eISSN : 2287-4577
pISSN : 2287-9099
https://www.jistap.org
Vol. 14 No. 2 June 30, 2026

Journal of Information Science Theory and Practice

Journal of Information Science Theory and Practice

JISTaP

01 Bridging the Gaps in Information Security Risk Management in Higher Education: Challenges, Best Practices, and Future Directions
26 Job Satisfaction Among University Librarians and Library Staff in Myanmar: An Exploratory Study
50 Technology, Trust, and Context: A Socio-Technical Framework for DLT Implementation in Digital Archives
62 Open Science Adoption Barriers in Indonesia's Scholarly Communication System: A Pentahelix Analysis Combining a Systematic Literature Review and Interviews
81 Research Data Management Practices: A Comparative Study of Research Scholars from Engineering, Science, and Arts, Humanities, and Social Sciences
97 Exploring Platform-Mediated Health Information Behavior: ADHD Self-Diagnosis Intention on Video-Based Social Media Among Korean Young Adults

KiSTi www.kisti.re.kr

Indexed/Covered by SCOPUS, DOAJ, CrossRef, KCI, and KoreaScience

Vol. 14 | No. 2 | June 30, 2026

JISTaP
Journal of Information Science Theory and Practice

General Information

Aims and Scope

The Journal of Information Science Theory and Practice (*JISTaP*) is an international journal that aims at publishing original studies, review papers and brief communications on information science theory and practice. The journal provides an international forum for practical as well as theoretical research in the interdisciplinary areas of information science, such as information processing and management, knowledge organization, scholarly communication and bibliometrics. JISTaP will be published quarterly, issued on the 30th of March, June, September, and December. JISTaP is indexed in the Scopus, Korea Citation Index (KCI), Directory of Open Access Journals (DOAJ), and KoreaScience by the Korea Institute of Science and Technology Information (KISTI) as well as CrossRef. The full text of this journal is available on the website at http://www.jistap.org

Indexed/Covered by

Scopus DOAJ DIRECTORY OF OPEN ACCESS JOURNALS Crossref Cited-by 한국학술지인용색인 Korea Citation Index KoreaScience

Publisher

Korea Institute of Science and Technology Information
(02456) 66 Hoegi-ro, Dongdaemun-gu, Seoul, Republic of Korea
(T) +82-2-3299-6104
(F) +82-2-3299-6067
E-mail: jistap@kisti.re.kr
URL: https://www.kisti.re.kr

Yonsei University's Research Institute for Academic Library Development (RIALD)
(03722) 421 Widang Hall, Yonsei University, 50 Yonsei-ro, Seodaemun-gu, Seoul, Republic of Korea
(T) +82-2-2123-2405
(F) +82-2-393-8348
E-mail: thelibrary@yonsei.ac.kr
URL: https://thelibrary.yonsei.ac.kr

Managing Editor: Hyekyong Hwang, Eungi Kim

Copy Editor: Ken Eckert

Design & Printing Company: MEDrang Inc.

2nd Floor, Hyoryeong Building, 32 Mugyo-ro, Jung-gu, Seoul 04521, Korea
(T) +82-2-325-2093
(F) +82-2-325-2095
E-mail: info@medrang.co.kr
Homepage: www.medrang.co.kr

Open Access and Creative Commons License Statement

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

This paper meets the requirements of KS X ISO 9706, ISO 9706-1994 and ANSI/NISO Z39.48-1992 (Permanence of Paper).

2026 Copyright © Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development

JISTaP
Journal of Information Science Theory and Practice

Editorial Board

Co-Editors-in-Chief

Gary Marchionini
University of North Carolina, USA

Jee Yeon Lee
Yonsei University, Korea

Associate Editor

Kiduk Yang
Youngnam Old Document Archive Center, Korea

Co-Managing Editors

Hyekyong Hwang
Korea Institute of Science and Technology Information, Korea

Eungi Kim
Keimyung University, Korea

Editorial Board

Dan Albertson
University at Buffalo, SUNY, USA

Daniel Martínez Ávila
São Paulo State University, Brazil

Beeraka Ramesh Babu
University of Madras, India

Pia Borlund
University of Copenhagen, Denmark

France Bouthillier
McGill University, Canada

Kathleen Burnett
Florida State University, USA

Ina Fourie
University of Pretoria, South Africa

Xiao-Zhi Gao
University of Eastern Finland, Finland

Boryung Ju
Louisiana State University, USA

Donghun Kim
Nanjing University, China

Sung Un Kim
Yonsei University, Korea

Kung Jin Lee
Ewha Womans University, Korea

Thomas Mandl
Universität Hildesheim, Germany

Lokman I. Meho
American University of Beirut, Lebanon

Jin Cheon Na
Nanyang Technological University, Singapore

Dan O'Connor
Rutgers University, USA

Wole Michael Olatokun
University of Ibadan, Nigeria

Woojin Paik
Konkuk University Glocal Campus, Korea

M. P. Satija
Guru Nanak Dev University, India

Laura Saunders
Simmons University, USA

Ou Shiyan
Nanjing University, China

Paul Solomon
University of South Carolina, USA

Kulthida Tuamsuk
Khon Kaen University, Thailand

JungWon Yoon
Jeonbuk National University, Korea

Lihong Zhou
Wuhan University, China

Consulting Editors

Reysa Alenzuela
Oriental Institute, ASCR, Czech Republic

Wayne Buente
University of Hawaii, USA

Sujin Butdisuwan
Mahasarakham University, Thailand

Seon Heui Choi
Korea Institute of Science and Technology Information, Korea

M. Krishnamurthy
DRTC, Indian Statistical Institute, India

S. K. Asok Kumar
The Tamil Nadu Dr Ambedkar Law University, India

P. Rajendran
SRM University, India

2026 Copyright © Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development

JISTaP
Journal of Information Science Theory and Practice

Table of Contents

Vol. 14 No. 2 June 30, 2026
Journal of Information Science Theory and Practice • https://www.jistap.org

Articles

01 Bridging the Gaps in Information Security Risk Management in Higher Education: Challenges, Best Practices, and Future Directions
Ruon Kueth Bum, Kibreab Adane, Mohammed Abebe, Mesay Samuel, Durga Prasad Sharma

26 Job Satisfaction Among University Librarians and Library Staff in Myanmar: An Exploratory Study
Thet Mon Swe, Cong Jing Ran, Siluo Yang, Qunzhe Ding

50 Technology, Trust, and Context: A Socio-Technical Framework for DLT Implementation in Digital Archives
Fabiano Couto Correa da Silva, Alexandre Faria de Oliveira

62 Open Science Adoption Barriers in Indonesia's Scholarly Communication System: A Pentahelix Analysis Combining a Systematic Literature Review and Interviews
Suci Indrawati Irwan, Edwin Rizal, Ninis Agustini Damayani, Agus Rusmana

81 Research Data Management Practices: A Comparative Study of Research Scholars from Engineering, Science, and Arts, Humanities, and Social Sciences
K. K. Shameer, Modepalli Doraswamy

97 Exploring Platform-Mediated Health Information Behavior: ADHD Self-Diagnosis Intention on Video-Based Social Media Among Korean Young Adults
Jung Sun Seo, Jee Yeon Lee

117 **Call for Paper**

118 **Information for Authors**

2026 Copyright © Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 1-25, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.1

Bridging the Gaps in Information Security Risk Management in Higher Education: Challenges, Best Practices, and Future Directions

Ruon Kueth Bum
Faculty of Computing & Software Engineering, Arba Minch University, Arba Minch, Ethiopia
E-mail: ruombuom12@gmail.com

Kibreab Adane*
Faculty of Computing & Software Engineering, Arba Minch University, Arba Minch, Ethiopia
E-mail: kibreinfo@gmail.com

Mohammed Abebe
Faculty of Computing & Software Engineering, Arba Minch University, Arba Minch, Ethiopia
E-mail: moshethio@gmail.com

Mesay Samuel
Faculty of Computing & Software Engineering, Arba Minch University, Arba Minch, Ethiopia
E-mail: mess.sama@gmail.com

Durga Prasad Sharma
Faculty of Computing & Software Engineering, Arba Minch University, Arba Minch, Ethiopia
E-mail: dp.shiv08@gmail.com

ABSTRACT

Higher education institutions (HEIs) are becoming a breeding ground for hackers due to their open culture policies and the volume of sensitive data they produce. Unless an appropriate information security risk management (ISRM) framework is in place to support them in thriving in the digital era, African HEIs in general and Ethiopian HEIs in particular are not immune to the expanding cybersecurity threats. This study aims to identify existing gaps, best practices, and future directions regarding ISRM in HEIs in Ethiopia. To achieve its core objective, the study adopted an exploratory research design and leveraged quantitative and qualitative approaches. Online and offline survey questions were distributed by email and in person, respectively, to collect quantitative data. Academic and information and communication technology (ICT) staff personnel from four different HEIs were chosen using the purposive sample technique. The qualitative data were gathered from relevant research and an interview with the ICT directors. The topics covered by the data collection tool were adopted from recent international information security frameworks and standards. Microsoft Excel 2016 (Microsoft, Redmond, WA, USA) was used for data analysis. Even though there are some acceptable secure practices in the studied HEIs, secure online and offline practices are still lacking in the areas of organizational, people, physical, and technology controls. To address the aforementioned concerns, the study proposes an appropriate ISRM Framework for HEIs to mitigate unauthorized access, use, disclosure, alteration, or deletion of valuable information, although the framework was not put into practice or transformed into a prototype or simulation-based demonstration.

Keywords: information security risk management framework, information security policy in higher education, information security in Ethiopian higher education, risk identification, risk assessment, risk mitigation

Received: April 18, 2025 **Revised:** February 5, 2026
Accepted: February 27, 2026 **Published:** June 30, 2026

***Corresponding Author:** Kibreab Adane
https://orcid.org/0000-0002-3021-5059
E-mail: kibreinfo@gmail.com

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [Ruon Kueth Bum, Kibreab Adane, Mohammed Abebe, Mesay Samuel, Durga Prasad Sharma] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

Information security is the process of protecting and preserving private or sensitive data so that it is not compromised by unauthorized access, use, disclosure, disruption, alteration, or erasure. Safeguarding sensitive information requires the adoption of numerous strategies to preserve confidentiality, integrity, and availability (Alhassan & Adjei-Quaye, 2017).

Higher education institutions (HEIs) are the least secure places in the universe when compared to other organizations because of allowing Bring Your Own Devices (BYOD), as they produce legal documents like degree certificates, experience growing student enrolments, hold a large number of hardcopy and softcopy sensitive materials with inadequate IT security and data protection mechanisms, and are a fertile ground for IT exploration and publicly open innovation platforms (Adane, 2020; Bongiovanni, 2019).

Information security breaches occur in both developed and developing countries' HEIs. For example, Several HEIs in the USA, notably Georgia Institute of Technology (March 2019), the University of Washington (February 2019), the University of Utah (June 2018), and the University of Vermont (May 2018), have recently reported information security breaches. Internal database attacks compromised about 1.3 million Georgia Institute of Technology records; human error compromised about 1 million University of Washington personal health records; electronic equipment theft at the University of Utah resulted in the loss of 607 patients' personal information; and a security breach at the University of Vermont that affected NetID, the university's online services portal, may have compromised the personal information of 37,000 current and former faculty, staff, and students (Bongiovanni, 2019). Alenezi (2024) revealed that HEIs in South Africa (Tshwane University of Technology, January 2024), Argentina (University of Buenos Aires, December 2023), the Philippines (De La Salle University, October 2023), and Brazil (Universidade Federal de Mato Grosso do Sul, September 2023) have been the target of cyberattacks in recent years.

HEIs are supposed to protect sensitive data and ensure its confidentiality, integrity, and accessibility (Kombo et al., 2023). According to Keefa et al. (2024), insider threats, inadequately implemented information security frameworks, BYOD policy, and a lower investment in information security were among the main vulnerabilities in HEIs. In another study, Keefa et al. (2024) stated that poor security management, significant employee turnover, a general lack of enthusiasm for information security, human factors, work settings, and technology are some of the major challenges affecting information security in HEIs.

Alenezi (2024) conducted a systematic review considering research publications from 2014 to 2024 on cybersecurity risks and strategies in HEIs in developing and emerging countries, which included authors from Morocco, China, the Philippines, Moldova, India, Ecuador, Ghana, Indonesia, Turkey, Malaysia, and Jordan. The author review finding reveals the following key gaps: i) a lack of cybersecurity research focusing on the particular challenges of African universities, ii) a lack of longitudinal studies to evaluate the long-term effects of International Organization for Standardization (ISO) 27001 implementation, iii) a lack of comparative studies on information security considering diverse educational institutions, iv) a lack of cybersecurity education programs, and iv) insufficient evaluations of how cybersecurity training affects actual security outcomes. Nkambule and Jansen van Vuuren (2024) stated that African HEIs lack a thorough legislative framework for cybersecurity, experience insufficient financial resources and cybersecurity competence, and lack cybersecurity awareness or hygiene among users. The authors suggest that institutions must keep pace with evolving threats, prioritize cybersecurity, and implement effective plans.

Addressing the aforementioned challenges requires developing a comprehensive information risk management framework. The field of information security risk management (ISRM) encompasses the methodical process of detecting, evaluating, and mitigating potential risks to the organization's important data assets (Daimi & Peoples, 2021). These processes include the following elements.

Risk identification: This phase includes locating potential threats and vulnerabilities against an organization's information assets. It encompasses analyzing both internal and external factors, conducting risk assessments, and taking into account various components like technology, processes, and human factors.

Risk assessment: In prioritizing their efforts to mitigate recognized risks, organizations assess the likelihood and consequences of such risks. In this step, the possible effects of a risk occurrence are evaluated, and the organization's tolerance for such risks is established.

Risk mitigation: Companies put controls and procedures in place to lessen the possibility and effect of hazards that have been recognized. This includes implementing

 https://doi.org/10.1633/JISTaP.2026.14.2.1

technical controls, establishing procedures and guidelines, conducting recurring security awareness training, and ensuring compliance with relevant laws and standards.

Risk monitoring and review: Companies keep an eye on and evaluate the performance of their information security procedures on a constant basis. This includes conducting regular vulnerability assessments, conducting penetration tests, keeping an eye on security logs, and developing incident response strategies.

Compliance and legal considerations: It is morally required of organizations to consider the legal and regulatory aspects of information security compliance. This requires a careful understanding of both industry-specific legislation and data protection laws.

Poor information management, noncompliance with acceptable standards and laws for risk management, and the inability to identify sources of threats and vulnerabilities were some of the challenges in HEIs (Kombo et al., 2023). Like many other HEIs worldwide, HEIs in Ethiopia are vulnerable to a variety of information security threats that jeopardize the availability, confidentiality, and integrity of digital assets. In this regard, Ejerssa (2018) revealed insufficient information security controls, a lack of clear and uniform information technology governance, and immaturity in the application of information security measures in the HEIs of Ethiopia, despite not developing an ISRM framework. Abebe (2022) revealed a lack of knowledge and comprehension among academic personnel, employees, and scholars about the protection of information, its assurance, and the safeguarding of computer systems in the selected public organizations in Ethiopia, despite not developing an ISRM framework.

Although they do not consider ISRM in Ethiopian HEIs, related studies (Ansari & Ali, 2021; Araújo et al., 2025; Baleid & Abdullah, 2026; Bongiovanni, 2019; Dawar & Shivarama, 2017; Ganesen et al., 2022; Joshi & Singh, 2017; Kiura & Mango, 2017; Njoroge et al., 2019; Putri & Wijaya, 2023; Sikman et al., 2023; Suroso & Fakhrozi, 2018) conducted assessments on ISRM in HEIs. Our study sought to fill in gaps in the literature by utilizing a variety of the latest and most popular ISRM frameworks, standards, and best practices from the viewpoint of people, physical, organizational, and technological controls. To improve generalizability, other researchers looking into ISRM may choose to employ the data collection tools and research findings from our study.

In short, the core contributions of the study are fourfold.

- Review popular International Information Security Management Frameworks, Standards, and Best Practices to assess ISRM Practices in HEIs of Ethiopia.
- Identify current gaps and best practices in managing information security risks from the viewpoint of people, physical, organizational, and technological controls.
- Develop a comprehensive ISRM framework for HEIs in Ethiopia.
- Compare the proposed framework with the related studies' frameworks to illustrate the unique contributions of the study.

2. RELATED WORKS

While various countries have adopted diverse strategies to safeguard their respective university environments, a notable gap in research studies addressing this domain within the localized context of HEIs in Ethiopia is evident. This paucity of scholarly endeavors investigating ISRM practices in Ethiopian higher education presents a significant gap in the existing body of knowledge.

Ejerssa (2018) assessed the maturity level of information security within some of the public universities in Ethiopia and revealed the presence of information security risks that need to be addressed. Sikman et al. (2023) proposed a model for establishing and operating a durable system for managing information security in HEIs, despite not delving into the particular challenges and risks encountered by said institutions. Putri and Wijaya (2023) focus on minimizing the occurrence and impact of various information technology risks in Indonesian educational institutions, despite not assessing the risk of lacking information policies and training employees.

Ganesen et al. (2022) focus on the necessity for the higher education sector to adopt a cybersecurity risk appraisal methodology to protect its information technology infrastructure from cyberattacks, despite the failure of the sector to explicitly advocate for continuous monitoring, assessment, and enhancements to counteract emerging risks. Bongiovanni (2019) identifies seven primary subjects discussed in the literature, such as risk management frameworks, standards, technical solutions for cyber-related issues, governance systems for information security management, and the need for additional research on information security culture within HEIs.

Sulistyowati and Hari Ginardi (2018) highlight the importance of addressing vulnerabilities in websites and In-

ternet networks in academic environments. However, the applicability of the methodology needs to be investigated in different academic settings for adaptability. Njoroge et al. (2019) designed a framework that aims to address the gaps in current security practices and align universities' security risks, but the study needs to be expanded by investigating the impacts of information security breaches on the academic and administrative functions of universities. Suroso and Fakhrozi (2018) used a framework for assessing and addressing threats to information systems, despite not providing detailed guidance on selecting and applying safeguards and mitigation strategies for identified risks.

Joshi and Singh (2017) proposed a model to effectively address security risks stemming from university network configuration, despite not considering other essential elements of information security, including policies, mobile device management, physical security measures, and employee education on information risks. Yilmaz and Yalman (2016) highlights that universities can improve their information security by implementing precautions, providing training for secure application development, and prioritizing data categorization and encryption.

3. MATERIALS AND METHODS

3.1. Research Design and Approach

Considering the limited research in the area of the selected topic, the current study adopted an exploratory research design and leveraged quantitative and qualitative approaches. The exploratory research design enables the researcher to gain a deeper understanding of the issue (Kumar, 2015). Online and offline survey questions were distributed by email and in person, respectively, to collect quantitative data. Following rigorous assessment of different International ISRM Frameworks, Standards, and Best Practices (Al-Ahmad & Mohammed, 2015; International Telecommunication Union [ITU], 2020; Nagar, 2018; National Institute of Standards and Technology [NIST], 2024; PCI Security Standards Council, 2008; Priest, 1988; SANS Institute, 2016; The British Standards Institution, n.d.; U.S. Department of Health and Human Services, 2025) the study formulated survey questionnaires considering organizational, people, physical, and technological controls. The qualitative data were gathered from a thesis, a recent journal publication, international frameworks, and an interview with information and communication technology (ICT) directors.

3.2. Study Population and Sampling Techniques

The study employed a purposive sampling technique by selecting cases that would help to comprehend the current status of information security in Ethiopia's HEIs, as well as enabling the researcher to select respondents with information security awareness and domain expertise. Purposive sampling is a form of non-probability sampling in which researchers rely on their judgment when choosing elements/members of the population to participate in their study. It is also known as judgment sampling (Campbell et al., 2020). The sample size was determined based on the Raosoft online sample size calculator (Raosoft Inc., Seattle, WA, USA) and the recommended sample size was 258 respondents out of the total population of 5,534 for sufficient generalization.

3.3. Data Collection Procedures

The study employed online survey questionnaires that were prepared using Google Cloud Forms (Google, Mountain View, CA, USA) and used printed or paper-based surveys. The data collection instrument underwent multiple stages of validation to guarantee both data accuracy and reliability. The first validation stage involved a pilot test with 15 participants from two public universities. The research team used the pilot test to find unclear language in the items, to improve the order of the questions, and to calculate the time needed to finish the survey. The pilot group feedback helped researchers enhance the questionnaire clarity and decrease response bias. The revised questionnaire underwent an expert review for content validity during its second stage. Three experts with knowledge in information security and risk management evaluated the items to determine their relevance and their match with ISRM frameworks (ISO/IEC 27005; NIST SP 800-30) and their appropriateness for Ethiopian HEIs. The experts provided feedback, which led to small modifications that improved construct validity. The instrument underwent Cronbach's alpha analysis to test its internal reliability following the completion of the main data collection. The Cronbach's alpha values for the different constructs ranged from 0.78 to 0.86, which falls within the acceptable to good reliability range. The results show that each construct's items measured the specific ISRM dimension consistently. The process included multiple bias mitigation strategies. The study used voluntary participation with anonymity and simple language to prevent confusion among participants. The research targeted participants from various universities and staff positions to reduce selection bias while enhancing generalizability.

The printed questionnaires were distributed among respondents who did not have access to the Internet, as their participation was crucial for the study. Those questionnaires were distributed to ICT professionals and academic staff of Wolaita Sodo University (WSU), Arba Minch University (AMU), Wachemo University (WCU), and Werabe University (WRU). In addition, four ICT directors of those institutions were interviewed to collect detailed qualitative facts. The study conducted a rigorous review and analysis of relevant scholarly literature, including journal articles, research theses, dissertations, and project reports, to look for open issues and best practices.

The researcher underscored the imperative to uphold ethical considerations throughout all process stages, including data gathering and subsequent post-collection endeavors (Cacciattolo, 2015). Upon completion of data collection, the researcher followed strict protocols for the secure storage, retention, and destruction of the collected data, following institutional and regulatory requirements.

3.4. Information Security Risk Management Framework Validations

The proposed 9-step ISRM framework was validated by four domain experts, including two academics specializing in information security and two practitioners from higher education IT departments. Both the thesis supervisors and the examining committees evaluated and gave encouraging comments about the ISRM during the Master of Science (MSC) thesis defense.

4. RESEARCH RESULTS

Microsoft Excel 2016 (Microsoft, Redmond, WA, USA) was used for data analysis. According to the data analysis, 77% of the respondents were male, and 23% were female. The respondents' age range was primarily between 30 and 40 years old, with 64% of them falling into this age range, 27% into the 20-30 age group, and the remaining 9% into the >40 age group. Of the respondents, 47% held a master's degree, 37% held a first degree, and the remaining 8% held a doctorate (Ph. D.) or diploma. Respondents with 5-10 years of experience made up the majority (47.9%), followed by those with >10 years (28.2%), 3-5 years (18.2%), and 0-3 years (5.6%).

To identify existing gaps, best practices, and potential avenues for improvement, the study thoroughly evaluated ISRM within the framework of HEIs in Ethiopia. The study examined well-known international standards and practices from four distinct angles—organizational, human, physical, and technological controls to accomplish these goals (see Sections 4.1 to 4.4 below).

4.1. Responses from Academic Staff Members on Organizational Controls Perspective

Organizational Controls encompass assessment results regarding information security policies, classification and handling of sensitive data, and understanding of any applicable legal data protection laws and privacy regulations, as shown in Table 1.

As indicated in Table 1, most respondents (48%) said "I don't know" in response to the presence of institutional information security policy, indicating significant ambiguity across academic institutions. "No" responses comprised 38%, implying awareness of policy absence within these settings. Affirmative "yes" responses were the smallest segment at 19%. This distribution reveals variable knowledge levels and potential gaps in policy development, communication, and familiarity within academic institutions.

The data analysis results regarding familiarity with protocols surrounding proper data classification, handling,

Table 1. Study participants' response regarding organizational controls

Organizational controls	Questions	Yes (%)	No (%)	Not sure (%)
Information security policies	Does your institution have an approved information security policy that has been published, communicated to relevant staff, and acknowledged by them?	19	38	48
Classification and handling of sensitive data	Do you, as academic staff, have familiarity with protocols surrounding proper data classification, handling, and access control in your institution?	85	15	0
Understanding of any applicable legal data protection laws & privacy regulations	Do you, as academic staff, possess a basic understanding of the legal, regulatory, and contractual requirements—such as data protection and privacy laws—that govern information security at your institution?	66	11	24

HEIs, higher education institutions; ISO, International Organization for Standardization.

and access control show that 15% responded "no," while 85% provided "yes" responses. This distribution suggests a strong comprehension among the academic community of the significance of these information security best practices within the higher education setting.

The data analysis results regarding academic staff awareness of legal, regulatory, and contractual requirements related to information security within their institution reveal varying levels of understanding, with 66% showing awareness, 24% expressing uncertainty, and 11% indicating a lack of awareness. This visual representation offers valuable insights into the knowledge landscape of information security within the academic community.

4.2. Responses from Academic Staff Members on People Controls Perspective

People Controls encompasses assessment results regarding information security responsibilities, reporting of suspected information security incidents, an independent information security policy review team, information security (awareness, education, and training), knowledge about common social engineering attack techniques, formalized disciplinary processes, information security policies for remote workers, and signing of a non-disclosure agreement, as shown in Table 2.

The data analysis results in Table 2 indicate that 17% of respondents do not have explicit information security duties outlined in their roles, while 83% reported the presence of such responsibilities. This disparity underscores the varying levels of focus on information security within academic staff responsibilities, emphasizing the importance of enhancing security measures in educational settings.

With an increasing number of cybersecurity incidents and skills shortage in attack identification and prevention, it is vital to assess the knowledge gap between cybersecurity education and industrial/institutional needs (Catal et al., 2023). In this respect, our study assessed whether academic staff had undergone specific training to facilitate the prompt reporting of observed or suspected incidents through designated channels. It is noteworthy that 18% of academic staff members reported receiving such tar-

Table 2. Study participants' response regarding people controls

People controls	Questions	Yes (%)	No (%)	Not sure (%)
Information security responsibilities	In your job description as academic staff, do your written responsibilities explicitly include information security responsibilities?	83	17	0
Reporting of suspected information security incidents	Have you, as academic staff, received training that specifically covers the establishment of a system for personnel to promptly report observed or suspected information security incidents through the appropriate channels?	82	18	0
An independent information security policy review team	Are you aware of an independent reviewer in your institution who ensures that information security is implemented and operated in accordance with the organization's information security policy, topic-specific policies, rules, and standards?	10	65	25
Information security (awareness, education, and training)	Did you receive any information security awareness, education, and training from information and communication technology staff as an academic staff member?	17	83	0
Knowledge about common social engineering attack techniques	As academic staff, are you knowledgeable about common social engineering attack techniques, such as phishing emails?	64	36	0
Formalized disciplinary process	Is there a formalized disciplinary process in place that is communicated to academic staff regarding the actions to be taken against personnel and other relevant interested parties who have committed an information security policy violation in your institution?	19	57	24
Information security policy for remote workers	Is there a policy in place that mandates the implementation of security measures when personnel are working remotely to protect information accessed, processed, or stored outside the university's premises?	15	32	53
Signing of non-disclosure agreements	As academic staff, are you required to sign a confidentiality or non-disclosure agreement as part of your initial terms and conditions of employment or through an internal memo?	22	46	32

 https://doi.org/10.1633/JISTaP.2026.14.2.1

geted training, indicating a proactive approach to incident reporting within this subset. However, the predominant response of 82% of academic staff lacking this specialized training reveals a notable gap in preparedness and awareness regarding the critical process of reporting information security incidents. This disparity underscores the importance of enhancing training initiatives to empower academic staff with the requisite skills and knowledge to effectively navigate and report security incidents through the appropriate channels in educational settings.

The data analysis results reveal that 10% of academic staff members were cognizant of the existence of an independent reviewer to ensure the implementation and operation of information security in alignment with the organization's policies, topic-specific guidelines, rules, and standards. In comparison, 65% were not aware, and 25% responded with uncertainty. This data underscores potential gaps in communication and transparency regarding information security oversight mechanisms within academic institutions.

It is apparent that a minority of academic staff members, specifically 17%, have participated in information security awareness, education, or training sessions conducted by ICT staff. In contrast, the majority of 83% of respondents have not taken advantage of such opportunities to enhance their knowledge in information security. The data highlights a clear opportunity for HEIs to prioritize and strengthen information security initiatives, thereby better equipping their staff to safeguard sensitive data.

The findings reveal that a majority, constituting 64% of respondents, expressed knowledge of common social engineering techniques, including phishing emails. In contrast, 36% of participants indicated a lack of awareness in this area. This underscores the importance of enhancing awareness and training programs on social engineering among academic staff to fortify cybersecurity measures effectively.

The findings reveal that 19% of respondents confirmed the existence of a formalized disciplinary process for information security policy violations, while a significant portion, comprising 57%, expressed uncertainty about its implementation. Additionally, 24% of participants indicated the absence of a formalized disciplinary procedure for addressing information security policy breaches. The data suggests a critical need for academic institutions to improve their information security governance and communication strategies. The lack of clarity and uncertainty among academic staff members regarding disciplinary processes for handling information security policy violations indicates a potential gap in awareness and preparedness.

The data analysis results show that 15% of respondents had a high level of awareness by acknowledging the presence of a policy that dictates the implementation of security protocols to safeguard information accessed, processed, or stored outside the university's physical confines. In contrast, a considerable majority, comprising 53%, expressed uncertainty or a lack of clarity regarding the existence of such a policy, indicating potential gaps in communication or awareness within the academic community. Furthermore, 32% of participants explicitly stated the absence of a formal mandate requiring the adoption of security measures during remote work activities, highlighting areas where organizational policies may need enhancement. These findings emphasize the critical importance of fostering a culture of information security and promoting clear guidelines for maintaining data confidentiality in diverse work settings, especially those beyond the traditional campus environment.

The data analysis results regarding the obligation to sign a confidentiality or non-disclosure agreement reveal that 46.3% of academic staff members indicated that they are not required to sign such agreements, signaling potential variations in confidentiality protocols across universities. Additionally, 32.1% expressed uncertainty about this requirement, suggesting a need for enhanced communication and clarity regarding confidentiality expectations. On the other hand, 21.6% of respondents affirmed the necessity of signing confidentiality agreements, highlighting a subset of staff members who are subject to such obligations.

4.3. Responses from Academic Staff Members on Physical Controls Perspective

Physical Controls encompass respondents' understanding of the physical security measures and clear procedures for disposing of physical documents, as shown in Table 3.

As shown in Table 3, 88% of academic staff members understand the importance of physical security measures, such as securing offices and reporting suspicious activities. However, 12% of staff members indicated a lack of comprehension in this area. These findings highlight the significance of promoting awareness and adherence to physical security protocols among academic staff to enhance workplace safety and protect sensitive information.

Our study unveils the responses of academic staff members concerning the existence of a clear policy or procedure for managing and disposing of sensitive or con-

Table 3. Study participants' response regarding physical controls

Physical controls	Questions	Yes (%)	No (%)	Not sure (%)
Understanding of physical security measures	Do you understand the importance of physical security measures, including locking offices, securing sensitive documents, and promptly reporting any suspicious activities or individuals?	88	12	0
Clear procedure for disposing of physical documents	Is there a clear policy or a procedure for handling and disposing of sensitive or confidential physical documents or media in your institution?	4	42	54

fidential physical documents or media within their institution. The percentages corresponding to the responses are delineated as follows: 4% indicated the presence of such a policy, 54% expressed uncertainty regarding its existence, and 42% confirmed the absence of a defined protocol for handling confidential physical information. The findings highlight a potential need for improved communication, training, and implementation of structured guidelines for managing confidential information in physical formats. Establishing clear policies and procedures in this area is essential to ensure data security, compliance, and risk mitigation within academic institutions.

4.4. Responses from Information and Communication Technology Staff Members on Technological Controls Perspective

Technological Controls ensures the presence of information security compromises or incidents; inventory teams for critical IT infrastructure; certified information security professionals; backup systems; up-to-date and licensed anti-malware software; patch management; BYOD policy; know-how regarding an emerging security risks and new technology trends; third party software risks; approved business continuity plans; encryption techniques; fraudulent website blocking; expertise in fixing hardware or software issue; a standardized information security framework; regular penetration testing; and evaluation of information security control effectiveness, as shown in Table 4.

The ICT personnel were asked about the occurrence of information security breaches within their institutional frameworks in recent years. The corresponding percentages for each response category are delineated as follows: Yes - 44.44%, No - 31.11%, and I don't know - 24.44%. These quantitative metrics offer valuable insights into the frequency of security incidents and the level of cognizance among ICT professionals within the surveyed academic institutions. The findings underscore the need for continual vigilance and proactive measures to strengthen information security practices in the academic sector.

The research inquiry targets ICT personnel in selected universities regarding the establishment of a comprehensive inventory or registry specifically tailored for pivotal assets within each cybersecurity system managed by their ICT directorates. The data breakdown illustrates that 46% of respondents acknowledge the implementation of such a system, while 30% negate its existence, and 24% remain uncertain about the presence of an organized inventory or registry for these critical assets. This indicates potential variations in approaches to asset management and underscores the importance of further potential enhancement of asset management protocols within academic ICT directorates.

The study assessed the availability of designated information security staff in ICT directorates for managing information security cases. The findings reveal that 9% of respondents affirm the existence of such staff, while a majority of 78% indicates a lack of designated personnel for this role. Additionally, 13% of respondents express uncertainty regarding the presence of information security staff within the ICT directorate. The findings imply a notable gap in the allocation of designated information security staff within ICT directorates of selected universities.

The question was posed to the ICT staff of the selected universities regarding the presence of certified information security professionals within the ICT directorate of their respective institutions. The highest percentage (57%) of respondents signaled the lack of certified information security professionals. Subsequently, 30% expressed uncertainty, while only 13% confirmed certified information security professionals. Overall, these implications highlight areas for improvement in strengthening information security capabilities within academic settings to effectively protect valuable data assets.

The data obtained from ICT staff at selected universities regarding the presence of a backup system for critical data protection and disaster recovery measures within their institutions indicates that 11% of partici-

Table 4. Study participants' responses regarding technological controls

Technological controls	Questions	Yes (%)	No (%)	Not sure (%)
Information security compromises or incidents	Has your institution ever been compromised by information security issues in the last few years?	44.44	31.11	24.44
Inventory or registry of important cybersecurity assets	Is there a defined inventory or registry maintained for important assets associated with each cybersecurity system within your ICT directorate?	46	30	24
Designated Information Security staff in the ICT directorate	Are there designated information security staff within the ICT directorate who are responsible for handling information security cases?	9	78	13
Certified information security professionals within the ICT directorate	Are there any certified information security professionals within the ICT directorate of your institution?	13	57	30
Backup systems for disaster recovery	Is there a backup system in place to safeguard critical data and facilitate disaster recovery in the event of data loss or system failure in your institution?	11	62	17
The university's up-to-date licensed anti-malware software	Does the university have up-to-date and licensed anti-malware software in place to protect its systems and endpoints from malicious software threats?	13	50	37
Patch management in the university's critical infrastructure	Is there a patch management system in place at the university to ensure that systems and endpoints are regularly updated with the latest security patches and updates?	8	70	22
BYOD policy or framework	Is there a policy or framework in place regarding BYOD at the university?	10	77	13
Emerging security risks and new technology trends	Do you stay updated on emerging security risks and new technology trends?	24	76	0
Specific approaches for the risk associated with third-party software	Does your institution have a specific approach in place to manage information security risks associated with third-party software applications?	50	18	32
Institution-approved business continuity plans	Has the institution developed an approved business continuity plan?	45	16	29
Implementation of encryption in the institution	Has your institution implemented encryption?	40	31	29
Enforcement of specific requirements	Does your ICT directorate have measures in place to enforce specific password requirements for system and account access?	77	23	0
Blocking access to certain types of websites	Does your organization have a practice in place to identify the types of websites to which personnel should or should not have access, and does it consider blocking access to certain types of websites?	68	8	23
Establishment of risk measurement criteria	Does your organization have established risk measurement criteria for assessing and managing ICT risks?	7	83	10
Reliance on service providers for information security risk management	In the context of information security risks, do you rely on service providers for some or your entire IT infrastructure?	61	26	13
Availability of a professional to fix a hardware or software issue	In the event of a hardware or software issue in the data center, are there professionals available to fix it?	92	8	0

ICT, information and communication technology; BYOD, Bring Your Own Devices.

pants affirmed the availability of a backup system, while the majority of 62% stated the absence of such a system. Furthermore, 17% of respondents expressed uncertainty regarding the presence of backup measures in place. This data underscores a concerning trend where a substantial portion of institutions lack adequate backup systems, posing potential risks in data security and disaster preparedness within academic ICT settings.

The responses obtained from ICT staff members regarding the presence of up-to-date and licensed anti-malware software within the university environment indicate that 50% of respondents indicate a lack of up-to-date and licensed anti-malware software. Following closely, 37% expressed uncertainty, while only 13% confirmed the presence of such protective measures. The findings underscore the urgency for proactive measures to strengthen university cybersecurity postures.

The data obtained from the survey of ICT staff in universities regarding the presence of a patch management system reveals that the highest percentage, with 70% of respondents, reported the absence of such a system, indicating a critical gap in cybersecurity practices. Following this, 22% expressed uncertainty about the implementation of a patch management system, highlighting the need for clarity and communication in cybersecurity protocols. Lastly, only 8% confirmed the presence of a patch management system, underscoring the importance of enhancing cybersecurity measures within university ICT departments. These findings emphasize the necessity for universities to prioritize the establishment of effective patch management systems.

