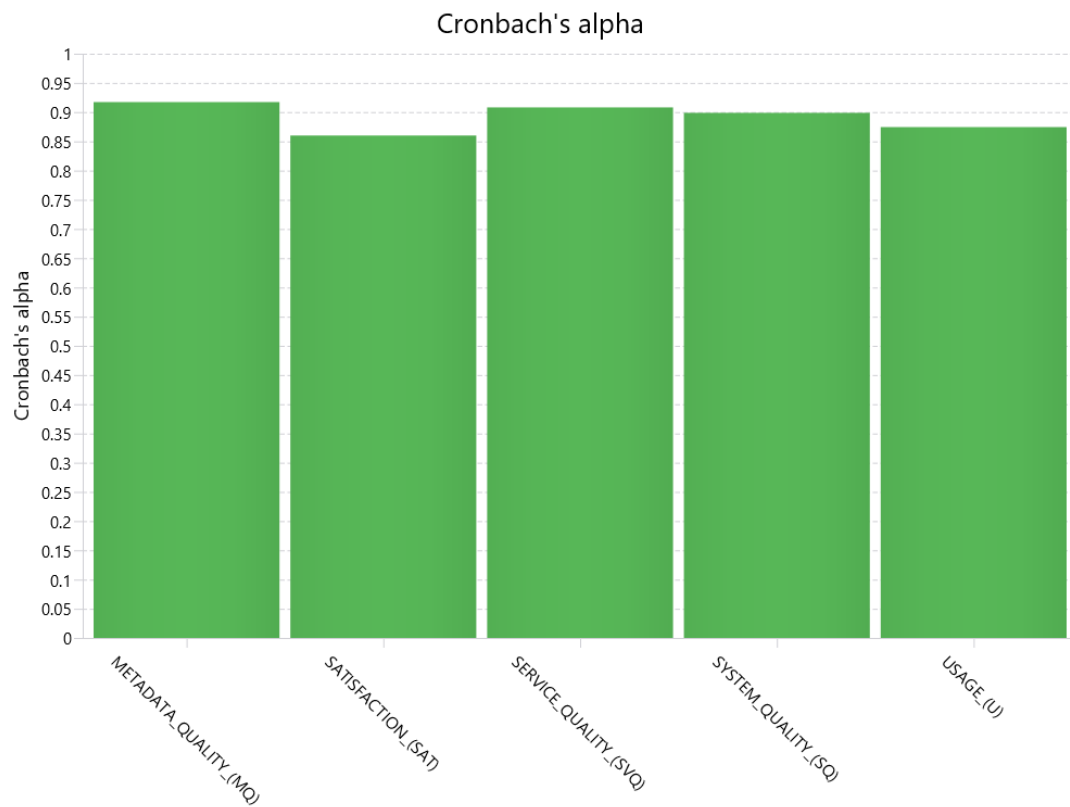


Figure 4.6: Composite Reliability (pa) Bar Chart

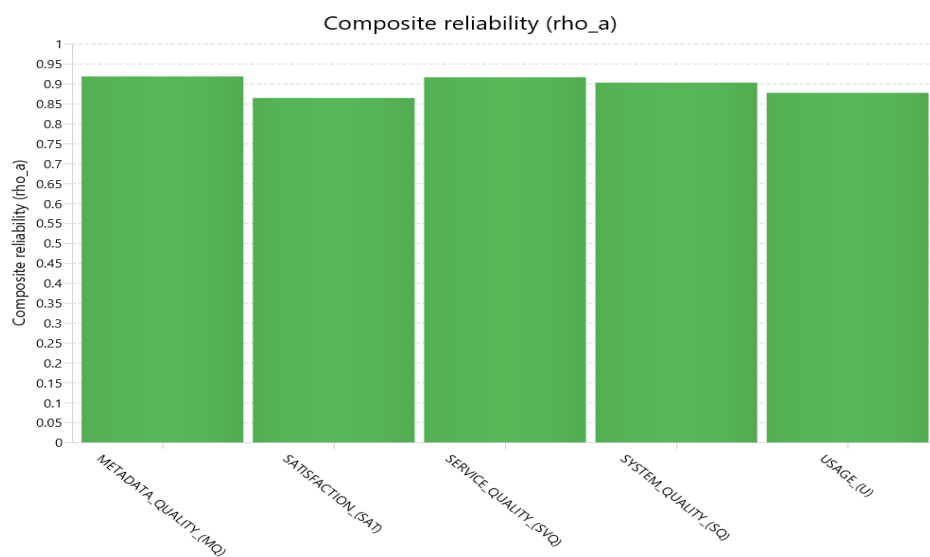
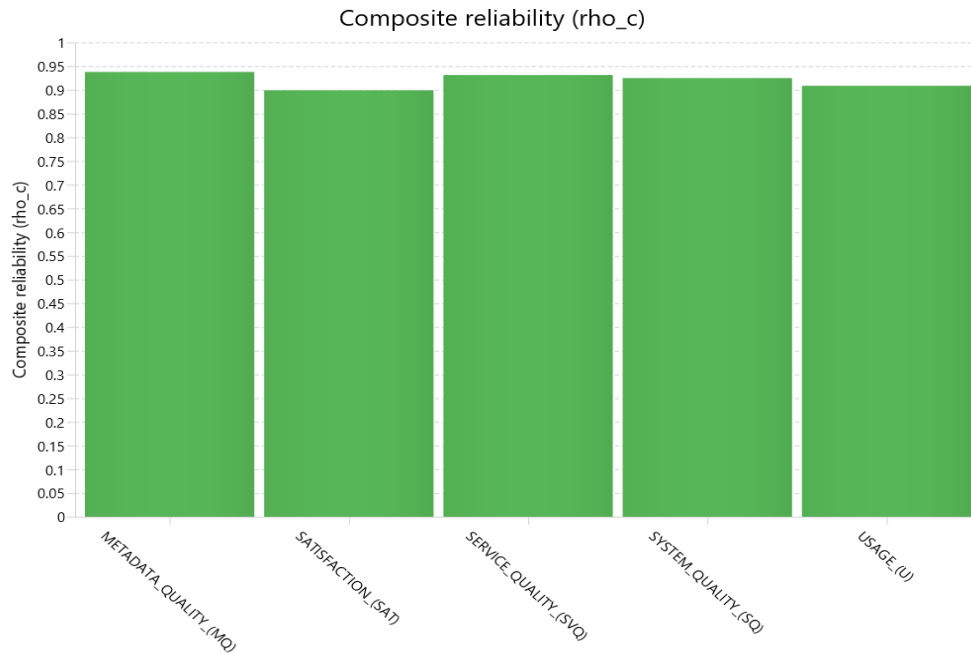


Figure 4.7: Composite Reliability (pc) Bar Chart



The results indicate that:

- Cronbach's Alpha values range from 0.860 to 0.917,
- Composite Reliability (pa) values range from 0.864 to 0.918, and
- Composite Reliability (pc) values range from 0.899 to 0.938.

All values exceed the minimum recommended threshold of 0.70, demonstrating strong internal consistency reliability for all constructs. These findings confirm that the indicators within each construct are highly consistent in measuring their respective latent variables.

4.3.3 Convergent Validity

Convergent validity assesses the extent to which the indicators of a construct share a high proportion of variance in common. In PLS-SEM, convergent validity is evaluated using the Average Variance Extracted (AVE), where values of 0.50 or higher indicate that the construct explains more than half of the variance of its indicators (Hair et al., 2022).

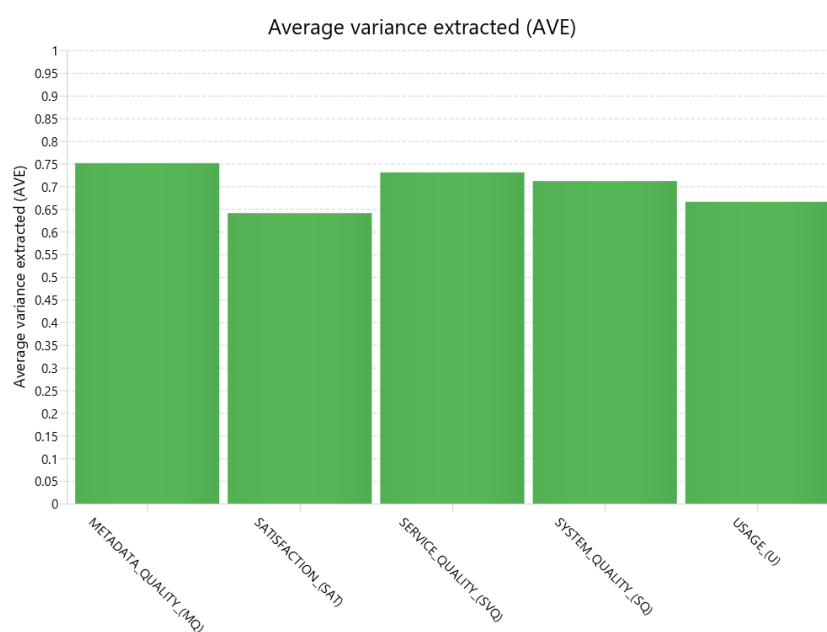
The convergent validity results are presented in *Table 4.6* and *Figure 4.8*. All constructs recorded AVE values ranging from 0.641 to 0.751, exceeding the recommended threshold of 0.50. These findings confirm that the measurement model

demonstrates adequate convergent validity, indicating that the indicators associated with each construct adequately represent their respective latent variables.