The data collected from the survey of ICT staff in universities regarding the existence of a policy or framework concerning BYOD practices reveals that 77% of respondents indicated the absence of a BYOD policy or framework at their institutions. In contrast, 13% expressed uncertainty about the presence of such guidelines, while only 10% confirmed the existence of a BYOD policy. These results underscore the need for universities to focus on developing and implementing clear BYOD policies to effectively manage and regulate personal device usage within academic settings.

The responses of ICT staff from selected universities regarding their practice of staying updated on emerging security risks and new technology trends reveal that 24% of respondents indicated that they stay updated on these aspects, reflecting a proactive approach to knowledge enhancement within the field. Conversely, 76% of respondents reported not staying updated, highlighting a potential gap in awareness and readiness to address evolving security challenges and technological advancements. This data suggests the importance of continuous learning and vigilance in staying abreast of emerging trends for effective ICT management within university settings.

The responses of ICT staff from universities regarding the presence of a specific approach to manage information security risks associated with third-party software applications illustrate that 18% of respondents indicate their institution does not have a specific approach in place for managing these risks. In contrast, 32% of respondents stated that they were unsure if such an approach existed, while 50% confirmed the presence of a defined strategy for handling information security risks related to third-party software applications. This data suggests that a significant majority of universities may need to enhance their measures in addressing security risks associated with third-party software applications.

The responses from ICT staff at universities indicate that 45% have confirmed the presence of an approved business continuity plan, signifying proactive measures towards operational resilience. Conversely, 16% reported a lack of such a plan, suggesting potential vulnerabilities in addressing unforeseen disruptions. The significant percentage of 29% expressing uncertainty underscores the importance of enhancing communication and clarity regarding business continuity strategies within the university's ICT directorate. This data highlights the crucial role of robust continuity planning in ensuring organizational preparedness and mitigating risk in the dynamic landscape of HEIs.

The perspectives of ICT staff from HEIs regarding the implementation of encryption within their organizations reveal that 40% of respondents confirmed the presence of encryption measures in place, indicating a proactive stance towards data security and confidentiality. Alternatively, 31% of respondents reported that their institution has not implemented encryption, highlighting a potential gap in safeguarding sensitive information. Additionally, 29% of respondents expressed uncertainty about the status of encryption implementation, underscoring the need for clarity and awareness regarding data protection strategies within university ICT environments. This data highlights the importance of robust encryption practices in enhancing cybersecurity measures and mitigating risks in higher education settings.

The responses from ICT staff regarding the existence of measures within their ICT directorate to enforce specific password requirements for system and account access

 https://doi.org/10.1633/JISTaP.2026.14.2.1

reveal that 77% of respondents confirmed the presence of such measures, indicating a proactive approach to enhancing security protocols. However, 23% of respondents indicated the absence of enforced password requirements, suggesting potential vulnerabilities in access control mechanisms. This data highlights the importance of robust password policies in safeguarding system integrity and data confidentiality within ICT environments, emphasizing the need for comprehensive security measures to mitigate risks effectively.

The responses obtained from ICT staff regarding the presence of organizational practices to identify permissible and restricted website categories for personnel access, including the consideration of blocking access to specific websites, indicate that 68% of respondents affirmed the existence of such practices. In contrast, 8% of respondents stated that their organization does not have such practices in place. Moreover, 23% of respondents expressed uncertainty on this matter, emphasizing the need for clearer communication and implementation of website access policies within organizational frameworks. These findings underscore the significance of establishing robust protocols to regulate website access, mitigate risks, and maintain a secure digital environment within the organization.

The responses from ICT directorate staff regarding the presence of established risk measurement criteria for assessing and managing ICT risks within their organizations reveal that 83% of respondents indicated the absence of such criteria, while 7% confirmed the existence of established risk measurement criteria. Additionally, 10% of respondents expressed uncertainty on this matter, emphasizing the importance of clarity and alignment in risk assessment frameworks within organizational ICT contexts. These insights underscore the critical importance of implementing effective risk measurement criteria to bolster risk management practices and fortify ICT resilience in organizational contexts.

The insights from ICT staff regarding their reliance on service providers for managing some or all aspects of their IT infrastructure within the realm of information security risks indicate that a majority of respondents, accounting for 61%, acknowledge leveraging service providers, reflecting a strategic outsourcing strategy for IT infrastructure management. On the contrary, 26% of respondents indicated a self-reliant approach, preferring internal control over their IT infrastructure without external service provider involvement. Furthermore, 13% of respondents expressed uncertainty regarding their reliance on service providers, emphasizing the necessity for a deeper understanding of the implications of such dependencies on information security risks. These findings underscore the significance of assessing the strategic implications of outsourcing IT infrastructure on ISRM practices within organizational contexts.

The responses provided by ICT staff concerning the availability of professionals to address hardware or software issues within the data center setting reveal that 92% of respondents acknowledge the presence of skilled professionals poised to resolve technical issues, signifying a proactive stance towards expedient problem resolution. Conversely, 8% of respondents indicate a dearth of professionals available for troubleshooting, hinting at a potential insufficiency in technical support within the data center milieu. These findings underscore the importance of having skilled professionals on hand to ensure efficient maintenance and troubleshooting of hardware and software issues in data center operations, thereby enhancing overall operational resilience and continuity.

The study reveals significant insights into HEIs in Ethiopia regarding the adoption of information security standards, best practices, and frameworks by AMU, WSU, WRU, and WCU. Firstly, WRU emerges as the frontrunner in embracing the "ISO 27001" standard, showcasing the highest adoption rate at 14%. Conversely, AMU exhibits a notable level of uncertainty, with 14% of responses falling into the "I don't know" category, indicating a potential area of ambiguity or lack of clarity in information security practices. Moreover, WSU and WCU demonstrate a moderate approach to adoption, with the former showing an 8% utilization of "COBIT" and the latter implementing "CISCO ASA" at a rate of 6%. Both AMU and WSU reveal lower levels of utilization in categories such as "no framework/standard," "PCI DSS," and "HIPAA," each registering at 2% or below. Overall, the findings underscore the importance of continued exploration into the factors influencing the adoption patterns of information security frameworks within academic institutions. By addressing areas of uncertainty, enhancing moderate adoption levels, and improving low utilization rates, universities can strengthen their information security posture and better protect sensitive data assets against evolving threats and vulnerabilities.

We observed responses from ICT staff at specific universities regarding the frequency of penetration testing to evaluate the security posture of systems and networks. The data showcases that a significant majority of 86% of respondents stated never engaging in penetration testing activities. Following this, 9% of participants indicated oc-

casional testing, while a smaller percentage of 6% reported conducting penetration testing regularly. This breakdown underscores a notable gap in consistent security evaluation practices, with occasional penetration testing being less common for the majority.

We observed responses from ICT staff regarding the frequency of evaluating the effectiveness of information security controls in the university context. The analysis indicates that 78% of respondents reported that these evaluations are never conducted, suggesting a potential area for improvement in assessing and strengthening security measures. In contrast, 9% of respondents stated that evaluations are regularly carried out, reflecting a proactive approach to monitoring and enhancing information security practices. Additionally, 13% of respondents mentioned that evaluations occur occasionally, indicating a moderate level of attention towards assessing security controls. These findings emphasize the significance of consistent and thorough evaluations to uphold the robustness of information security measures within the university.

4.5. A Comparative Presentation of Each Higher Education Institutions's Perspectives on Organizational, People, Physical, and Technological Controls

The comprehensive analysis in Table 5 unveils a nuanced picture of the information security landscape at AMU, WSU, WCU, and WRU. Each institution showcases distinct strengths and weaknesses across organization controls, people control, physical controls, and technological controls.

Organization controls: AMU and WCU are advancing in data classification, while WSU demonstrated an awareness of legal compliance. However, the communication of information security policies to staff is a concern for AMU and WCU. WSU is also facing challenges in effectively communicating security policies to staff and understanding sensitive data classification. WRU is struggling with comprehending data classification and legal requirements, and lacks a universally accepted security policy.

People control: AMU and WCU have well-informed academic staff regarding phishing emails. However, a significant weakness is the lack of delineated information security responsibilities in the job descriptions of their academic staff. Additionally, there is a noticeable absence of an independent security compliance reviewer, incident reporting training, ICT-led security education, breach disciplinary procedures, remote work security protocols, and confidentiality agreements at the onset of employment. On the other hand, WSU and WRU lack awareness of phishing emails and do not specify information security responsibilities in job descriptions. These institutions also do not have an independent security compliance reviewer, incident reporting training, ICT-led security education, formal breach disciplinary procedures, remote work security protocols, and confidentiality agreements established at the start of employment.

Physical controls: AMU, WSU, and WCU emphasize physical security measures such as office locking and robust controls in the data center, including environmental and access control measures, and reporting suspicious activities. However, AMU lacks clear protocols for handling sensitive documents and video surveillance systems. WSU faces weaknesses in managing sensitive documents, video surveillance, redundancy, and disaster recovery systems. WRU demonstrates shortcomings in implementing physical security measures, particularly office locking and data center controls, as evidenced by deficiencies in perimeter security, video surveillance, redundancy systems, environmental controls, and access mechanisms.

Technological controls: The investigation indicates that all universities have developed definitive inventories of essential assets within their cybersecurity frameworks, institute-specific password policies, and clearly defined authorized website access for personnel. Nevertheless, a common vulnerability among these institutions is the lack of dedicated information security staff and certified experts. AMU is deficient in established risk assessment criteria for the management of ICT risks. WSU is particularly lacking in the evaluation of information security control efficacy, the implementation of encryption, system updates for security patches, and BYOD policy. WCU encountered a shortage of certified security personnel, dedicated ICT security staff, faced difficulties in penetration testing, and had issues with data backup systems. WRU is missing critical security measures such as penetration testing and anti-malware software.

5. DISCUSSION ON KEY RESEARCH FINDINGS

5.1. Organizational Controls Perspective

Despite most academic staff having familiarity with protocols surrounding proper data classification, handling, and access control in their institution, as well as having a basic understanding of applicable legal, regulatory (such as data protection laws and privacy regulations), or contractual requirements related to information security in their institution, they were not sure about the pres-

 https://doi.org/10.1633/JISTaP.2026.14.2.1

Table 5. A comparative presentation of each HEI's perspectives on organizational, people, physical, and technological controls

Thematic areas	University strengths and weaknesses			
	AMU	WSU	WCU	WRU
Organizational controls perspective	While the university has made progress in data classification, there are gaps in legal compliance and ineffective communication of its information security policy to staff members	The university staff demonstrates awareness of legal requirements but lacks effective communication of the information security policy to staff and understanding of sensitive data classification	The staff at the university understands data classification levels but lacks awareness of legal requirements for information security, and the institution also lacks a published security policy for staff	University academic staff exhibit a deficiency in comprehending data classification and legal requirements, alongside the absence of a universally acknowledged security policy within the institution
People controls perspective	University academic staff are aware of social engineering techniques but lack independent security policy oversight, structured incident reporting, robust remote work security measures, confidentiality agreements in employment terms, and comprehensive information security training	The study revealed that the university academic staff lack awareness of phishing emails and information security responsibilities in job descriptions. The institution lacks an independent security compliance reviewer, incident reporting training, ICT-led security education, disciplinary processes for breaches, a remote work security policy, and confidentiality agreements at employment commencement	The academic staff at the university are aware of phishing emails but lack information security responsibilities in job descriptions. The institution lacks an independent security compliance reviewer, incident reporting training, ICT-led security education, breach disciplinary procedures, remote work security protocols, and confidentiality agreements at employment start	The university academic staff lack awareness of phishing emails and information security responsibilities in job descriptions, while the institution lacks an independent security compliance reviewer, incident reporting training, ICT-led security education, formal breach disciplinary procedures, remote work security protocols, and confidentiality agreements at the start of employment
Physical controls perspective	The university prioritizes physical security measures like office locking and robust controls in the data center, such as perimeter security, redundancy systems, environmental controls, and access control mechanisms, and reporting suspicious activities, but lacks clear protocols for sensitive documents and video surveillance systems	The university recognizes the importance of physical security measures, including office locking, safeguarding documents, and reporting suspicious activities. Weaknesses are apparent in handling sensitive documents, video surveillance, redundancy, and disaster recovery systems	The university emphasizes physical security measures like office locking, data center controls, perimeter security, redundancy systems, environmental controls, and access mechanisms. Clearer protocols for sensitive documents and video surveillance implementation have been put in place	The university's implementation of physical security measures, particularly office locking and controls within the data center, is not given due priority. This is evidenced by shortcomings in perimeter security, video surveillance, redundancy systems, environmental controls, and access mechanisms
Technological controls perspective	The university has established a clear inventory of crucial assets linked to each cybersecurity system, enforces specific password protocols for system and account entry, determines authorized and unauthorized website access for personnel, and has implemented encryption measures. Nevertheless, there is a notable absence of dedicated information security personnel, certified professionals in the field, and the establishment of risk measurement criteria or assessing and managing (ICT) risks	The research findings indicate that the university has successfully enforced specific password criteria for system and account access, and a structured inventory for critical assets related to each cybersecurity system. However, there is a notable absence of assessment of information security control efficiency, encryption implementation, regular system updates for security patches, and an established policy for BYOD at the university	The university displays proactive measures in addressing security risks and technology advancements, enforcing password protocols, managing website access, and providing expertise for data center maintenance. Nevertheless, there are shortcomings in certified security personnel, dedicated ICT security staff, conducting penetration testing, and establishing backup systems for data protection	The university is diligent in addressing emerging security risks and technology trends, enforcing password protocols, and managing website access. Yet, there are deficiencies in designated information security staff, certified professionals, asset inventory for cybersecurity, and essential security measures like penetration testing and anti-malware software

HEI, higher education institution; AMU, Arba Minch University; WSU, Wolaita Soddo University; WCU, Wachemo University; WRU, Werabe University; ICT, information and communication technology; BYOD, Bring Your Own Devices.

ence of information security policies in their institutions. These findings indicate the importance of establishing and communicating a proper information security policy with each academic staff member for appropriate data classification, handling, and access control. Petersen (2013) stated that colleges and HEIs must conform to different legislative requirements at the federal/national, regional, and local levels when dealing with the handling of different public records. These institutions vary in size, financial resources, and human capital; they are often required to concentrate on addressing different risks or priorities. Regulatory and compliance requirements encompass notifying data breaches and reporting laws for public records requests and personally identifiable information.

5.2. People Controls Perspective

Despite most academic staff indicating the presence of written responsibilities explicitly including information security responsibilities in their job description, being aware of reporting of suspected information security incidents, and being knowledgeable about common social engineering attack techniques like phishing emails, they did not receive any information security awareness, education, or training from ICT staff. They further indicate a lack of formalized disciplinary processes when information security policy is violated, they were not sure about the presence of information security policies for remote workers, and they indicate a lack of signing non-disclosure agreements in their institution.

The results show how crucial it is to have an independent information security policy review team in order to maintain the current information security policy, its implementation, and its operation.

The ICT staff of each institution is supposed to provide regular information security awareness, education, and training to improve the academic staff's security hygiene. All HEIs are expected to ensure that each employee signs a non-disclosure agreement to safeguard the privacy and security of sensitive data, and they are expected to implement formalized disciplinary processes for information security policy violations by internal and remote workers.

5.3. Physical Controls Perspective

Despite most academic staff understanding the importance of physical security measures, including locking offices, securing sensitive documents, and promptly reporting any suspicious activities or individuals, they indicate a lack of clear policy and procedures for disposing of physical documents in their institutions. These findings show the importance of having a clear policy and procedure in each institution for disposing of physical documents or documents in printed form to prevent information leakage.

Even though most ICT employees report having inventories for critical IT infrastructure, knowing how to deal with third-party software risks, confirming the existence of approved business continuity plans, encryption techniques, confirming the enforcement of access control policies, practicing blocking malicious websites, and confirming the availability of professionals to fix hardware or software issues, the majority of ICT employees report that there have been compromised information security issues in the past few years, and that their ICT directorate lacks certified information security professionals, patch management, BYOD policies, and regular backup systems in their organizations. There is a lack of formal measuring standards for evaluating and controlling ICT risks and penetration testing. Most ICT staff admitted to not keeping up with new developments in technology and security threats.

5.4. Technological Controls Perspective

The most productive cybersecurity professionals can outperform the less experienced graduates in the field. Graduates with expertise in cybersecurity positions can assist institutions and nations in promptly addressing cybersecurity issues (National Research Council, 2013). In the early days, the need for information security experts have been met with employees who are trained in related fields like computer science, information science, software engineering, and more while in recent years, some HEIs have begun to incorporate cybersecurity courses as part of their education curriculum to tackle the shortage of experts in the field (Catal et al., 2023). Considering the aforementioned modern practices, HEIs in Ethiopia are supposed to produce or recruit certified/skilled information security professionals within their ICT directorates to promptly address the shortage of information security experts or the evolving cybersecurity-related issues as well, and have harmonized guidelines for integrating technology, people, and policy/procedures to reduce security incidents. Mobile devices are personal devices that can pose a risk to any institution. In this regard, HEIs are supposed to enforce BYOD policies for encryption of valuable data stored in mobile devices and remotely wipe out data when those devices are lost to prevent sensitive information leakage (Adane, 2020; Grajek, 2015; Petersen, 2013; Yousif Yaseen, 2022).

One of the most valuable resources for universities is information or data, which needs to be safeguarded against security breaches (Joshi & Singh, 2017). The majority of reported breaches in higher education are classified as hacking or malware. These breaches occurred when an outsider used malware, spyware, or direct access to obtain records. Accidental disclosure of private data to an undesired recipient by fax or email, or accidentally made publicly available on a website, as well as the loss of a portable device, such as a stolen or misplaced laptop or memory device, were other reported breaches (Grama, 2014). Malware can occur when an unauthorized piece of software is placed on a user's PC or a higher education server, limiting access and/or resulting in a system crash. Malware comes in many forms, such as worms, viruses, ransomware, and adware (Readiness and Emergency Management for Schools Technical Assistance Center, 2017). Careful monitoring and regular assessment of risks could help HEIs in managing voluminous network traffic flows and the associated vulnerabilities (Grajek, 2015). In this respect, HEIs in Ethiopia are expected to use up-to-date and licensed anti-malware software, perform patch management, implement and practice regular backups of valuable data in the institutions, encourage staff to stay updated regarding emerging security risks and new technology trends, and develop a risk measurement framework for assessing and managing ICT risks.

6. THE PROPOSED COMPREHENSIVE INFORMATION SECURITY RISK MANAGEMENT FRAMEWORK

Based on the findings, our study introduces a novel framework for assessing, protecting against, and preventing information security risks within the context of universities. It delineates a systematic approach to identifying risks associated with critical assets. The internal and external components of the proposed framework are presented as follows.

The study suggests nine (9) steps for implementing the internal components of the proposed framework.

6.1. Step 1 - Establish Risk Measurement Criteria

During the initial phase, key stakeholders, including the head of the ICT directorate, the head of the academic bureau, the head of finance, and university staff, collaborate to set benchmarks for assessing risk impact based on the university's mission and business objectives. The impact areas considered will encompass reputation and customer confidence, financial aspects, productivity, safety and health, as well as potential fines and penalties. Through thorough discussions and analysis, specific criteria for measuring risks will be established by prioritizing the impact areas that can affect the university's mission and objectives. The stakeholders shall fill in the blanks in the criteria worksheet to make them meaningful to the university. These risk measurement criteria will outline the levels of impact—high, medium, and low—enabling the university to effectively evaluate and address risks in alignment with its strategic goals and values.

6.2. Step 2 - Develop an Information Asset Profile

In this phase, the process commences with the establishment of university asset profiles. These profiles serve as detailed representations of each information asset, delineating their unique characteristics, qualities, features, and intrinsic value. The criteria for identifying critical assets encompass their significance to the university, active utilization in daily operational processes, and the potential impact on impeding the university's ability to fulfill its objectives and mission if lost. Each asset's profile is meticulously captured on a dedicated worksheet, as exemplified in Table 6, to provide a structured framework for informed decision-making and proactive risk mitigation strategies.

6.3. Step 3 - Identify Information Asset Containers

In this phase, the emphasis lies on identifying the containers in which the university's information assets are stored, processed, and controlled.

Technical containers: These containers encompass the hardware and software elements that fall within the organization's jurisdiction but also extend beyond its confines. They include essential IT infrastructure components like servers, databases, and networks, which are crucial for information management.

Physical containers: Physical containers denote the tangible locations where physical documents and assets are housed, such as filing systems, secure rooms, and external storage sites. These spaces, both within and outside the organization, store physical information resources securely.

People containers: People containers involve individuals with insights into the organization's information assets, both internally and externally. This category comprises employees, contractors, vendors, and other stakeholders who interact with and possess knowledge about the organization's information landscape.

Table 6. Establishing HEI critical information asset profile

Information asset	Unique features and qualities	Characteristics	Value
Student records	Personal information, academic history, enrollment status	Sensitive, confidential, regulatory compliance	Critical for academic progress and records
Research data	Experimental results, scholarly publications, intellectual property	Proprietary, research integrity, collaboration	Foundation for scholarly contributions
Financial information	Budgets, grants, transactions, payroll data	Financially sensitive, compliance requirements	Essential for fiscal planning and reporting
Administrative databases	HR records, procurement data, institutional reports	Operational efficiency, administrative support	Facilitates institutional management
Communication networks	Email communications, online collaboration platforms	Real-time communication, data exchange	Enhances collaboration and information sharing
Technology infrastructure	Servers, computers, software applications, databases	Backbone of IT operations, data storage	Supports academic and administrative functions
Physical security	Access control systems, surveillance cameras, security personnel	Safeguards buildings and assets, prevents unauthorized access	Protects physical infrastructure and resources

HEI, higher education institution; HR, human resource.

Table 7. Identification of critical information assets, security threats, and storage locations/containers

Information asset	Threat scenario	Container type
Student records	Data breaches	Technical container
Research data	Cyberattacks	Technical container
Financial information	Insider threats	People containers
Administrative databases	Third-party risks	Technical container
Communication networks	Cyberattacks	Technical container
Technology infrastructure	Physical theft or damage	Physical containers
Physical security	Compliance violations	Physical containers

6.4. Step 4 - Identify Areas of Concern

In Step 4, the process begins by referring back to information asset risk profiles, focusing on threats unique to the university and its operations. Each container is reviewed to list critical assets and identify areas of concern. The goal is not to list every possible threat scenario but to quickly pinpoint situations that could affect university assets. Each document is thoroughly examined to document all relevant concerns on an information asset profile worksheet, including the asset name and a detailed description of the concern.

6.5. Step 5 - Identify Threat Scenarios

In this step, areas of concern are expanded into threat scenarios that further detail the properties of a threat. The threats are assessed by understanding threat scenarios, which involve outlining information assets alongside their corresponding threat scenarios and the containers in which they are stored. A detailed elucidation is presented in Table 7 as follows.

6.6. Step 6 - Identify Risks

In this stage, the primary aim is to document the outcomes for an organization when a threat becomes a reality, thereby concluding the risk assessment process. The assessment of the impact on the university is based on the previously identified threat scenarios and their associated risks. The possible threats to the university's information assets and their corresponding risks are presented in Fig. 1, which enables a detailed examination and understanding of the potential consequences for the university. The evaluation of the consequences to university assets involves analyzing the financial implications of asset loss, hacking incidents, or non-compliance fines with ISRM standards,

 https://doi.org/10.1633/JISTaP.2026.14.2.1

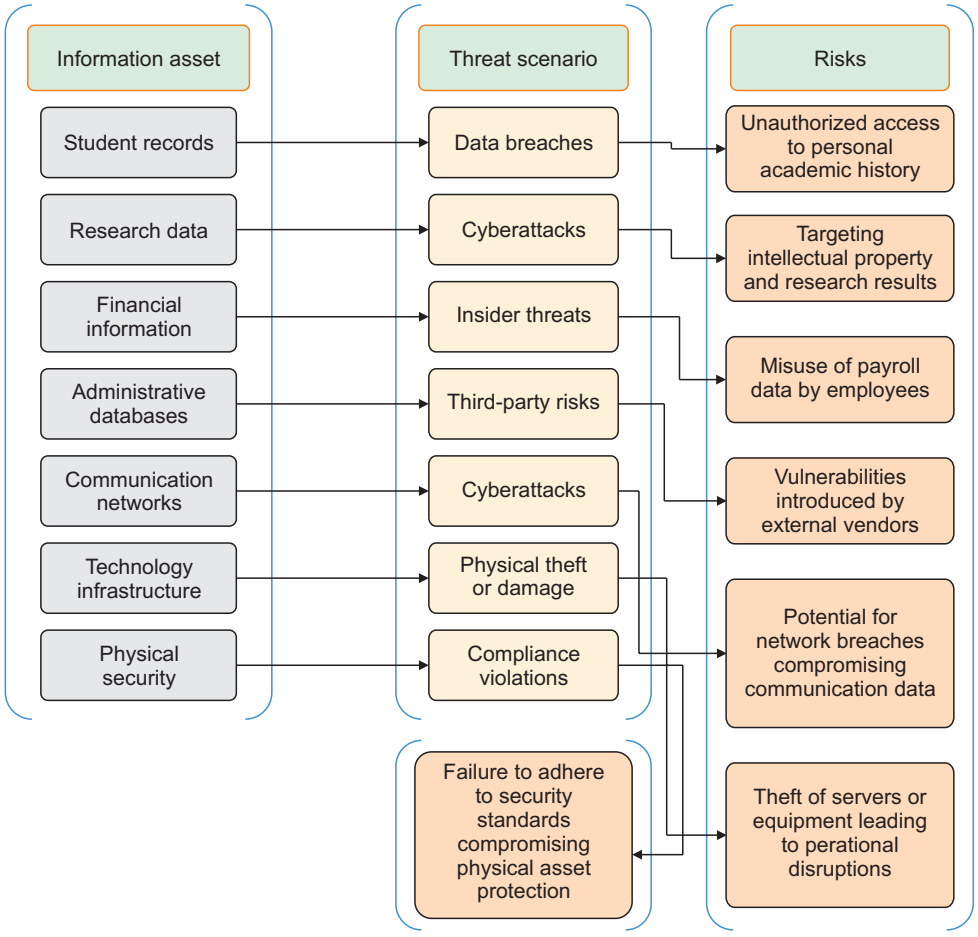


Fig. 1. Risk and security threat identification for information assets.

frameworks, or industry best practices. Understanding the potential costs to the university in these scenarios is essential for effective risk management and strategic decision-making. By assessing these factors, institutions can proactively mitigate risks and safeguard their valuable assets.

6.7. Step 7 - Analyze Risks

The risk analysis starts by referring to the risk measurement criteria created in Step 1, classifying the consequences of each threat on universities according to the criteria of low, moderate, and high. Next, a relative risk score will be calculated, which can be used to analyze risk and help universities determine the right risk strategy. The relative risk score calculation refers to the impact value. The impact value is derived from the risk measurement criteria (Impact area value: Low=1, Medium=2, High=3). Relative risk scores will be calculated and used to analyze risk and help the university to determine the right risk strategy. Each score for each impact area ranking will be multiplied by the impact (Low, Medium, and High) to generate an impact value to guide the focus area. This relative risk score is derived by considering the extent to which the consequence of a risk impacts the organization against the relative importance of the various impact areas, and possibly the probability. In other words, if Financial and Fines, and Legal outcomes are most important to the university, these risks will generate higher scores than risks with equivalent impacts and probabilities in another area. The sample risk analysis is explained in Table 8.

Table 8. Risk score impact sample calculation

Impact area	Ranking	Impact	Impact value
Reputation	2	Medium (2)	4
Financial	5	High (3)	15
Productivity	1	Low (1)	1
Safety and health	3	Low (1)	3
Fines & legal	4	High (3)	12

6.8. Step 8 - Select Mitigation Approach

In Step 8, the final step of the risk management process, the university determines which of the risks it has identified require mitigation and develops a mitigation strategy for those risks. This is accomplished by first prioritizing risks based on their relative risk score. Once risks have been prioritized, mitigation strategies are developed that consider the value of the asset and its security requirements, the containers in which it lives, and the organization's unique operating environment.

Risk acceptance: Evaluate risks that are deemed acceptable and decide to acknowledge them without taking further action.

Risk avoidance: Begin by identifying potential risks and implementing ISO 27001: 2022 controls to avoid them altogether.

Risk reduction: Implement measures to reduce the likelihood and impact of identified risks by adopting ISO 27001: 2022 security controls.

Risk transfer: Transferring certain risks to external parties like insurance providers or third-party vendors to reduce the financial impact on the institution as a result of security incidents.

Risk contingency: Develop contingency plans to prepare for and respond to potential security incidents. The risk mitigation approaches are outlined in Fig. 2.

6.9. Step 9 - Risk Monitoring

The last stage of risk assessment involves the continuous process of identifying, assessing, and managing risks related to information security within an organization. This includes gathering threat intelligence, conducting vulnerability assessments, performing security audits, and monitoring incidents to detect patterns and vulnerabilities. Structured reporting and feedback mechanisms ensure stakeholders are informed and engaged.

The external components of the proposed framework are presented in Figs. 3 and 4 as follows.

Risk communication: exchange of real-time information, advice, and opinions between experts.

Risk documentation: the process of documenting the findings during assessment.

6.10. Validations for the Proposed Information Security Risk Management Framework

A Delphi-style review was conducted to validate the proposed 9-step ISRM framework with four domain experts, including two academics specializing in information security and two practitioners from higher education IT departments. The experts agreed that the framework addressed the unique contextual challenges of Ethiopian HEIs, particularly in balancing formal standards such as

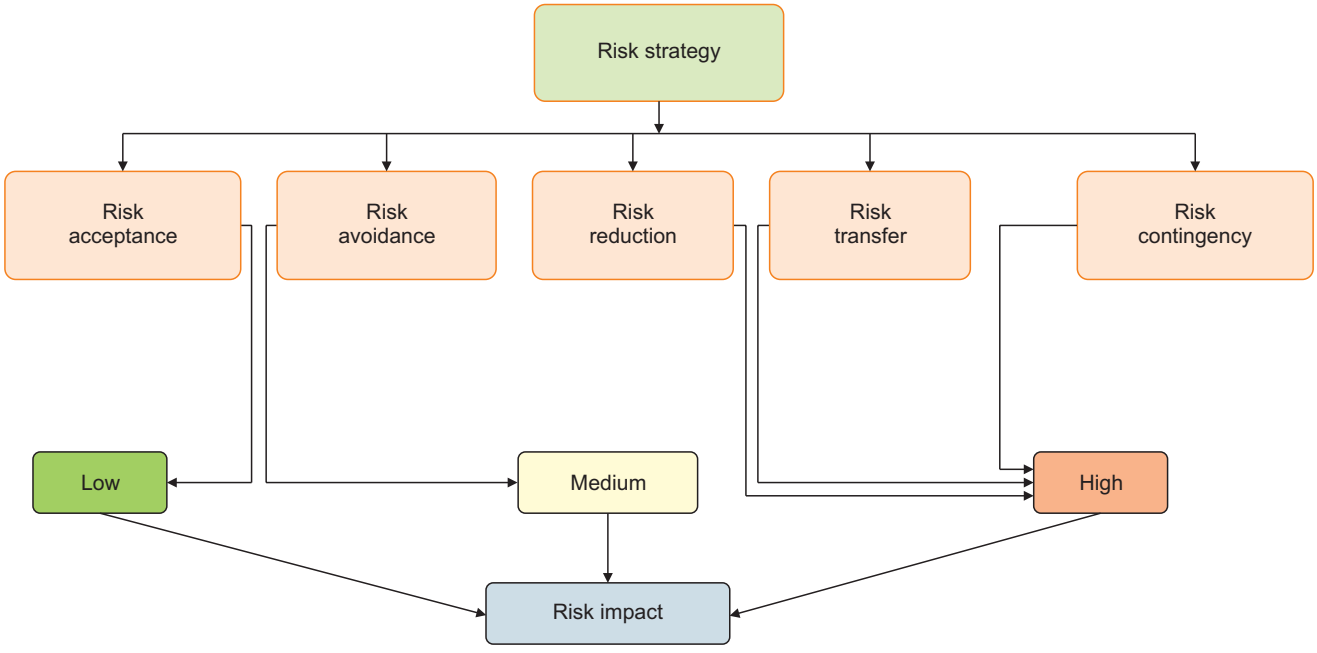


Fig. 2. Risk mitigation approaches.

 https://doi.org/10.1633/JISTaP.2026.14.2.1

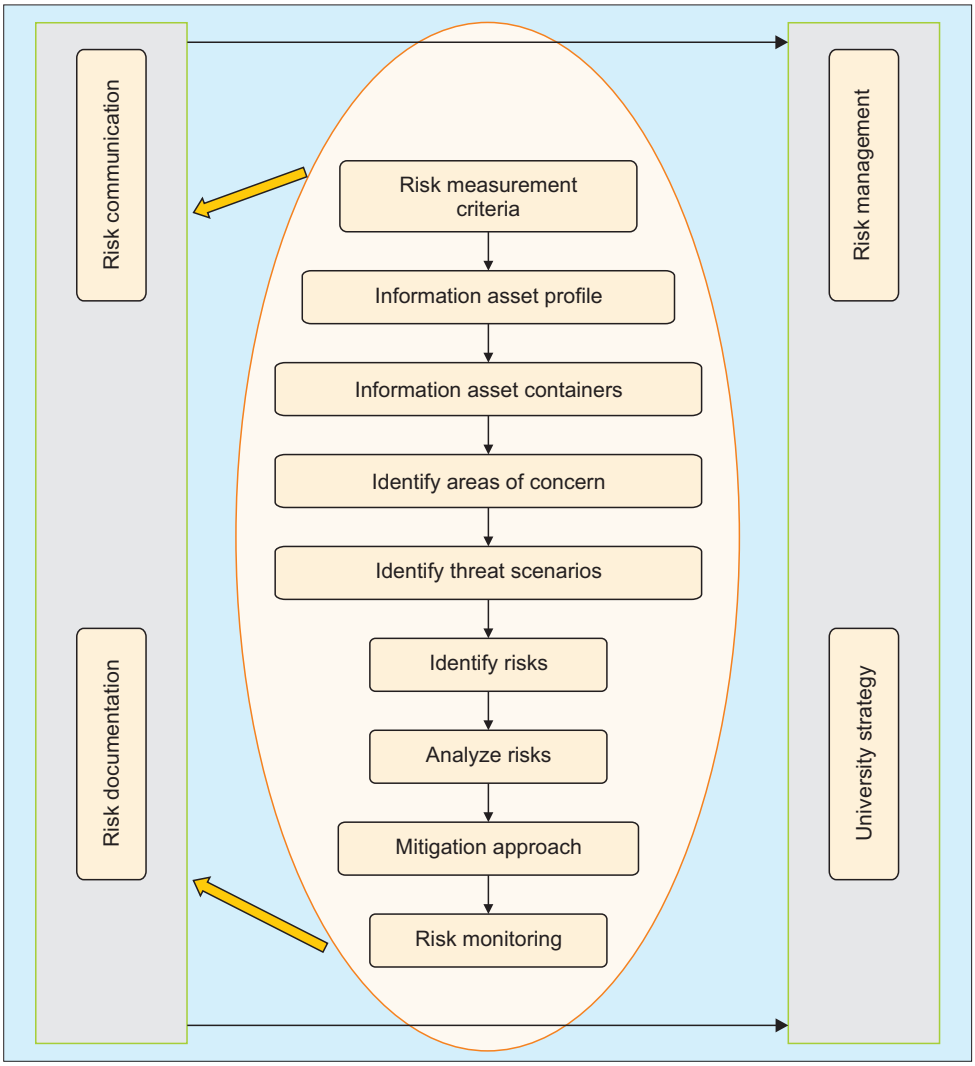


Fig. 3. Proposed comprehensive information security risk management framework.

ISO 27005 (NIST SP 800-30) with resource constraints. Minor suggestions included emphasizing continuous awareness training and clarifying the boundary between Step 6 (Risk Identification) and Step 7 (Risk Analysis). The experts confirmed that the model was relevant, adaptable, and contributed to the ISRM body of knowledge, as indicated in Section 3.4.

7. A COMPARATIVE ANALYSIS OF THE PROPOSED FRAMEWORK VS. INTERNATIONAL STANDARDS/ FRAMEWORKS

The proposed nine-step framework enhances ISRM theory through its explicit inclusion of resource-constraint adaptation within the risk management cycle. The existing ISRM models, including ISO 27001, NIST SP 800-30, and ITU-T X.1055, contain implicit assumptions about sufficient financial, technical, and human resources, which restrict their use in under-resourced settings. The framework implements risk measurement simplification (Step 1) and academic information asset and container profiling (Steps 2-3), and budget-based mitigation strategy prioritization (Step 8) to create a context-aware extension of existing maturity models. The study introduces a fresh theoretical dimension to ISRM theory, which shows that risk management success depends on both strict process adherence and institutional capabilities and flexibility. The research demonstrates how global standards can be transformed into scalable models for diverse institutional contexts through systematic hybridization, which benefits higher education systems in the Global South.

The international standards provide complete structures, yet they require substantial financial and technical

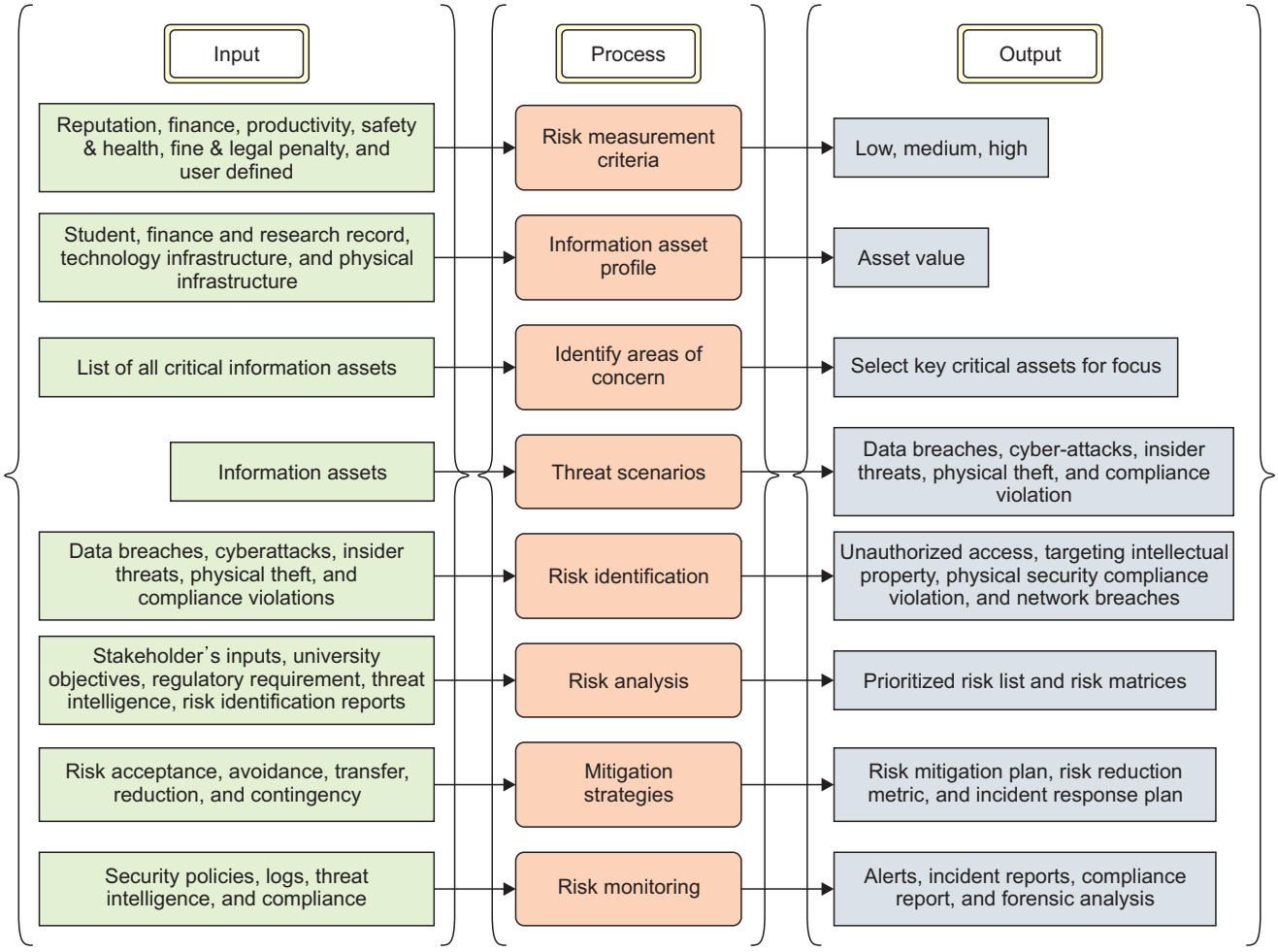


Fig. 4. Framework input, process, and output flow chart.

resources for implementation, which makes them difficult to implement in Ethiopian HEIs with limited resources. The proposed framework uses risk measurement criteria that are specific to the local context and a customized asset profiling method, which considers the distinctive information assets of HEIs, including research data, academic systems, and student records. The framework includes two new elements that are absent or underdeveloped in current frameworks: information asset container identification and areas of concern mapping. The framework provides detailed vulnerability assessments between physical and digital domains, which institutions with basic security infrastructure require. The framework includes practical and cost-effective monitoring mechanisms in its review phase to address the continuous oversight gap present in ISO and NIST models. The framework combines global best practices with local adaptability to achieve scalability for developing-country contexts while remaining operational in low-resource settings. Table 9 (Caralli et al., 2007; ISO, 2022; ITU, 2008; NIST, 2012; 2018) shows a comparative analysis of the proposed 9-step framework vs. international standards/frameworks.

8. A COMPARATIVE ANALYSIS OF THE PROPOSED FRAMEWORK VS. RELATED STUDIES

Table 10 (Ansari & Ali ,2021; Araújo et al., 2025; Baleid & Abdullah, 2026; Dawar & Shivarama, 2017; Kiura & Mango, 2017; Njoroge et al., 2019) shows comparative evidence of information security challenges in HEIs across regions. The research conducted in Kenya, India, and Brazil reveals that the problems encountered in Ethiopian HEIs are part of a larger pattern of problems that are common in developing countries. The studies conducted in Kenyan public and private universities have consistently

 https://doi.org/10.1633/JISTaP.2026.14.2.1

Table 9. Comparative analysis of proposed 9-step framework vs. international standards/frameworks

Proposed 9-step framework (Ethiopian HEIs)	ISO/IEC 27001 (ISO, 2022)	NIST SP 800-30/RMF (NIST, 2012; 2018)	ITU-T X.1055 (ITU, 2008)	OCTAVE Allegro (Caralli et al., 2007)	Novelty/added value
Step 1: Establish risk measurement criteria	Defines the parameters for risk assessment, along with the maximum acceptable risks	Risk assessment requires both risk framing and evaluation factors	The standard provides general guidelines for establishing risk assessment criteria	This approach identifies risk impact areas, yet lacks formal scoring systems	Our approach introduces HEI-specific risk assessment scores for academic contexts
Step 2: Develop an information asset profile	The system needs to create an information asset profile, which includes asset inventory classification	The system categorization method with asset criticality evaluation stands out as a key requirement	The standard recommends asset identification processes, yet it does not provide detailed profiling information	The framework identifies critical assets but fails to include academic information in its analysis	Our approach provides standardized academic asset profiling mechanisms
Step 3: Identify information asset containers	Asset locations are described in general terms in this standard	The system uses defined boundaries to establish risk areas but lacks physical container specifications	The standard provides general information about storing information assets	The framework lacks direct guidance for container mapping procedures	Our approach contains explicit container mapping functionalities for higher education institutions
Step 4: Identify areas of concern	The framework requires organizations to identify their vulnerabilities, yet it lacks a structured method for concern identification	Organizational risk context represents a key aspect of this framework	The standard includes general descriptions of potential vulnerabilities	The approach includes steps to identify specific areas of concern during the process	Our approach adapted OCTAVE for HEIs in Ethiopia through this methodology
Step 5: Identify threat scenarios	Organizations must specify threats as part of their assessments, but without a specific HEI-related context	The approach details threat enumeration procedures. The standard provides general information about threat vectors	The framework includes threat scenarios, but their dynamic nature remains limited	The framework includes threat scenarios, but their dynamic nature remains limited	Our approach provides contextualized threat scenarios specifically designed for HEIs
Step 6: Risk identification	The risk assessment process includes this core element	Risk assessment includes this step as one of its fundamental components	General guidance exists for this step in the framework	The framework employs relative impact evaluation methods to determine risks	Our study uses a combination of quantitative and qualitative approaches for risk evaluation in HEIs
Step 7: Risk analysis	The approach requires both qualitative and quantitative risk analysis methods	Multiple analysis approaches are supported by this standard	The framework contains general guidelines for performing analysis activities	The method uses relative impact evaluation to assess risks	Our study uses both quantitative and qualitative risk evaluation methods for HEIs
Step 8: Selection of mitigation approach	All risk management plans need to contain this requirement	Control selection and prioritization are described within the standard framework	The framework presents a wide range of mitigation strategies	Risk mitigation planning receives encouragement in this approach	Our proposed framework provides custom-made mitigation strategies for organizations with limited resources
Step 9: Risk monitoring and review	The framework demands that organizations develop continuous improvement cycles	The framework requires ongoing continuous monitoring as its core requirement	The framework includes instructions for periodic review	The framework addresses monitoring indirectly, but does not provide a detailed approach	The system presents an implementation for monitoring that accommodates limited resources within HEIs

HEIs, higher education institutions; ISO, International Organization for Standardization; NIST, National Institute of Standards and Technology.

shown that there are weak governance structures, low levels of awareness, and insufficient adoption of structured risk management processes. The findings in Indian HEIs are similar to those of the other two countries, in that libraries and ICT departments point out problems with access control and staff training and propose modifications to ISO 27001 that are relevant to their local context. The Brazilian research confirms these concerns by showing that federal universities are aware of the limitations of generic models and are advocating for HEI-specific frameworks that include continuous review and context-sensitive criteria.

These similarities suggest that the proposed nine-step framework can be applied elsewhere. The framework addresses HEI-specific risks through its inclusion of asset container identification (Step 3) and areas of concern (Step 4), and its focus on resource prioritization and low-cost monitoring (Steps 8 and 9), which are relevant to the budgetary and capacity constraints of institutions in the Global South. In addition to Africa, Asia, and Latin America, the framework provides insights for underfunded universities in developed countries where cybersecurity resources may be deprioritized compared to other institutional objectives. Thus, while based on the Ethiopian case, the framework contributes to an international discussion on building resilient, context-aware ISRM strategies in higher education.

9. STUDY LIMITATIONS

Despite having significant contributions to the information security field in general and HEIs in particular, this study has the following limitations. The study chose four HEIs in Ethiopia using a purposive sampling technique, which may limit the generalizability of the findings. It used descriptive statistics, which exclude inferential statistics, and did not employ different statistical techniques for analyzing and mitigating subjective bias. Additionally, the framework was not put into practice or transformed into a prototype or simulation-based demonstration. The study did not evaluate the ISRM practices of other industries; it solely focused on HEIs. Future research works are expected to fill these gaps.

10. CONCLUSIONS

This study investigated current gaps, best practices, and next directions regarding the management of information security risks in HEIs in Ethiopia from the viewpoints of organizational, people, physical, and technological controls. Based on the identified gaps, the study developed a comprehensive information risk management framework as a viable solution. To illustrate the proposed 9-step framework's unique contributions, the study compared it to other well-known international standards and frame-

Table 10. Comparative evidence of information security challenges in HEIs across regions

Country	Study	Key findings	Relevance to proposed 9-step framework
Kenya	Njoroge et al. (2019)	The implementation of IS practices faces obstacles because of insufficient policy enforcement and insufficient awareness	The framework supports both Step 1 (Risk Criteria) and Step 2 (Asset Profiling) by focusing on governance and awareness
Kenya	Kiura & Mango (2017)	Universities operate on informal procedures because they lack standardized risk-identification protocols	The framework supports both Step 6 (Risk Identification) and Step 7 (Risk Analysis)
India	Dawar & Shivarama (2017)	The current models fail to meet requirements, so the researcher develops a dynamic model that follows ISO 27001 standards	The framework supports both Step 2 (Asset Profiling) and Step 5 (Threat Scenarios)
India	Ansari & Ali (2021)	The implementation of IS practices suffers from inadequate access controls and insufficient staff training	The framework mirrors Step 8 (Mitigation) through its emphasis on training and awareness
Brazil	Araújo et al. (2025)	The current risk frameworks lack specificity for higher education	The framework validates both Step 1 (Local Criteria) and Step 9 (Monitoring and Review)
Cross-region	Baleid & Abdullah (2026)	Higher education institutions worldwide encounter persistent problems because of weak governance structures combined with low staff awareness and insufficient financial support	The proposed 9-step model requires a structured, adaptable framework because of its need

HEIs, higher education institutions; IS, information security; ISO, International Organization for Standardization.

 https://doi.org/10.1633/JISTaP.2026.14.2.1

works as well as comparable studies. The literature-based evidence shows that HEIs around the world confront comparable challenges when it comes to information security threats and risks. These similarities imply that other HEIs could adopt the suggested nine-step structure.

From an organizational control perspective, the absence of an information security policy was considered a key gap, while the familiarity of academic staff with protocols surrounding proper data classification, handling, and access control as well as having a basic understanding of applicable legal, regulatory (such as data protection laws and privacy regulations), or contractual requirements related to information security in their institution is considered as best practices.

From a people control perspective, the absence of an independent reviewer for organization information security policy implementation and operations; lack of awareness, education, and training regarding information security; lack of formalized disciplinary processes when information security policy is violated; and lack of signing non-disclosure agreements in their institution were considered as key gaps, while presence of written responsibilities regarding information security in their job description, awareness of most academic staff about reporting of suspected information security incidents, as well as being knowledgeable about common social engineering attack techniques like phishing emails, were considered as best practices.

From a physical control perspective, despite understanding the significance of physical security measures, such as locking offices, securing sensitive documents, and quickly reporting any suspicious activities or individuals, the majority of academic staff considered the lack of clear policies and procedures for disposing of physical documents in their institutions.

From technological control perspectives, the presence of compromised information security issues in the last few years; lack of designated information security staff and certified information security professionals within ICT directorates; lack of up-to-date and licensed anti-malware software, patch management, BYOD policy, and regular backup systems; lack of motivation among most ICT staff to stay updated on emerging security risks and new technology trends; and lack of established risk measurement criteria for assessing and managing ICT risks, as well as lack of penetration testing, were considered as key gaps; while presence of inventories or registries of important cyber security assets; availability of specific approaches to manage information security risks associated with third-party software applications; presence of approved business continuity plans, application of encryption techniques, enforcement of access control policies in their institutions, and blocking of malicious websites; and availability of professionals to fix hardware or software issues were considered as best practices in Ethiopian HEIs.

Considering the limited research in the area of the selected topic, this study adopted an exploratory research design and leveraged quantitative and qualitative approaches. The research findings may inspire higher education officials, ministries of education, policymakers, and other concerned bodies to look into open issues and enforce the practical implementation of the Unified ISRM Framework.

Future research works are expected to fill the following gaps. The study chose four HEIs in Ethiopia using a purposive sampling technique, which may limit the generalizability of the findings. It used descriptive statistics, which exclude inferential statistics, and did not employ different statistical techniques for analyzing and mitigating subjective bias. Additionally, the framework was not put into practice or transformed into a prototype or simulation-based demonstration. The study did not evaluate the ISRM practices of other industries; it solely focused on HEIs.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

Abebe, G. (2022). Perceived importance of information technology governance for Ethiopian higher educational institutions. *International Research Journal of Engineering and Technology (IRJET)*, 9(12), 1237-1244. https://www.irjet.net/archives/V9/i12/IRJET-V9I12207.pdf

Adane, K. (2020). Threats introduced by Bring Your Own Devices (BYOD) adoption in an Ethiopian higher educational institution: Solutions to security and privacy. *IUP Journal of Information Technology*, 16(2), 7-29. https://iupindia.in/ViewArticleDetails.asp?ArticleID=2779

Al-Ahmad, W., & Mohammed, B. (2015). *A code of practice for effective information security risk management using COBIT 5*. Paper presented at 2015 Second International Conference on Information Security and Cyber Forensics (InfoSec), Cape Town, South Africa.

Alenezi, A. (2024). Cybersecurity risks and strategies in learn-

ing services of higher education institutions (HEIs) in developing and emerging countries – a critical scoping review. *The Egyptian Journal of Business Studies,* 48(3), 480-506. https://doi.org/10.21608/alat.2024.373548

Alhassan, M. M., & Adjei-Quaye, A. (2017). Information security in an organization. *International Journal of Computer (IJC)*, 24(1), 100-116. https://doi.org/10.53896/ijc.v24i1.820

Ansari, A. J., & Ali, P. M. N. (2021). Security challenges in central university libraries in India. *Library Philosophy and Practice*, 2021(April), 5299. https://digitalcommons.unl.edu/libphilprac/5299

Araújo, J. G. R., Callado, A. L. C., & Bomfim, E. T. (2025). Risk management in Brazilian federal universities: Evaluating the achievement of strategic objectives. *Revista de Educação e Pesquisa em Contabilidade (REPeC) (Journal of Education and Research in Accounting)*, 19, 1-30. https://doi.org/10.17524/repec.v19.e3803

Baleid, H. M., & Abdullah, M. F. (2026). Cybersecurity in higher education: A systematic review of threats, challenges, and mitigation strategies. *Journal of Science and Technology*, 31(1), 20-27. https://doi.org/10.20428/jst.v31i1.3563

Bongiovanni, I. (2019). The least secure places in the universe? A systematic literature review on information security management in higher education. *Computers & Security,* 86, 350-357. https://doi.org/10.1016/j.cose.2019.07.003

Cacciattolo, M. (2015). Ethical considerations in research. In M. Vicars, S. Steinberg, T. McKenna, & Cacciattolo, M. (Eds.). *The praxis of english language teaching and learning (PELT): Beyond the Binaries: Researching Critically in EFL Classrooms* (pp. 61-79). SensePublishers Rotterdam.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. *Journal of Research in Nursing,* 25(8), 652-661. https://doi.org/10.1177/1744987120927206

Caralli, R. A., Stevens, J. F., Young, L. R., & Wilson, W. R. (2007). *Introducing OCTAVE allegro: Improving the information security risk assessment process* (SEI Report CMU/SEI-2007-TR-012). Software Engineering Institute. Pittsburgh, PA, USA. https://doi.org/10.1184/R1/6574790.v1

Catal, C., Ozcan, A., Donmez, E., & Kasif, A. (2023). Analysis of cyber security knowledge gaps based on cyber security body of knowledge. *Education and Information Technologies,* 28(2), 1809-1831. https://doi.org/10.1007/s10639-022-11261-8

Daimi, K., & Peoples, C. (2021). Advances in cybersecurity management. Springer Cham.

Dawar, V. A., & Shivarama, J. (2017). *Design and development of dynamic information security management models for sustainable academic libraries*. https://ir.inflibnet.ac.in/handle/1944/2074

Ejerssa, N. (2018). *Assessment of information security maturity level on Ethiopian public universities* (master's thesis). Addis Ababa University, Addis Ababa, Ethiopia.

Ganesen, R., Bakar, A. A., Ramli, R., Rahim, F. A., & Zawawi, M. N. A. (2022). Cybersecurity risk assessment: Modeling factors associated with higher education institutions. *International Journal of Advanced Computer Science and Applications*, 13(8), 355-362. https://doi.org/10.14569/IJACSA.2022.0130843

Grajek, S. (2015). *Top 10 IT issues, 2015: Inflection point*. https://er.educause.edu/articles/2015/1/top-10-it-issues-2015-inflection-point

Grama, J. (2014). *Just in time research: Data breaches in higher education*. https://library.educause.edu/resources/2014/5/just-in-time-research-data-breaches-in-higher-education

International Organization for Standardization. (2022). *ISO/IEC 27001:2022 — Information security, cybersecurity and privacy protection — Information security management systems — Requirements*. https://www.iso.org/standard/27001

International Telecommunication Union. (2008). X.1055 : *Risk management and risk profile guidelines for telecommunication organizations*. https://www.itu.int/rec/T-REC-X.1055-200811-I

International Telecommunication Union (ITU). (2020). *Global cybersecurity index*. ITU Publications.

Joshi, C., & Singh, U. K. (2017). Information security risks management framework – A step towards mitigating security risks in the university network. *Journal of Information Security and Applications*, 35, 128-137. https://doi.org/10.1016/j.jisa.2017.06.006

Keefa, B., Mayoka, G. K., Nkamwesiga, L., & Nyamadi, M. (2024). Information security in higher education institutions: A systematic literature review. *RSEA Journal*, (2024: 16th ORSEA Conference Proceedings), 302-320. https://doi.org/10.56279/orseaj.C2024.18

Kiura, S. M., & Mango, D. M. (2017). Information systems security risk management (ISSRM) model in Kenyan private chartered universities. *European Journal of Computer Science and Information Technology*, 5(2), 1-15. https://eajournals.org/ejcsit/vol-5-issue-2-april-2017/information-systems-security-risk-management-issrm-model-kenyan-private-chartered-universities/

Kombo, F. S., Mwakalinga, P. G., Kumbo, L. I., Edward, L. M., & Bhalalusesa, N. P. (2023). Assessment of higher education information security risk management practices in Tanzania. *East African Journal of Education and Social Sciences*,

4(3), 229-239. https://eajess.ac.tz/index.php/eajess/en/article/view/453?articlesBySimilarityPage=1

Kumar, R. (2015). *Research methodology: A step-by-step guide for beginners* (4th ed.). SAGE.

Nagar, S. (2018). Introduction to OCTAVE. In S. Nagar (Ed.), *Introduction to OCTAVE: For engineers and scientists* (pp. 1-16). Apress.

National Institute of Standards and Technology. (2012). *Guide for conducting risk assessments (Special Publication 800-30 Revision 1)*. https://csrc.nist.gov/pubs/sp/800/30/r1/final

National Institute of Standards and Technology. (2018). *Risk management framework for information systems and organizations: A system life cycle approach for security and privacy (Special Publication 800-37 Revision 2)*. https://csrc.nist.gov/pubs/sp/800/37/r2/final

National Institute of Standards and Technology (NIST). (2024). *The NIST cybersecurity framework 2.0*. https://doi.org/10.6028/NIST.CSWP.29

National Research Council. (2013). *Professionalizing the nation's cybersecurity workforce?: Criteria for decision-making*. The National Academies Press.

Njoroge, P. M., Ogalo, J., & Ratemo, C. M. (2019). A framework for effective information security risk management in Kenyan public universities. *International Journal of Social Sciences and Information Technology*, 4(10), 1-19. https://www.ijssit.com/main/wp-content/uploads/2019/10/Framework-For-Effective-Information-Security-Risk-Management-In-Kenyan-Public-Universities.pdf

Nkambule, M., & Jansen van Vuuren, J. (2024). Integrating enterprise architecture into cybersecurity risk management in higher education. *International Conference on Cyber Warfare and Security*, 19(1), 501-510. https://doi.org/10.34190/iccws.19.1.2189

PCI Security Standards Council. (2008). *Payment card industry security standards*. https://www.pcisecuritystandards.org/pdfs/pcissc_overview.pdf

Petersen, R. (2013). *EDUCAUSE response to NIST RFI: Developing a framework to improve critical infrastructure cybersecurity*. https://library.educause.edu/resources/2013/4/educause-response-to-nist-rfi-developing-a-framework-to-improve-critical-infrastructure-cybersecurity

Priest, R. G. (1988). Data protection act. *Bulletin of the Royal College of Psychiatrists,* 12(5), 204. https://doi.org/10.1192/s0140078900020162

Putri, N. L., & Wijaya, A. F. (2023). Information technology risk management in educational institutions using ISO 31000 Framework. *Journal of Information Systems and Informatics,* 5(2), 630-649. https://doi.org/10.51519/journalisi.v5i2.468

Readiness and Emergency Management for Schools Technical Assistance Center. (2017). *Cybersecurity considerations for institutions of higher education (Cybersecurity for Higher Ed fact sheet)*. https://files.eric.ed.gov/fulltext/ED593780.pdf

SANS Institute. (2016). *The Center for Internet Security (CIS) Critical security controls v6.0.* https://www.sans.org/media/critical-security-controls/critical-controls-poster-2016.pdf

Sikman, L., Latinovic, T., Sarajlic, N., & Sikanjic, G. (2023). A model of sustainable information security management system in higher education institutions. *Journal of Physics: Conference Series,* 2540(1), 012003. https://doi.org/10.1088/1742-6596/2540/1/012003

Sulistyowati, I., & Hari Ginardi, R. V. (2018). *Information security risk management with OCTAVE method and ISO/EIC 27001: 2013 (Case study: Airlangga University)*. Paper presented at 4th International Seminar on Science and Technology, Surabaya, Indonesia.

Suroso, J. S., & Fakhrozi, M. A. (2018). Assessment of information system risk management with OCTAVE Allegro at education institution. *Procedia Computer Science,* 135, 202-213. https://doi.org/10.1016/j.procs.2018.08.167

The British Standards Institution. (n.d.). *ISO/IEC 27001 - Information security management system*. https://www.bsigroup.com/en-IN/products-and-services/standards/iso-iec-27001-information-security-management-system/

U.S. Department of Health and Human Services. (2025). *Summary of the HIPAA privacy rule*. https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html

Yilmaz, R., & Yalman, Y. (2016). A comparative analysis of university information systems within the scope of the information security risks. *TEM Journal,* 5(2), 180-191. https://doi.org/10.18421/tem52-10

Yousif Yaseen, K. A. (2022). Importance of cybersecurity in the higher education sector 2022. *Asian Journal of Computer Science and Technology,* 11(2), 20-24. https://doi.org/10.51983/ajcst-2022.11.2.3448

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 26-49, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.2

Job Satisfaction Among University Librarians and Library Staff in Myanmar: An Exploratory Study

Thet Mon Swe*
Department of Library and Information Studies, Yadanabon University, Mandalay, Myanmar
Department of Library Science, Research Center for Chinese Science Evaluation (RCCSE), School of Information Management, Wuhan University, Hubei, China
E-mail: thetmonswe.kya@gmail.com

Cong Jing Ran
Department of Library Science, Research Center for Chinese Science Evaluation (RCCSE), School of Information Management, Wuhan University, Hubei, China
E-mail: rancongjing@163.com

Siluo Yang
Department of Library Science, Research Center for Chinese Science Evaluation (RCCSE), School of Information Management, Wuhan University, Hubei, China
E-mail: 58605025@qq.com

Qunzhe Ding
Department of Library Science, Research Center for Chinese Science Evaluation (RCCSE), School of Information Management, Wuhan University, Hubei, China
E-mail: dingqunzhe1@163.com

ABSTRACT

Job satisfaction among librarians and staff is a critical human resource concern that influences organizational effectiveness, yet it remains underexplored in Myanmar's university libraries. This study aims to assess job satisfaction levels and identify key influencing factors among librarians and staff in Myanmar's university libraries, with attention to demographic and positional disparities. A cross-sectional quantitative survey was conducted with 111 participants from 49 university libraries. Data were analyzed using IBM SPSS version 25 (IBM Co., Armonk, NY, USA) and IBM SPSS AMOS version 25 (IBM Co.), employing exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Career training and user interface friendliness were found to significantly enhance job satisfaction, while salary, working environment, and supervisory factors had no significant impact. Notably, library assistants (5) reported lower satisfaction compared to deputy directors and librarians. The findings also indicate that Myanmar librarians prioritize user service over personal job satisfaction. Prioritizing career training and user interface design is essential for improving job satisfaction among Myanmar's university library staff. Strategic initiatives should focus on enhancing training opportunities and user-centered service delivery to foster a more satisfying and effective workplace.

Keywords: job satisfaction, librarians and library staff, career training and user interface, university libraries, Myanmar

Received: May 23, 2025 **Revised:** March 10, 2026
Accepted: March 14, 2026 **Published:** June 30, 2026

***Corresponding Author:** Thet Mon Swe
https://orcid.org/0000-0002-9290-6744
E-mail: thetmonswe.kya@gmail.com

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [Thet Mon Swe, Cong Jing Ran, Siluo Yang, Qunzhe Ding] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

Effective human resource management (HRM) is widely recognized as a cornerstone of organizational success, contributing to productivity, employee morale, and sustained competitiveness (DeCenzo et al., 2015). In academic libraries, personnel play a pivotal role in delivering quality services and advancing knowledge (Lakos & Phipps, 2004; Xu & Wang, 2024). As libraries navigate an increasingly dynamic educational environment, promoting workforce engagement and satisfaction has become increasingly important for institutional growth and service excellence.

While job satisfaction and motivation (JSM) are well-established drivers of employee performance, collaboration, and innovation, existing research has predominantly focused on global or general organizational contexts (Adams, 2024). In Myanmar, where higher education is undergoing significant transformation, the specific experiences of academic library personnel remain largely unexplored. Previous studies in Myanmar have examined job satisfaction in various sectors (Khaing, 2019; Perez et al., 2023; Thaung, 2019), but empirical attention has not been devoted to university libraries, despite their central role in academic support.

Addressing this gap is essential for enhancing the operational effectiveness of academic libraries and fostering educational achievement. Therefore, this study investigates how Myanmar's unique cultural values, institutional norms, and socio-political context influence job satisfaction among university librarians. By examining these factors, the research aims to provide insights that can inform HRM strategies and promote professional development within Myanmar's academic libraries.

2. STATEMENT OF RESEARCH PROBLEM

Library services are essential for university communities, and librarians play a critical role in providing information for research, teaching, learning, preservation, personal enlightenment, and career development. Librarian professionals in Myanmar manage library services, including collection development, cataloging, and classification (Win et al., 2019). They use software systems such as E-Lib and SOLIB for tasks cataloguing and inventory management. Libraries also offer information literacy and outreach programs, technology services, and user services. Consequently, the performance of librarians and library staff also directly reflects the current state of university library services in Myanmar. Paraprofessional staff typically handle membership registration, reference services, and circulation. Professional librarians are responsible for preserving library materials, and facility management plays a crucial role in this effort. Chief librarians encourage staff to participate in professional development programs and connect with other libraries for knowledge exchange. Nevertheless, management of salary payments, promotions, recognition, compensation, years of service, performance evaluations, passing specific civil service exams, educational attainment, and pensions and benefits adheres to national civil service policies (Win, 2019). Therefore, some librarians express dissatisfaction due to a lack of incentives, poor working conditions and leadership practices, and low salary payments. Such situations can lead to dissatisfaction, absenteeism, and lateness, which in turn hinder the progress of research, scholarship, and institutional development. Hence, this study aims to investigate job satisfaction as a predictor of librarians' functioning in university libraries in Myanmar, in order to improve librarians' overall performance. In addition, insights from global literature offer valuable perspectives that not only help us to understand the problems librarians in Myanmar confront but also how academic libraries can foster worker morale and job satisfaction. Thus, the purpose of this study is to evaluate academic librarians' and staff's degree of job satisfaction in Myanmar, highlighting the need for decision-makers and accountable authorities to address their issues. This study specifically identifies the following objectives.

2.1. Research Objectives and Questions

The main purpose of the research objectives is to assess the level of job satisfaction among librarians and library staff in Myanmar universities, identify the key factors influencing their satisfaction, and provide evidence-based insights to inform decision-makers in academic libraries. To achieve this purpose, the following research questions are addressed:

1. What is the current level of job satisfaction among librarians and library staff in Myanmar universities?
2. What are the primary factors influencing job satisfaction among these professionals?
3. What strategies or interventions could enhance job satisfaction in Myanmar's academic libraries?

3. LITERATURE REVIEW

Academic librarians are widely recognized as key contributors to research growth and community success, and many countries believe they are critical to national development. Research on job satisfaction among librarians has become both a global endeavor and a locally focused effort to identify the factors that influence professional well-being and performance. Inevitably, supportive work environments are crucial everywhere. According to research conducted in both established and emerging Association of Southeast Asian Nations (ASEAN) countries, some studies have examined how organizational culture, leadership, work-life balance, career advancement, and pay affect the job satisfaction of academic librarians and staff.

An affective commitment and organizational tenure were key indicators for job satisfaction with Malaysian academic librarians (Abdul Karim, 2017); likewise, meeting users' expectations, providing constructive knowledge, staff development opportunities, social events, and religion with race were predominant factors for the job satisfaction of Malaysian library staff (Haque et al., 2012); similarly, knowledge, attitudes, and practices are influences for Brunei Darussalam public sector librarians (Tuah et al., 2024).

Cultural intelligence is a strong predictor of job performance, and so knowledge conversion skills lead to a creative work design in Indonesian academic librarians (Masrek et al., 2021; 2024). However, work environment and compensation did not have a significant relationship with Indonesian academic librarians (Kusumaningrum et al., 2016). Conversely, while performance and competency levels remained statistically similar, the knowledge characteristics of work design in Indonesian libraries showed significant variation (Mutia et al., 2024).

Moreover, librarianship is regarded as a lifelong profession that requires continuous skill development and new opportunities (Listor, 2024). Along the same lines, skillful leaders could support affectivity and self-efficacy, promoting positive emotional management and confidence in handling work-related challenges (Abatayo et al., 2023). Besides this, Dorado (2025) also critiqued the financial landscape, salary structures, benefits, and economic challenges required for the library profession's sustainability. Similarly, orientation, meeting user needs, and building satisfaction are important for Thai professionals' academic libraries (Tanloet & Tuamsuk, 2011). Tanloet and Tuamsuk (2011) further mentioned the need for ethical and moral competencies, marketing skills, and user interface fulfilment in future careers.

To provide a comprehensive evaluation of job satisfaction, Myanmar library professionals are needed to fill the research gap. Therefore, this study could address the need for localized studies, compared with ASEAN neighbor countries, to explore the particular opportunities and challenges faced by Myanmar university libraries. Pioneering research offers instructive perspectives on proven strategies for academic libraries to enhance employee morale and organizational performance.

3.1. Global and Local Perspectives of Job Satisfaction in Academic Libraries

Globally, academic librarians report higher satisfaction where HRM practices prioritize collaboration, recognition, and personal development (Ranaweera & Li, 2018). Greek academic librarians are most satisfied with their jobs, supervision, and working conditions, whereas they are less satisfied with pay and promotion (Togia et al., 2004). Professional duties account for 86% of all duties, underscoring their importance for efficient management (Mouza & Grigoriadou, 2016). Similarly, extrinsic, intrinsic, and performance characteristics substantially affect job satisfaction among public librarians in Northern Province, Sri Lanka (Shanmugathasan, 2020). In India, 50% of librarians express satisfaction with salary, 48.2% with promotion criteria, 46% with job security, and 69.8% with organizational relationships and recognition (Arumugam & Radha, 2023).

Persistent challenges, such as low salaries, inadequate infrastructure, and limited professional growth opportunities negatively impact morale in developing countries (Fatima & Bhatti, 2014; Ikonne & Onuoha, 2015). These HRM-related issues have direct consequences for service quality and institutional effectiveness. Likewise, remuneration, working conditions, autonomy, and professional relationships influence job satisfaction among Karachi University librarians in Pakistan (Nasrullah & Suhag, 2024). Additionally, librarians' job satisfaction is influenced by factors like job security, professional relationships, and client interactions. In contrast, dissatisfaction stems from issues like salary, benefits, working conditions, and research opportunities at the Federal University of Agriculture, Makurdi Library in Nigeria (Igbashal et al., 2016).

Within academic libraries, job satisfaction is profoundly shaped by identification with institutional culture, quality of leadership, and a sense of being valued at work (Martin, 2020a). Supportive colleagues, fair compensa-

tion, and recognition play pivotal roles in fostering motivation and enhancing performance. Further studies highlight that professional development, access to resources, inclusivity, and flexible working arrangements collectively contribute to a fulfilling work environment, ultimately raising the standard of services provided to students and faculty (Igbashal et al., 2016; Shahzad et al., 2023; Upev & Beetseh, 2017; Yu et al., 2018).

3.2. Distinctive Human Resource Management Challenges and Opportunities in Myanmar

Academic libraries in Myanmar face a range of distinct HRM challenges that directly affect job satisfaction and organizational effectiveness. Key barriers include inadequate compensation, insufficient physical infrastructure, and a shortage of skilled personnel (Kupryte & Nyein, 2018; Pipe & Tuamsuk, 2023). In addition, outdated administrative practices and limited opportunities for professional development persist, compounded by a lack of emphasis on staff well-being (Swe & Yang, 2024; Zar Kyaw et al., 2025). While initiatives such as the e-Library Myanmar project have made some progress in bridging these gaps, ongoing resource limitations, traditional leadership styles, and entrenched cultural norms continue to hinder meaningful advancement (Nyein, 2016; Win et al., 2019). Recent studies show that librarians in Myanmar's academic libraries often prioritize user needs and the quality of their services provided over their own job satisfaction.

Internationally, the adoption of modern HRM practices such as continuous training, flexible policies, and a supportive workplace culture has been shown to enhance employee well-being and boost overall organizational performance (Kumar & Boddeda, 2024). This trend underscores the importance of professional development and user experience, emphasizing the need for human resource (HR) strategies that strike a balance between service delivery and staff well-being. Factors such as access to career development and user-friendly library systems have a greater impact on service effectiveness than traditional concerns like salary or supervisory style.

However, current challenges, such as low salaries, outdated career progressions, and conventional management approaches, remain widespread and are especially acute in the Myanmar university libraries setting. Overcoming these challenges is essential for motivating staff, enhancing service quality, and supporting the nation's broader educational objectives. Given these ongoing issues, there is a clear need for empirical research to better understand the determinants of job satisfaction in this area, to inform future HRM strategies, and to foster sustainable institutional growth.

3.3. Job Structure of Myanmar University Libraries

The overall structure of education development in Myanmar includes 164 universities and colleges (Hayden & Martin, 2013), and this number has continued to rise due to increasing student enrolment, government educational reforms, and the growing recognition of higher education as essential to national development. Consequently, college and university libraries have expanded as an integral part of this educational system. Furthermore, the duty allocation in the structure of university libraries is shown in Fig. 1. As well, this sample may be representative of Myanmar university librarians and staff in the evaluation of job satisfaction and was the first exploration in this area. According to previous literature and theoretical findings, many researchers and organizations have conducted studies on employee job satisfaction, as no organization and institution should neglect its HR. Job satisfaction is

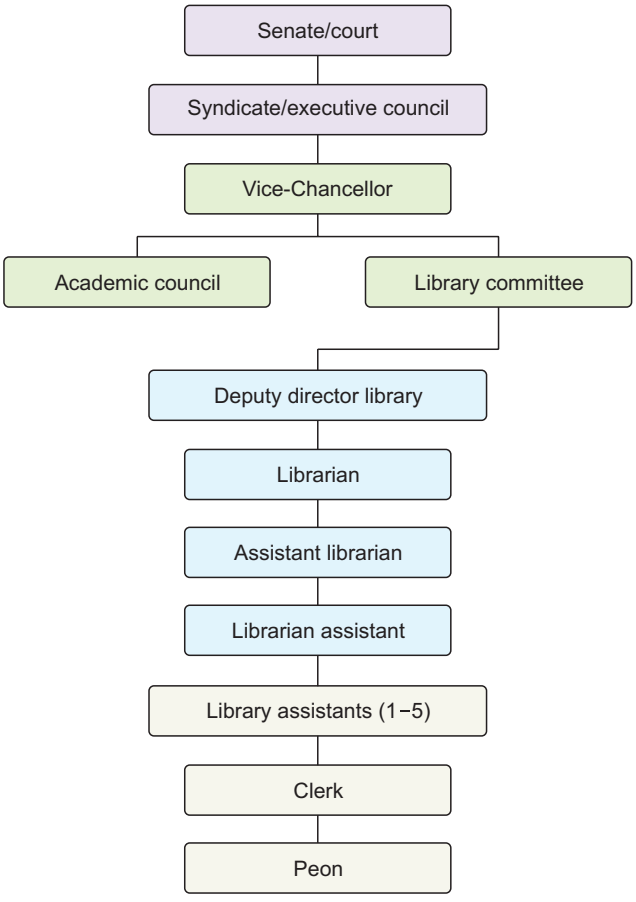


Fig. 1. Line type of staffing in university library.

essential for HRM; it is fundamentally linked to the education system and can influence national development and the government's standing (Bolatito & Mohamoud, 2024).