Table 4.6: Average Variance Extracted (AVE)

	Average variance extracted (AVE)
METADATA_QUALITY_(MQ)	0.751
SATISFACTION_(SAT)	0.641
SERVICE_QUALITY_(SVQ)	0.731
SYSTEM_QUALITY_(SQ)	0.712
USAGE_(U)	0.666

Figure 4.8: Average Variance Extracted Bar Chart (AVE Bar Chart)



These results demonstrate that:

- System Quality, Metadata Quality, and Service Quality adequately capture their respective indicator variance,
- Usage reflects consistent behavioural engagement with the system, and
- User Satisfaction indicators converge strongly to represent overall satisfaction with MyFoto.

Therefore, convergent validity is established for all constructs included in the measurement model.

4.3.4 Discriminant Validity

Discriminant validity assesses whether a construct is empirically distinct from other constructs in the model. In this study, discriminant validity was evaluated using the **Heterotrait–Monotrait Ratio (HTMT)**, which is currently regarded as a more rigorous criterion compared to traditional approaches such as the Fornell–Larcker criterion. According to Christian Henseler et al. (2015), HTMT values should be **below 0.90** to confirm discriminant validity.

The HTMT results are presented in **Table 4.7 (HTMT Matrix)**, **Table 4.8 (HTMT List)**

Table 4.7: Heterotrait–Monotrait Ratio Matrix (HTMT Matrix)

	METADATA_QUALITY_(MQ)	SATISFACTION_(SAT)	SERVICE_QUALITY_(SVQ)	SYSTEM_QUALITY_(SQ)	USAGE_(U)
METADATA_QUALITY_(MQ)					
SATISFACTION_(SAT)	0.116				
SERVICE_QUALITY_(SVQ)	0.107	0.197			
SYSTEM_QUALITY_(SQ)	0.09	0.218	0.114		
USAGE_(U)	0.201	0.583	0.331	0.474	

Table 4.8: Heterotrait–Monotrait Ratio List (HTMT List)

	Heterotrait-monotrait ratio (HTMT)
SATISFACTION_(SAT) <-> METADATA_QUALITY_(MQ)	0.116
SERVICE_QUALITY_(SVQ) <-> METADATA_QUALITY_(MQ)	0.107
SERVICE_QUALITY_(SVQ) <-> SATISFACTION_(SAT)	0.197
SYSTEM_QUALITY_(SQ) <-> METADATA_QUALITY_(MQ)	0.09
SYSTEM_QUALITY_(SQ) <-> SATISFACTION_(SAT)	0.218
SYSTEM_QUALITY_(SQ) <-> SERVICE_QUALITY_(SVQ)	0.114
USAGE_(U) <-> METADATA_QUALITY_(MQ)	0.201
USAGE_(U) <-> SATISFACTION_(SAT)	0.583
USAGE_(U) <-> SERVICE_QUALITY_(SVQ)	0.331
USAGE_(U) <-> SYSTEM_QUALITY_(SQ)	0.474

The analysis shows that all HTMT values are well below the recommended threshold of 0.90, with the highest observed value being 0.583, occurring between Usage and User Satisfaction. These results indicate that although the constructs are theoretically related—as expected within an information system success framework—they remain empirically distinct. This confirms that each construct captures a unique aspect of the MyFoto system experience and that discriminant validity is satisfactorily established.

4.3.5 Summary of Measurement Model Assessment

In summary, the measurement model assessment demonstrates that:

- All indicators exhibit strong indicator reliability,
- All constructs achieve high internal consistency reliability,
- Convergent validity is confirmed through AVE values exceeding 0.50, and

- Discriminant validity is established using the HTMT criterion.

Collectively, these findings indicate that the measurement model is robust, reliable, and valid, thereby providing a sound foundation for the evaluation of the structural model and hypothesis testing. The next section proceeds with the structural model assessment, including the evaluation of explanatory power, effect sizes, and the testing of direct and mediating relationships among constructs.

4.4 Structural Model Assessment

Following the establishment of a reliable and valid measurement model, the next stage of the PLS-SEM analysis involves the assessment of the structural model. The purpose of the structural model assessment is to evaluate the explanatory power of the proposed research framework and to examine the strength and relevance of the hypothesised relationships among the latent constructs.

Consistent with the procedures recommended by Hair et al. (2022), the structural model assessment focuses on two key criteria prior to hypothesis testing:

1. The coefficient of determination (R^2), which evaluates the model's explanatory power, and
2. The effect size (f^2), which assesses the relative contribution of each exogenous construct to the endogenous constructs.

These criteria provide important insights into how well the proposed model explains Usage and User Satisfaction in the MyFoto system context before examining the statistical significance of individual paths.

4.4.1 Coefficient of Determination (R^2)

The coefficient of determination (R^2) represents the proportion of variance in an endogenous construct that is explained by its predictor constructs. In the present study, two endogenous constructs are evaluated:

- Usage (U), predicted by System Quality, Metadata Quality, and Service Quality; and
- User Satisfaction (SAT), predicted by Usage.

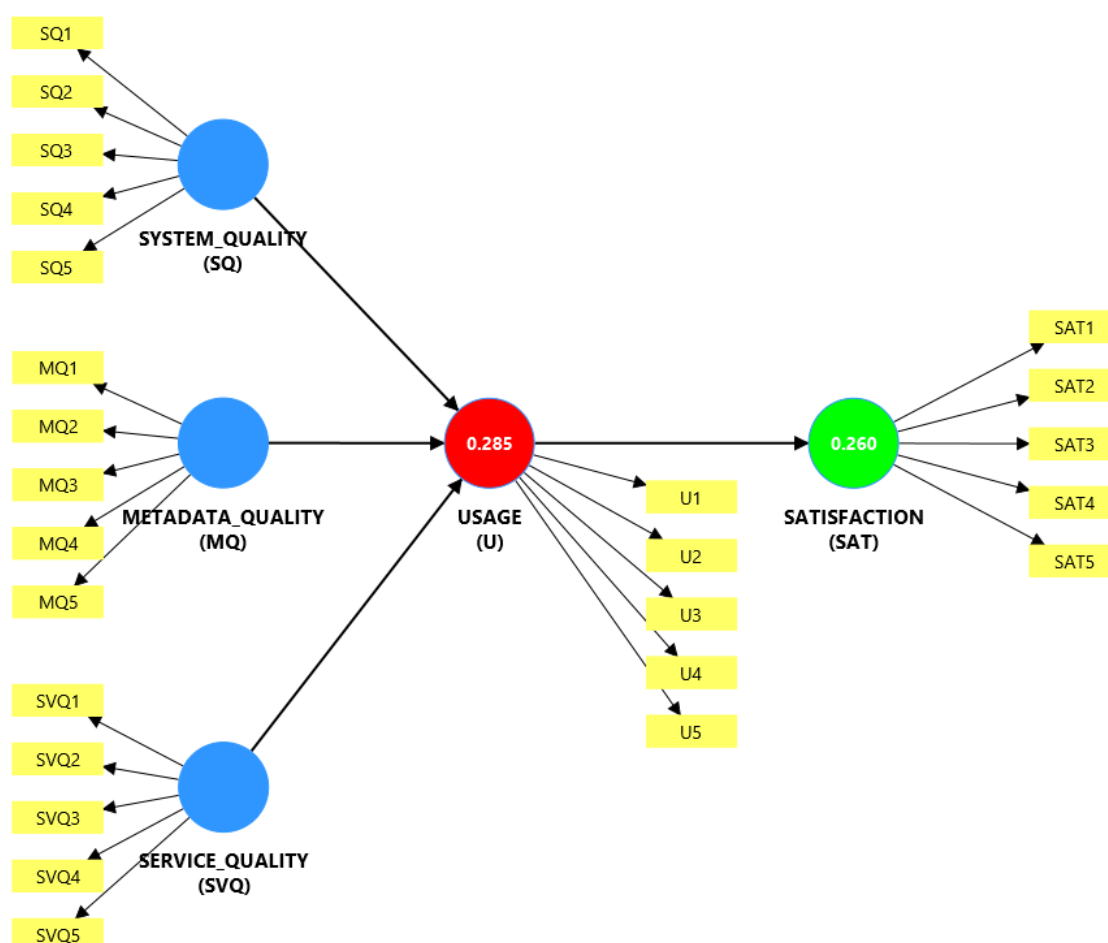
According to Hair et al. (2022), R^2 values of approximately 0.25, 0.50, and 0.75 can be interpreted as weak, moderate, and substantial explanatory power, respectively, although acceptable values may vary depending on the research context.

The R^2 results obtained from the PLS Algorithm are presented in **Table 4.9** (R^2 Overview) and visually illustrated in **Figure 4.8** (R^2 Overview) and Figure 4.9 (R^2 for Usage and Satisfaction).

Table 4.9: Coefficient of Determination (R^2)

	R-square	R-square adjusted
SATISFACTION_(SAT)	0.260	0.255
USAGE_(U)	0.285	0.270

Figure 4.9: Coefficient of Determination (R^2 Usage and Satisfaction)



As shown in **Table 4.9**, the R^2 value for Usage (U) is 0.285, indicating that System Quality, Metadata Quality, and Service Quality jointly explain 28.5% of the variance in Usage. This suggests that users' engagement with the MyFoto system is meaningfully influenced by their perceptions of system performance, metadata quality, and support services.