Fig. 1 depicts the organizational structure of the library system. The senate/court and syndicate/executive council offer overarching governance and strategic guidance for the institution. The vice-chancellor functions as the head executive, supervising all academic and administrative activities. The academic council, accountable for academic policy, and the library committee, which supervises library affairs, report to the vice-chancellor. The deputy director of the library oversees operations, supported by the librarian. The librarian oversees the assistant librarian and the library assistants, who may range from one to five in number to denote numerous roles. The supporting staff comprises the clerk, tasked with administrative responsibilities, and the peon, who manages general chores.

3.4. Conceptual Framework for Job Satisfaction

Job satisfaction is a fundamental construct in HRM, directly impacting organizational success, employee engagement, and retention (Ahmad et al., 2021; Karuna Sri et al., 2024; Oloyede & Soyemi, 2022). Conversely, dissatisfaction often arises from inadequate remuneration, outdated management practices, and restricted access to professional development, particularly in resource-constrained environments (Ranaweera et al., 2018; Townsend & Bugg, 2020). Key determinants of job satisfaction include fair compensation, effective leadership, supportive organizational culture, work-life balance, and opportunities for professional development (Adams, 2024; Kumar & Boddeda, 2024; Martin, 2020a; 2020b). These factors are not only vital globally but also prevalent in developing regions, where insufficient salary, limited recognition, and a lack of career advancement opportunities persist (Fatima & Bhatti, 2014; Ikonne & Onuoha, 2015). Many scholars have addressed theories like Herzberg's Two-Factor Theory, Maslow's Hierarchy of Needs, Hackman and Oldham's Job Characteristics Model, and the Job Demands-Resources (JD-R) Model, which have been relevant to job satisfaction factors (Demerouti et al., 2001; Herzberg, 2015; Mohd Rokeman et al., 2024). These theories highlight job design, job demands, and resources in enhancing motivation, productivity, and retention, including both intrinsic and extrinsic motivation. Comprehending these frameworks is crucial for firms to establish a nurturing and stimulating work environment. Therefore, the following hypotheses have been drawn from the above literature review, theories, and cultural conditions, given that there is no prior research in this area.

3.4.1. Hypothesis Development

Competitive compensation remains a foundational determinant of job satisfaction across industries (Karuna Sri et al., 2024). Studies have consistently shown that financial incentives, equitable remuneration, and robust benefits packages are vital for attracting and retaining talent in academic libraries. Dissatisfaction with salaries and inadequate benefits often contribute to higher attrition rates, especially in developing countries (Yaya, 2019). This concept leads to the following hypothesis.

H1. Salary and benefits significantly impact job satisfaction.

Modern HRM emphasizes the importance of work-life balance, flexible work arrangements, and continuous professional development. Access to training, ongoing learning opportunities, and recognition programs are linked to higher motivation and job satisfaction (Kumar & Boddeda, 2024; Ranaweera & Li, 2018; Ranaweera et al., 2018). A healthy balance between professional demands and personal life is essential for long-term employee well-being and productivity (Townsend & Bugg, 2020). Accordingly, the following hypothesis was formulated.

H2. The work environment significantly affects job satisfaction.

Rapid technological advancement and automation are reshaping the HRM landscape. While automation can drive operational efficiency, its successful implementation depends on careful change management and a focus on human needs (Vrontis et al., 2022). Moreover, while automation streamlines processes, its impact on job satisfaction is largely determined by how thoughtfully these technologies are implemented to address employees' needs and aspirations (Winkelhaus et al., 2022). These insights underscore the fundamental importance of prioritizing employee satisfaction and engagement in highly digitized environments for organizational performance. Therefore, the addressed hypothesis is "H3. Career training (CT) significantly affects job satisfaction."

Effective leadership and a constructive organizational culture are critical drivers of satisfaction among library staff. Supportive supervisors, transparent communication, and participative management foster trust and motivation (Adams, 2024; Martin, 2020b). Collaborative work environments, a sense of appreciation, and opportunities for staff input into decision-making processes further enhance engagement and morale (Oloyede & Soyemi, 2022).

Therefore, the following hypothesis is proposed.

H4. Supervisory management has a strong impact on job satisfaction.

Consequently, librarians are needed to enhance the library's image and service quality by communicating with users and information materials (Majid & Haider, 2008). Therefore, social capital partially mediates the significant effects of librarians' subjective well-being (SWB) on job satisfaction. Hence, SWB, job satisfaction, and social capital exhibited moderate levels (Bahrudin & Lawang, 2023). Thus, the following hypothesis was drawn.

H5. A user-friendly interface enhances job satisfaction.

3.5. Construction Factors and Items for Job Satisfaction

This section presents the items from the above section of the literature review, the conceptual framework, and the theories that affect job satisfaction, particularly for academic librarians. The items fit four theories of job satisfaction theoretical frameworks, and the way things work in the local professional world, and were adapted to reflect the flexible nature of Myanmar's social culture (see Table 1 [Abatayo et al., 2023; Abdul Karim, 2017; Aghaei et al., 2021; Arumugam & Radha, 2023; Dorado, 2025; Fatima & Bhatti, 2014; Igbashal et al., 2016; Ikonne & Onuoha, 2015; Khan & Ahmed, 2013; Kusumaningrum et al., 2016; Listor, 2024; Martin, 2020a; Martin, 2020b; Masrek et al., 2024; Mouza & Grigoriadou, 2016; Muthukumaran, 2014; Mutia et al., 2024; Nasrullah & Suhag, 2024; Oloyede & Soyemi, 2022; Ranaweera & Li, 2018; Ranaweera et al., 2018; Shahzad et al., 2023; Shanmugathasan, 2020; Togia et al., 2004; Unegbu et al., 2020; Upev & Beetseh, 2017; Williamson et al., 2005; Win et al., 2019; Yaya, 2019; Yu et al., 2018] and the Appendix). Furthermore, this study uses four main theories of job satisfaction: Herzberg's Two-Factor Theory, Maslow's Hierarchy of Needs, Hackman and Oldham's Job Characteristics Model, and the JD-R Model, to adapt questions from other studies to make them relevant to librarians at Myanmar universities.

4. METHODS

This study employed a quantitative, exploratory research design and an empirical approach to assess job satisfaction among librarians and library staff systematically. There were a total of 38 closed-ended questions in the survey (see Appendix), organized into six thematic dimensions of job satisfaction theories, with the conceptual framework and hypothesis development outlined above. The participants' opinions were assessed using a 5-point Likert scale, where 1 indicated "strongly disagree," and 5 indicated "strongly agree."

After drawing inspiration from other proven surveys, the questionnaire was pilot-tested with a select group of librarians to assess clarity, reliability, and content validity. The researcher conducted a pilot study with 30 people before drafting the final analysis. At that point, she removed one component, such as work-life balance, from the analysis. Therefore, the researcher amended the final instrument using Google Forms (Google LLC., Mountain View, CA, USA) and then sent a link to the Google Form from an individual head librarian to university personnel. Furthermore, the researcher contacted individuals directly by telephone for enhanced involvement. The data collection process lasted roughly three months, commencing in October 2024 and concluding in December. The primary

Table 1. Construction factors for job satisfaction

Construct	Items	Adapted
Salary benefits	7	Muthukumaran (2014); Ikonne & Onuoha (2015); Igbashal et al. (2016); Ranaweera & Li (2018); Ranaweera et al. (2018); Yaya (2019); Martin (2020a); Nasrullah & Suhag (2024); Dorado (2025)
Work environment conditions	6	Togia et al. (2004); Kusumaningrum et al. (2016); Martin (2020b); Oloyede & Soyemi (2022); Arumugam & Radha (2023)
Supervisor management	6	Fatima & Bhatti (2014); Mouza & Grigoriadou (2016); Shanmugathasan (2020); Aghaei et al. (2021); Abatayo et al, (2023)
Career training	6	Williamson et al. (2005); Upev & Beetseh (2017); Win et al. (2019); Yu et al. (2018); Shahzad et al. (2023); Listor (2024)
Job satisfaction and motivation	6	Abdul Karim (2017); Unegbu et al. (2020); Aghaei et al. (2021); Masrek et al. (2024); Shahzad et al. (2023)
User interface friendliness	6	Khan & Ahmed (2013); Mouza & Grigoriadou (2016); Mutia et al. (2024)

Table 2. Respondents' institutional affiliation

No.	Name of university library	Frequency	Percent
1	East Yangon University	2	1.8
2	Yangon University of Foreign Languages (YUFL)	3	2.7
3	Yadanabon University	8	7.2
4	Sport Library Yangon (Institute of Sports and Physical Education Yangon)	2	1.8
5	University of Computer Studies, Yangon	2	1.8
6	Kyauk Se University	5	4.5
7	Yangon University of Economic	1	0.9
8	University of Co-operative and Management, Sagaing	1	0.9
9	University of Yangon	1	0.9
10	Other libraries	1	0.9
11	Yezin Agricultural University	2	1.8
12	Naypyitaw State Academy	5	4.5
13	Sagaing Universtiy of Education	4	3.6
14	Mandalay Institute of Technology (MIT)	4	3.6
15	Sagaing Universtiy	2	1.8
16	University of Medicine, Mandalay	2	1.8
17	Magaway University	1	0.9
18	Ministry of Broder Affair, Education and Training Department, Central Training School, Sagaing	1	0.9
19	Information and Communication Technology Training Institute (ICTTI), Yangon	1	0.9
20	Mandalay University	1	0.9
21	Meiktila University of Economics	2	1.8
22	University of Medicine, Yangon	1	0.9
23	Meiktila University	3	2.7
24	Technological University, Mandalay (TUM)	2	1.8
25	Monywa University	2	1.8
26	Pathein University	1	0.9
27	Department of Medical Research (Pyin Oo Lwin Branch) Departmental Library	1	0.9
28	Shwebo University	1	0.9
29	Mandalay University of Foreign Language (MUFL)	3	2.7
30	Universities' Central Library	1	0.9
31	Mandalar University	6	5.4
32	Mawlamyine University	1	0.9
33	Dagon University	2	1.8
34	Taunggyi University	2	1.8
35	Hinthada University	10	9
36	Hpa-An University	3	2.7
37	Myingyan University	4	3.6
38	Panglong University	1	0.9

 https://doi.org/10.1633/JISTaP.2026.14.2.2

Table 2. Continued

No.	Name of university library	Frequency	Percent
39	Taungoou University	1	0.9
40	Pyay University	1	0.9
41	Bago University	1	0.9
42	University for the Development of the National Races of the Union (UTYCC-Library, Sagaing)	1	0.9
43	Mandalay University of Distance Education	1	0.9
44	Teachers Training College Mandalay (Mandalay Education College)	3	2.7
45	Myanmar Mercantile Marine College, Yangon	4	3.6
46	Technology University, Taunggyi	1	0.9
47	Technology University, Yamaetheinn	1	0.9
48	Government Technological Institute, Mandalay	1	0.9
49	Government Technical Institute, Insein	1	0.9
Total		111	100

data was collected from 53 universities, including 127 participants.

The study used cluster sampling, chosen for its efficiency in obtaining data from geographically dispersed populations while maintaining representativeness. Probability sampling techniques were employed, with outlier removal and normality testing to enhance the dataset's robustness. This methodological framework enhances the study's reliability and validity, leading to well-grounded conclusions. Hence, the final sample consisted of 111 librarians and staff from 49 universities across Myanmar (see Table 2). The data set represented the entire population of Myanmar university librarians and staff because job satisfaction levels were not different across universities. Additionally, the Ministry of Education's organizational structure for civil staff has led to the relocation of librarians and staff to various local university libraries.

This research strictly adhered to ethical guidelines. All data were obtained with the informed agreement of each participating librarian and library staff member by a request to fill out the Google Forms.

Data were analyzed using IBM SPSS version 25 (IBM Co., Armonk, NY, USA) and IBM SPSS AMOS version 25 (IBM Co.).

5. RESULTS

5.1. Respondent Profile

The majority of respondents are women (92.8%), while men represent only 7.2%. The largest group is aged 41-50 (29.7%). The next age groups are 20-30 (26.1%) and 31-40 (24.3%). A smaller percentage of respondents are in older age brackets: 51-60 (17.1%) and above 60 (2.7%). A significant portion of respondents are single (57.7%). Married individuals make up 36.9%, while a small percentage are separated (0.9%) or widowed (4.5%). The majority hold a master's degree in library and information science (40.5%). Other qualifications include bachelor's degrees in library science (5.4%) and various specializations (29.7%). Experience levels vary, with notable concentrations among staff with 1-5 years (22.5%) and 21-25 years (22.5%) of experience. The workforce also includes those with less than one year of experience (6.3%) and those with over 30 years of experience (6.3%), suggesting a mix of both newer and more seasoned professionals. The majority of respondents hold positions as library assistant 2 (26.1%) and librarian (16.2%). Other positions include assistant librarian (15.3%) and various levels of librarian assistants, indicating a hierarchical structure within the library staff. The presence of lower-level positions (such as clerks) suggests a varied staffing structure; see Table 3.

5.2. Kaiser-Meyer-Olkin and Bartlett's Test for Factor Analysis Suitability

The Kaiser-Meyer-Olkin (KMO) measure assesses the adequacy of the sample for factor analysis, where values closer to 1 reflect greater suitability. Generally, a KMO value above 0.7 is considered acceptable; see Table 4 (Kaiser, 1974; Hair et al., 2019). Moreover, principal component analysis was conducted to identify the underlying

Table 3. Demographics of respondents

No.	Categories	Types	Frequency	Percent
1.	Gender	Man	8	7.2
		Woman	103	92.8
2.	Age (yr)	20-30	29	26.1
		31-40	27	24.3
		41-50	33	29.7
		51-60	19	17.1
		Above over 60	3	2.7
3.	Marital status	Single	64	57.7
		Married	41	36.9
		Separated	1	0.9
		Widowed	5	4.5
4.	Education level	B.A. (LIS)	6	5.4
		M.A. (LIS)	45	40.5
		Diploma (LIS)	19	17.1
		Ph.D. (LIS)	3	2.7
		B.A. (Other specialization subject)	33	29.7
		B.Sc. (Other specialization subject)	3	2.7
		M.Sc. (Other specialization subject)	1	0.9
		Diploma (Other specialization subject)	1	0.9
5.	Working experience (yr)	During 1 year	7	6.3
		1-5	25	22.5
		6-10	6	5.4
		11-15	14	12.6
		16-20	17	15.3
		21-25	25	22.5
		26-30	10	9.0
		Over 30 years	7	6.3
6.	Position	Deputy director	3	2.7
		Librarian	18	16.2
		Assistant librarian	17	15.3
		Library assistant 2	29	26.1
		Library assistant 3	15	13.5
		Library assistant 4	14	12.6
		Library assistant 5	11	9.9
		Clerk	4	3.6
Total			111	100

LIS, library and information studies.

 https://doi.org/10.1633/JISTaP.2026.14.2.2

Table 4. Value of KMO and Bartlett's test

Factor		Value
KMO measure of sampling adequacy		0.866
Bartlett's test of sphericity	Approximately Chi-square	1,873.699
	df	253
	Sig.	<0.001

Sig.=0.000 (or <0.05), the result is statistically significant, meaning your data is suitable for factor analysis.
KMO, Kaiser-Meyer-Olkin; df, degrees of freedom; Sig., significance level.

structure of the questionnaire items. Six components with eigenvalues greater than 1 were retained based on the Kaiser criterion. These six components together accounted for 73.85% of the total variance, indicating a robust and meaningful factor structure. After rotation, the first component explained 22.09% of the variance, followed by the second (13.78%), third (10.82%), fourth (10.17%), fifth (8.57%), and sixth (8.42%). Additionally, Bartlett's Test of Sphericity evaluates whether correlations among variables are significant; a p-value of <0.001 confirms that the data is appropriate for factor analysis (Bartlett, 1950). The Rotated Component Matrix presents variable loadings on extracted components after Varimax rotation, where

Table 5. Exploratory factor analysis (EFA) results

	Rotated component matrix[a)]					
Factors	1	2	3	4	5	6
UIF2	0.868					
UIF3	0.861					
UIF4	0.859					
UIF5	0.825					
UIF6	0.816					
UIF1	0.790					
CT2		0.866				
CT3		0.807				
CT1		0.790				
CT5		0.642				
WEC4			0.859			
WEC5			0.681			
WEC2			0.656			
WEC3			0.604			
SM2				0.876		
SM1				0.842		
SM3				0.688		
JSM1					0.743	
JSM4					0.683	
JSM6					0.546	
SB3						0.838
SB7						0.835
SB2						0.590

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization.[a)]
UIF, user interface friendliness; CT, career training; WEC, work environment conditions; SM, supervisor management; JSM, job satisfaction and motivation; SB, salary benefits.
[a)]Rotation converged in 6 iterations.

loadings exceeding 0.6 signify strong associations with the factors (Hair et al., 2019). This matrix facilitates the identification of underlying constructs, informing both research and practical applications by elucidating variable clustering and improving measurement strategies. As a result, the researcher conducted additional exploratory factor analysis (EFA) analyses (see Table 5).

5.3. Factor Analysis Results of Reliability and Validity Assessment

The study's factor analysis revealed moderate satisfaction with salary, positive perceptions of the work environment, strong confidence in supervisory management, favourable views of CT, high overall job satisfaction, and a high level of satisfaction with the user interface. The Cronbach's alpha values indicated good reliability (>0.7); nevertheless, a value below 0.7 suggests only moderate reliability (Taber, 2018). Therefore, the value of the salary benefit (SB) was moderate. The study also showed high reliability in job satisfaction, with a value above 0.723, and excellent reliability in user interface satisfaction, indicating consistent measurement of satisfaction (Sürücü & Maslakci, 2020); see Table 6.

5.4. Convergent Validity Analysis of Composite Reliability, Average Variance Extracted, and Maximum Shared Variance Results

The convergent validity analysis of the study showed that the factors that were measured, SB, work environment conditions (WEC), supervisory management, CT, job satisfaction, and user interface friendliness (UIF), are very similar to each other and only slightly overlap. The items explain over 50% of the variance in SB, indicating adequate convergent validity, as indicated by the average

Table 6. Factor analysis result of reliability and validity

No.	Variable	Item	Mean	Standard deviation	Cronbach's alpha
1.	Salary benefits	SB2	3.39	0.844	0.658
		SB3	2.18	0.907	
		SB7	2.89	0.918	
2.	Work environment conditions	WEC2	3.8	0.615	0.751
		WEC3	3.57	0.655	
		WEC4	3.64	0.615	
		WEC5	3.73	0.587	
3.	Supervisor management	SM1	3.81	0.611	0.812
		SM2	3.76	0.664	
		SM3	3.59	0.694	
4.	Career training	CT1	3.61	0.69	0.873
		CT2	3.68	0.753	
		CT3	3.72	0.677	
		CT5	3.64	0.685	
5.	Job satisfaction and motivation	JSM1	3.74	0.723	0.795
		JSM4	3.82	0.621	
		JSM6	3.87	0.676	
6.	User interface friendliness	UIF1	3.94	0.717	0.912
		UIF2	4.14	0.658	
		UIF3	4.03	0.667	
		UIF4	3.92	0.634	
		UIF5	3.96	0.7	
		UIF6	4.21	0.74	

 https://doi.org/10.1633/JISTaP.2026.14.2.2

variance extracted (AVE) of 0.511. The composite reliability (CR) (0.783) is acceptable, indicating reasonable internal consistency. The AVE of 0.4458 falls slightly below the threshold of 0.5, suggesting that the items may not fully capture some variance. Nevertheless, the AVE value is below 0.50, and although the CR indices exceed 0.60, the convergent validity of the concept may still be adequate (Fornell & Larcker, 1981; Henseler et al., 2015; Cheung et al., 2024). The CR (0.839) is strong, suggesting excellent internal consistency. Also, this part had maximum shared variance (MSV), which was defined as the strongest link between that construct and any other construct in the model. All constructs have AVE>MSV, indicating that they exhibit good discriminant validity (Leguina, 2015); see Table 7.

5.5. Pearson Correlation Matrix of Job Satisfaction Factors

Job satisfaction exhibited a strong correlation with UIF (r=0.652**) and CT (r=0.554**), both significant at the 0.01 level. Improvements in the user interface and CT correlated with increased job satisfaction. There is a moderate correlation with supervisory management (r=0.339**) and WEC (r=0.401**), both significant at the 0.01 level. The SB exhibit a weak positive correlation with job satisfaction (r=0.200*), significant at the 0.05 level, suggesting that SB contribute minimally to job satisfaction. There is a positive correlation with WEC (r=0.220*) and supervisory management (r=0.190*), both significant at the 0.05 level; however, these correlations are relatively weak. In regard to WEC, there is a strong correlation with supervi-

Table 7. Results of convergent validity analysis CR, AVE, and MSV

No.	Variable	Item	Standardized regression weight	AVE	CR	MSV
1.	Salary benefits	SB2	0.341	0.511	0.783	0.064
		SB3	0.566			
		SB7	1.047			
2.	Work environment conditions	WEC2	0.681	0.4458	0.839	0.210
		WEC3	0.675			
		WEC4	0.757			
		WEC5	0.54			
3.	Supervisor management	SM1	0.874	0.6158	0.983	0.210
		SM2	0.802			
		SM3	0.663			
4.	Career training	CT1	0.763	0.6367	0.925	0.295
		CT2	0.845			
		CT3	0.836			
		CT5	0.743			
5.	Job satisfaction and motivation	JSM1	0.617	0.5836	0.876	0.295
		JSM4	0.818			
		JSM6	0.837			
6.	User interface friendliness	UIF1	0.783	0.5803	0.948	0.295
		UIF2	0.856			
		UIF3	0.876			
		UIF4	0.762			
		UIF5	0.714			
		UIF6	0.779			

CR, composite reliability; AVE, average variance extracted; MSV, maximum shared variance.

sory management (r=0.418**), and moderate correlations with CT (r=0.339**) and UIF (r=0.363**), all significant at the 0.01 level. Supervisory management is positively correlated with CT (r=0.349**) and UIF (r=0.253**), suggesting that improved HRM practices may enhance training effectiveness and user interface design. CT exhibits a significant correlation with UIF (r=0.472**) at the 0.01 level, indicating that effective training may improve user interface design; see Table 8.

5.6. Discriminant Validity Analysis Results

The study also analyzed the validity of various constructs, including SB, WEC, leadership practices, CT, and user-friendly interfaces. The AVE value above 0.5 indicated adequate convergent validity, and all constructs showed AVE values above 0.5, indicating effective capture of their respective constructs. The correlation values showed varying degrees of validity, with AVE values above 0.5 indicating discriminant validity. The study concluded that all constructs effectively capture their respective constructs; see Table 9.

5.7. Model Fit Indices Analysis Results

The model's fit is analyzed using various metrics, including Chi-square, the goodness of fit index, the adjusted goodness of fit index, the normal fit index, the incremental fit index, the comparative fit index, the root mean square error of approximation, the probability of close fit, and the Tucker-Lewis index. The results indicate a good fit, but not a close one, as values fall below the recom-

Table 8. Pearson correlation matrix of job satisfaction factors

Factor	JSM	SB	WEC	SM	CT	UIF
JSM	1					
SB	0.200*	1				
WEC	0.401**	0.220*	1			
SM	0.339**	0.190*	0.418**	1		
CT	0.554**	0.153	0.339**	0.349**	1	
UIF	0.652**	0.06	0.363**	0.253**	0.472**	1

JSM, job satisfaction and motivation; SB, salary benefits; WEC, work environment conditions; SM, supervisor management; CT, career training; UIF, user interface friendliness.
*p<0.05, **p<0.01.

Table 9. Analysis results of discriminant validity (AVE) and correlation value

Factor	SB	WEC	SM	CT	UIF
Salary benefits	0.714				
Work environment conditions	0.252	0.668			
Supervisor management	0.228	0.459	0.785		
Career training	0.066	0.395	0.359	0.797	
User interface friendliness	0.017	0.415	0.257	0.543	0.797

AVE, average variance extracted; SB, salary benefits; WEC, work environment conditions; SM, supervisor management; CT, career training; UIF, user interface friendliness.

Table 10. Analysis result of model fit indices

Measurement	X^2/df	GFI	AGFI	NFI	IFI	CFI	TCL	RMSEA
Good-fit	<3	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	<0.08
Measurement model	1.616	0.793	0.735	0.775	0.9	0.897	0.879	0.075

df, degrees of freedom; GFI, goodness-of-fit index; AGFI, adjusted goodness-of-fit index; NFI, normed fit index; IFI, incremental fit index; CFI, comparative fit index; TLI, Tucker-Lewis index (sometimes called NNFI); RMSEA, root mean square error of approximation.

 https://doi.org/10.1633/JISTaP.2026.14.2.2

Table 11. Path coefficients and hypothesis testing results

Path	Path coefficient	CR	p-value	Hypothesis result
Salary Benefits → job satisfaction and motivation	0.093	0.825	0.409	Rejected
Work environment condition → job satisfaction and motivation	0.13	0.863	0.388	Rejected
Supervisor management → job satisfaction and motivation	0.035	0.455	0.649	Rejected
Career training → job satisfaction and motivation	0.219	2.456	0.014	Accepted
User interface friendly → job satisfaction and motivation	0.474	4.635	<0.001***	Accepted

CR, composite reliability.
***p<0.001.

mended threshold of 0.9. The model's root mean square error of approximation value is 0.075, indicating a moderate fit; see Table 10.

5.8. Path Coefficients and Hypothesis Testing Results for Job Satisfaction

The structural equation model (SEM) depicts the relationships between various factors and JSM among library staff. The results indicate that both CT and UIF have significant positive effects on JSM. This is evidenced by their substantial path coefficients leading to JSM in the model. In contrast, supervisor management (SM), SB, and WEC do not demonstrate statistically significant effects on JSM, as their path coefficients are relatively small and not significant.

The results indicate that while SB, working environment conditions, and leadership practices do not significantly influence job satisfaction, both CT and UIF have a positive and significant impact; see Table 11, and Figs. 2 and 3. Therefore, Fig. 3 illustrates the visual analysis details by SEM.

H1. SB do not significantly affect job satisfaction.

H2. Working environment conditions do not significantly affect job satisfaction.

H3. Supervisory management has no significant effect on job satisfaction.

H4. CT significantly affects job satisfaction (p-value=0.05).

H5. UIF significantly affects job satisfaction (p-value=0.001).

5.9. Analysis of Variance Analysis Result of Job Satisfaction by Participants

The analysis of variance (ANOVA) results indicate significant differences in job satisfaction across library roles. The overall p-value of 0.002 suggests that at least one group has a different level of satisfaction compared to others. The ANOVA results indicate a statistically significant difference in job satisfaction across different positions (F=3.497, p=0.002); see Table 12. However, post hoc analysis reveals that most positions exhibit relatively similar levels of job satisfaction, except library assistant 5, which shows significantly lower satisfaction compared to the deputy director (p=0.043) and librarian (p=0.003); see Fig. 4.

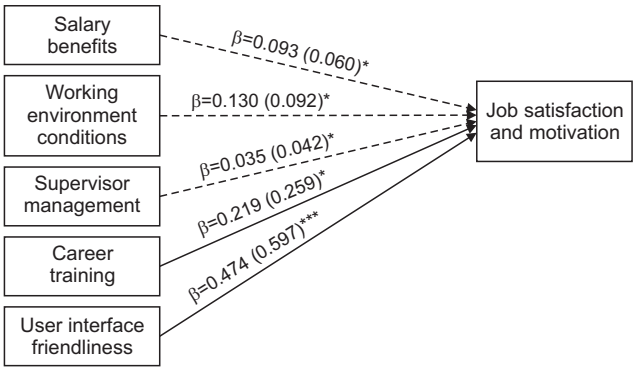


Fig. 2. Path coefficients and hypothesis testing results. *p<0.05, ***p<0.001.

6. DISCUSSION

The tabulated data illustrate the respondents' institutional affiliation with the highest numbers (see Table 2), and the findings provide a realistic overview of job satisfaction among librarians and library staff across various roles and institutional contexts. The analysis reveals that professional development opportunities and user-friendly library systems are the principal drivers of job satisfaction among academic librarians. CT and accessible, well-designed user interfaces were found to significantly enhance satisfaction, whereas salary, general working conditions, and management practices did not show a notable effect.

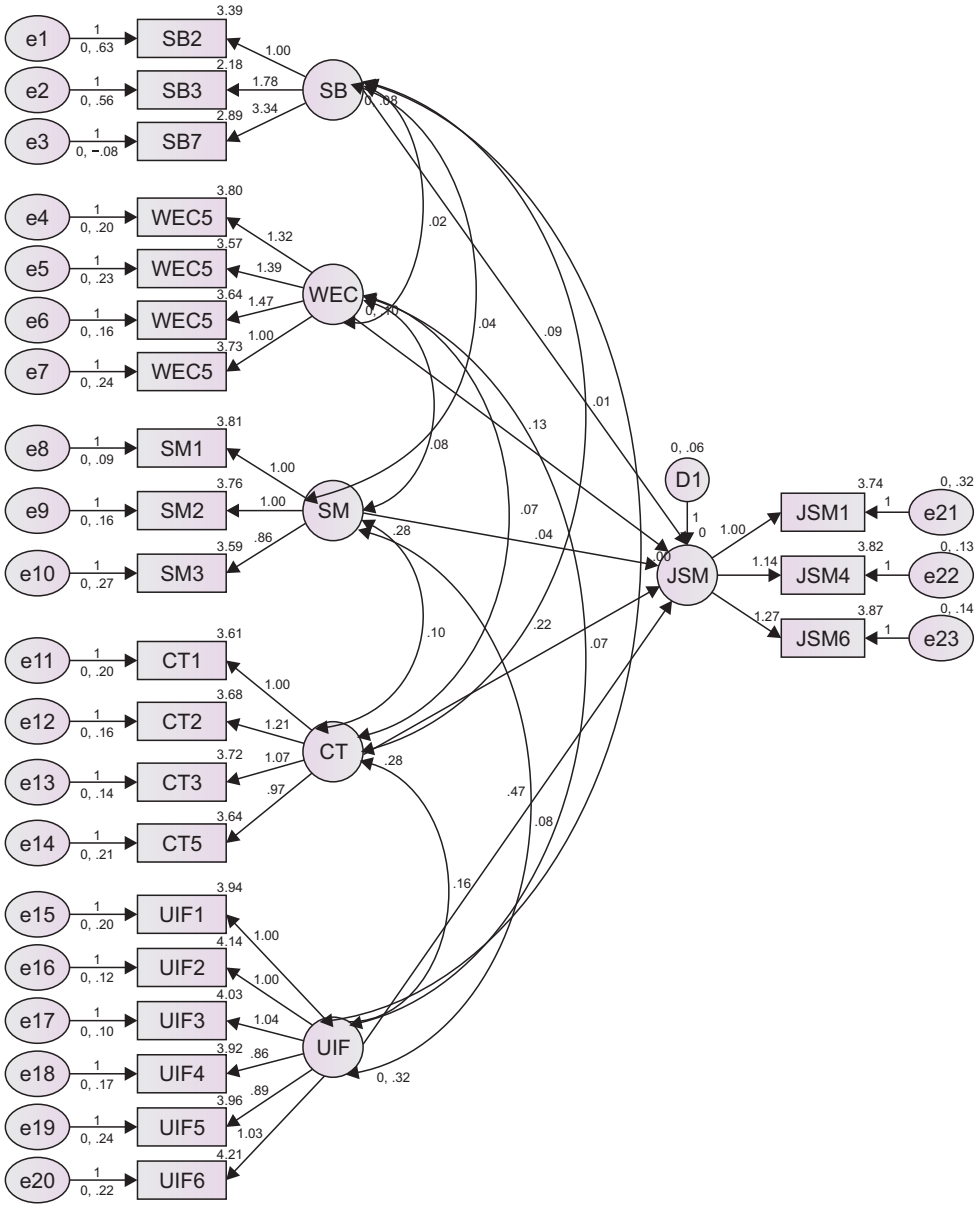


Fig. 3. Visual representation of factors influencing job satisfaction. SB, salary benefits; WEC, work environment conditions; SM, supervisor management; CT, career training; UIF, user interface friendliness; JSM, job satisfaction and motivation.

Table 12. ANOVA analysis result of job satisfaction by participants

Job satisfaction and motivation between librarians and staffs	Sum of squares	df	Mean square	F	Sig.
Between groups	6.811	7	0.973	3.497	0.002
Within groups	28.660	103	0.278		
Total	35.471	110			

Sig.=0.000 (or <0.05), the result is statistically significant, meaning your data is suitable for factor analysis.
ANOVA, analysis of variance; df, degrees of freedom; Sig., significance level.

 https://doi.org/10.1633/JISTaP.2026.14.2.2

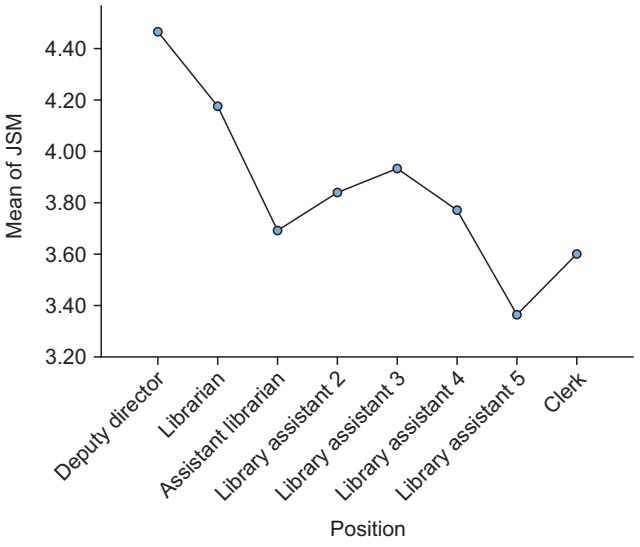


Fig. 4. Level of job satisfaction by participants. The mean difference is significant at 0.05 level. JSM, job satisfaction and motivation.

These results align with prior research, which emphasizes the importance of ongoing training and effective communication tools in supporting both satisfaction and service quality in academic library settings (Aghaei et al., 2021; Sare & Edward Bales, 2014; Win, 2019). Correlation analysis confirms strong associations between work satisfaction and these two main components. This shows that the Myanmar university library workers are devoted to their jobs and want to provide the greatest service to users. Given their semi-professional status, most librarians and staff want training and workshops to enhance their capacity to deliver user-centered services. Thus, the study supported the findings of Detlor et al. (2024) and King (2025).

Further statistical analysis revealed significant variation in job satisfaction by occupational role, with librarians generally reporting higher satisfaction than library assistants. This finding suggests that targeted support and tailored development opportunities for specific staff groups could help address disparities and optimize overall workplace satisfaction. The study's exploratory and confirmatory factor analyses validated the reliability and distinctiveness of the measured constructs. Importantly, the results highlight a shift away from traditional assumptions that salary and leadership practices are central to job satisfaction. Instead, the evidence indicates that skill development and modern training programs exert a stronger influence on employee morale and motivation. These findings are consistent with global trends that underscore the growing significance of professional growth and user experience in the academic library sector (Tella et al., 2007).

The objectives of the study set out to examine whether most positions have similar levels of job satisfaction, except for library assistant 5. ANOVA revealed statistically significant differences in job satisfaction ($F=3.497$, $p=0.002$) (see Table 12). Therefore, in response to the first research question, identifying the level of job satisfaction, the results indicate that deputy directors ($p=0.043$) and librarians ($p=0.003$) were satisfied in their job (see Fig. 4). Addressing the second research question, which explored the role of professional development and technology, the data reveal that both CT and UIF significantly affect job satisfaction. Specifically, librarians who have access to ongoing training opportunities and work with intuitive, user-friendly library systems report higher levels of satisfaction. These results were confirmed through hypothesis testing with both CT ($p=0.05$) and user interface usability ($p=0.001$) emerging as significant predictors (see Table 11). Neither SB, working environment conditions, nor leadership management had a significant impact. These findings are supported by the hypothesis tests, which showed no statistically significant relationships between these traditional workplace factors and overall job satisfaction.

The third objective and research question considered that university senate members and rectors (see Fig. 1) must prioritize library development, librarian professional development, and user service improvement. As mentioned by Oh (2017), library administration should focus on librarian JSM. Hence, university administrators and policymakers should report to the government by improving librarians' and staff's compensation benefits, working environments, and leadership practices. Deputy directors (chief librarians) should also engage with policymakers and relevant authorities in initiating collaborations with international library associations, such as library consortia, to form alliances and provide training. Additionally, the library and information science departments of Myanmar universities should actively support training and continuing education. To improve workplace satisfaction, institutions should prioritize CT and user interface design. Policymakers should consider mentorship programs, online training, and tech-driven skill-building seminars. Moreover, policymakers should foster job satisfaction among librarians and staff to ensure high workplace engagement and the future of Myanmar's universities.

Moreover, this research shows that many Myanmar universities must locate library specialists and staff in the

correct places. Therefore, the study aligns with Phinney (2025) in suggesting that administrators and managers should implement organizational improvements, including the employment of permanent equity, diversity, and inclusion (EDI) experts, formalized compensation structures, training programs, dedicated funding for equity-deserving groups, and accountability measures for leaders. Although the results suggest that HR policies should shift away from an exclusive focus on compensation and managerial oversight and instead prioritize professional development and digital resource design, in practical terms, this means investing in robust training programs and ensuring that library systems are easy to use, not only to improve staff satisfaction but also to promote service quality and institutional effectiveness.

In summary, while traditional factors such as salary and supervision are less influential in this research, opportunities for career growth and efficient, user-centered technology are crucial for supporting job satisfaction among librarians in Myanmar's academic libraries. Addressing these findings through targeted HRM and institutional strategies will be essential for advancing the performance and well-being of university library staff nationwide.

7. CONCLUSION

The current cross-sectional research results enhance the existing literature on job satisfaction among academic librarians in Myanmar by highlighting vocational training and user interface design as significant variables. The two factors enable users to locate information efficiently, navigate digital resources, and access library services with minimal barriers, thereby fostering a more supportive and productive work environment for librarians. Interestingly, the recent political climate in Myanmar has led to the retirement of many library professionals, creating a demand for skilled and qualified staff. This transition has highlighted how working conditions, as well as structural and institutional constraints, affect job satisfaction. The findings provide a comprehensive examination of job satisfaction within national higher education institutions, helping to understand the factors that influence workplace satisfaction by analyzing with EFA and confirmatory factor analysis.

According to the survey, library assistants, particularly at level 5, report lower job satisfaction than senior positions. Myanmar librarians and staff generally have similar levels of job satisfaction influenced by CT and user interface service rather than financial incentives, except for library assistants (level 5). Expanding career development programs at national and international levels is also crucial. According to gender differences and census reports, the results showed that there are more women than men librarians and staff in the workplace. Moreover, this study highlights the dedication and ethical commitment of Myanmar's predominantly women library workforce, which actively seeks advanced training to enhance its expertise.

Overall, additional research is required to investigate factors such as leadership practices, employee performance, corporate culture, and technology improvements. Researchers should conduct longitudinal studies to track changes in librarians' job satisfaction over time. The librarians and staff of Myanmar's universities exhibit robust professional principles, a commitment to user service, and a dedication to lifelong learning. Despite obstacles, they emphasize professional advancement and knowledge dissemination over monetary compensation, underscoring the need for strategic investment in librarianship education and infrastructure. By cultivating a friendly and adequately resourced professional environment, institutions can improve work satisfaction and the overall quality of library services, thereby advancing higher education in Myanmar.

7.1. Contribution

This research advances understanding of job satisfaction for Myanmar's librarians by highlighting the importance of CT and user-focused systems, and by challenging the traditional emphasis on salary and management. It also underscores the value of considering demographic and cultural factors when developing HR policies. This study found that salary and managerial practices did not contribute to job satisfaction, highlighting the need to prioritize employee motivation and skill development over traditional leadership approaches. This shift emphasizes the growing importance of professional growth and user experience, as illustrated by the research model.

7.2. Implications

For practice and policy, the findings suggest that academic libraries should invest in comprehensive training programs and improved system design to enhance job satisfaction and service quality. Organizations are encouraged to adopt a holistic approach to employee well-being, while policymakers should support initiatives that promote professional growth. Addressing these areas will help

build a more motivated library workforce and strengthen the broader educational mission.

7.3. Recommendations

To enhance job satisfaction and efficiency among library staff, it is essential to establish competitive pay structures, improve digital infrastructure, and expand inclusive professional development opportunities. Future research should focus on the qualitative aspects of librarian satisfaction, particularly regarding workplace culture, technological innovations, and career advancement over time.

Based on these findings, it is recommended that university administrators and policymakers prioritize developing and implementing comprehensive training programs, mentorship opportunities, and technology-driven skill-building seminars for library staff. Enhancing the usability of library interfaces and providing more opportunities for career advancement will create a more motivated workforce and further improve the quality of library services.

While this study offers valuable insights, it is important to recognize its limitations. Although the study includes a geographically diverse sample, certain regions faced challenges with Internet access, affecting questionnaire completion. Therefore, future studies should aim for a more representative population by employing interviews or focus groups to increase participation. Besides this, future research should adopt longitudinal and mixed methods to gain a deeper understanding of trends in job satisfaction and to explore the evolving needs of academic librarians in greater detail, considering other influencing factors by structuring a theoretical and practical model. Notably, this study serves as a pioneering effort to examine job satisfaction among academic librarians and library staff in Myanmar.

Additional government exchange programs for librarians and staff, such as job training programs, seminars, workshops, conferences, internships, and study programs, should be coordinated with other developed countries, and, if necessary, continuous assistance should also be sought from international library professionals to strengthen their library skills and user service delivery.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGEMENTS

I also extend my gratitude to the librarians and library staff of those Myanmar university libraries who participated in my data collection process and provided valuable insights and firsthand perspectives on job satisfaction of university libraries in Myanmar, highlighting the collective efforts of all involved.

REFERENCES

Abatayo, J. V. C., Lagumen, A. S., & Potane, J. (2023). Stressors, affectivity, and self – efficacy as predictors of librarians' thriving at work. *International Multidisciplinary Research Journal*, 5(1), 82-93. https://doi.org/10.54476/ioer-imrj/751772

Abdul Karim, N. H. (2017). Investigating the correlates and predictors of job satisfaction among Malaysian academic librarians. *Malaysian Journal of Library and Information Science*, 13(2), 69-88. http://jummec.um.edu.my/index.php/MJLIS/article/view/6980

Adams, D. (2024). *Strategies large multinational organizational leaders use to retain and motivate employees to increase work output* (doctor dissertation). Walden University, Minneapolis, MN, USA.

Aghaei, S., Habibi, S., Khodayari-Zarnaq, R., & Iraji, Z. (2021). Exploring academic library managers communication skills and the effect on librarians job motivation and satisfaction. *DESIDOC Journal of Library & Information Technology*, 41(5), 339-344. https://doi.org/10.14429/djlit.41.5.16551

Ahmad, M., Khan, A., & Arshad, M. (2021). Major theories of job satisfaction and their use in the field of Librarianship. *Library Philosophy and Practice*, 6385. https://digitalcommons.unl.edu/libphilprac/6385

Arumugam, J., & Radha, L. (2023). Significant factors of job satisfaction among the library professionals in Tamilnadu: A study. *International Journal of Arts, Science and Humanities*, 11(1), 8-13. https://doi.org/10.34293/sijash.v11i1.6239

Bahrudin, M., & Lawang, R. M. Z. (2023). Investigating the mediating role of social capital in the influence of job satisfaction on subjective well-being among librarians in Java Island, Indonesia. *International Journal of Research and Innovation in Social Science*, VII(VI), 1288-1301. https://doi.org/10.47772/ijriss.2023.7711

Bartlett, M. S. (1950). Tests of significance in factor analysis. *British Journal of Statistical Psychology*, 3(2), 77-85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

Bolatito, A. O. S., & Mohamoud, Y. A. (2024). Reward management and employee performance: A review of job satisfac-

tion in Somalia. *TWIST*, 19(1), 128-137. https://twistjournal.net/twist/article/view/145

Cheung, G. W., Cooper-Thomas, H. D., Lau, R. S., & Wang, L. C. (2024). Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations. *Asia Pacific Journal of Management,* 41(2), 745-783. https://doi.org/10.1007/s10490-023-09871-y

DeCenzo, D. A., Robbins, S. P., & Verhulst, S. L. (2015). *Fundamentals of human resource management.* 12th ed. Wiley.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512. https://doi.org/10.1037/0021-9010.86.3.499

Detlor, B., Serenko, A., La Rose, T., & Julien, H. (2024). A survey of public library-led digital literacy training in Canada: Perceptions of administrators and instructors. *Evidence Based Library and Information Practice*, 19(3), 23-41. https://doi.org/10.18438/eblip30553

Dorado, D. A. (2025). Exploring the landscape of librarianship in the Philippines: Establishing the profession's population parameter estimates. *Journal of Librarianship and Information Science,* 57(3), 733-745. https://doi.org/10.1177/09610006241240485

Fatima, H. Z., & Bhatti, R. (2014). Job satisfaction among LIS professionals of universities in the Punjab province. *Pakistan Journal of Information Management and Libraries*, 15, 30-36. https://pjiml.pu.edu.pk/jo/index.php/pjiml/article/view/116

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. https://doi.org/10.2307/3151312

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. https://doi.org/10.1108/ebr-11-2018-0203

Haque, M., Karim, A. N. M., Muqtadir, A., & Anam, S. (2012). Dimensions of job satisfaction of library professionals: A qualitative exploration. *International Journal of Business and Social Research*, 2(5), 46-62. https://www.researchgate.net/publication/344390829

Hayden, M., & Martin, R. (2013). Recovery of the education system in Myanmar. *Journal of International and Comparative Education*, 2(2), 47-57.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. https://doi.org/10.1007/s11747-014-0403-8

Herzberg, F. (2015). Motivation-hygiene theory. In J. B. Miner (Ed.), *Organizational behavior 1: Essential theories of motivation and leadership* (pp. 61-74). Routledge.

Igbashal, A. A., Beetseh, K., & Kumba, L. (2016). Factors affecting librarians job satisfaction in federal university of agriculture Makurdi library. *International Journal of Academic Library and Information Science,* 4(9), 264-270. https://www.semanticscholar.org/paper/Factors-Affecting-Librarians-Job-Satisfaction-in-of-Agena-Beetseh/5de9baaafc8ce3e35daa71d0c510ff64c25da2a9

Ikonne, C. N., & Onuoha, U. D. (2015). Factors influencing job satisfaction of librarian in federal and state university libraries in Southern Nigeria. *Open Access Library Journal,* 2(2), e1337. https://doi.org/10.4236/oalib.1101337

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36. https://doi.org/10.1007/BF02291575

Karuna Sri, S. G., Srikanth, D. T., & Deepthi, S. (2024). An overview on employee well-being and job satisfaction: Strategies for organizational success. *Interantional Journal of Scientific Research in Engineering and Management*, 8(7), 1-7. https://doi.org/10.55041/ijsrem36267

Khaing, E. T. H. (2019). *Influencing factors on burnout and job satisfaction of academic staff in Yangon University of economics* (master's thesis). Yangon University, Yangon, Myanmar.

Khan, A., & Ahmed, S. (2013). The impact of digital library resources on scholarly communication: Challenges and opportunities for university libraries in Pakistan. *Library Hi Tech News*, 30(8), 12-29. https://doi.org/10.1108/lhtn-07-2013-0046

King, M. (2025). Key insights into factors that shape the ideal EDI learning experiences of Canadian academic librarians. *Evidence Based Library and Information Practice*, 20(1), 196-198. https://doi.org/10.18438/eblip30657

Kumar, N. P., & Boddeda, N. (2024). Exploring contemporary HRD strategies: Impact on Employee job satisfaction through advanced tools and techniques. *International Journal of Management and Development Studies*, 13(2), 1-9. https://doi.org/10.53983/ijmds.v13n2.001

Kupryte, R., & Nyein, M. S. (2018). *The eLibrary Myanmar project: Benefits and impact on Myanmar's higher education libraries.* Paper presented at 17th Congress of Southeast Asian Librarians (CONSAL XVII), Naypyitaw, Myanmar.

Kusumaningrum, D., Yudhanto, S., & Yoganingrum, A. (2016). [Correlation between librarian job satisfaction factors: A case study of librarians of Indonesian Institution of Science]. *BACA: Journal of Documentation and Information*, 37(1), 1-10. Indonesian. https://doi.org/10.14203/j.baca.

v37i1.273

Lakos, A., & Phipps, S. (2004). Creating a culture of assessment: A catalyst for organizational change. *Portal-Libraries and the Academy*, 4(3), 345-361. https://escholarship.org/uc/item/0843106w

Leguina, A. (2015). A primer on partial least squares structural equation modeling (PLS-SEM). *International Journal of Research & Method in Education*, 38(2), 220-221. https://doi.org/10.1080/1743727X.2015.1005806

Listor, E. (2024). Career progression as predictor on job satisfaction of academic librarians in the Bicol Region, Philippines. *JPAIR Institutional Research*, 22(1), 43-72. https://doi.org/10.7719/irj.v22i1.892

Majid, S., & Haider, A. (2008). Image problem even haunts hi-tech libraries: Stereotypes associated with library and information professionals in Singapore. *Aslib Proceedings*, 60(3), 229-241. https://doi.org/10.1108/00012530810879105

Martin, J. (2020a). Job satisfaction of professional librarians and library staff. *Journal of Library Administration*, 60(4), 365-382. https://doi.org/10.1080/01930826.2020.1721941

Martin, J. (2020b). Workplace engagement of librarians and library staff. *Journal of Library Administration*, 60(1), 22-40. https://doi.org/10.1080/01930826.2019.1671037

Masrek, M. N., Mutia, F., Susantari, T., Yuwinanto, H. P., & Tri Atmi, R. (2024). Knowledge conversion abilities and innovative work behavior of Indonesian academic librarians. *The International Information & Library Review*, 56(2), 150-166. https://doi.org/10.1080/10572317.2024.2331983

Masrek, M. N., Yuwinanto, H. P., Atmi, R. T., Soesantari, T., & Mutia, F. (2021). Cultural intelligence and job performance of academic librarians in Indonesia. *The Journal of Academic Librarianship*, 47(5), 102394. https://doi.org/10.1016/j.acalib.2021.102394

Mohd Rokeman, N. R., Che Kob, C. G., & Mohd Yaacob, N. (2024). A review of the job satisfaction theory for vocational college education perspective. *International Journal of Modern Education (IJMOE)*, 6(20), 522-532. https://gaexcellence.com/ijmoe/article/view/1908

Mouza, A. M., & Grigoriadou, S. P. (2016). Job analysis of academic librarians in Greece: Investigating differences among institutions regarding obligations and responsibilities. *Library Management*, 37(1-2), 29-54. https://doi.org/10.1108/lm-08-2015-0057

Muthukumaran, C. K. (2014). Job satisfaction of academic librarians: A correlation between job satisfactions and demographic condition of the faculty in selected academic libraries. *International Journal of Management Research and Review*, 4(1), 39-49. https://www.proquest.com/openview/93d7bd2c0ae5b76c4603e5456ddc449b/1?pq-origsite=gscholar&cbl=2028922

Mutia, F., Soesantri, T., Prasetyo, H., Atmi, R. T., Hamzah, M. F., & Masrek, M. N. (2024). Comparison of Public college librarians' performance, competence, and work design in Indonesia and Malaysia. *Journal of Library, Information, and Archival Science*, 12(1), 14-24. https://doi.org/10.24252/kah.v12i1a2

Nasrullah, & Suhag, A. K. (2024). Analyzing strategies for improvement of job satisfaction among the university librarians of Karachi: A quantitative study. *Spry Contemporary Educational Practices*, 3(1), 747-769. https://doi.org/10.62681/sprypublishers.scep/3/1/40

Nyein, M. S. (2016). Transforming libraries in Myanmar: The eLibrary Myanmar project. *Insights: The UKSG Journal,* 29(3), 266-272. https://doi.org/10.1629/uksg.319

Oh, D. G. (2017). Analysis of the factors affecting volunteering, satisfaction, continuation will, and loyalty for public library volunteers: An integrated structural equation model. *Journal of Librarianship and Information Science*, 51(4), 894-914. https://doi.org/10.1177/0961000617747338

Oloyede, O. E., & Soyemi, O. D. (2022). Influence of work-life balance on turnover intentions of librarians in universities in South-West, Nigeria: Implication and strategies for improvement. *Library Philosophy and Practice*, 7063. https://digitalcommons.unl.edu/libphilprac/7063

Perez, E. F., Maung, H. N., Lwin, N., & Widyaningsih, N. (2023). Job satisfaction gap in international and local non-profit organizations in Myanmar. *Social Evolution and History,* 12(2), 662-680. https://www.researchgate.net/publication/377238146_JOB_SATISFACTION_GAP_IN_INTERNATIONAL_AND_LOCAL_NON-PROFIT_ORGANIZATIONS_IN_MYANMAR

Phinney, J. (2025). EDI and anti-racism work is labour-intensive for racialized academic librarians (and organizations could do more to address this). *Evidence Based Library and Information Practice*, 20(1), 202-204. https://doi.org/10.18438/eblip30656

Pipe, T. T., & Tuamsuk, K. (2023). Pagoda data management and metadata requirements for libraries in Myanmar. *Journal of Information Science Theory and Practice*, 11(3), 79-91. https://doi.org/10.1633/JISTaP.2023.11.3.6

Ranaweera, R. A. A. S., & Li, S. (2018). Job satisfaction of staff in university libraries in Sri Lanka. *International Journal of Organizational Innovation,* 11(1), 0839. https://www.ijoi-online.org/index.php/back-issues-11-20/11-vol-11-num-1-july-2018/78-job-satisfaction-of-staff-in-university-libraries-in-sri-lanka

Ranaweera, R. A. A. S., Li, S., & Bodhinayaka, D. (2018). Job satisfaction of library staff: A study based on university

libraries in Sri Lanka. *International Journal of Human Resource Studies*, 2018, 8(3), 53-59. https://doi.org/10.5296/ijhrs.v8i3.13190

Sare, L., & Edward Bales, S. (2014). Professional identity: A grounded theory study of veteran academic librarians. *Library Review*, 63(8-9), 574-589. https://doi.org/10.1108/lr-02-2014-0020

Shahzad, K., Khan, S. A., Javed, Y., & Iqbal, A. (2023). E-learning for continuing professional development of university librarians: A systematic review. *Sustainability*, 15(1), 849. https://doi.org/10.3390/su15010849

Shanmugathasan, S. (2020). Factors influencing the job satisfaction of librarians of the public libraries in Northern Province, Sri Lanka. *Sri Lanka Library Review*, 34(2), 13-23. https://doi.org/10.4038/sllr.v34i2.31

Swe, T. M., & Yang, S. (2024). Factors influencing user satisfaction with university library websites in Myanmar. *Journal of Information Science Theory and Practice*, 12(2), 1-21. https://doi.org/10.1633/JISTaP.2024.12.2.1

Sürücü, L., & Maslakci, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, 8(3), 2694-2726. https://doi.org/10.15295/bmij.v8i3.1540

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Tanloet, P., & Tuamsuk, K. (2011). Core competencies for information professionals of Thai academic libraries in the next decade (A.D. 2010–2019). *The International Information & Library Review*, 43(3), 122-129. https://doi.org/10.1080/10572317.2011.10762889

Tella, A., Ayeni, C. O., & Popoola, S. O. (2007). Work motivation, job satisfaction, and organisational commitment of library personnel in academic and research libraries in Oyo State, Nigeria. *Library Philosophy and Practice*, 118. https://www.academia.edu/download/86239890/tella2.pdf

Thaung, S. S. (2019). *The impact of HRM practices on employee job satisfaction of universities in Yangon Southern District.* Paper presented at Myanmar Universities' Research Conference 2019 (MURC 2019), Yangon, Myanmar.

Togia, A., Koustelios, A., & Tsigilis, N. (2004). Job satisfaction among Greek academic librarians. *Library & Information Science Research*, 26(3), 373-383. https://doi.org/10.1016/j.lisr.2004.01.004

Townsend, T., & Bugg, K. (2020). Perceptions of work–life balance for urban academic librarians: An exploratory study. *Journal of Library Administration*, 60(5), 493-511. https://doi.org/10.1080/01930826.2020.1729624

Tuah, N. A. A., Rahman, A., & Rahman, H. A. (2024). *Knowledge, attitudes, and practices toward physical activity among public sector librarians in Brunei Darussalam*. https://doi.org/10.21203/rs.3.rs-4878236/v1

Unegbu, V. E., Babalola, Y. T., & Basahuwa, C. B. (2020). The role of motivation in librarians' job performance in public university libraries. *Journal of Management Information Systems& E-commerce*, 7(1), 1-12. https://doi.org/10.15640/jmise.v7n1a1

Upev, M. T., & Beetseh, K. (2017). Job satisfaction and performance of librarians on Benue State University Library. *International Journal of Academic Library and Information Science*, 5(3), 122-127. http://www.academicresearchjournals.org/IJALIS/PDF/2017/May/Upev%20and%20Beetseh.pdf

Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2022). Artificial intelligence, robotics, advanced technologies and human resource management: A systematic review. *The International Journal of Human Resource Management*, 33(6), 1237-1266. https://doi.org/10.1080/09585192.2020.1871398

Williamson, J. M., Pemberton, A. E., & Lounsbury, J. W. (2005). An investigation of career and job satisfaction in relation to personality traits of information professionals. *The Library Quarterly*, 75(2), 122-141. https://doi.org/10.1086/431330

Win, D. A., Nyein, M. S., Gill, A. K., & Siew, V. (2019). *Role of library associations' and LIS curriculum in uplifting the competencies of librarians.* Paper presented at Leadership roles in international librarianship: How can information professionals from Africa, Asia & Oceania, Latin America & Caribbean be part of it? Alexandria, Egypt.

Win, H. M. (2019). *The role of civil service management in Myanmar* (doctoral dissertation). BRAC University, Dhaka, Bangladesh.

Winkelhaus, S., Grosse, E. H., & Glock, C. H. (2022). Job satisfaction: An explorative study on work characteristics changes of employees in Intralogistics 4.0. *Journal of Business Logistics*, 43(3), 343-367. https://doi.org/10.1111/jbl.12296

Xu, Q., & Wang, S. (2024). Research on the educational role of university libraries. *International Education Forum*, 2(6), 213-218. https://doi.org/10.26689/ief.v2i6.7926

Yaya, J. A. (2019). Job satisfaction among librarians in Nigerian public universities. *Journal of Library Services and Technologies*, 1(1), 73-92. https://credence-publishing.com/journal/uploads/archive/20191558946544947356048 1.pdf

Yu, K., Gong, R., Jiang, C., Hu, S., Sun, L., & Luo, Y. Z. (2018). A study on the effect of continuing education with digital technology on professional growth and job satisfaction of librarians. *Eurasia Journal of Mathematics, Science*

and Technology Education, 14(7), 3285-3292. https://doi.org/10.29333/ejmste/91247

Zar Kyaw, A. T., Zhou, L., & Wang, Z. (2025). User requirements for research data management services in Myanmar university libraries: A case study of the University of Yangon Library. *Information Development*. https://doi.org/10.1177/02666669241309015

APPENDIX. Factor analysis items

No	Items	SD	D	N	A	SA
	Salary benefits items	1	2	3	4	5
1.	My salary fairly reflects my job duties and responsibilities					
2.*	I am satisfied with the regular salary increases I receive					
3.*	My salary adequately supports my personal and family expenses					
4.	The fringe benefits provided by my university (e.g., health insurance, paid leave) enhance my job satisfaction					
5.	The pension benefits offered by my organization provide me with a sense of financial security for the future					
6.	The combination of salary and pension benefits motivates me to remain in my role					
7.*	My salary and benefits are competitive compared to other positions in similar fields					
	Work environment condition items					
1.	My physical workspace is comfortable, organized, and conducive to productivity					
2.*	There is a culture of respect, inclusivity, and support among my colleagues					
3.*	Communication within my team and with other departments is effective and keeps me well-informed					
4.*	My organization promotes diversity and values inclusivity in the workplace					
5.*	Constructive feedback is encouraged, helping to create a positive work environment					
6.	I feel comfortable voicing my opinions and suggestions to my supervisors					
7.	I like the Burmese culture of respect and dignity in workplace relationships					
	Supervisor management items					
1.*	My supervisor is competent in their role and supportive of my efforts					
2.*	My supervisor values and shows interest in my professional development					
3.*	I am given adequate autonomy in making decisions related to my daily tasks and responsibilities					
4.	I participate in decision-making processes that impact my work and library services					
5.	The rules and procedures in place support rather than hinder my ability to do a good job					
6.	The rules and regulations related to my work are consistent with the standards I know and understand					
	Career training items					
1.*	My organization offers sufficient opportunities for professional development, including workshops, conferences, and training sessions					
2.*	I am encouraged to pursue further education or professional certifications to advance my career					
3.*	The organization values lifelong learning and provides resources to enhance my skills (e.g., online courses, seminars)					
4.	The training provided has made me confident in using the latest library technologies					
5.*	Continuous learning and skill development are prioritized and supported by my organization					
6.	In my free time, I often study new technologies related to library science (information literacy, digital literacy) on my own					

 https://doi.org/10.1633/JISTaP.2026.14.2.2

No	Items	SD	D	N	A	SA
	Job satisfaction and motivation items					
1.*	The stability and security of my job motivate me to stay engaged and perform well					
2.	Recognition and rewards for my work make me feel appreciated and motivate me to work harder					
3.	The mission and values of my university align with my personal values, enhancing my job commitment					
4.*	I find personal fulfillment in assisting library users and contributing to their academic success					
6.*	The intellectual challenges of my role as a library professional keep me engaged and motivated					
	User interface friendliness items					
1.*	I feel very happy and fulfilled when interacting with library users					
2.*	Assisting users in finding the information they need brings me satisfaction					
3.*	Engaging with users enhances my overall job satisfaction					
4.*	Positive interactions with library users motivate me to perform my duties effectively					
5.*	I enjoy the opportunities to help and support library users in their academic and personal endeavors					
6.*	I am willing to help library users with their needs at any time, without any prompting from others					

SD, strongly disagree; D, disagree; N, neither agree nor disagree; A, agree; SA, strongly agree.
*The asterisk indicates that the question was included in the factor analysis.

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 50-61, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.3

Technology, Trust, and Context: A Socio-Technical Framework for DLT Implementation in Digital Archives

Fabiano Couto Correa da Silva*
Department of Information Science, Federal University of Rio Grande do Sul, Porto Alegre, Brazil
E-mail: fabianocc@gmail.com

Alexandre Faria de Oliveira
Department of Information Science, Brazilian Institute of Information in Science and Technology (IBICT), Brasília, Brazil
E-mail: alexandreoliveira@ibict.br

ABSTRACT

The digital preservation of archival collections faces growing challenges in ensuring long-term authenticity and integrity. This article presents a critical analysis of distributed ledger technology (DLT) and blockchain applications in digital preservation, with a specific focus on archival repositories. Through a systematic literature review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and an analysis of existing implementations, this study identifies the opportunities and limitations of these technologies. The main contribution is the first rigorous synthesis, operationalization, and contextual validation of a socio-technical implementation framework for DLT in archives. This framework, grounded in socio-technical systems theory, integrates technical, organizational, economic, regulatory, and social dimensions to guide information professionals. Unlike previous reviews focused on technical aspects, this study offers a holistic approach, filling a significant gap by providing practical guidelines for informed decision-making. The findings suggest that the success of DLT implementations depends less on intrinsic technical characteristics and more on the "joint optimization" of social and technical subsystems, aligned with specific organizational needs, national regulatory frameworks, and long- term sustainability. The article concludes by offering a practical, context-adaptive tool for libraries, archives, and information centers considering the adoption of DLT.

Keywords: digital preservation, blockchain, distributed ledger technologies, archival repositories, socio-technical framework, information science practice

Received: September 3, 2025 **Revised:** February 3, 2026
Accepted: February 27, 2026 **Published:** June 30, 2026

***Corresponding Author:** Fabiano Couto Correa da Silva
https://orcid.org/0000-0001-5014-8853
E-mail: fabianocc@gmail.com

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [Fabiano Couto Correa da Silva, Alexandre Faria de Oliveira] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

The digital era has fundamentally transformed the nature of archival records, creating unprecedented opportunities for information access while introducing complexities that challenge traditional archival management practices (Owens, 2018). The growing reliance on digital systems for creating, managing, and preserving official documents, academic records, and cultural heritage intensifies the need for robust mechanisms to ensure long-term authenticity and integrity (Lin et al., 2020).

Authenticity in digital environments extends beyond purely technical issues, encompassing legal and social dimensions that require interdisciplinary approaches (Lemieux, 2017b). Unlike physical documents, digital objects depend entirely on metadata, management systems, and technological infrastructures to maintain their integrity over time (Bantin, 2016).

Distributed ledger technologies (DLT), particularly blockchain, have emerged as a promising proposal to address some of these challenges, offering features such as immutability, transparency, and verifiability (Lemieux, 2017a). However, the existing literature often neglects critical analyses of technical limitations, operational costs, and practical implementation challenges. This study identifies and addresses four critical gaps: (1) the absence of comprehensive frameworks that integrate technical, organizational, economic, regulatory, and social dimensions; (2) the lack of systematic analyses on the adaptability of DLT solutions to different national and institutional contexts; (3) the scarcity of practical guidance for integrating DLT with established digital preservation infrastructures; and (4) a shortage of critical analyses on the long-term sustainability of DLT implementations.

The main original contribution of this study is the development of the first synthesis, operationalization, and rigorous contextual validation of a socio-technical implementation framework for DLT in archives. While multifactor models exist in technology adoption literature, such as the technology acceptance model (TAM) (Davis, 1989) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), these are primarily focused on predicting user acceptance rather than guiding the systemic implementation of complex infrastructures in an organizational context. This work fills the critical gap between general adoption theories and the practical, multi-faceted requirements of archival digital preservation.

This study adopts an explicitly international perspective, recognizing that digital preservation challenges are global, but solutions must be adapted to specific contexts. The main objective is to develop a critical and comprehensive analysis of the state of the art on DLT applications in digital preservation, culminating in the proposal of a multidimensional framework adaptable to different national and organizational contexts for use by information professionals.

2. LITERATURE REVIEW

Digital preservation as a discipline emerged from the convergence of archival science, computer science, and information studies (Owens, 2018). The Open Archival Information System (OAIS) model (ISO 14721:2012) provides the fundamental conceptual framework for digital preservation systems (Lavoie, 2014). Complementing OAIS, the Digital Curation Centre's Curation Lifecycle Model expands the preservation perspective to include activities throughout the entire lifecycle of digital objects (Higgins, 2008). The TRUST Principles (Transparency, Responsibility, User focus, Sustainability, Technology) offer an operational framework for evaluating trustworthy digital repositories (Lin et al., 2020), recognizing that technical reliability is necessary but not sufficient for organizational trust.

2.1. Alternative Digital Authenticity Technologies: Beyond Blockchain

Before considering DLT, it is imperative to evaluate established technologies that have long been pillars of digital archival practices. Digital signatures, based on public-key infrastructure (PKI), provide authenticity and non-repudiation but depend on trust in certificate authorities and face challenges in long-term preservation (Blanchette, 2006). Timestamping services, especially those following the RFC 3161 standard, use a trusted third party to attest to the existence of data at a specific time, but this introduces a single point of failure (Sumner, 2025). Hash logs and hash- chaining are simpler methods for integrity monitoring but lack the decentralized consensus of blockchain. Compared to these, blockchain's proposition is to combine these functionalities into a single, decentralized system, but this comes with challenges in complexity, cost, and scalability.

2.2. Socio-Technical Perspectives on Digital Archives

Socio-technical systems (STS) theory provides a robust lens for understanding the interplay between technology

and its social context. Originating from the work of the Tavistock Institute, STS posits that the design and performance of any organization must understand and optimize the interdependence between its social subsystem (people, culture, governance) and its technical subsystem (tools, processes, infrastructure). A central STS principle is "joint optimization," meaning that optimizing one subsystem in isolation tends to produce suboptimal overall performance (Molleman & Broekhuis, 2001). In the context of digital preservation, a technically perfect DLT solution is doomed to fail if it is incompatible with the organizational culture, workflows, or skills of an archival institution. This study builds on these theoretical foundations by operationalizing socio-technical insights into a concrete, actionable framework for DLT implementation.

2.3. Blockchain in the Literature: Promises, Implementations, and Critiques

The literature on DLT in digital preservation includes theoretical explorations, implementation studies, and critical analyses. Lemieux (2017a) developed a framework for evaluating blockchain as a trustworthy recordkeeping system. However, more recent analyses question some of the initial promises, identifying limitations related to scalability, cost, and complexity (Bralić et al., 2020). The ARCHANGEL project, developed by the University of Surrey and The National Archives of the United Kingdom, is the most documented implementation, using a permissioned blockchain to record cryptographic checksums of archival documents (Collomosse et al., 2018). While a successful proof of concept, its long-term sustainability remains a concern (Currie, 2021). The literature review reveals several gaps, including a scarcity of longitudinal studies, a lack of systematic comparisons with alternative technologies, and limited research on the social and organizational aspects of DLT implementation in library and archival settings.

3. METHODOLOGY

This study adopts a qualitative exploratory approach, structured in three distinct phases: (1) a systematic literature review to map the state of the art on DLT in digital preservation; (2) a comparative case analysis of documented implementations to identify patterns of success and failure; and (3) an analytical synthesis to develop and propose a socio-technical framework. This methodological design ensures that the proposed framework is both grounded in the existing scholarly literature and validated against real-world applications.

3.1. Systematic Literature Review

To ensure transparency and reproducibility, a systematic literature review was conducted following the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement guidelines (Page et al., 2021). The review was designed to answer the following research questions:

- RQ1: What are the primary reported benefits and challenges of using DLT/blockchain for digital preservation in archival contexts?
- RQ2: What technical, organizational, and contextual factors influence the implementation outcomes of DLT projects in archives and libraries?
- RQ3: How does the existing literature address the long-term sustainability and governance of DLT-based preservation systems?

The search strategy involved querying five major academic databases: Web of Science, Scopus, Library and Information Science Abstracts, ACM Digital Library, and IEEE Xplore. This selection ensures comprehensive coverage across information science, computer science, and engineering disciplines. The search was performed for publications between January 2008 and January 2025, using a combination of the following keywords: ("blockchain" OR "distributed ledger technology" OR "DLT") AND ("digital preservation" OR "archives" OR "recordkeeping" OR "authenticity" OR "integrity").

The screening process is detailed in the PRISMA flow diagram (Fig. 1). The initial search yielded 742 records. After removing 253 duplicates, titles and abstracts of the

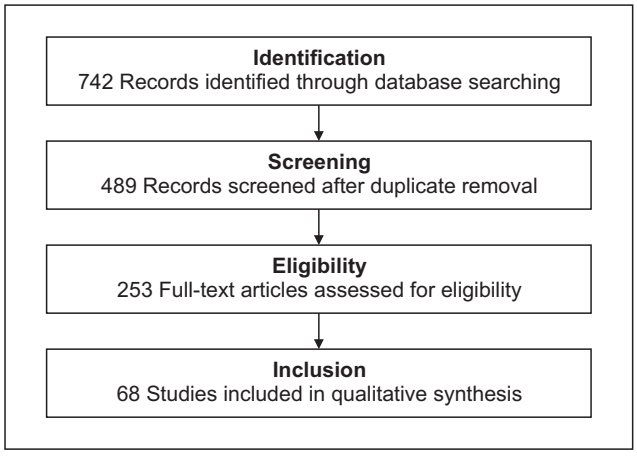


Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart of the systematic literature review.

 https://doi.org/10.1633/JISTaP.2026.14.2.3

remaining 489 records were screened for relevance. This led to the exclusion of 236 articles that did not directly address the use of DLT in a preservation or archival context. The full texts of the remaining 253 articles were assessed for eligibility based on the inclusion and exclusion criteria outlined in Table 1. This final step resulted in the inclusion of 68 studies for qualitative synthesis. The synthesis involved a process of thematic coding to extract key concepts, reported outcomes, and critical factors discussed in the literature, forming the empirical basis for the subsequent framework development.

3.2. Case Analysis and Framework Development

The case analysis phase aimed to ground the theoretical findings in practical application. The selection of cases was guided by the availability of public documentation and their representativeness of different implementation contexts. The ARCHANGEL project was selected for its status as a well-documented, large-scale, international collaboration involving a national archive. The Brazilian initiatives, including the Hipátia model and judicial archives, were chosen to represent a national-level strategy and a specific domain application within a developing country context. This purposive sampling allows for a richer comparative analysis.

The analysis of each case was systematized using the multidimensional framework presented in Table 2, which was developed from the thematic coding of the literature review. This analytical process involved mapping the documented information for each case against the five dimensions (Technical, Organizational, Economic, Regulatory, Social). This structured approach ensures a consistent and reproducible synthesis, allowing for the identification of cross-case patterns. The framework development was, therefore, an iterative process of analytical induction, where insights from the literature informed the case analysis, and the patterns emerging from the cases were used to refine and validate the final proposed framework (Section 6).

3.3. Study Limitations

This study has limitations. The literature on DLT in digital preservation is recent, limiting the availability of longitudinal studies. Many implementations are pilot projects, offering limited evidence on scalability. The analysis is based on public documentation, which may introduce a selection bias. The qualitative nature of the study limits its statistical generalization, although it allows for an in-depth understanding of contextual factors.