Similarly, the R^2 value for User Satisfaction (SAT) is 0.260, indicating that Usage explains 26.0% of the variance in User Satisfaction. This finding demonstrates that actual system usage plays a substantial role in shaping users' overall satisfaction with the MyFoto system.

Taken together, these R^2 values indicate that the proposed structural model demonstrates moderate explanatory power, which is considered acceptable and meaningful in behavioural and information systems research, particularly within organisational and public-sector contexts. The results support the theoretical assumption that system success in MyFoto is not solely determined by system qualities alone, but is realised through users' actual interaction and engagement with the system.

4.4.2 Effect Size (f^2)

While R^2 values indicate the overall explanatory power of the model, effect size (f^2) provides a more granular assessment of the relative impact of each exogenous construct on an endogenous construct. Specifically, f^2 measures the change in R^2 when a particular predictor is omitted from the model.

According to Cohen's (1988) guidelines, f^2 values of approximately:

- 0.02 indicate a small effect,
- 0.15 indicate a medium effect, and
- 0.35 indicate a large effect.

The effect size results for the present study are presented in **Table 4.9A** (f^2 Matrix).

Table 4.9A: Effect Size (f^2 Matrix)

f-square - Matrix					
	METADATA_QUALITY_(MQ)	SATISFACTION_(SAT)	SERVICE_QUALITY_(SVQ)	SYSTEM_QUALITY_(SQ)	USAGE_(U)
METADATA_QUALITY_(MQ)					0.048
SATISFACTION_(SAT)					
SERVICE_QUALITY_(SVQ)					0.084
SYSTEM_QUALITY_(SQ)					0.239
USAGE_(U)		0.351			

The analysis reveals the following patterns:

- **System Quality → Usage** exhibits a medium effect size, indicating that system-related attributes such as usability, reliability, and interface design play a substantial role in encouraging users to engage with MyFoto.
- **Service Quality → Usage** demonstrates a small-to-medium effect, suggesting that the availability of support services and assistance contributes to usage, although to a lesser extent than system-related factors.
- **Metadata Quality → Usage** shows a small effect, indicating that while metadata accuracy, completeness, and consistency are important, their influence on usage is more incremental in nature.
- **Usage → User Satisfaction** exhibits a medium-to-large effect size, highlighting Usage as the most influential predictor of User Satisfaction in the model.

These findings are theoretically significant, as they reinforce the central role of Usage as a behavioural mechanism through which quality dimensions translate into satisfaction. In other words, even when users perceive the system, metadata, and services positively, satisfaction is primarily realised when these qualities lead to meaningful and sustained system use.

4.4.3 Interpretation of Structural Model Strength

Overall, the structural model assessment demonstrates that the proposed framework possesses adequate explanatory strength and practical relevance. The moderate R^2 values indicate that the model captures a meaningful portion of user behaviour and satisfaction, while the f^2 results highlight the differential importance of individual predictors.

In particular, the results emphasise that:

- System Quality is the most influential quality dimension in driving Usage,
- Usage serves as a critical explanatory link between quality perceptions and satisfaction outcomes, and
- The behavioural pathway proposed by the DeLone and McLean IS Success Model is empirically supported within the MyFoto government archive context.

These findings provide a strong empirical basis for proceeding to hypothesis testing and mediation analysis, which are presented in the following sections.

4.5 Hypothesis Testing (Direct Effects: H1–H4)

Following the assessment of the structural model’s explanatory power, the next stage of analysis involves hypothesis testing of the direct relationships proposed in the research framework. This section examines the extent to which System Quality, Metadata Quality, and Service Quality influence Usage, as well as the effect of Usage on User Satisfaction.

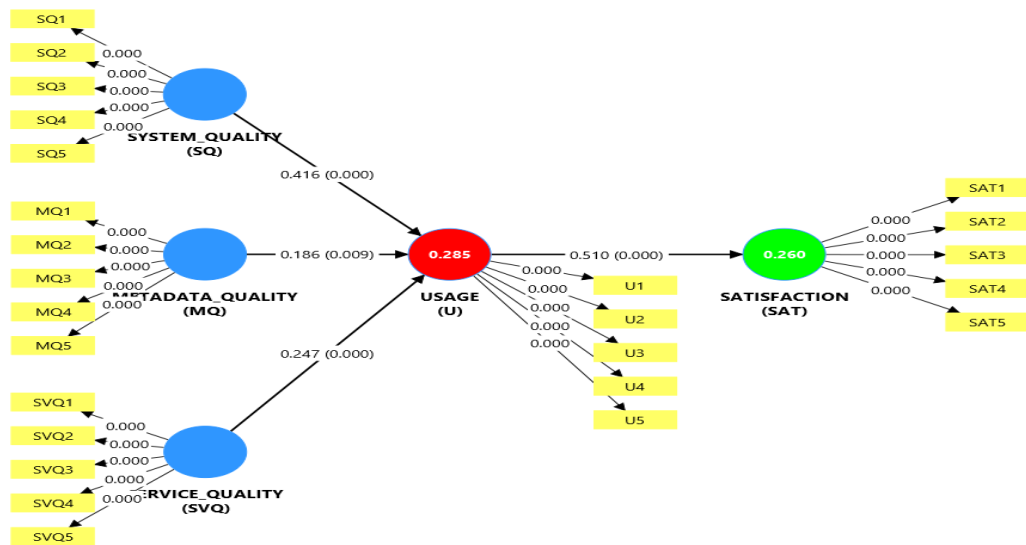
Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4 with 5,000 resamples, two-tailed testing, and a significance level of $\alpha = 0.05$, as recommended for mediation-oriented PLS-SEM studies (Hair et al., 2022). The bootstrapping results provide estimates of path coefficients (β), t-values, and p-values, which are used to determine the statistical significance and strength of each hypothesised relationship.

The results of the direct effects are summarised in **Figure 4.9A** (Path Coefficients – Bootstrapping Results) and illustrated in **Figure 4.9B** (Structural Model with Path Coefficients).

Table 4.9B: Path Coefficients (Bootstrapping Results)

Path coefficients - Mean, STDEV, T values, p values						Copy to Ex
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	
METADATA_QUALITY_(MQ) -> ...	0.186	0.195	0.072	2.604	0.009	
SERVICE_QUALITY_(SVQ) -> US...	0.247	0.252	0.065	3.774	0.000	
SYSTEM_QUALITY_(SQ) -> USA...	0.416	0.418	0.067	6.165	0.000	
USAGE_(U) -> SATISFACTION_(...	0.510	0.515	0.056	9.027	0.000	

Figure 4.9A: Structural Model (with Path Coefficients)



4.5.1 Effects of Quality Dimensions on Usage

- **H1: System Quality → Usage**

Hypothesis H1 proposes that System Quality has a significant positive effect on Usage of the MyFoto system.

The bootstrapping results indicate that the relationship between System Quality and Usage is positive and statistically significant

($\beta = 0.416$, $t = 6.165$, $p < 0.001$).

This finding supports H1 and suggests that users are more likely to engage actively with MyFoto when the system is perceived as easy to use, reliable, responsive, and supportive of work-related tasks. In the context of a government digital photo archive, system performance plays a critical role in encouraging consistent use, particularly for metadata-intensive activities such as uploading, searching, and retrieving photographic records.

- **H2: Metadata Quality → Usage**

Hypothesis H2 posits that Metadata Quality has a significant positive effect on Usage.

The results show that Metadata Quality significantly influences Usage

($\beta = 0.186$, $t = 2.604$, $p = 0.009$).

Although the magnitude of the effect is smaller compared to System Quality, the relationship remains statistically significant, thereby supporting H2. This finding indicates that accurate, complete, and well-structured metadata enhances users' ability to locate and utilise photographic resources efficiently, which in turn encourages continued system usage.

This result is particularly relevant for MyFoto, where metadata functions as the primary mechanism for search precision and contextual understanding of visual records.

- **H3: Service Quality → Usage**

Hypothesis H3 proposes that Service Quality has a significant positive effect on Usage.

The bootstrapping analysis confirms that Service Quality significantly affects Usage

($\beta = 0.247$, $t = 3.774$, $p < 0.001$).

This result supports H3 and demonstrates that responsive support services, availability of guidance, and trust in technical assistance play an important role in sustaining user engagement with the system. In organisational environments such as JAPEN, where users may vary in technical proficiency, service support functions as an enabling factor that reduces barriers to system use.

4.5.2 Effect of Usage on User Satisfaction

- **H4: Usage → User Satisfaction**

Hypothesis H4 examines the relationship between Usage and User Satisfaction.

The results reveal a strong and statistically significant positive relationship between Usage and User Satisfaction

($\beta = 0.510$, $t = 9.027$, $p < 0.001$).

This finding provides strong support for H4 and confirms that higher levels of system usage substantially enhance users' overall satisfaction with MyFoto. The magnitude of this effect is the largest among the direct relationships tested, underscoring Usage as a key determinant of system success.

This result aligns closely with the behavioural logic of the DeLone and McLean IS Success Model (2003), which emphasises that system benefits and satisfaction are realised through actual system use rather than merely through positive perceptions of quality.

4.5.3 Summary of Direct Hypothesis Testing

In summary, all four direct hypotheses (H1–H4) are supported. The results demonstrate that:

- System Quality, Metadata Quality, and Service Quality each significantly influence Usage, and
- Usage has a strong positive effect on User Satisfaction.