Table 1. Inclusion and exclusion criteria for the systematic review

Inclusion criteria	Exclusion criteria
Studies on blockchain/ distributed ledger technology applications in digital preservation	Studies focused exclusively on cryptocurrencies without archival application
Documented implementations of blockchain systems for authenticity	Commercial implementations without adequate technical documentation
Theoretical analyses on the intersection of blockchain and digital preservation	Publications without peer review or institutional validation
Studies in English and Portuguese (2008-2025)	Purely speculative studies without an empirical basis
Research in archival repositories and records management	Promotional literature without critical analysis

Table 2. Multidimensional analysis framework (tool for case analysis)

Dimension	Aspects analyzed	Evaluation indicators
Technical	Architecture, consensus algorithms, integration, scalability, security	Compatibility with standards, processing capacity, robustness
Organizational	Alignment with objectives, process changes, training, governance	Available expertise, absorption capacity, institutional culture
Economic	Implementation/operation costs, financial sustainability, return on investment	Direct/indirect costs, tangible/intangible benefits
Regulatory	Legal compliance, archival standards, privacy, accountability	Adherence to legal frameworks, certification, responsibility
Social	User acceptance, professional practices, transparency, access	Satisfaction, behavioral changes, social impact

4. ANALYSIS OF EXISTING IMPLEMENTATIONS AND CRITICAL SUCCESS FACTORS

To provide a concrete basis for the framework, this section analyzes documented DLT implementations. A critical aspect of this analysis is the definition of implementation outcomes. For the purpose of this study, "success" is defined not merely as technical functionality, but as the achievement of the project's stated preservation goals (e.g., integrity verification), sustained operational use beyond a pilot phase, and alignment with the institution's long-term strategic and financial resources. Conversely, "failure" is defined as the discontinuation of a project before reaching operational status, significant budget or timeline overruns leading to cancellation, or an inability to transition from a research-funded prototype to a sustainably managed service.

The ARCHANGEL project established an important precedent for DLT applications in official archival contexts (Collomosse et al., 2018). Applying the multidimensional framework (Table 2), its Technical dimension is characterized by a permissioned Ethereum blockchain architecture, which reflects a mature design choice to manage scalability by only recording cryptographic hashes on-chain. From an Organizational perspective, its success as a proof-of-concept was driven by strong leadership from the University of Surrey and The National Archives, demonstrating high technical and organizational expertise (Table 3). However, its Economic dimension reveals a primary limitation: a heavy dependence on research funding, which raises questions about its long-term financial sustainability and classifies it as a successful pilot with uncertain operational longevity (Currie, 2021). The project's Regulatory and Social dimensions were addressed by design, focusing on integrity for public records and building trust through a decentralized model.

In Brazil, the context is different. The Hipátia model, from the Brazilian Institute of Information in Science and Technology (Braga & Arellano, 2022), represents a national-level strategy for Trustworthy Digital Archival Repositories. Here, the interest in DLT is part of a broader Organizational effort to modernize information infrastructure. The analysis of this case shows a focus on integrating DLT with existing systems rather than replacing them, a key success factor identified in Table 3. The authentication of over 156,000 documents in judicial archives (Hong et al., 2011) demonstrates Social acceptance and a clear use case, but a detailed analysis of its Economic sustainability and Technical architecture is not yet publicly available, highlighting a common gap in many DLT projects.

The comparative analysis of these and other cases (Table 4) reveals consistent patterns, which are synthesized into the critical success factors shown in Table 3. Successful projects tend to have a limited and well-defined scope and are managed by teams with competent leadership. In contrast, projects that struggle often suffer from unrealistic expectations and a lack of clear governance. These findings, derived from applying the analytical framework of Table 2 to the cases, strongly suggest that organizational and contextual factors often outweigh purely technical considerations in determining the ultimate success of a DLT implementation.

5. CRITICAL CHALLENGES AND RISKS IN DLT IMPLEMENTATION

The implementation of DLT in digital preservation is not without significant challenges that span all five dimensions of the socio-technical framework. Technical limitations, such as the low transaction throughput of traditional blockchains, present scalability issues for large-scale archival applications (Bralić et al., 2020). The principle of immutability, often cited as a primary benefit, creates a direct conflict with legal and ethical requirements. A key example is the "right to be forgotten" (also known as

Table 3. Critical success factors in blockchain implementations

Factor	Successful implementations	Implementations with difficulties
Scope	Limited and well-defined (e.g., integrity verification)	Broad and ambitious (e.g., complete system replacement)
Integration	Complements existing systems	Requires replacement of infrastructure
Leadership	Competent technical and organizational expertise	Lack of specialized knowledge
Resources	Sustainable and diversified funding	Dependence on a single funding source
Expectations	Realistic about capabilities and limitations	Unrealistic expectations about benefits
Governance	Clear decision-making structures	Absence of governance models

 https://doi.org/10.1633/JISTaP.2026.14.2.3

Table 4. Comparative analysis of blockchain implementations in digital preservation

Project	Context	Architecture	Scope	Results	Limitations
ARCHANGEL	United Kingdom (The National Archives)	Permissioned Ethereum, multi-blockchain	Integrity verification of official documents	Successful proof of concept, functional user interfaces	Dependence on research funding, uncertain sustainability
Hipátia+blockchain (Instituto Brasileiro de Informação em Ciência e Tecnologia [Brazilian Institute of Information in Science and Technology])	Brazil	Integration with existing model	Trustworthy digital repositories	Established infrastructure, multiple partnerships	Blockchain implementation still experimental
University libraries	Multiple countries	Hybrid solutions	Preservation of theses and dissertations	Specific use cases	Limited scale, restricted resources
Judicial archives	Brazil	Public/private blockchain	Authentication of legal documents	156,000+ documents authenticated	Lack of sustainability analysis

the right to erasure or Article 17 of the GDPR), which is a cornerstone of the European Union's General Data Protection Regulation (GDPR) and Brazil's Lei Geral de Proteção de Dados (LGPD) (Belen-Saglam et al., 2023). These legal concerns are a core component of the framework's Regulatory dimension and are not treated as separate factors.

Furthermore, challenges related to organizational culture represent a critical aspect of the Organizational dimension. The successful integration of a DLT system requires more than just technical expertise; it demands a shift in workflows, staff training, and a culture that is receptive to change. As identified in the literature, a lack of organizational readiness and resistance to new processes are significant barriers to adoption (Tella et al., 2022). Therefore, these factors are integral to the framework's analysis, not excluded from it.

To provide a more granular view, the risks identified in the literature can be contextualized by the national and institutional environments in which they are most acute. The claim that risks must be justified by national context is a central tenet of the socio-technical approach advocated in this paper. A specific risk's probability and impact are not universal; they are weighted by the local regulatory landscape, economic conditions, and organizational maturity. Table 5 (Belen-Saglam et al., 2023; Bralić et al., 2020; Currie, 2021; Kayikci et al., 2022; Tella et al., 2022; Zhou et al., 2020) synthesizes these risks, categorizing them by the context where they are most pronounced. The methodology for this table involved identifying recurring challenges in the systematic literature review and mapping them to the contextual factors observed in the analyzed implementations, with each risk now supported by a specific citation.

Further elaborating on the regulatory dimension, the specific legal frameworks in place heavily influence the feasibility and design of any DLT implementation. Table 6 provides concrete examples of national legislation that must be considered, illustrating the practical application of the framework's Regulatory dimension.

6. A MULTIDIMENSIONAL CONCEPTUAL FRAMEWORK FOR DLT IMPLEMENTATION

Based on the synthesis of the literature and the analysis of existing implementations, this study proposes a multidimensional conceptual framework for DLT implementation in archival repositories. Grounded in STS theory, the framework is designed to facilitate the "joint optimization" of the social and technical subsystems by systematically considering their interdependence. It integrates five critical dimensions: technical, organizational, economic, regulatory, and social.

- Technical dimension: Addresses system architecture, consensus algorithms, integration with existing systems (like OAIS), scalability, and security. Evaluation focuses on compatibility with standards, processing capacity, and robustness.
- Organizational dimension: Examines strategic alignment, necessary changes to workflows and processes, staff training requirements, and governance models for the DLT network.

Table 5. Primary risks of DLT implementation by national context

National context	Primary risks	Description	Illustrative source
Developed countries (e.g., United Kingdom, European Union members)	Regulatory & compliance complexity	Navigating complex data protection laws like GDPR, which may conflict with blockchain's immutability	Belen-Saglam et al. (2023)
-	High integration costs	The cost of integrating DLT with sophisticated legacy systems in established national archives can be prohibitive	Currie (2021)
Developing countries (e.g., Brazil)	Lack of specialized expertise	A shortage of local professionals with the skills to develop, implement, and maintain DLT systems	Tella et al. (2022)
-	Financial sustainability	Dependence on intermittent government funding or short-term grants makes long-term operation uncertain	Zhou et al. (2020)
All contexts	Governance & standardization	Lack of clear governance models for decentralized networks and absence of interoperability standards	Bralić et al. (2020)
-	Energy consumption & environmental impact	The high energy usage of Proof-of-Work blockchains is a significant environmental and cost concern	Kayikci et al. (2022)

DLT, distributed ledger technology; -, not available.

Table 6. Examples of specific national legislation and regulatory frameworks

Regulatory frameworks	Geographic context	Example legislation	Relevance to DLT in archives
Data protection & privacy	European Union	General Data Protection Regulation (GDPR)	Governs the right to erasure (Art. 17), data portability, and cross-border data transfers, posing challenges for immutable ledgers
	Brazil	Lei Geral de Proteção de Dados	Similar to GDPR, establishes rights for data subjects and rules for data processing that must be reconciled with DLT architecture
	United States	Privacy Act of 1974, state-level laws (e.g., CCPA/CPRA)	Creates a complex, fragmented compliance landscape for personal data held in government and private archives
Electronic identification & trust services	European Union	eIDAS Regulation (No. 910/2014)	Provides a legal framework for electronic signatures, seals, and timestamps, which can be integrated with or complemented by DLT systems
Access to information	Brazil	Lei de Acesso à Informação	Mandates transparency for public records, a goal that DLT can support, but requires careful design to protect sensitive information
	United States	Freedom of information act	Governs public access to government records, where DLT could potentially provide a verifiable audit trail of access and modifications

DLT, distributed ledger technology; CCPA/CPRA, The California Consumer Privacy Act/The California Privacy Rights Act of 2020; eIDAS, electronic IDentification, Authentication and trust Services.

- Economic dimension: Considers the total cost of ownership, including implementation and long-term operational costs, financial sustainability models, and return on investment, both tangible and intangible.

- Regulatory dimension: Focuses on compliance with relevant legal frameworks (e.g., GDPR, LGPD), archival standards, privacy implications, and accountability mechanisms.

- Social dimension: Addresses user acceptance by archivists and researchers, impacts on professional practices, and the system's contribution to public transparency and trust.

6.1. Novel Contributions Beyond Existing Frameworks

The principal novelty of this framework lies in its operationalization of STS theory into a context-adaptive planning tool specifically for archival digital preservation (Hong et al., 2011). While other models exist, they serve different purposes. The TAM and the UTAUT are powerful for predicting individual user adoption but are not designed to guide the complex, systemic implementation of an organizational infrastructure (Davis, 1989; Venkatesh et al., 2003). More recent STS-based frameworks, such as the STS for digital heritage model for digital heritage, provide a valuable analytical lens but remain highly theoretical and are not tailored to the specific regulatory and operational realities of archival repositories (Lu et al., 2025). As shown in Table 7 (Davis, 1989; Lu et al., 2025; Venkatesh et al., 2003), the proposed framework fills the critical gap between general theories of user acceptance and broad analytical models, offering a prescriptive, actionable roadmap for institutional decision-making.

6.2. Contextual Weighting Mechanism: A Strategic Planning Tool

To transform the framework from a descriptive model into a strategic planning tool, we introduce a contextual weighting mechanism. This process empowers an institution to assign a numerical weight to each of the five dimensions based on its unique strategic priorities, resources, and environment. It is crucial to note that the weights presented in Table 8 are purely illustrative. Their purpose is to demonstrate the *process* of contextualization, not to prescribe specific values. The provenance of these weights in a real-world application would be a deliberative process involving key stakeholders (e.g., archivists, IT managers, legal counsel, administrators), and their justification would be documented as part of the initial feasibility assessment. For example, a national archive with strict legal mandates might assign the highest weight to the "Regulatory" dimension, whereas a smaller, community-based archive with limited funding would likely prioritize the "Economic" dimension.

6.3. Phased Implementation Process: A Practical Guide

The framework is complemented by a practical guide for implementation, structured as a five-phase process to mitigate risk and allow for iterative learning. This guide, presented in Table 9, is not a novel invention but rather a synthesis and adaptation of established best practices from technology project management and the digital preservation literature, informed by models such as the OAIS reference model. Its origin lies in structuring the complex task of DLT implementation into manageable stages, each

Table 7. Comparative analysis of DLT implementation and adoption frameworks

Framework	Theoretical basis	Target domain	Key differentiator
Proposed framework (this study)	STS theory, empirical case analysis	DLT in archival repositories	Operationalizes STS into a weighable, archive-specific planning tool and implementation roadmap
STS-DH framework (Lu et al., 2025)	STS theory	Digital heritage (broad)	Highly theoretical, descriptive rather than prescriptive; not tailored for DLT or the specificities of archives
TAM/UTAUT (Davis, 1989; Venkatesh et al., 2003)	Psychology, sociology	Technology adoption by individuals	Focuses on predicting user acceptance, not guiding systemic organizational implementation; lacks archival, regulatory, and economic depth

STS, socio-technical systems; DLT, distributed ledger technology; STS-DH, socio-technical systems for digital heritage; TAM/UTAUT, technology acceptance model/unified theory of acceptance and use of technology.

Table 8. Illustrative example of contextual weighting

Dimension	University archive (limited resources)	National archive (strict regulation)
Technical	15% (focus on simple integration)	20% (focus on scalability and security)
Organizational	25% (focus on staff training and acceptance)	20% (focus on governance and coordination)
Economic	30% (focus on low total cost of ownership)	15% (focus on long-term budget sustainability)
Regulatory	15% (focus on basic privacy compliance)	35% (focus on national laws and standards)
Social	15% (focus on ease of use for researchers)	10% (focus on public transparency)

Table 9. Phased implementation process

Phase	Duration	Main objectives	Deliverables	Success criteria
1. Assessment	3-6 months	Multidimensional feasibility analysis; stakeholder weighting	Feasibility report, risk matrix, weighted framework	Informed decision to proceed or halt
2. Pilot	6-12 months	Limited implementation for concept validation	Functional pilot system, performance data, lessons learned	Concept validated, risks understood
3. Refinement	3-6 months	Optimization based on pilot results	Refined system, updated documentation, improved metrics	Measurable performance improvements
4. Expansion	12-24 months	Implementation at operational scale	System in production, trained staff, governance in place	Sustainable operation at scale
5. Operation	Ongoing	Long-term system maintenance and evolution	Periodic audit reports, system updates, sustainability plan	Long-term integrity and accessibility ensured

with clear objectives, deliverables, and success criteria.

6.4. Illustrative Scenario: Applying the Framework at a Municipal Archive

To demonstrate the framework's applied relevance, we consider the hypothetical case of the "Metropolis Municipal Archive" (MMA), a mid-sized public institution responsible for preserving official city records, including property deeds, council meeting minutes, and historical photographs.

6.4.1. The Challenge

The MMA faces growing pressure to provide verifiable digital versions of its records. Recent incidents of unauthorized alteration of digital files on the city's central server have eroded public trust. The city council has heard about blockchain and allocated a small exploratory budget to investigate it as a solution for ensuring the integrity of the digital archive.

6.4.2. Step 1: Assessment Phase (Applying the Framework)

The archive director convenes a working group including a senior archivist, the city's IT department lead, a lawyer from the city's legal department, and the finance officer. They use the multidimensional framework to structure their feasibility study.

6.4.2.1. Stakeholder Weighting.

The group first debates and assigns weights. Due to a recent, highly publicized data breach, Regulatory (compliance with state-level public records laws) and Social (restoring public trust) dimensions are weighted heavily. As a municipal entity, the Economic dimension is also a major concern due to tight budgets. They arrive at the following illustrative weights: Technical (15%), Organizational (20%), Economic (25%), Regulatory (25%), and Social (15%).

6.4.2.2. Multidimensional Analysis.

Technical: The IT lead determines that their current digital repository (based on OAIS principles) is robust. A full replacement is infeasible. The best approach would be an integration layer—a permissioned DLT that anchors hashes of the archival information packages without storing the records themselves on-chain. This minimizes scalability issues.

- Organizational: The senior archivist notes that the current staff has no DLT expertise. Significant training would be required. The workflow for ingesting new digital records would need to be modified to include the hashing and registration step. This dimension is identified as a high-effort area.
- Economic: The finance officer calculates the potential costs. A commercial, off-the-shelf DLT solution is too expensive. An open-source solution would require hiring a specialized consultant for the pilot phase. Ongoing operational costs (node maintenance, cloud hosting) are a major concern and must be factored into future budget requests.
- Regulatory: The city lawyer confirms that using DLT to *enhance* the integrity of public records is compliant with state law. However, they caution against storing any personally identifiable information on an immutable ledger due to potential conflicts with state privacy regulations. The design must ensure the

 https://doi.org/10.1633/JISTaP.2026.14.2.3

DLT component is purely for integrity verification of hashes.
- Social: The group agrees that a key outcome must be a public-facing verification portal where citizens can check the integrity of a digital record by uploading it or entering its hash. This would directly address the goal of improving public trust.

6.4.3. The Decision

Based on the assessment, the working group concludes that a full-scale implementation is too risky and costly at this stage. However, a limited, focused pilot is feasible and strategically sound. They recommend to the city council a 12-month pilot project (Phase 2) with a clear, limited scope: to build a proof-of-concept for integrity verification of property deeds created in the last five years. Their feasibility report, structured around the five dimensions, provides a clear, evidence-based rationale for this recommendation, justifying the required budget for a consultant and pilot infrastructure. The framework allowed the MMA to move from a vague directive ("investigate blockchain") to a concrete, risk-mitigated, and strategically aligned project plan.

7. DISCUSSION

The results reveal a significant complexity at the intersection of DLT and digital preservation, challenging simplistic narratives of DLT as a universal solution. The main theoretical contribution is demonstrating that the effectiveness of DLT depends less on its intrinsic technical characteristics and more on a careful alignment with specific organizational needs, regulatory contexts, and implementation capabilities. The proposed multidimensional framework, grounded in STS theory, represents a methodological advancement over existing approaches by promoting an integrated analysis that considers the complex interactions between technical, organizational, economic, regulatory, and social factors.

The comparative analysis of implementations reveals that organizational and project management factors often outweigh technical considerations. This has important practical implications for information professionals, suggesting that investments in organizational capacity building and strategic planning may be more critical than specific technological choices. The illustrative scenario of the MMA demonstrates how the framework can be used as a practical tool to guide decision-making, moving from a vague technological interest to a structured, risk-assessed pilot project.

Directions for future research are plentiful. Longitudinal studies are desperately needed to move beyond the proof-of-concept stage and assess the long-term sustainability and operational challenges of DLT systems in archives. Furthermore, more systematic comparative evaluations, pitting DLT-based solutions against enhanced traditional methods (e.g., advanced PKI and timestamping services) across standardized dimensions of cost, security, and usability, would provide invaluable data for institutional decision-makers.

8. CONCLUSIONS

This study offers a comprehensive critical analysis of DLT applications in digital preservation that provides an evidence-based conceptual framework for decision-making. The main contribution is the first rigorous synthesis, operationalization, and contextual validation of a socio-technical implementation framework for DLT in archives, integrating five critical dimensions. This research demonstrates that the effectiveness of DLT fundamentally depends on the alignment between technology and context.

To create narrative symmetry, we revisit the four research gaps identified in the introduction. The proposed framework directly addresses the (1) absence of comprehensive models and the (2) lack of analysis on adaptability. The study's focus on integration offers guidance on (3) complementing existing infrastructures. Finally, the economic and organizational dimensions systematically address (4) the scarcity of critical analyses on sustainability. For information science theory, this work operationalizes STS theory into a practical tool. For information science practice, it provides a structured, risk-mitigating roadmap for librarians and archivists navigating the complexities of emerging technologies.

In summary, this study demonstrates that while DLT offers unique capabilities for integrity verification, its effective implementation requires careful consideration of the technical, organizational, economic, regulatory, and social factors specific to each context. The proposed framework offers a practical tool for organizations to make informed decisions, emphasizing that the success of technological implementations in digital preservation depends less on intrinsic technical features and more on the joint optimization of the social and technical subsystems, aligned with organizational needs, national regulatory frameworks, and long-term sustainability.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGEMENTS

The authors thank the anonymous reviewers for their constructive comments and suggestions. We also acknowledge support from Brazil's National Council for Scientific and Technological Development (CNPq) - Case: 305515/2024-1- and the Brazilian Institute of Information in Science and Technology (IBICT).

REFERENCES

Bantin, P. C. (2016). *Building trustworthy digital repositories: Theory and implementation*. Bloomsbury Academic.

Belen-Saglam, R., Altuncu, E., Lu, Y., & Li, S. (2023). A systematic literature review of the tension between the GDPR and public blockchain systems. *Blockchain: Research and Applications,* 4(2), 100129. https://doi.org/10.1016/j.bcra.2023.100129

Blanchette, J. F. (2006). The digital signature dilemma. *Annals of Telecommunications*, 61(7-8), 908-923. https://doi.org/10.1007/BF03219871

Braga, T., & Arellano, M. M. (2022). *[Hypatia: A preservation model for trustworthy digital archival repositories]*. Brazilian Institute of Information in Science and Technology. Portuguese.

Bralić, V., Stančić, H., Stengård, M. (2020). A blockchain approach to digital archiving: Digital signature certification chain preservation. *Records Management Journal*, 30(3), 345-362. https://doi.org/10.1108/RMJ-08-2019-0043

Collomosse, J., Bui, T., Brown, A., Sheridan, J., Green, A., Bell, M., Fawcett, J., Higgins, J., & Thereaux, O. (2018). *ARCHANGEL: Trusted archives of digital public documents*. Paper presented at DocEng '18: Proceedings of the ACM Symposium on Document Engineering 2018, New York, NY, USA. https://doi.org/10.1145/3209280.3229120

Currie, A. (2021). *The FAIR forever study overview of key findings and recommendations*. https://www.dpconline.org/docs/technology-watch-reports/2429-dpctw19-02/file

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly,* 13(3), 319-340. https://doi.org/10.2307/249008

Higgins, S. (2008). The DCC curation lifecycle model. *International Journal of Digital Curation,* 3(1), 134-140. https://doi.org/10.2218/ijdc.v3i1.48

Hong, J., Hwang, M., Hsu, H., Wong, W., & Chen, M. (2011). Applying the technology acceptance model in a study of the factors affecting usage of the Taiwan digital archives system. *Computers & Education,* 57(3), 2086-2094. https://doi.org/10.1016/j.compedu.2011.04.011

Kayikci, Y., Gozacan-Chase, N., Rejeb, A., & Mathiyazhagan, K. (2022). Critical success factors for implementing blockchain-based circular supply chain. *Business Strategy and the Environment*, 31(7), 3595-3615. https://doi.org/10.1002/bse.3110

Lavoie, B. (2014). *The open archival information system (OAIS) reference model: Introductory guide* (2nd ed.). Digital Preservation Coalition.

Lemieux, V. L. (2017a). *Blockchain and distributed ledgers as trusted recordkeeping systems: An archival theoretic evaluation framework*. Paper presented at Future Technologies Conference 2017, Vancouver, Canada.

Lemieux, V. L. (2017b). *Blockchain recordkeeping: A SWOT analysis*. https://magazine.arma.org/wp-content/uploads/simple-file-list/2017_06_IM_blockchain_recordkeeping_SWOT_lemieux.pdf

Lin, D., Crabtree, J., Dillo, I., Downs, R. R., Edmunds, R., Giaretta, D., De Giusti, M., L'Hours, H., Hugo, W., Jenkyns, R., Khodiyar, V., Martone, M. E., Mokrane, M., Navale, V., Petters, J., Sierman, B., Sokolova, D. V., Stockhause, M., & Westbrook, J. (2020). The TRUST principles for digital repositories. *Scientific Data,* 7(1), 144. https://doi.org/10.1038/s41597-020-0486-7

Lu, J., García-Badell, G., & Rodriguez, J. B. (2025). Digital heritage from a socio-technical systems perspective: Integrated case analysis and framework development. *Heritage,* 8(9), 348. https://doi.org/10.3390/heritage8090348

Molleman, E., & Broekhuis, M. (2001). Sociotechnical systems: Towards an organizational learning approach. *Journal of Engineering and Technology Management,* 18(3-4), 271-294. https://doi.org/10.1016/s0923-4748(01)00038-8

Owens, T. (2018). *The theory and craft of digital preservation*. Johns Hopkins University Press.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ,* 372, n71. https://doi.org/10.1136/bmj.n71

Sumner, M. (2025). *Blockchain vs traditional timestamping methods*. https://www.scoredetect.com/blog/posts/blockchain-vs-traditional-timestamping-methods

Tella, A., Amuda, H. O., & Ajani, Y. A. (2022). Relevance of blockchain technology and the management of libraries and archives in the 4IR. *Digital Library Perspectives,* 38(4), 460-475. https://doi.org/10.1108/dlp-08-2021-0065

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly,* 27(3), 425-478. https://doi.org/10.2307/30036540

Zhou, Y., Soh, Y. S., Loh, H. S., & Yuen, K. F. (2020). The key challenges and critical success factors of blockchain implementation: Policy implications for Singapore's maritime industry. *Marine Policy,* 122, 104265. https://doi.org/10.1016/j.marpol.2020.104265

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 62-80, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.4

Open Science Adoption Barriers in Indonesia's Scholarly Communication System: A Pentahelix Analysis Combining a Systematic Literature Review and Interviews

Suci Indrawati Irwan*
Faculty of Communication, Padjadjaran University, West Java, Indonesia
E-mail: suci22006@mail.unpad.ac.id

Edwin Rizal
Faculty of Communication, Padjadjaran University, West Java, Indonesia
E-mail: edwin.rizal@unpad.ac.id

Ninis Agustini Damayani
Faculty of Communication, Padjadjaran University, West Java, Indonesia
E-mail: ninis.agustini@unpad.ac.id

Agus Rusmana
Faculty of Communication, Padjadjaran University, West Java, Indonesia
E-mail: a.rusmana@unpad.ac.id

ABSTRACT

Open science is widely promoted to enhance transparency, accessibility, and trust in scholarly communication, yet its adoption in Indonesia remains uneven and system-dependent. This study aims to identify the dominant barriers to open science adoption and examine how these barriers are configured across Pentahelix actors. Using a sequential mixed-methods design, the research combines a systematic literature review of peer-reviewed studies (2020-2024; n=58) with semi-structured interviews involving 20 stakeholders. The literature most frequently reports cultural resistance (28.4%), infrastructure limitations (19.8%), and lack of incentives (18.5%), suggesting that constraints extend beyond technical readiness. Interview findings indicate that governance and infrastructure constraints constitute the dominant barriers across actors, although their manifestation varies according to institutional roles and authority. The results show that governance and infrastructure shape how incentives and cultural norms translate into practice across the research ecosystem. Overall, barriers appear relational and systemic, emerging from cross-actor misalignment in governance execution, infrastructure sustainability, incentive signaling, and mediation capacity. The findings suggest that accelerating adoption requires coordinated yet differentiated interventions, including aligning incentive structures for open outputs, translating policy commitments into operational mechanisms, strengthening national research data governance, ensuring sustainable infrastructure support, and enhancing mediation capacity through collaboration with media and community intermediaries.

Keywords: open science, scholarly communication, open science adoption, institutional repositories, Pentahelix framework, Indonesia

Received: December 1, 2025 **Revised:** March 10, 2026
Accepted: March 14, 2026 **Published:** June 30, 2026

***Corresponding Author:** Suci Indrawati Irwan
https://orcid.org/0009-0004-7994-6575
E-mail: suci22006@mail.unpad.ac.id

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [Suci Indrawati Irwan, Edwin Rizal, Ninis Agustini Damayani, Agus Rusmana] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

Open science has emerged as a reform-oriented paradigm that addresses systemic challenges in research by promoting greater transparency, reproducibility, and accessibility throughout the entire research lifecycle (Pontika et al., 2015). While open science is widely promoted in policy discourse, its translation into practice varies substantially across research systems and is shaped by governance arrangements, infrastructure readiness, incentive alignment, and cross-actor coordination.

Scholarly communication is a core process through which scientific knowledge is produced, shared, assessed, and preserved over time. It encompasses the processes through which research outputs (journal articles, data, methods, and software) are created, validated, shared, and archived (Codina et al., 2023; Romary, 2011). While digital transformation has expanded dissemination channels and accelerated knowledge exchange, structural problems such as unreliable evaluation mechanisms, predatory publishing, risks of data manipulation, and infrastructural disparities remain embedded in many scholarly systems (Smart, 2022; Šobota, 2024). These challenges undermine trust in research outputs and limit the equitable circulation and reuse of scientific knowledge.

Recent developments in information science and science policy research highlight the importance of coordinated infrastructures and governance arrangements in enabling reliable and transparent scholarly communication. Empirical studies of national science and technology information systems demonstrate that effective scholarly communication depends on integrated data environments, robust research lifecycle management, and interoperable infrastructures (Kim & Hyun, 2025). Qualitative evidence further suggests that open science implementation is shaped not only by individual attitudes but also by institutional capacity, incentive alignment, and cross-actor coordination, particularly in how policies are translated into operational procedures and supported by usable technical systems.

However, while existing scholarship has produced extensive conceptual and policy-oriented discussions of open science, practice-oriented analyses that systematically connect implementation barriers across multiple actor groups and translate them into actionable intervention pathways remain limited. This gap is especially salient in national contexts where scholarly communication infrastructures and governance arrangements are still evolving, such as Indonesia, because adoption bottlenecks often arise from interactions among policy operationalization, infrastructure capacity, and incentive structures rather than from isolated technical or cultural constraints.

To address this gap, the present study examines open science adoption within Indonesia's scholarly communication system through a multi-actor governance perspective. The study integrates a systematic literature review (SLR) with qualitative interviews and applies the Pentahelix model (Academia, Government, Business, Community, and Media) as an analytical lens. In this study, Pentahelix actors are treated as analytical categories, and their perspectives are empirically captured through interviews with individuals representing each actor category. The scope of analysis is limited to identifying and interpreting implementation barriers and cross-actor solution pathways related to open science practices within the scholarly communication system; it does not evaluate the performance of specific technologies or assess research outcomes.

Accordingly, this study seeks to develop a structured understanding of barriers to implementing open science and potential solutions by integrating evidence from the literature with practitioner perspectives. Three research questions guide the analysis:

RQ1. What challenges to open science implementation are identified in the scholarly literature?

RQ2. How do barriers to open science adoption manifest across Pentahelix actor categories, as reflected in interview evidence?

RQ3. What integrated, cross-actor solutions emerge from the literature and interview data to enhance the sustainability and transparency of scholarly communication systems?

2. CONCEPT OF OPEN SCIENCE

Open science comprises a set of principles and practices intended to enhance transparency, accessibility, and reusability across the research lifecycle. It spans multiple dimensions (open access to publications, open research data, and open methods) while also including related approaches like open peer review and, in some contexts, citizen engagement (Bertram et al., 2023; Klebel et al., 2025; Pontika et al., 2015). In this study, "open science implementation" is understood not as endorsement in principle, but as the practical integration of these dimensions into routine research and institutional workflows.

Within scholarly communication systems, open science reshapes how research outputs are disseminated,

evaluated, and preserved. Open access challenges subscription-based dissemination models, while open data and open methods extend scholarly communication beyond articles to include datasets, protocols, and software (Rodés-Bachs et al., 2025). Consequently, repositories, metadata standards, persistent identifiers, licensing practices, and interoperability become central components of implementation that link research production to long-term preservation and reuse (Taşkın, 2026).

Importantly, open science adoption is not solely a technical matter. Prior studies show that implementation depends on institutional policies and governance capacity, including the translation of policy into operational procedures (e.g., deposit requirements, data management guidance, and compliance monitoring), the availability of organizational support (e.g., data stewardship and training), and alignment with incentive structures and legal–ethical constraints (Cuevas Shaw et al., 2022; González-Teruel et al., 2022; Ollé et al., 2023). Likewise, repositories and data infrastructures require sustained funding, human resources, and cross-organizational coordination to remain usable and trusted over time (Armeni et al., 2021; Klebel et al., 2025).

Consistent with this literature, the present study conceptualizes open science as a governance challenge embedded within a broader scholarly communication system rather than as a discrete set of technical practices (Cruz Romero, 2025; Cudennec et al., 2022). The Pentahelix model is used to examine how barriers and responsibilities are distributed across academia, government, business, community, and media actors, and how coordinated interventions across these actor categories can support more sustainable and transparent implementation (González-Teruel et al., 2022).

3. LITERATURE REVIEW

Scholarly communication has long been conceptualized within information science as a socio-technical system through which scientific outputs are created, organized, validated, and made accessible (Garvey, 2014; Lopes et al., 2019). Traditionally governed by formal written conventions, peer-review structures, and disciplinary norms, this system has been constrained by subscription-based business models, limited methodological transparency, and uneven opportunities for participation (O'Sullivan et al., 2021; Sawant, 2012). These constraints align with broader findings in information systems research, which show that fragmented data infrastructures, insufficient interoperability, and uneven institutional capabilities hinder effective knowledge sharing. Analyses of national STI systems, for example, reveal the importance of integrated datasets, standardized metadata, and coordinated information governance to support transparent scientific communication (Kim & Hyun, 2025).

Within this literature, open science has been widely promoted as a corrective paradigm designed to enhance openness, accountability, and inclusivity in research practices. The open science ecosystem includes open access publishing, open data, reproducible methods, open peer review, transparent metrics, supportive policy frameworks, and enabling digital tools (Pontika et al., 2015). Across the reviewed studies, these practices collectively reshape scholarly communication by expanding discoverability, improving verification, and supporting cross-disciplinary collaboration (Hayashi, 2021; Tsakonas, 2021). Empirical evidence consistently links open science with increased citation impact, broader dissemination, reduced redundancy, and more efficient research cycles (Piwowar et al., 2007; Piwowar & Vision, 2013; Rodriguez-Pomeda et al., 2023).

Across the studies synthesized in the SLR, institutional repositories (IRs) emerge as a fundamental component of the open science ecosystem. Prior research demonstrates that improving repository interfaces, automating deposit workflows, and enhancing metadata quality can significantly increase the adoption of green open access. Gualo et al. (2023) highlight that master data repositories require rigorous quality frameworks, certification processes, and adherence to International Organization for Standardization/International Electrotechnical Commission standards to ensure trust, accuracy, and reusability in open science ecosystems. In this study, these issues are analytically coded as infrastructure limitations and technical barriers in the adoption of open science (see Table 1) (Altman et al., 2023; Arthur & Hearn, 2021; Avissar-Whiting et al., 2021; Bornmann et al., 2021; Camkin et al., 2022; Chiware, 2020; Ciriminna et al., 2021; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Fox et al., 2021; Guirlet & Schneider, 2024; Haim & Jungblut, 2023; Hauschke et al., 2021; Hofmann, 2022; Ignat & Ayris, 2020; Ignat et al., 2021; Kwasnicka et al., 2021; Lee & Chung, 2023; Lee et al., 2023; Loureiro Cardoso et al., 2024; Lui et al., 2022; Manghi et al., 2020; Muneja, 2023; Mwangi et al., 2021; Nüst & Eglen, 2021; Peeters, 2021; Ramachandran et al., 2021; Rao et al., 2022; Reiter-Pázmándy, 2021; Rodriguez-Pomeda et al., 2023; Šobota, 2024; Thaldar et al., 2023; Toribio-Flórez et al., 2021; Vuong et al., 2020; Yu et al., 2024; Zarghani et

 https://doi.org/10.1633/JISTaP.2026.14.2.4

Table 1. Open science challenges in scholarly communication

No.	Challenges	Frequency	Percentage (%)	Article
1	Cultural resistance	23	28.4	Altman et al., 2023; Arthur & Hearn, 2021; Avissar-Whiting et al., 2021; Ciriminna et al., 2021; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Fox et al., 2021; Guirlet & Schneider, 2024; Haim & Jungblut, 2023; Hofmann, 2022; Ignat & Ayris, 2020; Kwasnicka et al., 2021; Loureiro Cardoso et al., 2024; Lui et al., 2022; Muneja, 2023; Mwangi et al., 2021; Nüst & Eglen, 2021; Peeters, 2021; Ramachandran et al., 2021; Reiter-Pázmándy, 2021; Rodriguez-Pomeda et al., 2023; Šobota, 2024; Zarghani et al., 2023
2	Infrastructure limitations	16	19.8	Altman et al., 2023; Arthur & Hearn, 2021; Bornmann et al., 2021; Camkin et al., 2022; Guirlet & Schneider, 2024; Hauschke et al., 2021; Ignat et al., 2021; Lee & Chung, 2023; Lee et al., 2023; Manghi et al., 2020; Muneja, 2023; Nüst & Eglen, 2021; Ramachandran et al., 2021; Rao et al., 2022; Yu et al., 2024; Zarghani et al., 2023
3	Lack of incentives	15	18.5	Arthur & Hearn, 2021; Bornmann et al., 2021; Camkin et al., 2022; Chiware, 2020; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Guirlet & Schneider, 2024; Hofmann, 2022; Lee et al., 2023; Lui et al., 2022; Mwangi et al., 2021; Peeters, 2021; Rao et al., 2022; Reiter-Pázmándy, 2021; Šobota, 2024
4	Technical barriers	9	11.1	Altman et al., 2023; Bornmann et al., 2021; Chiware, 2020; Delikoura & Kouis, 2021; Hauschke et al., 2021; Lui et al., 2022; Nüst & Eglen, 2021; Peeters, 2021; Yu et al., 2024
5	Legal issues	6	7.4	Loureiro Cardoso et al., 2024; Manghi et al., 2020; Mwangi et al., 2021; Ramachandran et al., 2021; Thaldar et al., 2023; Toribio-Flórez et al., 2021
6	Data quality	5	6.2	Chiware, 2020; Ignat & Ayris, 2020; Kwasnicka et al., 2021; Lee & Chung, 2023; Zarghani et al., 2023
7	Data privacy	4	4.9	Ignat & Ayris, 2020; Lui et al., 2022; Mwangi et al., 2021; Thaldar et al., 2023
8	Other	3	3.7	Avissar-Whiting et al., 2021; Guirlet & Schneider, 2024; Vuong et al., 2020

Percentages are calculated based on total coded barrier instances (N=81), not the number of reviewed articles (n=58).

al., 2023).

The SLR reveals that barriers to open science adoption cluster into several recurring categories, indicating that adoption challenges are widespread and multilayered. These categories include technical barriers (e.g., limited digital infrastructure, insufficient metadata standards, and unclear licensing arrangements), socio-economic constraints (such as high article processing charges, predatory journals, and inadequate institutional funding), and behavioral and cultural barriers (including low digital literacy, resistance to data sharing, and disciplinary norms) (Borges et al., 2021; Ignat & Ayris, 2020; Vuong et al., 2020). Empirical evidence further demonstrates that the presence of formal policy frameworks alone does not guarantee effective implementation. For example, Borrego (2016)'s analysis of Spanish open access mandate compliance shows that only 58.4% of publicly funded articles are available as open access, with minimal use of IRs despite permissive publisher policies. These patterns form the basis for the barrier categories summarized in Table 1 (Altman et al., 2023; Arthur & Hearn, 2021; Avissar-Whiting et al., 2021; Bornmann et al., 2021; Camkin et al., 2022; Chiware, 2020; Ciriminna et al., 2021; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Fox et al., 2021; Guirlet & Schneider, 2024; Haim & Jungblut, 2023; Hauschke et al., 2021; Hofmann, 2022; Ignat & Ayris, 2020; Ignat et al., 2021; Kwasnicka et al., 2021; Lee & Chung, 2023; Lee et al., 2023; Loureiro Cardoso et al., 2024; Lui et al., 2022; Manghi et al., 2020; Muneja, 2023; Mwangi et al., 2021; Nüst & Eglen, 2021; Peeters, 2021; Ramachandran et al., 2021; Rao et al., 2022; Reiter-Pázmándy, 2021; Rodriguez-Pomeda et al., 2023; Šobota, 2024; Thaldar et al., 2023; Toribio-Flórez et al., 2021; Vuong et al., 2020; Yu et al., 2024; Zarghani et al., 2023).

Beyond the direct technical and cultural barriers identified in the literature, institutional dynamics emerge as a critical determinant of open science outcomes. Brinks et al. (2019) argue that institutional weakness (manifested in noncompliance, instability, or weak enforcement) undermines policy effectiveness across many governance systems. When applied to open science, this perspective suggests that policy mandates alone are insufficient

without supporting enforcement mechanisms, sustained cross-actor coordination, and resilient information infrastructures. Empirical findings from *Journal of Information Science Theory and Practice* further indicate that adoption behaviors are shaped by organizational pressures and structural conditions, as demonstrated in studies on environmental compliance and information-intensive workforce ecosystems (Mubdir et al., 2025; Tipsena et al., 2025). In this study, such governance-related constraints are analytically examined as cross-cutting barriers that manifest differently across Pentahelix actors.

Well-known approaches like the Triple Helix and Quadruple Helix models (Carayannis & Campbell, 2010; Etzkowitz & Leydesdorff, 2000) provide foundational perspectives on innovation ecosystems but do not fully address the civic and media dimensions pertinent to open science. The Pentahelix framework extends these models by incorporating academia, government, business, community, and media, providing a more comprehensive analysis of how multi-actor interactions shape knowledge ecosystems (Tonković et al., 2015). Within the open science context, the Pentahelix model is used in this study as an analytical structure to attribute identified barriers and solutions to specific actor roles, highlighting how adoption depends not only on individual researcher behavior but also on coordinated policies, digital infrastructures, societal engagement, and mediating institutions.

Taken together, the literature reveals a fragmented analytical landscape. Although open science principles and individual implementation challenges are well documented, fewer studies systematically integrate infrastructural, cultural, and policy-related dimensions across multiple actor groups using empirical synthesis. This study addresses this gap by synthesizing evidence from a SLR and qualitative interviews to develop a multi-actor, ecosystem-oriented understanding of open science implementation.

4. METHODOLOGY

This study employs a mixed-methods design, integrating SLR and semi-structured interviews. The combination of these methods strengthens methodological rigor by enabling triangulation and enhancing the credibility of findings. The SLR provides a structured overview of the existing knowledge base, highlights recurring challenges, and synthesizes global evidence on open science implementation in scholarly communication. Complementing the SLR, the semi-structured interviews provide contextualized, experience-based insights into how these challenges are encountered and negotiated by actors involved in research, repository management, governance, and science communication. Together, these methods support the development of a multi-actor, empirically grounded understanding of scholarly communication and open science adoption. The overall research design builds upon prior conceptualizations of an end-to-end scholarly communication system (Hidayat et al., 2025).

Fig. 1 presents the current study's analytical flow within a sequential mixed-methods design. The SLR was conducted first to identify recurring barrier categories and evidence patterns (RQ1). These findings informed the interview protocol and guided the subsequent semi-structured interviews, which examined how the identified barriers manifest across Pentahelix actors within the Indonesian scholarly communication system (RQ2). The SLR and interview findings were then integrated through the

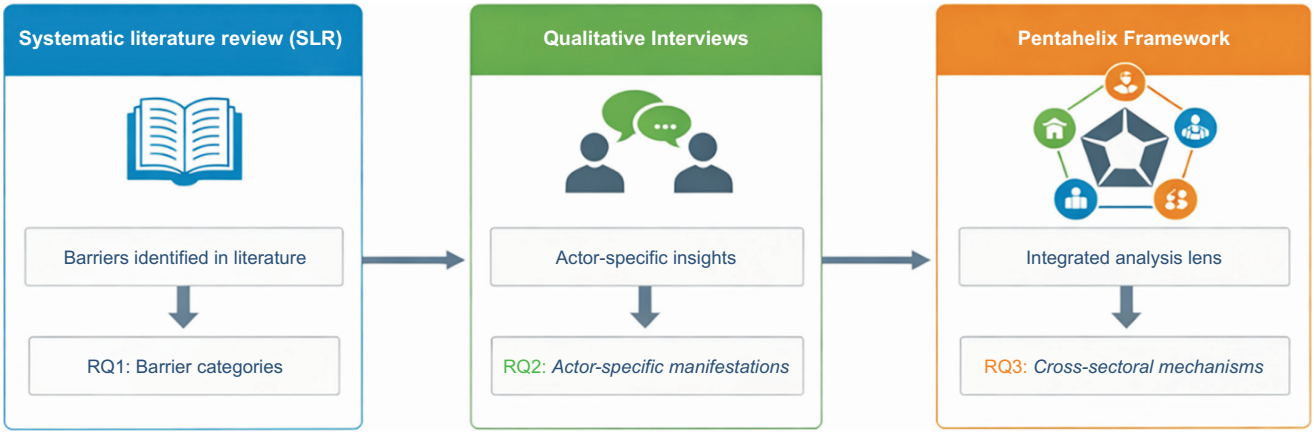


Fig. 1. Research design and analytical flow.

 https://doi.org/10.1633/JISTaP.2026.14.2.4

Pentahelix lens to synthesize cross-sectoral mechanisms and intervention pathways for strengthening open science adoption (RQ3). Arrows indicate the sequence of evidence generation and the points of integration across methods.

The study received ethical approval from the University of Padjadjaran Research Ethics Committee (ethics number: 1058/UN6.KEP/EC/2024). All interview participants provided informed consent, and the interview data were anonymized to safeguard confidentiality.

4.1. Systematic Literature Review Method

The SLR followed established guidelines for evidence synthesis (Kitchenham & Charters, 2007; Xiao & Watson, 2019). The planning phase involved formulating research questions and developing a review protocol to ensure transparency, reproducibility, and minimal bias. The PICOC framework (Population, Intervention, Comparison, Outcome, Context) was applied to guide the construction of search terms and to delimit the scope (Petticrew & Roberts, 2006). "Scholarly communication" served as the population, while "open science" constituted the intervention.

A comprehensive search strategy was developed using Boolean operators and keyword variations to maximize coverage while maintaining relevance (dos Santos et al., 2022). The final search string was constructed iteratively during the planning phase and applied consistently across all databases to ensure comparability of results:

("scholarly communication" OR "academic communication" OR "intellectual communication" OR "research communication" OR "scientific communication")

AND

("open science" OR "open access" OR "open data" OR "open peer review" OR "open reproducible research" OR "open science policies" OR "accessible science" OR "open science ethics" OR "open science evaluation" OR "open science tools" OR "public science")

Searches were conducted across three digital libraries (Emerald Insight, Scopus, and Taylor & Francis) selected for their broad coverage of scholarly communication, information science, and open science. Together, these databases capture both theoretical and applied studies relevant to the analytical focus of this review.

Explicit inclusion and exclusion criteria were applied. Eligible studies met the following conditions:

1. peer-reviewed journal articles

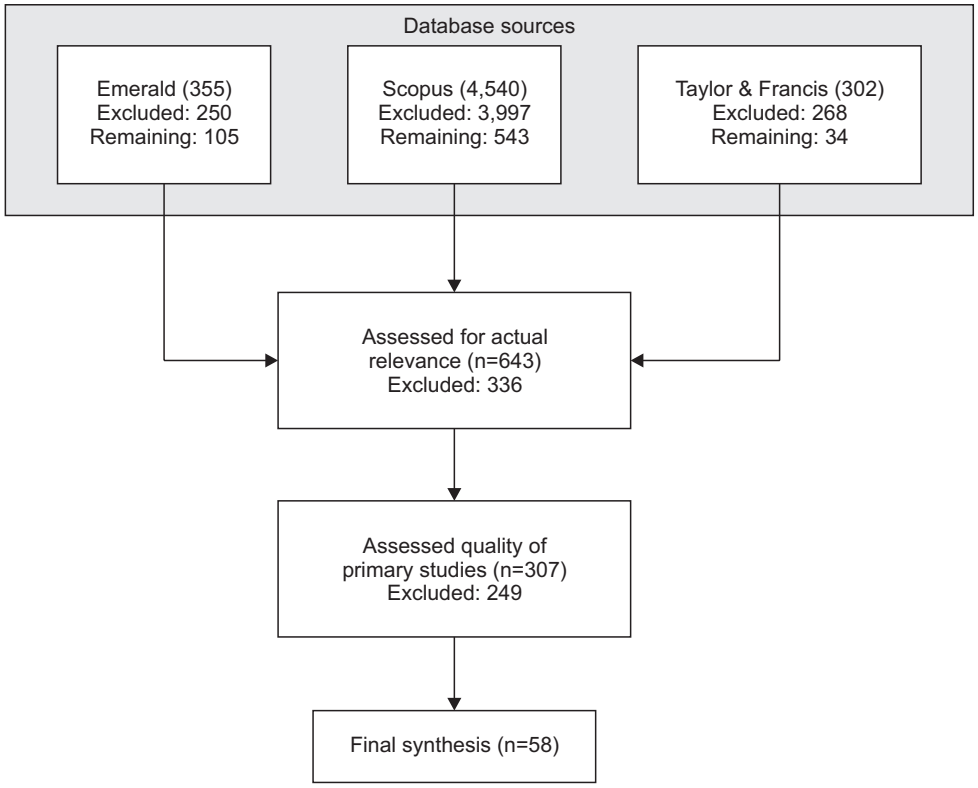


Fig. 2. The systematic literature review protocol.

2. published between 2020 and 2024
3. written in English
4. explicitly addressing both open science and scholarly communication

A quality assessment checklist adapted from Kitchenham & Charters (2007) evaluated each study on relevance, clarity, methodological robustness, and explanatory depth. Articles scoring below 2.1 out of 3 (70%) were excluded to preserve rigor. A structured, piloted extraction form ensured consistent data capture across studies.

During the conducting phase, the search string was executed across selected databases, followed by title, abstract, and full-text screening. Quality-eligible studies (n=58) were synthesized using thematic aggregation. Challenges were categorized broadly, while contextual variations in barriers were retained to preserve institutional and national specificity. The overall SLR workflow is illustrated in Fig. 2.

4.2. Interview Method

Respondents were recruited through official email invitations and professional networks. All participants provided informed consent before taking part in the study. Twenty participants who met the inclusion criteria were interviewed. Eligibility criteria included (1) prior experience in scholarly publication (journal articles, conference proceedings, or research data outputs), (2) engagement with IRs, and (3) involvement in, or awareness of, open science initiatives.

Table 2 summarizes participants' roles within the scholarly communication system, including university lecturers and researchers, repository managers, government-affiliated research and information professionals, technology service providers, and open science communication intermediaries. Participants were affiliated with public and private universities, national research institutions, and government-related organizations across both Java and non-Java regions, spanning diverse disciplinary backgrounds.

Table 2. Demographic characteristics of respondents

No.	Initial	Gender	Actor category	Role	Region
1	WD	M	Academia	Scientist	Banten, Indonesia
2	RY	W	Academia	Scientist	West Java, Indonesia
3	AB	M	Academia	Scientist	West Java, Indonesia
4	RH	W	Academia	Lecturer	West Java, Indonesia
5	AN	M	Academia	Lecturer	West Java, Indonesia
6	YM	M	Academia	Scientist	West Java, Indonesia
7	TK	W	Academia	Lecturer	South Sumatra, Indonesia
8	IS	W	Academia	Scientist	North Maluku, Indonesia
9	PR	M	Academia	Lecturer	West Java, Indonesia
10	SM	W	Government	Government	DKI Jakarta, Indonesia
11	WR	M	Government	Government	DKI Jakarta, Indonesia
12	ED	M	Government	Government	DKI Jakarta, Indonesia
13	CH	M	Government	Government	DKI Jakarta, Indonesia
14	MD	W	Community	OS communicator	London, United Kingdom
15	DS	M	Media	OS communicator	West Java, Indonesia
16	DN	W	Government	Ministry repository manager	DKI Jakarta, Indonesia
17	AL	M	Government	Ministry repository manager	DKI Jakarta, Indonesia
18	YD	M	Academia	University repository manager	West Java, Indonesia
19	SN	M	Academia	University repository manager	DKI Jakarta, Indonesia
20	DF	M	Business	Tech information technology specialist	Banten, Indonesia

M, man; W, woman; DKI, Daerah Khusus Ibukota (Special Capital Region of Jakarta); OS, open science.

 https://doi.org/10.1633/JISTaP.2026.14.2.4

Sampling followed a purposive maximum-variation strategy to capture heterogeneity across actor roles and institutional contexts. Initial thematic saturation was observed after approximately ten interviews; additional interviews were conducted to broaden actor coverage and confirm the stability of emerging themes. Interviews were conducted either via video conferencing platforms or in person, depending on participant availability, and lasted approximately 40-60 minutes. With participants' consent, interviews were audio-recorded and transcribed verbatim. All interviews were conducted in Bahasa Indonesia.

Data analysis followed a two-stage coding process. First, transcripts were coded inductively to identify recurring barriers, practices, and implementation challenges. Second, the resulting codes were mapped deductively to Pentahelix actor categories to examine how similar barriers manifested differently depending on institutional role, authority, and proximity to policy implementation and technical infrastructure. The Pentahelix framework therefore served as an interpretive lens for tracing actor-dependent mechanisms and relational dynamics, rather than as a prescriptive governance model.

5. RESULTS

5.1. Challenges in the Implementation of Open Science

The results of the SLR indicate that the most critical challenges in implementing open science within the context of scholarly communication are cultural resistance (28.4%), infrastructure limitations (19.8%), and lack of incentives (18.5%). These findings suggest that barriers to adoption extend beyond technical constraints and are closely associated with academic culture and institutional incentive structures. A detailed overview of the frequency and percentage distribution of the identified challenges is provided in Table 1 (Altman et al., 2023; Arthur & Hearn, 2021; Avissar-Whiting et al., 2021; Bornmann et al., 2021; Camkin et al., 2022; Chiware, 2020; Ciriminna et al., 2021; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Fox et al., 2021; Guirlet & Schneider, 2024; Haim & Jungblut, 2023; Hauschke et al., 2021; Hofmann, 2022; Ignat & Ayris, 2020; Ignat et al., 2021; Kwasnicka et al., 2021; Lee & Chung, 2023; Lee et al., 2023; Loureiro Cardoso et al., 2024; Lui et al., 2022; Manghi et al., 2020; Muneja, 2023; Mwangi et al., 2021; Nüst & Eglen, 2021; Peeters, 2021; Ramachandran et al., 2021; Rao et al., 2022; Reiter-Pázmándy, 2021; Rodriguez-Pomeda et al., 2023; Šobota, 2024; Thaldar et al., 2023; Toribio-Flórez et al., 2021; Vuong et al., 2020; Yu et al., 2024; Zarghani et al., 2023), while their overall distribution is illustrated in Fig. 3.

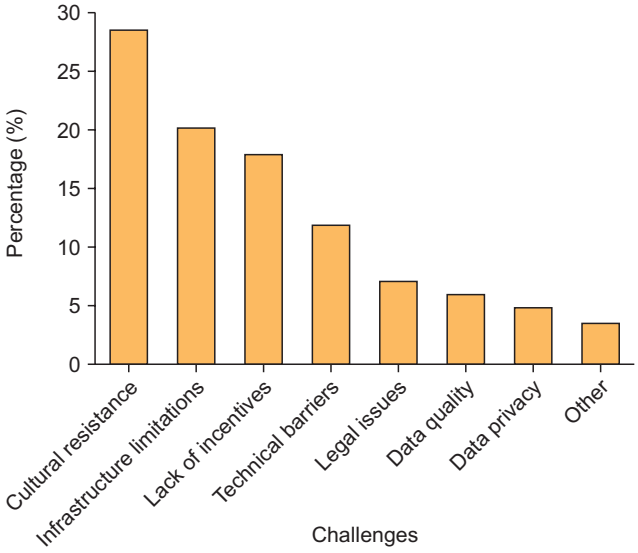


Fig. 3. Distribution of open science barriers identified in the systematic literature review.

More specifically, cultural resistance emerges as the most frequently identified barrier, accounting for 28.4% of reported challenges. This category encompasses limited awareness, divergent interpretations of openness, and reluctance among researchers and institutions to adopt open practices. Infrastructure limitations represent the second most frequently reported challenge (19.8%), reflecting insufficient technological capacity, weak support systems, and constrained financial resources for sustainable implementation. Lack of incentives (18.5%) constitutes the third major barrier, highlighting the absence of recognition and reward mechanisms that would encourage engagement with open science practices.

In addition to these dominant challenges, several other barriers were identified in the literature. Technical barriers (11.1%) include interoperability issues and limited integration of digital systems. Legal issues (7.4%) reflect uncertainties related to copyright, licensing, and intellectual property rights, while data quality concerns (6.2%) highlight difficulties in ensuring the accuracy, reliability, and reproducibility of research data.

Taken together, these findings illustrate the multidimensional nature of open science adoption challenges identified through the SLR. While this section addresses RQ1 by mapping the distribution of barriers in the literature, the following section advances the analysis by examining how these challenges manifest across specific

actor groups within the Pentahelix ecosystem, drawing on interview data (RQ2).

5.2. Barriers Based on the Pentahelix Framework

Building on the barrier categories identified through the SLR (RQ1), the interview findings illuminate how these challenges are experienced and enacted by different actors within the Pentahelix ecosystem. Rather than appearing uniformly, barriers manifest in actor-specific forms shaped by institutional roles, degrees of authority, and proximity to infrastructure and policy implementation. The following sections present these dynamics across the five Pentahelix actor categories: academia, government, business and technology, community, and media.

5.2.1. Academia

Within academia, barriers to open science adoption emerge from a combined dominance of governance and infrastructure constraints, reinforced by cultural norms related to ownership, risk, and trust. Ethical motivations for openness were articulated by several participants (P06:YM5). However, actual engagement often remained conditional and situational, shaped by project requirements, funder expectations, and institutional directives rather than intrinsic commitment (P03:AB10; P02:RY02). Data sharing was frequently described as informal and restricted to trusted circles, reflecting persistent cultural norms around control and reputational risk (P01:WD03).

At the institutional level, governance arrangements strongly mediate academic participation. University lecturers emphasized that rector-level regulations or formal leadership endorsement are often prerequisites for systematic engagement with repositories and open platforms (P05:AN01). Compliance-oriented practices were evident, with some participants indicating that open science activities become salient primarily when clearly embedded in institutional rules or evaluation mechanisms (P04:RH03). Forward-looking views framed open science as a strategy for increasing research visibility and impact, particularly through established platforms perceived as reliable and secure. One participant noted that repositories can enhance access to scholarly literature and increase citation potential (P08:IS11), while another expressed a clear preference for established global platforms, stating, "For manuscripts, I prefer arXiv" (P09:PR09).

Infrastructure-related barriers further reinforce these governance and cultural dynamics. Academic repository managers highlighted weak interoperability arrangements and the absence of formal agreements with national repositories as major constraints on data flow and reuse (P19:SN5). Unclear institutional regulations were also reported to limit enforcement capacity, generating hesitation in mandating deposits (P18:YD08). Collectively, these findings indicate that academic barriers are not primarily incentive-driven, but are rooted in the interaction between governance mechanisms, infrastructural alignment, and entrenched cultural practices, consistent with the salience patterns shown in Fig. 4.

5.2.2. Government

At the governmental level, barriers are characterized by the co-dominance of governance and infrastructure constraints, particularly in relation to policy operationalization and implementation capacity. Participants involved in national policy formulation and library coordination described ongoing efforts to harmonize institutional practices through working groups and inter-agency forums (P10:SM4), as well as initiatives to formalize repository networks via ministerial regulations (P11:WR08, WR09). However, these policy instruments have yet to translate into consistent compliance across institutions.

Operational challenges were especially salient among repository administrators, who described curation, verification, and long-term maintenance as resource-intensive processes that limit scalability (P12:ED11). Infrastructure fragility was further underscored by accounts of system restrictions or temporary closures due to security con-

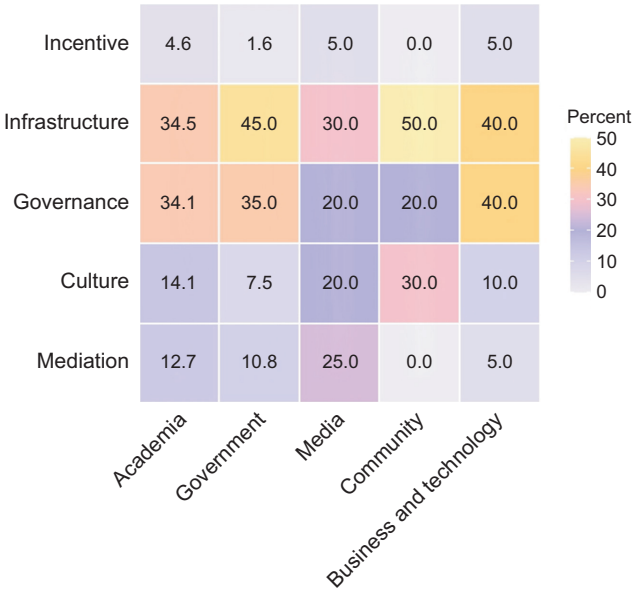


Fig. 4. Heatmap actor-specific barrier salience across the Pentahelix framework.

cerns and technical limitations (P17:AL8). Although incentive-based mechanisms (linking repository deposit to performance indicators) were reported as emerging, their implementation remains uneven and secondary to structural constraints (P16:DN17).

From a governance perspective, respondents emphasized the absence of a fully integrated national research data management framework. The lack of a consolidated consortium for research data governance was cited as a barrier to standardization, interoperability, and long-term sustainability (P13:CH13, CH19). Overall, governmental barriers reflect not a lack of policy intent, but fragmented execution, limited enforcement capacity, and uneven infrastructural readiness, aligning with the strong governance and infrastructure salience observed in Fig. 4.

5.2.3. Business and Technology Sector

In the business and technology sector, barriers are primarily concentrated around infrastructure sustainability and governance integration, rather than cultural or incentive-related factors. Based on the limited interview evidence from the business and technology sector, the technology service provider involved in this study emphasized that engagement with open science initiatives is largely project-based and contingent on short-term collaboration agreements (P20:DF10, DF19). This limits the sector's ability to provide sustained technical support, system maintenance, and long-term innovation.

While technological actors possess critical expertise for addressing infrastructure-related challenges, their role within the open science ecosystem remains peripheral and weakly institutionalized. Limited integration into governance structures constrains their capacity to influence standards, interoperability decisions, or long-term platform strategies. As reflected in Fig. 4, the salience of governance and infrastructure barriers in this sector highlights the gap between technical capability and institutional embedding.

5.2.4. Community Actors

Interview evidence from the community actor included in this study suggests that barriers to open science engagement were experienced primarily through infrastructure and cultural constraints, particularly in relation to access, reuse, and the recognition of non-academic knowledge practices. Participants emphasized the practical difficulties of engaging with open science infrastructures, including challenges related to interoperability, reliability, and sustained access to reusable research outputs. These constraints limit communities' ability to meaningfully reuse data and participate in knowledge production.

Cultural barriers further shape community engagement. Participants highlighted the persistence of expert-centric norms and limited recognition of non-academic knowledge practices, which restrict the integration of community actors into open science workflows. Governance-related gaps (particularly the lack of clear procedural guidance at the implementation level) were noted as contextual constraints that exacerbate infrastructural and cultural barriers (P14:MD4). As visualized in Fig. 4, the community perspective represented in this study was most strongly associated with barriers linked to infrastructure readiness and reuse practices, rather than with mediation capacity itself.

5.2.5. Media Actors

Based on the limited interview evidence from the media actor included in this study, the most salient barriers were located in the domain of mediation, alongside significant infrastructure and governance constraints. Participants emphasized limited operational clarity for dissemination and engagement, noting that existing policies provide little guidance for platform-level communication and public-facing translation of research outputs (P15:DS16, DS18). These gaps constrain media actors' ability to contextualize research for non-specialist audiences and to sustain trust-building communication around open science.

Infrastructure fragility and governance ambiguity further shape these mediation challenges. Technical vulnerability affects platform reliability and visibility, while unclear institutional responsibilities limit long-term planning and investment. As shown in Fig. 4, the media perspective represented in this study occupies a distinct intermediary position within the Pentahelix, in which mediation barriers appear especially pronounced but remain closely coupled with infrastructural and governance limitations.

Fig. 4 summarizes the actor-specific salience of open science adoption barriers across the Pentahelix framework. Color intensity indicates the relative salience (percentage) of five aggregated barrier categories (incentives, infrastructure, governance, culture, and mediation) derived from thematic coding of interview transcripts. Governance- and infrastructure-related barriers cut across all actors, indicating system-level constraints in policy operationalization and technical readiness. Beyond these shared challenges, barrier configurations vary by actor, underscoring the relational and actor-dependent nature of

open science adoption. The following section synthesizes these findings to identify cross-sectoral intervention pathways (RQ3).

5.3. Cross-Sectoral Solutions and Mechanisms for Strengthening Open Science Adoption

Building on the dominant barriers identified through the SLR, particularly lack of incentives, cultural resistance, and infrastructure limitations (RQ1; Table 1 [Altman et al., 2023; Arthur & Hearn, 2021; Avissar-Whiting et al., 2021; Bornmann et al., 2021; Camkin et al., 2022; Chiware, 2020; Ciriminna et al., 2021; Craft & Harlow, 2020; Delikoura & Kouis, 2021; Fox et al., 2021; Guirlet & Schneider, 2024; Haim & Jungblut, 2023; Hauschke et al., 2021; Hofmann, 2022; Ignat & Ayris, 2020; Ignat et al., 2021; Kwasnicka et al., 2021; Lee & Chung, 2023; Lee et al., 2023; Loureiro Cardoso et al., 2024; Lui et al., 2022; Manghi et al., 2020; Muneja, 2023; Mwangi et al., 2021; Nüst & Eglen, 2021; Peeters, 2021; Ramachandran et al., 2021; Rao et al., 2022; Reiter-Pázmándy, 2021; Rodriguez-Pomeda et al., 2023; Šobota, 2024; Thaldar et al., 2023; Toribio-Flórez et al., 2021; Vuong et al., 2020; Yu et al., 2024; Zarghani et al., 2023] and Fig. 3) and their actor-specific manifestations revealed by the interview findings (RQ2), this section synthesizes cross-sectoral mechanisms and intervention pathways that may strengthen the sustainability and transparency of scholarly communication. Rather than introducing new empirical evidence, this analysis integrates patterns observed across the literature and interviews through the analytical lens of the Pentahelix framework. While incentive misalignment remains visible across the literature, the interview findings (RQ2) indicate that governance and infrastructure constraints constitute the most persistent system-level barriers across Pentahelix actors, shaping the conditions under which incentives, mediation, and cultural change can operate.

5.3.1. Incentive Reconfiguration as a Cross-Cutting Mechanism

Misaligned incentive structures emerge as an enabling constraint that conditions engagement with open science, rather than as a standalone determinant of adoption. As shown in the SLR results, the lack of incentives is among the most frequently reported barriers. Interview findings further indicate that, in practice, open science activities are often framed as administrative obligations rather than as integral research practices. This dynamic is reflected in interview accounts in which repository deposit gains priority primarily when linked to formal performance evaluation, as noted by one government-affiliated repository manager: "Deposit data only becomes a priority when it is directly linked to performance indicators" (P16:DN15).

Taken together, these findings suggest that incentive reconfiguration (integrating open science outputs into research assessment, promotion criteria, and institutional performance indicators) functions as a key enabling mechanism across Pentahelix actors. However, the analysis also reveals an important boundary condition: Incentive-based approaches alone may encourage procedural compliance rather than substantive engagement if they are not accompanied by cultural change and adequate institutional support.

5.3.2. Governance Translation and Policy Operationalization

The synthesis of RQ1 and RQ2 highlights a persistent gap between policy articulation and operational implementation. While national and institutional open science policies provide an essential regulatory foundation, interview findings demonstrate that these instruments often lack technical specificity, enforcement mechanisms, and coordinated implementation across institutions. As a result, policy mandates tend to function symbolically rather than operationally.

Effective governance solutions, therefore, require translation mechanisms that connect high-level policy commitments to institutional practices. These include developing clear technical guidelines, standardized definitions of research data, and interoperable workflows between institutional and national repositories. The analysis indicates that enforcement mechanisms (conditional funding, reporting requirements, or audit procedures) are necessary to support implementation. Still, their effectiveness depends on parallel investments in institutional capacity and infrastructural readiness.

5.3.3. Infrastructure Stabilization and Capacity Building

Consistent with both the SLR and interview findings, infrastructural fragility remains a critical constraint on open science adoption. System instability, limited human resources, and uneven metadata practices undermine trust in repositories and discourage sustained engagement. The synthesis suggests that effective solutions in this domain extend beyond short-term technical fixes toward long-term capacity building, including professional training for repository personnel, sustainable funding models, and shared service arrangements across institutions.

The analysis further indicates that business and technology actors possess underutilized potential as contributors to system resilience. However, their involvement remains largely project-based and peripheral. Integrating these actors more systematically through public–private partnerships or service-level agreements may enhance infrastructural stability, while simultaneously introducing governance challenges related to accountability, data ownership, and long-term sustainability.

5.3.4. Mediation, Trust, and the Role of Media and Community Actors

The synthesis of interview findings underscores the importance of mediation and trust-building in addressing cultural resistance to open science. Media and community-based actors play a critical role in translating open science principles into accessible practices, clarifying misconceptions related to data misuse, and enhancing the visibility of open research outputs. However, their effectiveness is constrained by infrastructural vulnerabilities and limited institutional recognition.

The analysis suggests that strengthening mediation capacity (stable platform support, clearer policy mandates, and structured collaboration with academic and governmental actors) can mitigate perceived risks and foster greater trust in open science practices. This highlights a further boundary condition: Mediation efforts are unlikely to succeed in isolation if core governance arrangements and technical infrastructures remain unstable. For media actors, mediation functions as a primary operational role, whereas for community actors, mediation capacity is largely contingent upon infrastructure reliability and the feasibility of reuse practices.

5.3.5. Toward a Coordinated but Differentiated Pentahelix Strategy

Taken together, the integrated findings from RQ1 and RQ2 indicate that open science adoption cannot be achieved through single-actor or single-instrument interventions. Instead, it requires a coordinated but differentiated strategy in which each Pentahelix actor addresses barriers aligned with its institutional role and capacity. Academia plays a central role in normalizing practices and cultural change; government actors are pivotal in translating policy into practice and enforcing it; business and technology actors contribute technical expertise and infrastructural stability; and media and community actors facilitate mediation and trust-building.

To consolidate these mechanisms into a single analytical view of interdependencies and failure pathways, Fig. 5 maps the Pentahelix actors, the four intervention engines, and the two contrasting outcomes.

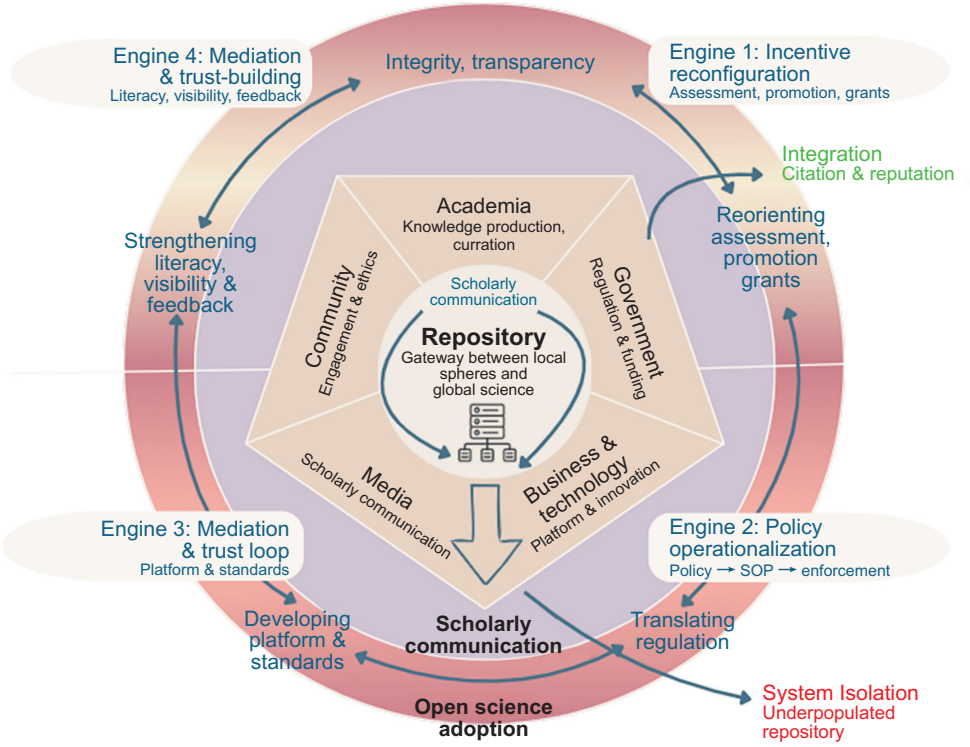


Fig. 5. Pentahelix actor collaboration model in open science. SOP, standard operating procedure.

Fig. 5 summarizes the RQ3 findings on why open science adoption through IRs often fails to stabilize, framing scholarly communication as the core operational flow that determines whether an IR becomes a pathway to integration or slips into isolation.

At the center of the diagram is the repository/IR positioned as a gateway between local scholarly practices inside the institution and the global science system. The pentagon represents the Pentahelix actors (Academia, Government, Business & Technology, Media, and Community) whose combined actions shape the sociotechnical conditions of adoption. The thick circular arrows emphasize that an IR is not merely a storage site but part of an autopoietic cycle of scholarly communication: knowledge production → dissemination/archiving → discoverability and reuse → citation and recognition → reputational reinforcement. In this view, an IR only becomes meaningful when it is enrolled in a living communication circuit rather than reduced to an administrative document deposit.

The outer ring depicts four intervention "engines" that correspond directly to the barriers highlighted in RQ3. Engine 1 (incentive reconfiguration) addresses the reputational logic: Without changes in assessment, promotion, and funding signals, repository deposition is not perceived as reputation-generating work. Engine 2 (policy operationalization) captures a recurring RQ3 bottleneck: Policies exist but are not translated into workable standard operating procedure, support routines, and enforcement mechanisms. Engine 3 (infrastructure stabilization) reflects technical impediments that produce stagnation (platform instability, weak metadata standards, low interoperability, and poor user experience) making self-archiving difficult to sustain. Engine 4 (mediation & trust-building) highlights socio-cultural constraints: literacy, visibility, communication, and feedback loops that cultivate trust. Without these, repositories remain peripheral to the community's actual communication practices.

The outcomes displayed on the right articulate two contrasting trajectories that answer RQ3. When repository-mediated communication is reintegrated into global circuits (indexed, discoverable, read, and cited), it produces integration in the form of citation and reputation, and the IR functions as an infrastructure of scientific communication. Conversely, when deposits remain disconnected from that circuit (through sparse content, weak standards, low visibility, and low trust), the IR moves toward 'system isolation': an underpopulated repository in which documents exist, but communication does not occur, resulting in a 'dead archive.'