These findings provide empirical support for the proposed quality → usage → satisfaction pathway and establish the foundation for examining the mediating role of Usage, which is addressed in the next section.

4.6 Mediation Analysis (Indirect and Total Effects: H5–H7)

Beyond the examination of direct effects, this study proposes that Usage functions as a mediating mechanism through which System Quality, Metadata Quality, and Service Quality influence User Satisfaction. Mediation analysis was therefore conducted to test hypotheses H5 to H7.

The mediation analysis was performed using the bootstrapping approach in SmartPLS 4, which directly estimates the specific indirect effects and their statistical significance without requiring assumptions of normality. This approach is consistent with contemporary mediation testing practices in PLS-SEM research (Hair et al., 2022).

The results of the mediation analysis are presented in **Table 4.9C** (Specific Indirect Effects) and **Table 4.6** (Total Effects), and visually supported by **Figure 4.9B** (Indirect Effects Path Diagram).

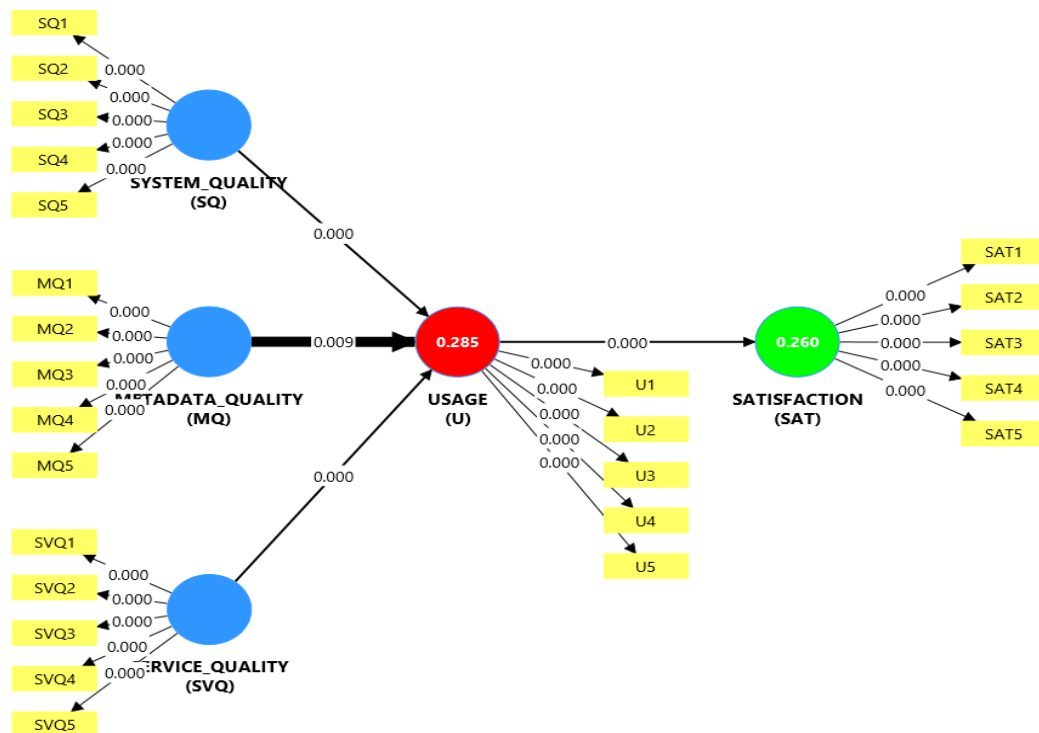
Table 4.9C: Specific Indirect Effects

Specific indirect effects - Mean, STDEV, T values, p values						Copy to Excel/Word	Copy to R
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values		
METADATA_QUALITY (MQ) -> USAGE (U) -> SATISFACTION (SAT)	0.095	0.100	0.039	2.435	0.015		
SERVICE_QUALITY (SVQ) -> USAGE (U) -> SATISFACTION (SAT)	0.126	0.131	0.039	3.232	0.001		
SYSTEM_QUALITY (SQ) -> USAGE (U) -> SATISFACTION (SAT)	0.212	0.216	0.042	5.011	0.000		

Table 4.9D: Total Effects

Total effects - Mean, STDEV, T values, p values						Copy to Excel/Word	Copy to R
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values		
METADATA_QUALITY (MQ) -> SATISFACTION (SAT)	0.095	0.100	0.039	2.435	0.015		
METADATA_QUALITY (MQ) -> USAGE (U)	0.186	0.195	0.072	2.604	0.009		
SERVICE_QUALITY (SVQ) -> SATISFACTION (SAT)	0.126	0.131	0.039	3.232	0.001		
SERVICE_QUALITY (SVQ) -> USAGE (U)	0.247	0.252	0.065	3.774	0.000		
SYSTEM_QUALITY (SQ) -> SATISFACTION (SAT)	0.212	0.216	0.042	5.011	0.000		
SYSTEM_QUALITY (SQ) -> USAGE (U)	0.416	0.418	0.067	6.165	0.000		
USAGE (U) -> SATISFACTION (SAT)	0.510	0.515	0.056	9.027	0.000		

Figure 4.9B: Indirect Effects Path Diagram



4.6.1 Mediation of Usage between System Quality and User Satisfaction (H5)

- Hypothesis H5 proposes that Usage mediates the relationship between System Quality and User Satisfaction.

The indirect effect of System Quality on User Satisfaction via Usage is positive and statistically significant

($\beta = 0.212$, $t = 5.011$, $p < 0.001$).

This result supports H5 and indicates that System Quality enhances User Satisfaction primarily by encouraging greater system usage. In other words, even when users perceive the system as technically sound, satisfaction is realised when those system qualities translate into active engagement with MyFoto.

Among the three mediated relationships tested, this pathway exhibits the strongest indirect effect, highlighting the central role of system performance in driving satisfaction through behavioural use.

4.6.2 Mediation of Usage between Metadata Quality and User Satisfaction (H6)

- Hypothesis H6 examines whether Usage mediates the relationship between Metadata Quality and User Satisfaction.

The indirect effect is found to be statistically significant

($\beta = 0.095$, $t = 2.435$, $p = 0.015$).

This finding supports H6 and indicates that Metadata Quality contributes to User Satisfaction by facilitating more effective system usage. While the indirect effect is smaller in magnitude compared to System Quality, it remains meaningful, particularly in a metadata-driven system such as MyFoto.

This result suggests that improvements in metadata accuracy, completeness, and clarity enhance satisfaction primarily when they lead to more efficient search, retrieval, and utilisation of photographic records.

4.6.3 Mediation of Usage between Service Quality and User Satisfaction (H7)

- Hypothesis H7 proposes that Usage mediates the relationship between Service Quality and User Satisfaction.

The bootstrapping results show a significant indirect effect

($\beta = 0.126$, $t = 3.232$, $p = 0.001$).

This supports H7 and indicates that service-related factors—such as responsiveness of support staff and availability of assistance—enhance satisfaction by enabling smoother and more confident system usage. In this context, service quality acts as a facilitative

mechanism that reduces usage barriers and strengthens users' overall experience with MyFoto.

4.6.4 Interpretation of Mediation Effects

The mediation analysis demonstrates that Usage plays a partial mediating role in all three quality–satisfaction relationships. While this study focuses on the indirect pathways, the significant mediation effects confirm that quality improvements alone are insufficient to maximise satisfaction unless they are translated into actual system use.

These findings provide strong empirical support for the behavioural pathway proposed in the DeLone and McLean IS Success Model (2003) and validate the positioning of Usage as a central mechanism in explaining system success within a government digital photo archive environment.

4.7 Qualitative Insights from Open-Ended Responses (Supportive Findings)

In addition to the quantitative analysis conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM), this study incorporated an open-ended question at the end of the questionnaire to capture respondents' qualitative feedback regarding their experiences with the MyFoto system. The inclusion of this open-ended question was intended to provide supplementary insights that could contextualise and enrich the interpretation of the quantitative findings, rather than to function as an independent qualitative investigation.

A total of 150 valid responses were reviewed for the open-ended question. The responses were analysed using a thematic summarisation approach, whereby recurring ideas, concerns, and suggestions were identified, categorised, and synthesised into key themes. This approach is appropriate for survey-based research that adopts a predominantly quantitative design, as it enables qualitative insights to support and triangulate statistical findings while remaining aligned with the explanatory objectives of the study.

Overall, the qualitative feedback demonstrates strong convergence with the quantitative SEM results, particularly in relation to the importance of system quality,

metadata quality, service support, and actual system usage in shaping user satisfaction within the MyFoto environment.

4.7.1 Key Themes Identified from Open-Ended Responses

Analysis of the open-ended responses revealed several recurring themes reflecting users' practical experiences and expectations of the MyFoto system. The most frequently mentioned themes are summarised in *Table 4.9E*.

Table 4.9E: Summary of Key Themes from Open-Ended Responses (n = 150)

Theme	Description	Illustrative Response (Excerpt)
Metadata completeness and accuracy	Respondents emphasised the importance of detailed, standardised, and accurate metadata for efficient retrieval of photographic records.	Clear and complete metadata really helps me find photos faster.
System performance and stability	System speed, responsiveness, and operational stability were identified as important factors affecting daily workflow efficiency.	The system is stable, but faster loading would improve productivity.
Search and filtering functionality	Advanced search capabilities, including keyword search and metadata-based filtering, were frequently highlighted as useful features.	Filtering by metadata makes searching much easier.
Usage dependency in daily tasks	Many respondents reported frequent reliance on MyFoto for reporting, documentation, and official communication activities.	I use MyFoto almost daily for reporting and documentation.
Training and user guidance	Respondents suggested the need for additional user training sessions, manuals, and onboarding guidance for new staff.	Short training sessions would help new users understand the system better.

Note: Responses are presented anonymously and have been lightly edited for clarity without altering their original meaning.

4.7.2 Interpretation of Qualitative Findings

The qualitative themes identified provide meaningful support for the quantitative findings reported earlier in this chapter. First, frequent references to metadata completeness and accuracy directly reinforce the significant effect of Metadata Quality on Usage observed in the structural model (H3). Respondents consistently indicated that well-structured metadata enhances their ability to search,

retrieve, and reuse photographic records efficiently, underscoring the operational importance of metadata quality in a government photo archive context.

Second, feedback related to system performance and stability aligns with the strong and significant relationship between System Quality and Usage (H1). Users' emphasis on responsiveness and reliability reflects the practical reality that system benefits can only be realised when technical performance adequately supports routine work processes.

Third, comments highlighting strong reliance on MyFoto for daily work tasks provide qualitative confirmation of the central role of Usage as a mediating construct. This finding supports the empirical result that Usage significantly influences User Satisfaction (H4) and mediates the relationships between quality dimensions and satisfaction (H5–H7). The qualitative responses suggest that satisfaction is not merely a passive perception of system quality, but an outcome derived from sustained and meaningful system use.

Finally, suggestions related to training and user guidance complement the quantitative findings on Service Quality. While Service Quality demonstrated a significant effect on Usage, the qualitative feedback indicates that enhanced training initiatives and clearer user support mechanisms could further strengthen system adoption and satisfaction, particularly among newer users.

4.7.3 Integration of Qualitative and Quantitative Findings

Taken together, the qualitative insights serve to triangulate and strengthen the quantitative SEM results. The open-ended responses do not introduce contradictory evidence; instead, they provide contextual explanations for why System Quality, Metadata Quality, and Service Quality influence Usage and, ultimately, User Satisfaction.

Importantly, these qualitative findings support the theoretical logic of the DeLone and McLean Information Systems Success Model (2003), which emphasises that system success is realised through actual system use and user experience. In the context of MyFoto, the qualitative feedback illustrates how system success is operationalised through everyday archival activities such as searching, retrieving, managing, and reusing photographic records in government operations.

4.8 Summary of Structural Model Findings

Overall, the results of the structural model assessment provide strong empirical support for the proposed research framework. The key findings can be summarised as follows:

- All direct hypotheses (H1–H4) are supported, indicating that System Quality, Metadata Quality, and Service Quality significantly influence Usage, and that Usage significantly influences User Satisfaction.
- Usage significantly mediates the relationships between System Quality, Metadata Quality, Service Quality, and User Satisfaction (H5–H7), confirming the presence of indirect behavioural pathways.
- Among all constructs, Usage emerges as the most influential factor in explaining User Satisfaction, highlighting its central role within the MyFoto system success model.

These findings confirm the robustness and explanatory power of the proposed research framework and empirically validate the behavioural pathway proposed by the DeLone and McLean IS Success Model (2003) within a government digital photo archive context. Collectively, the results establish a strong empirical foundation for the theoretical discussion, implications, and recommendations presented in Chapter Five.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter provides a comprehensive discussion of the empirical findings presented in Chapter Four by interpreting them in relation to the research objectives, hypotheses, and theoretical foundations established in Chapters One and Two. While the preceding chapter focused on reporting the statistical outcomes derived from the Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis, the present chapter moves beyond numerical results to critically examine their theoretical meaning, practical relevance, and broader implications.

The central aim of this study was to examine how System Quality (SQ), Metadata Quality (MQ), and Service Quality (SVQ) influence User Satisfaction (SAT), with Usage (U) acting as a mediating mechanism, within the context of the MyFoto government digital photo archive system operated by the Jabatan Penerangan Malaysia (JAPEN). This investigation is grounded in the DeLone and McLean Information Systems (IS) Success Model, which conceptualises system success as a dynamic process whereby quality dimensions shape user behaviour, leading to experiential outcomes such as satisfaction.

Accordingly, this chapter is structured to systematically discuss the key empirical findings in relation to each hypothesis (H1–H7), integrate quantitative and qualitative insights, and articulate the theoretical and practical contributions of the study. The chapter concludes by addressing study limitations and proposing directions for future research.

5.2 Discussion of Key Findings: Direct Relationships

5.2.1 System Quality and Usage (H1)

The findings indicate that System Quality has a strong and statistically significant effect on Usage, providing empirical support for Hypothesis H1. This result

suggests that users are more likely to engage actively with the MyFoto system when it is perceived as technically reliable, responsive, easy to navigate, and stable.

From a theoretical standpoint, this finding reinforces the argument that system quality functions as a foundational enabler of user behaviour. Within the IS success literature, system quality is often conceptualised as the technical infrastructure that determines whether users are willing and able to interact with a system. In government environments, where systems are frequently mandated but not always enthusiastically adopted, technical shortcomings can quickly translate into resistance or superficial use.

In the MyFoto context, system quality is particularly critical because the system supports operationally intensive tasks such as photographic retrieval for media reporting, archival documentation, and institutional record-keeping. If the system fails to perform efficiently, users may seek alternative informal practices, thereby undermining the system's intended role. The strong relationship observed in this study therefore highlights that system quality is not merely a technical attribute but a behavioural determinant that shapes how deeply a system is embedded into daily work routines.

The qualitative findings further strengthen this interpretation. Respondents repeatedly emphasised system speed, interface clarity, and operational stability as essential features that support their productivity. This convergence between quantitative and qualitative evidence confirms that system quality is a prerequisite for meaningful usage in a government digital archive environment.

5.2.2 Service Quality and Usage (H2)

The analysis also demonstrates a significant positive relationship between Service Quality and Usage, thereby supporting Hypothesis H2. This finding underscores the importance of human and organisational support structures in sustaining user engagement with digital systems.

Service quality encompasses elements such as responsiveness of support staff, availability of assistance, training provision, and clarity of user guidance. In public-sector organisations, where users often possess diverse levels of technical competence, these service-related factors play a crucial role in reducing uncertainty and facilitating system adoption.

Although the effect size of Service Quality is smaller than that of System Quality, its statistical significance indicates that technical performance alone is insufficient to guarantee sustained use. Instead, users require reassurance that assistance is available when challenges arise. The qualitative feedback regarding the need for additional training and clearer guidelines provides contextual insight into this relationship, suggesting that service quality acts as a safety net that enables continued and confident usage.

This finding aligns with IS research that highlights the socio-technical nature of system success, particularly in institutional settings where organisational support can shape user attitudes and behaviours over time.

5.2.3 Metadata Quality and Usage (H3)

Metadata Quality was also found to have a significant positive effect on Usage, supporting Hypothesis H3. Although the magnitude of this effect is comparatively smaller, its significance is theoretically and practically meaningful within a digital archival context.

Metadata quality directly influences users' ability to search, retrieve, interpret, and reuse photographic records. In systems such as MyFoto, where the primary value lies in efficient access to visual information, metadata completeness, accuracy, and consistency are essential for operational effectiveness. Poor metadata quality increases cognitive load, prolongs search time, and may discourage users from relying on the system.

The qualitative findings strongly reinforce this result, with respondents frequently highlighting the importance of detailed and well-structured metadata for efficient retrieval. This suggests that metadata quality operates as a behavioural enabler: users may not consciously evaluate metadata quality as a separate construct, but they experience its impact through smoother system interaction.

From a theoretical perspective, this finding extends IS success research by demonstrating that information quality—specifically metadata quality—plays an indirect yet critical role in shaping usage behaviour within archival systems.

5.2.4 Usage and User Satisfaction (H4)

One of the most salient findings of this study is the strong and statistically significant effect of Usage on User Satisfaction, confirming Hypothesis H4. This result indicates that satisfaction with MyFoto is primarily derived from actual system engagement rather than from abstract perceptions of quality alone.

This finding provides strong empirical support for the behavioural logic of the DeLone and McLean IS Success Model, which posits that system benefits are realised through use. In the MyFoto environment, users who frequently interact with the system—by searching, retrieving, and managing photographic records—are more likely to perceive the system as valuable and satisfying.

The qualitative responses further substantiate this interpretation, as many respondents described MyFoto as an integral component of their daily work processes. This suggests that satisfaction emerges cumulatively through repeated interaction and experiential learning, rather than through isolated system evaluations.

5.3 Discussion of Mediation Effects: The Central Role of Usage (H5–H7)

A key theoretical contribution of this study lies in its empirical validation of Usage as a mediating mechanism linking quality dimensions to User Satisfaction.

5.3.1 Mediation of System Quality and Satisfaction (H5)

The mediation analysis reveals that Usage significantly mediates the relationship between System Quality and User Satisfaction. This indicates that system quality enhances satisfaction primarily by encouraging sustained and effective system use.

Rather than exerting a purely direct influence, system quality creates the conditions necessary for users to engage meaningfully with MyFoto. This finding reinforces the argument that technical excellence alone does not guarantee satisfaction unless it translates into actual usage behaviour.

5.3.2 Mediation of Metadata Quality and Satisfaction (H6)

Usage also mediates the relationship between Metadata Quality and Satisfaction. This result highlights the behavioural pathway through which metadata quality contributes to system success. Users benefit from high-quality metadata through

improved retrieval efficiency, which enhances their overall system experience and satisfaction.

This mediated relationship emphasises that metadata quality functions as an enabling infrastructure that supports user behaviour, rather than as an outcome in itself.

5.3.3 Mediation of Service Quality and Satisfaction (H7)

The mediation effect observed for Service Quality confirms that support services influence satisfaction indirectly by enabling continued system use. Effective service support reduces usage barriers, particularly during learning or troubleshooting phases, thereby contributing to positive user experiences over time.

Collectively, these mediation findings position Usage as the central behavioural conduit through which system, metadata, and service qualities translate into user satisfaction.

5.4 Integration of Quantitative and Qualitative Findings

The integration of quantitative SEM results with qualitative open-ended feedback enhances the explanatory depth and credibility of the study. The qualitative insights do not contradict the statistical findings; rather, they provide contextual explanations for the observed relationships.

Users' emphasis on metadata completeness, system performance, and training needs directly aligns with the significant effects identified in the structural model. This triangulation strengthens the robustness of the proposed framework and supports the validity of the study's conclusions.

5.5 Theoretical Contributions

This study makes several notable contributions to IS and digital archival literature:

1. It empirically validates Usage as a mediating construct in a government digital photo archive context.
2. It highlights metadata quality as a behavioural enabler rather than merely a technical attribute.

3. It reinforces the behavioural foundation of IS success models by demonstrating that satisfaction is primarily usage-driven.

5.6 Practical Implications

The findings offer actionable implications for JAPEN and similar government agencies:

- System development should prioritise usability, responsiveness, and stability.
- Metadata governance frameworks should be institutionalised to ensure consistency and accuracy.
- Continuous training and responsive support services should be embedded into organisational practice.
- Usage metrics should be monitored as a key indicator of system success.

5.7 Limitations and Directions for Future Research

Despite its contributions, this study is subject to several limitations. The cross-sectional design restricts causal inference, and the focus on a single system limits generalisability. Future research could adopt longitudinal designs, incorporate additional behavioural constructs, or compare multiple archival systems across agencies.

5.8 Conclusion

In conclusion, this study demonstrates that System Quality, Metadata Quality, and Service Quality influence User Satisfaction primarily through the mediating role of Usage. By validating this behavioural pathway within the MyFoto government photo archive system, the study advances both IS success theory and practical understanding of digital archive management in the public sector.

The findings underscore that the success of government digital archives depends not only on technical design but on how effectively systems are integrated into everyday organisational practices through sustained and meaningful use.

5.9 Limitations of the Study and Recommendation

5.9.1 Limitation of the Study

Despite the valuable empirical insights generated by this study, several limitations should be acknowledged when interpreting the findings.

First, the study employed a cross-sectional research design, which restricts the ability to draw strong causal inferences regarding the relationships between System Quality, Metadata Quality, Service Quality, Usage, and User Satisfaction. The data were collected at a single point in time; therefore, longitudinal variations in user behaviour and satisfaction could not be fully examined.

Second, the research focused on a single institutional system, namely the MyFoto digital photo archive. Although the system represents an important government information infrastructure, the concentration on one platform may limit the generalisability of the findings to other digital archival systems, institutions, or organisational contexts.

Third, the sampling scope was primarily concentrated at the headquarters level, as respondents from all state offices across Malaysia could not be comprehensively included within the limited research timeframe. Consequently, potential regional variations in system usage practices, operational workflows, and user experience may not be fully reflected in the dataset.

Fourth, the relatively short data collection period (approximately one to two months) may not capture seasonal or operational fluctuations in system usage, particularly during periods involving intensive government communication activities or national event coverage.

Finally, the study relied on self-reported questionnaire data, which may be subject to response bias, including social desirability bias and common method variance, despite the procedural measures implemented to minimise these effects.

5.9.2 Recommendations for Future Research

Based on the identified limitations, several directions for future research are recommended.

First, future studies may adopt a longitudinal research design to examine changes in system usage behaviour and user satisfaction over time, thereby providing stronger evidence of causal relationships within the information systems success framework.

Second, comparative studies involving multiple government digital archival systems or inter-agency repositories could enhance the external validity of the findings and provide broader insights into digital archive performance within the public sector.

Third, future research may expand the geographical coverage of respondents by including users from state-level offices and regional operational units to capture contextual variations in system utilisation and service delivery environments across Malaysia.

Fourth, researchers are encouraged to incorporate mixed-method approaches, such as usability testing, system log analysis, or in-depth interviews, to complement survey-based findings and provide deeper behavioural and operational insights into digital archive usage.

Finally, future studies may focus specifically on system-level performance evaluation, particularly examining search performance, retrieval effectiveness, metadata indexing accuracy, and interface usability of digital photo archive systems. Such targeted investigations would provide a more technical assessment of how system functionality directly influences information retrieval efficiency and organisational workflow effectiveness.

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APPENDICES

Dear Participant,

You are invited to participate in a research study entitled **“Examining the Effects of System, Metadata, and Service Quality on User Satisfaction with the Mediating Role of Usage: A Case Study of MyFoto.”** This study is conducted as part of the postgraduate research requirement for the **Master of Science in Information Management** at the **Faculty of Information Science, Universiti Teknologi MARA (UiTM)**.

The objective of this study is to examine the effects of **system quality, metadata quality, and service quality** on **user satisfaction**, with **Usage** acting as a **mediating variable**, specifically within the context of the **MyFoto government digital photo archive system** operated by **Jabatan Penerangan Malaysia (JAPEN)**.

Your participation involves completing an online questionnaire, which will take approximately **10–15 minutes**. There are no right or wrong answers. All responses will be treated with strict confidentiality and will be used solely for academic and research purposes. Participation is entirely voluntary, and you may withdraw at any time without any consequences.

If you have any questions or require further clarification, please do not hesitate to contact the researcher.

Thank you for considering participation in this study. Your contribution is sincerely appreciated.

Sincerely,

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Postgraduate Student

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Salam Sejahtera,

Tuan/Puan dijemput untuk menyertai satu kajian penyelidikan bertajuk “**Menilai Kesan Kualiti Sistem, Metadata dan Perkhidmatan terhadap Kepuasan Pengguna dengan Peranan Pengantara Penggunaan: Kajian Kes MyFoto.**” Kajian ini dijalankan sebagai sebahagian daripada keperluan pengajian **Sarjana Sains Pengurusan Maklumat di Fakulti Sains Maklumat, Universiti Teknologi MARA (UiTM).**

Objektif kajian ini adalah untuk mengkaji kesan **kualiti sistem, kualiti metadata dan kualiti perkhidmatan** terhadap **kepuasan pengguna**, dengan **Penggunaan (Usage)** sebagai pemboleh ubah pengantara, dalam konteks **sistem arkib foto digital kerajaan MyFoto** yang digunakan oleh **Jabatan Penerangan Malaysia (JAPEN).**

Penyertaan Tuan/Puan melibatkan pengisian soal selidik atas talian yang mengambil masa lebih kurang **10–15 minit**. Tiada jawapan betul atau salah, dan semua maklumat akan dirahsiakan sepenuhnya serta hanya digunakan untuk tujuan akademik. Penyertaan adalah secara sukarela dan Tuan/Puan boleh menarik diri pada bila-bila masa tanpa sebarang implikasi.

Sekiranya terdapat sebarang pertanyaan, Tuan/Puan boleh menghubungi penyelidik.

Terima kasih atas kesudian Tuan/Puan untuk menyertai kajian ini. Sumbangan anda amat dihargai.

Yang benar,

Almunirah binti Alam

Pelajar Sarjana

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EXAMINING THE EFFECTS OF SYSTEM, METADATA, AND SERVICE QUALITY ON USER SATISFACTION WITH THE MEDIATING ROLE OF USAGE: A CASE STUDY OF MYFOTO / MENILAI KESAN KUALITI SISTEM, METADATA DAN PERKHIDMATAN TERHADAP KEPUASAN PENGGUNA DENGAN PERANAN PENGANTARA PENGGUNAAN: KAJIAN KES MYFOTO

INSTRUCTIONS / ARAHAN

Please read each statement carefully and indicate your level of agreement by selecting the appropriate response using the scale below.

Sila baca setiap pernyataan dengan teliti dan nyatakan tahap persetujuan anda berdasarkan skala berikut]:

Scale / Skala:

1 = Strongly Disagree / Sangat Tidak Setuju

2 = Disagree / Tidak Setuju

3 = Neutral

4 = Agree / Setuju

5 = Strongly Agree / Sangat Setuju

There are no right or wrong answers. We are interested only in your honest opinion.

[Tiada jawapan betul atau salah. Kami hanya berminat dengan pandangan jujur anda].

Please answer the following demographic questions. Your responses will remain confidential and are used solely for statistical analysis. *Sila jawab soalan demografi berikut. Jawapan anda akan dirahsiakan dan hanya digunakan untuk analisis statistik.*

PART A – DEMOGRAPHIC INFORMATION / BAHAGIAN A – MAKLUMAT DEMOGRAFI

1. What is your age? / Berapakah umur anda?

- ☐ 18–24
- ☐ 25–34
- ☐ 35–44
- ☐ 45–54
- ☐ 55 and above / 55 ke atas

2. Gender / Jantina

- ☐ Male / Lelaki
- ☐ Female / Perempuan

3. Department / Division

Jabatan / Bahagian:

- ☐ Bahagian Media dan Komunikasi Korporat
- ☐ Bahagian Gerak Saraf dan Pengurusan Isu
- ☐ Bahagian Komunikasi Visual dan Senireka
- ☐ Bahagian Komunikasi dan Pembangunan Masyarakat
- ☐ Bahagian Media Siber
- ☐ Bahagian Dasar dan Perancangan Strategik
- ☐ Bahagian Penerbitan dan Dasar Negara
- ☐ Bahagian Pengurusan Sumber Manusia
- ☐ Bahagian Perhubungan Antarbangsa
- ☐ Bahagian Khidmat Pengurusan dan Kewangan
- ☐ Bahagian Teknologi Digital

4. Role / Position

Peranan / Jawatan:

- ☐ Pengarah
- ☐ Timbalan Pengarah
- ☐ Ketua Penolong Pengarah
- ☐ Penolong Pengarah
- ☐ Penolong Pegawai Penerangan
- ☐ Penolong Pegawai Tadbir
- ☐ Pembantu Penerangan
- ☐ Akauntan
- ☐ Penolong Akauantan
- ☐ Jurutera
- ☐ Juruaudio visual
- ☐ Ketua Pembantu Tadbir
- ☐ Penerbit Rancangan Pembantu Tadbir
- ☐ Penerbit Rancangan
- ☐ Penolong Jurutera
- ☐ Jurufoto Pembantu Penerangan
- ☐ Pembantu Tadbir
- ☐ Jurufoto Pembantu Penerangan
- ☐ Pembantu Tadbir
- ☐ Pereka
- ☐ Pustakawan
- ☐ Jurufotografi

- ☐ Penolong Pustakawan
- ☐ Pembantu Pustakawan
- ☐ MyStep
- ☐ Lain-lain

5. Have you ever used MyFoto or NeuCanvas?

Pernahkah anda menggunakan MyFoto?

- ☐ Yes / Ya
- ☐ No / Tidak

6. Years of service / Tempoh berkhidmat

- ☐ < 1 year
- ☐ 1–3 years
- ☐ 4–6 years
- ☐ 7–10 years
- ☐ 10 years above

Instruction / Arahan:

Please read each statement carefully and indicate how much you agree or disagree by selecting the appropriate response using the scale provided below. / *Sila baca setiap pernyataan dengan teliti dan nyatakan sejauh mana anda bersetuju atau tidak bersetuju dengan memilih respons yang paling sesuai berdasarkan skala di bawah.*

Scale:

1 = Strongly Disagree / Sangat Tidak Setuju

2 = Disagree / Tidak Setuju

3 = Neutral / Neutral

4 = Agree / Setuju

5 = Strongly Agree / Sangat Setuju

There are no right or wrong answers. We are only interested in your honest personal opinion. / *Tiada jawapan yang betul atau salah. Kami hanya berminat dengan pendapat jujur anda sendiri.*

PART B – SYSTEM QUALITY(SQ) / BAHAGIAN B – KUALITI SISTEM

(1 = Strongly Disagree / Sangat Tidak Setuju ... 5 = Strongly Agree / Sangat Setuju)

No.	Statement/Kenyataan	Likert Scale 1-5 / Skala Likert 1-5				
		1 - Strongly Disagree (Sangat Tidak Setuju)	2 - Disagree (Tidak Setuju)	3- Neutral (Neutral)	4 - Agree (Setuju)	5 - Strongly Agree (Sangat Setuju)
7.	The MyFoto system is easy to use. / Sistem MyFoto mudah digunakan.					
8.	MyFoto is fast and responsive when I access it. / MyFoto pantas <i>dan</i> responsif apabila diakses.					
9.	The MyFoto interface is clear and user-friendly. / Antara muka MyFoto jelas					

	dan mesra pengguna.					
10.	MyFoto is reliable and functions without frequent errors. / MyFoto boleh dipercayai dan jarang mengalami ralat.					
11.	MyFoto features and functions support my work efficiently. / Fungsi dan ciri MyFoto membantu kerja saya dengan lebih cekap.					

PART C – METADATA QUALITY (MQ) / BAHAGIAN C – KUALITI METADATA

No.	Statement/Kenyataan	Likert Scale 1-5 / Skala Likert 1-5				
		1 - Strongly Disagree (Sangat Tidak Setuju)	2 - Disagree (Tidak Setuju)	3- Neutral (Neutral)	4 - Agree (Setuju)	5 - Strongly Agree (Sangat Setuju)
12.	Metadata in MyFoto is accurate and reliable. / Metadata dalam MyFoto tepat dan boleh dipercayai.					
13.	Metadata records in MyFoto are complete and consistent. / Rekod metadata dalam MyFoto lengkap dan konsisten.					
14.	Metadata helps me find relevant photographs. / Metadata membantu saya mencari foto yang relevan.					
15.	Metadata is presented in a clear and readable format. / Metadata dipaparkan dengan jelas dan mudah dibaca.					
16.	Metadata fields are sufficient for effective searching and retrieval. / Medan metadata mencukupi untuk carian dan capaian foto yang berkesan.					

PART D – SERVICE QUALITY (SVQ) / BAHAGIAN D – KUALITI PERKHIDMATAN

No.	Statement/Kenyataan	Likert Scale 1-5 / Skala Likert 1-5				
		1 - Strongly Disagree (<i>Sangat Tidak Setuju</i>)	2 - Disagree (<i>Tidak Setuju</i>)	3- Neutral (<i>Neutral</i>)	4 - Agree (<i>Setuju</i>)	5 - Strongly Agree (<i>Sangat Setuju</i>)
17.	Support staff respond promptly to my inquiries. / Kakitangan sokongan memberi respon dengan cepat.					
18.	Staff provide clear and helpful guidance on using MyFoto. / Kakitangan memberi panduan yang jelas dan membantu.					
19.	Technical support is available when I face problems. / Sokongan teknikal tersedia apabila saya menghadapi masalah.					
20.	I trust the assistance provided by MyFoto support staff. / Saya percaya bantuan yang diberi oleh sokongan MyFoto.					
21.	Overall, I am satisfied with the support services for MyFoto. / Secara keseluruhan, saya puas hati dengan perkhidmatan sokongan MyFoto.					

PART E – USAGE (U)/ BAHAGIAN E – PENGGUNAAN

No	Statement/ <i>Kenyataan</i>	Likert Scale 1-5 / <i>Skala Likert 1-5</i>				
		1 - Strongly Disagree (<i>Sangat Tidak Setuju</i>)	2 - Disagre e (<i>Tidak Setuju</i>)	3- Neutral (<i>Neutral</i>)	4 - Agree (<i>Setuju</i>)	5 - Strongl y Agree (<i>Sanga t Setuju</i>)
22.	I frequently use MyFoto in my work. / Saya kerap menggunakan MyFoto dalam kerja.					
23.	I regularly search for photographs using MyFoto. / Saya kerap membuat carian foto menggunakan MyFoto.					
24.	I use MyFoto to view or download photos for tasks. / Saya guna MyFoto untuk melihat atau memuat turun foto bagi tugas.					
25.	I rely on MyFoto to complete documentation/communication work. / Saya bergantung pada MyFoto untuk dokumentasi/komunikasi rasmi.					
26.	MyFoto is my primary source when I need official photographs. / MyFoto ialah sumber utama saya apabila perlukan foto rasmi.					

PART F – USER SATISFACTION (SAT) / BAHAGIAN F – KEPUASAN PENGGUNA

No.	Statement/ Kenyataan	Likert Scale 1-5 / <i>Skala Likert 1-5</i>				
		1 - Strongly Disagree (<i>Sangat Tidak Setuju</i>)	2 - Disagree (<i>Tidak Setuju</i>)	3- Neutral (<i>Neutral</i>)	4 - Agree (<i>Setuju</i>)	5 - Strongly Agree (<i>Sangat Setuju</i>)
27.	Overall, I am satisfied with MyFoto. / Secara keseluruhan, saya berpuas hati dengan MyFoto.					
28.	MyFoto meets my expectations as a digital photo archive. / MyFoto memenuhi jangkaan saya sebagai arkib foto digital.					
29.	I am pleased with my experience using MyFoto. / Saya gembira dengan pengalaman menggunakan MyFoto.					
30.	I would recommend continued use of MyFoto to colleagues. / Saya akan mengesyorkan penggunaan MyFoto kepada rakan sekerja.					
31	MyFoto improves my efficiency in completing work-related tasks. / MyFoto meningkatkan kecekapan saya menyiapkan tugas kerja.					

PART G – ADDITIONAL INFORMATION (OPEN-ENDED)

Primary Purpose of Using MyFoto

32. What is your primary purpose for using the MyFoto system in your work?

(For example: documentation, media publication, reporting, archival retrieval, communication, or other purposes)

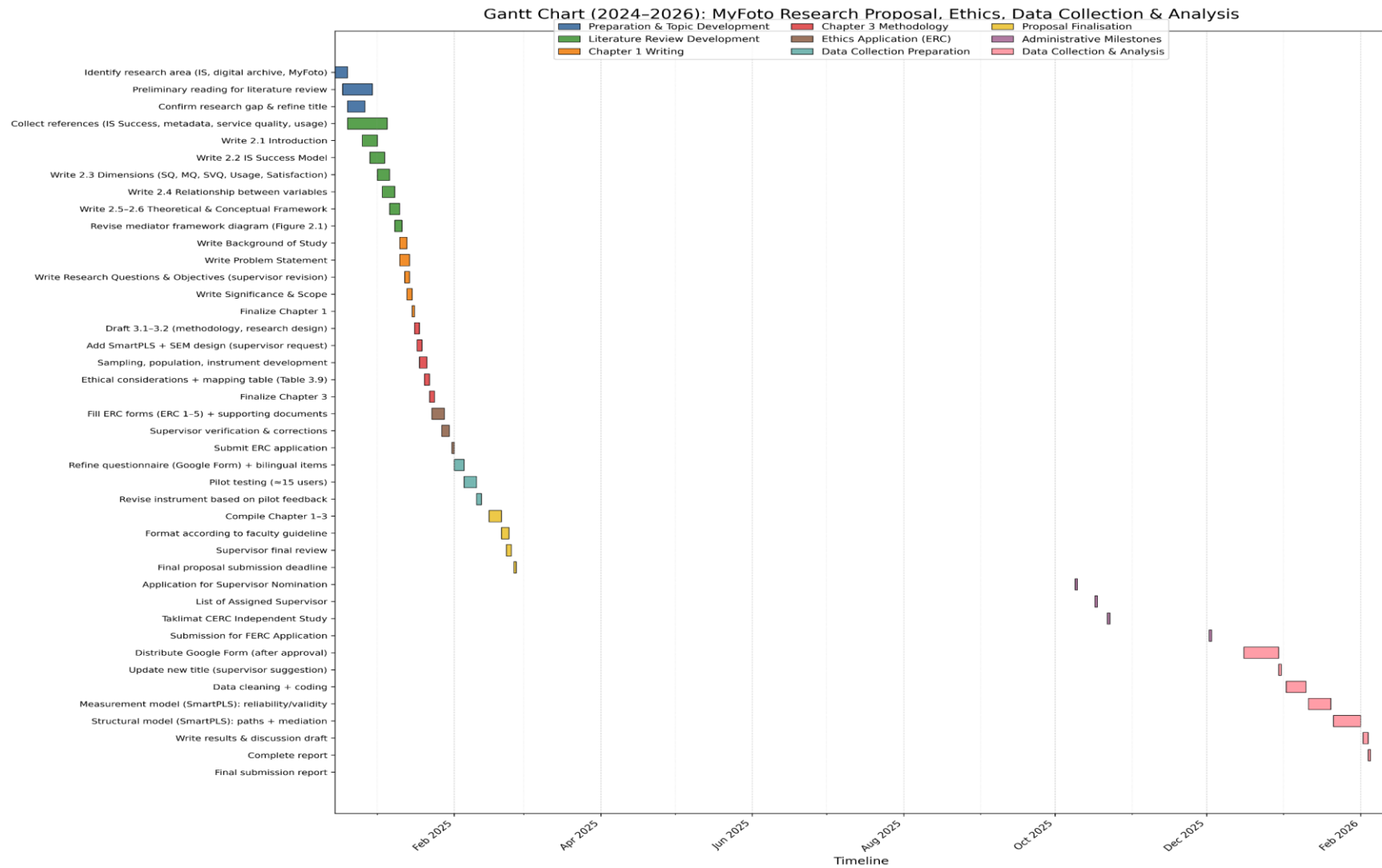
Bahasa Melayu:

Apakah tujuan utama anda menggunakan sistem MyFoto dalam tugas kerja anda?

(Contoh: dokumentasi, penerbitan media, pelaporan, capaian arkib, komunikasi, atau tujuan lain)

Answer/ Jawapan :

GANTT CHART





Our Reference : 800-FSM(PI.7/1/)(MR/42)
Date : 1447H رجب 25
15 January 2026

Dr Abdurrahman Bin Jalil
Almunirah Binti Alam (2024876902)
Fakulti Sains Maklumat
UiTM Kampus Puncak Perdana
40150 Shah Alam
SELANGOR

Dear Dr

APPROVAL LETTER - FACULTY ETHICS REVIEW COMMITTEE

Thank you for submitting your research proposal to the Faculty Ethics Review Committee (FERC). After considering your application, the Committee approved your proposal entitled **Examining the Effects of System, Metadata, and Service Quality on User Satisfaction with the Mediating Role of Usage: A Case Study of MyFoto**.

Details of the approval are as follows:

Ref. number:	800-FSM(PI.7/1/)(MR/42)
Approval Period:	26/11/2025 until 30/03/2026
Authorised personnel:	1. Dr Abdurrahman Bin Jalil 2. Almunirah Binti Alam (2024876902)

The Faculty Ethics Review Committee (FERC) operates in accordance with the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to FERC for approval.

If you require further information, please contact FERC Secretariat 03-7962 2006 or email afiqahamid@uitm.edu.my.

اوسهها، تقوى، مليا

"MALAYSIA MADANI"

"BERKHIDMAT UNTUK NEGARA"

Yours sincerely,

ASSOC PROF DR MAD KHIR JOHARI ABDULLAH SANI

Chairman

Faculty Ethics Review Committee, FSM

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Universiti Teknologi MARA
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Ruj. Kami : JAPEN.600-11/1/3 (4)
Tarikh : 12 November 2025

YBrs. Dr. Abdurrahman bin Jalil

Pensyarah Kanan

Fakulti Sains Maklumat

Universiti Teknologi MARA Cawangan Selangor

Kampus Puncak Perdana, Seksyen U10

40150 Shah Alam, Selangor

YBrs. Dr.,

KELULUSAN PERMOHONAN MENJALANKAN PENYELIDIKAN AKADEMIK DI JABATAN PENERANGAN MALAYSIA

Dengan segala hormatnya saya merujuk kepada surat daripada pihak YBrs. Dr. bertarikh **10 November 2025** bernombor rujukan **600-FSM (HEA-5/2/1)**.

2. Sukacita dimaklumkan bahawa Jabatan Penerangan Malaysia (JAPEN) melalui Bahagian Dasar dan Perancangan Strategik (BDPS) telah meneliti permohonan tersebut dan memberikan kebenaran kepada pelajar di bawah seliaan YBrs. Dr. iaitu **Puan Almunirah binti Alam (No. Pelajar: 2024876902)** untuk kajian dilaksanakan tertakluk kepada syarat-syarat seperti berikut:

- a) Pelaksanaan kajian adalah mengikut kaedah yang dimohon (soal selidik atas talian / kaedah kuantitatif) tanpa mengganggu operasi jabatan;
- b) Semua data responden hendaklah dirahsiakan, dianonimkan dan digunakan semata-mata bagi tujuan akademik, selaras dengan peraturan keselamatan maklumat kerajaan dan undang-undang berkaitan perlindungan data;
- c) Penyertaan adalah sukarela dan tidak melibatkan penzahiran maklumat terperinci atau sulit jabatan;
- d) Sebarang penggunaan logo, nama rasmi atau identiti korporat JAPEN memerlukan kelulusan bertulis daripada Pengurusan Tertinggi JAPEN;
- e) Semua laporan, dapatan atau penerbitan yang menggunakan maklumat jabatan wajib mendapat kelulusan bertulis JAPEN terlebih dahulu sebelum disiarkan atau digunakan bagi tujuan akademik; dan
- f) Satu salinan ringkasan dapatan (laporan eksekutif) dikemukakan kepada JAPEN bagi tujuan rujukan dasar dan penambahbaikan perkhidmatan selepas kajian selesai.

3. Sebarang hebahan atau edaran pautan soal selidik kepada warga kerja JAPEN (jika diperlukan) hendaklah diuruskan melalui saluran dalaman yang ditetapkan bagi memastikan keseragaman mesej dan pematuhan tatacara komunikasi jabatan.

4. Pihak jabatan menyambut baik kerjasama ini dan yakin dapatan kajian akan menyumbang kepada pengembangan ilmu serta penambahbaikan berasaskan bukti terhadap kualiti Perkhidmatan Awam. Sebarang pertanyaan dan maklum balas lanjut berhubung perkara ini pihak YBrS. Dr. boleh berhubung dengan **Cawangan Penyelidikan dan Naziran** melalui nombor perhubungan **03-8911 3591 / 5278**.

5. Segala perhatian YBrS. Dr. berhubung perkara ini amatlah dihargai dan didahului dengan ucapan terima kasih.

Sekian.

“MALAYSIA MADANI”

“BERKHIDMAT UNTUK NEGARA”

Saya yang menjalankan amanah,

(MUHAMMAD I BIN ABD RAHMAN)
Penolong Pengarah (Penyelidikan dan Naziran)
Bahagian Dasar dan Perancangan Strategik
Jabatan Penerangan Malaysia

s.k.: Pengarah Kanan (Pengurusan)
Jabatan Penerangan Malaysia

Pengarah
Bahagian Dasar dan Perancangan Strategik
Jabatan Penerangan Malaysia

AUTHOR'S PROFILE



Almunirah binti Alam obtained her Bachelor of Information Science (Hons.) in Information System Management (Second Class Upper) in 2024 from Universiti Teknologi MARA (UiTM), Malaysia. She has nearly 20 years of professional experience in the library and information management field, particularly within the government sector, where she has been actively involved in information organization, digital archive management, metadata administration, and photographic information services.

Her professional responsibilities include the acquisition, documentation, cataloguing, metadata management, preservation, and information service delivery for photographic and library materials, supporting institutional knowledge management and public information dissemination initiatives.