Fig. 5 also reinforces that interventions must be aligned and sequenced across actors. Incentive reforms without infrastructure support, policies without operational translation, or mediation without technical reliability are unlikely to yield sustained change. Accordingly, the Pentahelix framework is used here as an analytical lens to identify interdependencies and to indicate which interventions should precede others to stabilize open science adoption within the scholarly communication ecosystem.

6. DISCUSSION

Rather than reiterating descriptive patterns, this discussion advances an explanatory account of how systemic misalignment across governance, infrastructure, and incentives conditions actor-specific adoption pathways. This study set out to identify key barriers to open science adoption and to examine how these barriers manifest across actors within the scholarly communication ecosystem using a combined SLR and interview-based analysis framed by the Pentahelix model. By integrating findings from the literature (RQ1), actor-specific interview insights (RQ2), and cross-sectoral synthesis (RQ3), the discussion advances understanding beyond descriptive mapping toward explanatory mechanisms and conditional intervention pathways. Across the three research questions, governance and infrastructure emerge as the most persistent system-level conditions shaping how other mechanisms (incentives, mediation, and cultural change) operate across actors.

6.1. From Isolated Barriers to Systemic Misalignment

A central contribution of this study lies in demonstrating that barriers to open science adoption are not isolated obstacles but manifestations of systemic misalignment across cultural, institutional, and infrastructural dimensions. The SLR results show that cultural resistance, lack of incentives, and infrastructure limitations consistently dominate the literature. Interview findings further reveal that these barriers are mutually reinforcing rather than independent. For example, weak incentive structures amplify cultural resistance, while infrastructural fragility undermines trust and discourages engagement even among actors who are normatively supportive of open science.

This interactional perspective helps explain why policy mandates and technical platforms alone have yielded uneven adoption outcomes, rather than reflecting individual reluctance or technical immaturity; stalled implementa-

tion results from misaligned expectations, responsibilities, and capacities across the scholarly communication system.

6.2. Incentives as a Mechanism Rather Than a Solution

The findings refine existing debates on incentives in open science by showing that incentives function as a *mechanism* rather than a standalone solution. Both literature and interviews indicate that incentive structures shape behavior primarily by redefining priorities within existing institutional logics. When open science practices are formally recognized in evaluation and reporting systems, participation increases; however, this compliance-oriented engagement often remains procedural.

This suggests an important boundary condition: Incentive reforms are most effective when combined with cultural normalization and infrastructural support. Without these complementary elements, incentives risk reinforcing minimal compliance rather than fostering substantive openness. This nuance contributes to ongoing discussions on responsible research assessment by highlighting the limits of metric-driven reforms. Importantly, the interview-based findings indicate that incentive mechanisms do not explain actor-level variation on their own, but instead operate within the constraints imposed by governance arrangements and infrastructural readiness.

6.3. Governance Gaps and the Challenge of Policy Translation

The study also sheds light on the persistent gap between policy articulation and operational implementation. Although open science policies are increasingly in place at both national and institutional levels, their translation into everyday practice remains inconsistent. Interview findings reveal that ambiguity surrounding data definitions, unclear enforcement mechanisms, and fragmented coordination across institutions weaken policy effectiveness.

Importantly, this does not imply policy failure per se. Rather, it points to the absence of intermediary governance mechanisms that connect high-level commitments to technical workflows and organizational routines. The findings suggest that governance effectiveness depends less on mandates' presence than on their operationalization through clear guidelines, interoperable infrastructure, and institutional capacity-building.

6.4. Infrastructure as a Trust-Building Condition

Consistent with prior research, infrastructure emerges not only as a technical prerequisite but also as a trust-building condition. System instability, limited human resources, and inconsistent metadata practices erode confidence among users and intermediaries alike. Interview findings indicate that infrastructural fragility disproportionately affects actors responsible for implementation and mediation, including repository managers and science communication platforms.

This highlights a critical trade-off: While infrastructure investments are often portrayed as costly, their absence incurs hidden costs, including reduced participation, reputational risk, and reliance on informal or external platforms. Sustainable open science adoption, therefore, requires long-term infrastructural commitments rather than short-term project-based solutions. This finding aligns with the actor-specific salience patterns observed in Fig. 4, where infrastructure-related barriers cut across all Pentahelix actors.

6.5. Repositioning Media and Community Actors in Scholarly Communication

By explicitly incorporating media and community-based actors into the analytical framework, this study extends conventional discussions of scholarly communication beyond academia and government. The findings show that science communication intermediaries play a crucial role in mediating openness, clarifying misconceptions, and enhancing visibility. However, their effectiveness is constrained by limited institutional recognition and infrastructural vulnerability.

This underscores the need to reconceptualize 'media' in open science not merely as channels of dissemination but as active intermediaries within the knowledge ecosystem. Strengthening their role requires both technical support and clearer integration into governance and policy frameworks. While mediation constitutes the primary operational barrier for media actors, community actors are constrained more fundamentally by infrastructural access and the feasibility of reuse practices, which condition their ability to engage meaningfully in open science.

6.6. Implications for the Pentahelix Framework

Methodologically, the study demonstrates the value of the Pentahelix framework as an analytical tool rather than a prescriptive model. By mapping barriers and mechanisms across actor roles, the framework enables identification of interdependencies and sequencing challenges that would remain obscured in single-actor analyses. The findings suggest that effective open science strategies must be

coordinated yet differentiated, recognizing that each actor operates under distinct constraints and capacities.

At the same time, the uneven representation of actors (business and media) highlights the importance of contextual interpretation when applying the Pentahelix model. Rather than assuming symmetry, the framework is most effective when used to interrogate imbalance and asymmetry within real-world systems. In this sense, the Pentahelix framework enables explanation not by symmetry, but by tracing how asymmetries in capacity, authority, and proximity to infrastructure shape adoption outcomes.

7. CONCLUSION

Open science adoption in Indonesia emerges less as a problem of isolated technical deficiency than as a systemic challenge of governance coordination across a multi-actor research ecosystem. Evidence from the literature and stakeholder interviews shows that barriers are relational rather than independent: They are produced through misalignments among governance execution, incentive structures, infrastructure sustainability, and mediation capacity, and they manifest differently across actor groups. This matters because it shifts the understanding of open science adoption away from a narrow focus on individual compliance or technical readiness toward the broader question of how institutional roles, authority, and interactor coordination shape implementation outcomes. In this sense, the study shows that uneven adoption is not simply a sign of weak commitment, but a consequence of uneven capacity to translate policy aspirations into operational practice.

Analytically, the study demonstrates the value of the Pentahelix framework as a lens for identifying interdependencies and sequencing interventions, rather than treating it as a prescriptive governance model. The findings suggest that progress in open science adoption depends on coordinated yet differentiated action across actors, particularly in incentive realignment, policy operationalization, research data governance, infrastructure stabilization, and trust-building mediation. At the same time, these conclusions remain bounded by uneven actor representation and the review's focus on recent English-language literature. Further comparative and longitudinal research is therefore needed to clarify how collaborative governance arrangements evolve over time and under what conditions they can support sustainable open science implementation.

8. LIMITATIONS AND FUTURE RESEARCH

Several limitations should be acknowledged. First, while the interview sample captures all Pentahelix components, representation across actor categories remains uneven, reflecting the structure of the national scholarly communication system rather than proportional equivalence. Second, the SLR focused on English-language journal articles published between 2020 and 2024, potentially underrepresenting locally grounded or non-indexed perspectives. Future research could extend this analysis through longitudinal designs, comparative national studies, or deeper engagement with industry and media actors.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the National Library of Indonesia for providing access to Indonesia One Search (IOS) data, which supported this study. The authors also thank the University of Padjadjaran for its institutional support throughout the research process.

REFERENCES

Altman, M., Cohen, P. N., & Polka, J. (2023). Interventions in scholarly communication: Design lessons from public health. *First Monday*, 28(8). https://doi.org/10.5210/fm.v28i8.12941

Armeni, K., Brinkman, L., Carlsson, R., Eerland, A., Fijten, R., Fondberg, R., Heininga, V. E., Heunis, S., Koh, W. Q., Masselink, M., Moran, N., Baoill, A. Ó., Sarafoglou, A., Schettino, A., Schwamm, H., Sjoerds, Z., Teperek, M., van den Akker, O. R., van't Veer, A., & Zurita-Milla, R. (2021). Towards wide-scale adoption of open science practices: The role of open science communities. *Science and Public Policy,* 48(5), 605-611. https://doi.org/10.1093/scipol/scab039

Arthur, P. L., & Hearn, L. (2021). Reshaping how universities can evaluate the research impact of open humanities for societal benefit. *The Journal of Electronic Publishing*, 24(1). https://doi.org/10.3998/jep.788

Avissar-Whiting, M., Bakker, C., Heckner, H., Massip, S., Schneider, J., Townsend, R., & Woods, N. D. (2021). Addressing disorder in scholarly communication: Strategies from NISO Plus 2021. *Information Services & Use,* 41(1-2),

107-121. https://doi.org/10.3233/isu-210113

Bertram, M. G., Sundin, J., Roche, D. G., Sánchez-Tójar, A., Thoré, E. S. J., & Brodin, T. (2023). Open science. *Current Biology,* 33(15), R792-R797. https://doi.org/10.1016/j.cub.2023.05.036

Borges, G. C., dos Reis, J. C., & Medeiros, C. B. (2021). *Addressing search in scientific open data repositories: A semantic metasearch platform*. Paper presented at Proceedings of the 15th Brazilian e-Science Workshop, online.

Bornmann, L., Guns, R., Thelwall, M., & Wolfram, D. (2021). Which aspects of the open science agenda are most relevant to scientometric research and publishing? An opinion paper. *Quantitative Science Studies,* 2(2), 438-453. https://doi.org/10.1162/qss_e_00121

Borrego, Á. (2016). Measuring compliance with a Spanish Government open access mandate. *Journal of the Association for Information Science and Technology*, 67(4), 757–764. https://doi.org/10.1002/asi.23422

Brinks, D. M., Levitsky, S., & Murillo, M. V. (2019). *Understanding institutional weakness: Power and design in Latin American institutions*. Cambridge University Press.

Camkin, J., Neto, S., Bhattarai, B., Ojha, H., Khan, S., Sugiura, A., Lin, J., Nurritasari, F. A., & Karanja, J. M. (2022). Open science for accelerating the sustainable development goals: Status and prospects in Asia and the Pacific. *Frontiers in Political Science*, 4, 878761. https://doi.org/10.3389/fpos.2022.878761

Carayannis, E. G., & Campbell, D. F. J. (2010). Triple Helix, Quadruple Helix and quintuple helix and how do knowledge, innovation and the environment relate to each other? *International Journal of Social Ecology and Sustainable Development,* 1(1), 41-69. https://doi.org/10.4018/jsesd.2010010105

Chiware, E. R. T. (2020). Open research data in African academic and research libraries: A literature analysis. *Library Management*, 41(6-7), 383-399. https://doi.org/10.1108/lm-02-2020-0027

Ciriminna, R., Scurria, A., Gangadhar, S., Chandha, S., & Pagliaro, M. (2021). Reaping the benefits of open science in scholarly communication. *Heliyon,* 7(12), e08638. https://doi.org/10.1016/j.heliyon.2021.e08638

Codina, L., Morales-Vargas, A., Pedraza-Jiménez, R., & Cortiñas-Rovira, S. (2023). Scholarly communication: A discipline that should be promoted. *index.comunicación*, 13(1), 13-25. https://doi.org/10.33732/ixc/13/01Schola

Craft, A. R., & Harlow, S. (2020). Scholarly communications training: Professional development for the next generation of scholars. *Serials Review*, 46(3), 175-183. https://doi.org/10.1080/00987913.2020.1806651

Cruz Romero, R. (2025). Transparency in open science: An actionable principle? *Open Information Science*, 9(1), 20250016. https://doi.org/doi:10.1515/opis-2025-0016

Cudennec, C., Sud, M., & Boulton, G. (2022). Governing open science. *Hydrological Sciences Journal*, 67(16), 2359-2362. https://doi.org/10.1080/02626667.2022.2086462

Cuevas Shaw, L., Errington, T. M., & Mellor, D. T. (2022). Toward open science: Contributing to research culture change. *Science Editor*, 45(1), 14-17. https://doi.org/10.36591/SE-D-4501-14

Delikoura, E., & Kouis, D. (2021). Open research data and open peer review: Perceptions of a medical and health sciences community in Greece. *Publications*, 9(2), 14. https://doi.org/10.3390/publications9020014

dos Santos, J. I. A. S., da Silveira, D. S., da Costa, M. F., & Duarte, R. B. (2022). Consumer behaviour in relation to food waste: A systematic literature review. *British Food Journal*, 124(12), 4420-4439. https://doi.org/10.1108/bfj-09-2021-1075

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109-123. https://doi.org/10.1016/S0048-7333(99)00055-4

Fox, J., Pearce, K. E., Massanari, A. L., Riles, J. M., Szulc, Ł., Ranjit, Y. S., Trevisan, F., Soriano, C. R. R., Vitak, J., Arora, P., Ahn, S. J., Alper, M., Gambino, A., Gonzalez, C., Lynch, T., Williamson, L. D., & Gonzales, A. L. (2021). Open science, closed doors? Countering marginalization through an agenda for ethical, inclusive research in communication. *Journal of Communication*, 71(5), 764-784. https://doi.org/10.1093/joc/jqab029

Garvey, W. D. (2014). *Communication: The essence of science: Facilitating information exchange among librarians, scientists, engineers and students*. Elsevier.

González-Teruel, A., López-Borrull, A., Santos-Hermosa, G., Abad-García, F., Ollé, C., & Serrano-Vicente, R. (2022). Drivers and barriers in the transition to open science: The perspective of stakeholders in the Spanish scientific community. *Profesional de la información*, 31(3), e310305. https://doi.org/10.3145/epi.2022.may.05

Gualo, F., Caballero, I., Rodríguez, M., & Piattini, M. (2023). A data quality model for master data repositories. *Informatica*, 34(4), 795-824. https://doi.org/10.15388/23-INFOR534

Guirlet, M., & Schneider, R. (2024). Developing and improving the capability of scientific communities in open research data: A maturity continuum model: Concepts, elements, and applications. *Journal of Librarianship and Scholarly Communication*, 12(1), eP16320. https://doi.org/10.31274/

jlsc.16320

Haim, M., & Jungblut, M. (2023). How open is communication science? Open-science principles in the field. *Annals of the International Communication Association*, 47(3), 338-357. https://doi.org/10.1080/23808985.2023.2201601

Hauschke, C., Nazarovets, S., Altemeier, F., & Kaliuzhna, N. (2021). Roadmap to FAIR research information in open infrastructures. *Journal of Library Metadata*, 21(1-2), 45-61. https://doi.org/10.1080/19386389.2021.1999156

Hayashi, K. (2021). How could COVID-19 change scholarly communication to a new normal in the open science paradigm? *Patterns,* 2(1), 100191. https://doi.org/10.1016/j.patter.2020.100191

Hidayat, D. S., Sensuse, D. I., Elisabeth, D., & Hasani, L. M. (2025). Conceptual model of knowledge management system for scholarly publication cycle in academic institution. *VINE Journal of Information and Knowledge Management Systems*, 55(1), 187-222. https://doi.org/10.1108/vjikms-08-2021-0163

Hofmann, B. (2022). Open science knowledge production: Addressing epistemological challenges and ethical implications. *Publications*, 10(3), 24. https://doi.org/10.3390/publications10030024

Ignat, T., & Ayris, P. (2020). Built to last! Embedding open science principles and practice into European universities. *Insights: The UKSG Journal*. 33(1), 9. https://doi.org/10.1629/uksg.501

Ignat, T., Ayris, P., Gini, B., Stepankova, O., Özdemir, D., Bal, D., & Deyanova, Y. (2021). Perspectives on open science and the future of scholarly communication: Internet trackers and algorithmic persuasion. *Frontiers in Research Metrics and Analytics*, 6, 748095. https://doi.org/10.3389/frma.2021.748095

Kim, M. K., & Hyun, B. H. (2025). Exploring the knowledge structure and thematic evolution of NTIS-related research in South Korea (2008-2024): A bibliometric analysis. *Journal of Information Science Theory and Practice*, 13(3), 85-104. https://doi.org/10.1633/JISTaP.2025.13.3.6

Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software Engineering version 2.3*. https://www.researchgate.net/publication/302924724

Klebel, T., Traag, V., Grypari, I., Stoy, L., & Ross-Hellauer, T. (2025). The academic impact of open science: A scoping review. *Royal Society Open Science,* 12(3), 241248. https://doi.org/10.1098/rsos.241248

Kwasnicka, D., Ten Hoor, G. A., van Dongen, A., Gruszczyńska, E., Hagger, M. S., Hamilton, K., Hankonen, N., Heino, M. T. J., Kotzur, M., Noone, C., Rothman, A. J., Toomey, E., Warner, L. M., Kok, G., Peters, G. J., & Luszczynska, A. (2021). Promoting scientific integrity through open science in health psychology: Results of the Synergy Expert Meeting of the European health psychology society. *Health Psychology Review,* 15(3), 333-349. https://doi.org/10.1080/17437199.2020.1844037

Lee, J., & Chung, E. (2023). Research information service development plan based on an analysis of the digital scholarship lifecycle experience of humanities scholars in Korea: A qualitative study. *Science Editing*, 10(2), 127-134. https://doi.org/10.6087/kcse.309

Lee, T. H., Jung, M., & Kim, Y. (2023). Predicting psychologists' approach to academic reciprocity and data sharing with a theory of collective action. *The Electronic Library*, 41(23), 223-241. https://doi.org/10.1108/EL-10-2022-0232

Lopes, C., da Luz Antunes, M., & Sanches, T. (2019, September 24-27). Information literacy and open science: Before and after the new ACRL framework. In S. Kurbanoğlu, S. Špiranec, Y. Ünal, J. Boustany, M. L. Huotari, E. Grassian, D. Mizrachi, & Loriene Roy (Eds.), *Information Literacy in Everyday Life* (pp. 244-253). Springer Cham.

Loureiro Cardoso, T. M., Pinto, J. P., & Pestana, F. (2024). Networked research and open science: The WEIWER® experience. *Educational Media International*, 61(1-2), 16-25. https://doi.org/10.1080/09523987.2024.2357475

Lui, P. P., Gobrial, S., Pham, S., Giadolor, W., Adams, N., & Rollock, D. (2022). Open science and multicultural research: Some data, considerations, and recommendations. *Cultural Diversity & Ethnic Minority Psychology,* 28(4), 567-586. https://doi.org/10.1037/cdp0000541

Manghi, P., Atzori, C., De Bonis, M., & Bardi, A. (2020). Entity deduplication in big data graphs for scholarly communication. *Data Technologies and Applications*, 54(4), 409-435. https://doi.org/10.1108/dta-09-2019-0163

Mubdir, G. A., Hashim, S., Alziady, A. A. J., & Enayah, S. H. (2025). The effect of institutional pressures on the intention to adopt environmental disposal of electronic waste: Attitude as the mediating variable. *Journal of Information Science Theory and Practice*, 13(3), 55-71. https://doi.org/JISTaP.2025.13.3.4

Muneja, P. (2023). Open science and policy interface: The Tanzania perspective. *East African Journal of Science, Technology and Innovation*, 4(Special Issue2). https://doi.org/10.37425/eajsti.v4i3.771

Mwangi, K. W., Mainye, N., Ouso, D. O., Esoh, K., Muraya, A. W., Mwangi, C. K., Naitore, C., Karega, P., Kibet-Rono, G., Musundi, S., Mutisya, J., Mwangi, E., Mgawe, C., Miruka, S., & Kibet, C. K. (2021). Open science in Kenya: Where are we? *Frontiers in Research Metrics and Analytics*, 6, 669675.

https://doi.org/10.3389/frma.2021.669675

Nüst, D., & Eglen, S. (2021). CODECHECK: An open science initiative for the independent execution of computations underlying research articles during peer review to improve reproducibility [version 2; peer review: 2 approved]. *F1000Research*, 10, 253. https://doi.org/10.12688/f1000research.51738.2

Ollé, C., López-Borrull, A., Melero, R., Boté-Vericad, J. J., Rodríguez-Gairín, J. M., & Abadal, E. (2023). Habits and perceptions regarding open science by researchers from Spanish institutions. *PloS One,* 18(7), e0288313. https://doi.org/10.1371/journal.pone.0288313

O'Sullivan, L., Ma, L., & Doran, P. (2021). An overview of post-publication peer review. *Scholarly Assessment Reports*, 3(1), 6. https://doi.org/10.29024/sar.26

Peeters, F. V. (2021). Opening doors to discovery: Partnerships are key to advancing open science. *Information Services and Use*, 41(1-2), 171-176. https://doi.org/10.3233/isu-210105

Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. John Wiley & Sons.

Piwowar, H. A., Day, R. S., & Fridsma, D. B. (2007). Sharing detailed research data is associated with increased citation rate. *PloS One,* 2(3), e308. https://doi.org/10.1371/journal.pone.0000308

Piwowar, H. A., & Vision, T. J. (2013). Data reuse and the open data citation advantage. *PeerJ*, 1, e175. https://doi.org/10.7717/peerj.175

Pontika, N., Knoth, P., Cancellieri, M., & Pearce, S. (2015, October 21-22). Fostering open science to research using a taxonomy and an eLearning portal. In S. Lindstaedt, T. Ley, & H. Sack (Eds.), *Proceedings of the 15th International Conference on Knowledge Technologies and Data-driven Business* (pp. 1-8). Association for Computing Machinery.

Ramachandran, R., Bugbee, K., & Murphy, K. (2021). From open data to open science. *Earth and Space Science*, 8(5), e2020EA001562. https://doi.org/10.1029/2020EA001562

Rao, P., Kumar, S., Lim, W. M., & Rao, A. A. (2022). The ecosystem of research tools for scholarly communication. *Library Hi Tech*, 42(4), 1132-1151. https://doi.org/10.1108/lht-05-2022-0259

Reiter-Pázmándy, M. (2021). Data access for the social sciences in Austria. Open data, closed data, research infrastructures and re-use. *OZP – Austrian Journal of Political Science*, 50(1), 15-20. https://doi.org/10.15203/ozp.3737.vol50iss1

Rodés-Bachs, C., Sampedro, J., Frilingou, N., Gardumi, F., & Lo Giudice, C. (2025). Open science practices in integrated assessment models [version 2; peer review: 3 approved]. *Open Research Europe*, 5, 12. https://doi.org/10.12688/openreseurope.18824.2

Rodriguez-Pomeda, J., Casani, F., & Serrano-López, A. E. (2023). Reflections on the diffusion of management and organization research in the context of open science in Europe. *European Management Journal*, 41(5), 664-672. https://doi.org/10.1016/j.emj.2023.08.006

Romary, L. (2011). *Scholarly communication*. https://doi.org/10.48550/arXiv.1105.3287

Sawant, S. (2012). Transformation of the scholarly communication cycle. *Library Hi Tech News,* 29(10), 21-24. https://doi.org/10.1108/07419051211294482

Smart, P. (2022). The evolution, benefits, and challenges of preprints and their interaction with journals. *Science Editing*, 9(1), 79-84. https://doi.org/10.6087/kcse.269

Šobota, D. (2024). Critical open access literacy as a strategy to confront the challenges in scholarly communication. *Journal of Documentation,* 80(7), 168-186. https://doi.org/10.1108/jd-08-2023-0155

Taşkın, Z. (2026). Sustaining the "frozen footprints" of scholarly communication through open citations: An Annual Review of Information Science and Technology (ARIST) paper. *Journal of the Association for Information Science and Technology,* 77(1), 23-39. https://doi.org/10.1002/asi.24982

Thaldar, D., Gooden, A., & Steytler, M. (2023). Open science and human genetic data: Recommendations on South Africa's *Draft National Open Science Policy*. *Frontiers in Genetics*, 14, 1248747. https://doi.org/10.3389/fgene.2023.1248747

Tipsena, R., Chansanam, W., Tuamsuk, K., & Manorom, P. (2025). Predicting workforce needs in Thailand's digital industry: A machine learning approach (2023-2024). *Journal of Information Science Theory and Practice*, 13(3), 1-16. https://doi.org/10.1633/JISTaP.2025.13.3.1

Tonković, A. M., Veckie, E., & Veckie, V. W. (2015). Applications of Penta Helix model in economic development. *Economy of Eastern Croatia Yesterday, Today, Tomorrow*, 4, 385-393.

Toribio-Flórez, D., Anneser, L., deOliveira-Lopes, F. N., Pallandt, M., Tunn, I., & Windel, H. (2021). Where do early career researchers stand on open science practices? A survey within the max planck society. *Frontiers in Research Metrics and Analytics*, 5, 586992. https://doi.org/10.3389/frma.2020.586992

Tsakonas, G. (2021). Open science cannot succeed without open peer review. *LIBER Quarterly: The Journal of the Association of European Research Libraries*, 31(1), 1-6. https://doi.org/10.53377/lq.11114

Vuong, T. T., Ho, M. T., Nguyen, M. H., Nguyen, T. T., Nguyen, T. D., Nguyen, T. L., Luong, A. P., & Vuong, Q. H. (2020).

Adopting open access in the social sciences and humanities: Evidence from a developing nation. *Heliyon,* 6(7), e04522. https://doi.org/10.1016/j.heliyon.2020.e04522

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, 39(1), 93-112. https://doi.org/10.1177/0739456x17723971

Yu, W., Chen, J., & Deng, S. (2024). Open science under debate: Disentangling the interest on Twitter and scholarly research. *Sage Open*, 14(3), 21582440241271300. https://doi.org/10.1177/21582440241271300

Zarghani, M., Nemati-Anaraki, L., Sedghi, S., Noroozi Chakoli, A., & Rowhani-Farid, A. (2023). The application of open science potentials in research processes: A comprehensive literature review. *Libri,* 73(2), 167-186. https://doi.org/10.1515/libri-2022-0007

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 81-96, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.5

Research Data Management Practices: A Comparative Study of Research Scholars from Engineering, Science, and Arts, Humanities, and Social Sciences

K. K. Shameer*
Department of Library and Information Science, Dravidian University, Kuppam, India
Central Library, IIT Tirupati, Tirupati, India
E-mail: shameer@iittp.ac.in

Modepalli Doraswamy
Department of Library and Information Science, Dravidian University, Kuppam, India
E-mail: mdoraswamy@gmail.com

ABSTRACT

The need for better research data management (RDM) practices and culture within academic and research institutions is rising, and their significance in countering academic misconduct and maintaining integrity is increasingly recognized across sectors. Yet it needs to be seen how doctoral students practicing their research craft manage their data. What do RDM practices look like among early-stage researchers? The authors sought to understand how researchers use, provide access to, share, store, and back up research data, as well as their awareness of data management plans (DMPs). The authors studied a sample of researchers of engineering, science, and arts, humanities, and social sciences (AHSS) departments from select Indian Institutes of Technology to examine their data management practices. The authors designed and employed a structured questionnaire for data collection. A quantitative survey approach was adopted. It was found that science and engineering departments had slightly better data management practices and placed greater emphasis on data sharing than AHSS. Concerns about privacy, confidentiality, and fear of data misuse were the main reasons researchers cited for their unwillingness to share data. Researchers were found to be storing their data in easily "findable" and "accessible" methods; however, their FAIR compliance was otherwise lacking. Awareness of DMP was found to be low across disciplines. Strictly enforcing RDM implementation within academic institutions will help shape better data practices among researchers, which would ideally lead to an improved, more productive research environment. This study contributes to understanding the disciplinary differences in data practices among early-stage researchers and to identifying where gaps in awareness and practice exist.

Keywords: research data management, data sharing, FAIR principles, data loss, data recovery, data backup

Received: December 27, 2025 **Revised:** March 17, 2026
Accepted: March 20, 2026 **Published:** June 30, 2026

***Corresponding Author:** K. K. Shameer
https://orcid.org/0009-0002-0001-6259
E-mail: shameer@iittp.ac.in

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [K. K. Shameer, Modepalli Doraswamy] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

Research data can be understood as the foundational stone of the research ecosystem. It all begins with the most unassuming of elements: the research dataset. On its own, it may seem to hold no power. However, it is undoubtedly the researcher's most crucial resource (Borgman, 2012). By harnessing the potential of research datasets, they can drive the growth of knowledge capital onward and upward. The mechanism involved in such an assemblage is referred to as research data management (RDM). It is the process, workflow, and system for maintaining, storing, preserving, and overall managing data within an academic research environment. As a definition, RDM "concerns the organization of data, from its entry to the research cycle through to the dissemination and archiving of valuable results. It aims to ensure reliable verification of results and permits new and innovative research built on existing information" (Whyte & Tedds, 2011).

The volume of research is growing rapidly, especially in Asia. In particular, the Asian countries South Korea, China, Japan, and India are shown to be leading in research output growth (Nature Index, 2025; National Science Board, 2023). As research output grows, RDM is important for several reasons, including ensuring data integrity, facilitating efficient storage, analysis, and sharing. As a structure, RDM helps keep unethical practices in check to an extent, and can be considered "fundamental to research integrity" (Herr, 2019; National Academies of Sciences, Engineering, and Medicine, 2017). When researchers make their datasets available upon publication, it can help curb malpractices such as plagiarism. Recently, several publishers have begun giving RDM and the practice of research data sharing more importance for manuscript submissions. The integrity of a research paper can be verified through the presence of its datasets and vice versa (Yeo-Teh & Tang, 2024). If the dataset is available through repositories and similar sources, the relevant authorship will be attributed, helping prevent the possibility of malpractice or plagiarism. Scientific integrity can be ensured to an extent if researchers are provided with appropriate training in RDM (Nguyen & Tuamsuk, 2025).

Literature on RDM is on the rise, and it is gaining momentum across academia, as its relevance continues to be recognized. Data management is one of the most frequently researched topics in information science, as found in a comprehensive study by Junlabuddee and Tuamsuk (2021). From creation, storage, maintenance, and preservation to the dissemination of research-generated data, academia requires a delicate yet firm institutional policy statement to ensure everyone adheres to the same data practices, thereby achieving uniformity. Effective management of research data will help researchers organize their data, find relevant data to support their research, and avoid duplication. Libraries could be well-suited for this, as they work with the academic aspects of their parent institutions and can thus better understand researchers' needs. They can play an important role in implementing RDM by organizing, archiving, and preserving research data for future use (Tripathi et al., 2017a).

When discussing research datasets and RDM, we need to acknowledge the factors that encourage or discourage researchers from sharing their datasets. Researchers were found to share their research data to contribute to scientific progress and increase research visibility in significant numbers (Elsayed & Saleh, 2018). One motivator was that those who share data receive more citations than those who do not (Dorch, 2012). It is worth noting that willingness to share can increase in an open-research environment where scientists are assured that they will benefit from such sharing (Borycz et al., 2023). However, privacy concerns, confidentiality, and data misuse have been cited as the main reasons for not sharing data. Raising awareness of the many benefits of RDM will help motivate researchers to share data.

RDM can help protect sensitive/confidential data of research participants (Dube, 2025). It can help increase transparency in research and prevent data loss and misuse by ensuring proper storage and backup of research data. Among the merits of making raw data available is that it directly leads to opportunities for others to "replicate or correct earlier findings and, ostensibly, influence the pace and efficiency of future research endeavours" (Vasilevsky et al., 2017). Vasilevsky et al. (2017) also observed that although the significance and merits of research data sharing have been emphasized by many within academia, most publishers have not made it mandatory in article publishing. Nevertheless, most researchers are interested in using others' research data in their work. However, many do not regularly share their own data, citing issues such as insufficient time, lack of funding, and lack of a platform (Tenopir et al., 2011). This is a matter of concern, as it inadvertently stymies research growth. Sharing research data is one of the practices that can help curb and "detect research misconduct" (Nguyen & Tuamsuk, 2025). RDM is a vital means of addressing retractions, as it requires the submission of research data alongside the article for publication (Elango et al., 2019). It is further confirmed that

 https://doi.org/10.1633/JISTaP.2026.14.2.5

data mismanagement is among the top reasons for paper retraction (Campos-Varela & Ruano-Raviña, 2019). Thus, RDM is a comprehensive research practice that helps unify and streamline research and curbs academic malpractice. It is worth noting that global efforts to adhere to FAIR principles would also help in this regard (Yeo-Teh & Tang, 2024).

RDM is an intricate framework encompassing a wide range of data-based principles and expectations, helping propel research forward while ensuring the data at its core remains safe and within a sustainable ecosystem. FAIR can be described as the set of guiding principles formulated to ensure this. It sets out directives to help researchers create better datasets, thereby enabling improved research opportunities (Wilkinson et al., 2016). These principles stipulated that data should ideally be "Findable, Accessible, Interoperable, and Reusable" (FAIR) to be useful in a healthy research-driven ecosystem. The acceptance of FAIR as a "collaborative community approach" is the way forward to making RDM "effective in everyday research" (Rehnert & Takors, 2023). The potential for scientific advancement from making all research datasets available is incalculably large. If all research data were submitted to data repositories that adhered to the FAIR guidelines, researchers would find it easier to access required data, and consequently their work would become more convenient. There are many RDM platforms available that are FAIR-compliant, including both free and commercial options (Appendix 1). Along with these, institutional repository software, such as DSpace and EPrints, and digital library software, such as Greenstone, are also used to manage research data (Amorim et al., 2017). From the four most popular research data repositories, Dataverse, Dryad, Zenodo, and Figshare, it was found that although all four were well-suited in terms of their services, features, and FAIR compliance, Figshare was deemed best, and Dryad ranked last (Bhardwaj et al., 2025).

Many academic institutions, publishers, and funding bodies have made it an essential requirement for projects to have and abide by a data management plan (DMP). When properly implemented, it will map every step in the research lifecycle. It can be updated at any point in time during the project (Lau et al., 2021). Now, in developed countries, submitting a DMP is a requirement when proposing projects for funding; however, this is not the case in countries like India. Nevertheless, it is slowly taking place, as some Indian institutes have begun asking researchers to submit a DMP alongside their research proposals.

The present study concerns RDM among early-stage researchers, namely doctoral students. The authors attempted to assess their data practices and awareness of the RDM concept. Understanding underlying RDM practices and raising awareness of RDM among early-stage researchers will contribute to an improved research culture, wherever these researchers go and work.

2. OBJECTIVES OF THE STUDY

The present study sought to understand the RDM practices of the doctoral students and to examine whether discipline-wise differences existed. The authors have attempted to achieve this by framing the objectives which drove the research design and purpose of the present study.

The authors have endeavored to realize this goal by assessing how respondents interact with their own and others' data. This included examining the nature of access they provided or did not provide to their research datasets, and the reasons, if any, for not sharing. The present study also distinguished the various methods respondents used to back up and store their datasets and identified whether they had experienced data loss. The authors further sought to understand the extent of FAIR adherence among researchers in their research dataset management. Another area examined was in connection with the extent of awareness displayed by the researchers in the context of DMPs.

3. METHODOLOGY

Currently, there are 23 Indian Institutes of Technology (IITs). These Indian institutes are known for the high standard of technical education they provide to students who scored top marks in the relevant entrance examinations. Many IITs were included in various international higher education rankings by different agencies, such as the QS World University Rankings. Based on their year of establishment or upgradation to an IIT, the institutes are classified into three generations (Joint Seat Allocation Authority, 2025). The earliest IITs are classified as first-generation, followed by second-generation IITs, and the most recently established IITs are referred to as third-generation (Sharma, 2021).

The data for the present study were collected from six IITs based on the Indian National Institute Ranking Framework (NIRF). The top and bottom-ranked IITs from each generation were selected. The data were collected from research scholars at each of the selected IITs. The

data were collected between April and August 2025 via a structured online questionnaire. A total population size of 7,886 registered research scholars was present in all six IITs during the data collection period. Based on the Krejcie–Morgan and Cochran's finite-population formulas, we determined a sample size of 367 for the present study.

For data collection, the authors designed a structured questionnaire with closed-ended questions (Appendix 3) and included multiple-choice response items and a Likert scale. It was disseminated through Google Forms (Google LLC., Mountain View, CA, USA) to the sample under study. In the questionnaire, nine items were presented to assess the RDM practices and awareness of the survey respondents. The survey consisted of the following elements: data usage, significance attributed to data usage, nature of access provided to own data, reason(s) for not sharing data, if any, research data loss experiences, if any, backup and storage methods adopted, compatibility of data practices with FAIR guidelines, and DMP awareness.

The authors were able to collect data from 396 research scholars, which exceeds the required sample size. Responses were collected only from those who consented to participate in the study. Out of them, 228 were from engineering departments, 76 from science departments, and 92 from arts, humanities, and social sciences (AHSS). This is representative of the researcher population in the engineering-oriented IIT ecosystem. The data were analyzed using descriptive statistics in Microsoft Excel (Microsoft, Redmond, WA, USA) and SPSS (IBM Co., Armonk, NY, USA), and tested using appropriate tests to examine the RDM-related practices of the sample under study.

3.1. Limitations

The present work's sample has a significantly larger proportion of engineering researchers than of science and AHSS researchers. This is representative of the nature of the institutes under study. As IITs are engineering institutions, they consequently have a strong engineering student/researcher population, compared to the smaller numbers in science and AHSS departments. As AHSS and pure sciences are not among the primary objectives of engineering institutions, this is a given. The same can be seen reflected in the present study.

As the data collection instrument employed here is a structured questionnaire, the responses from the researchers are the basis for data analysis and interpretation regarding how research data practices are in the science, engineering, and AHSS departments of the selected IITs.

The study is limited to a small number of IITs. The authors have chosen two IITs from each generation, totaling six. The criteria were to select the top-ranking and lower-ranking IITs from each generation, based on performance in the NIRF 2024 data. As such, the study refers to only six IITs out of the 23 existing IITs.

3.2. Informed Consent/Ethical Statement

All study participants provided consent prior to participation, and all their confidentiality and anonymity were strictly maintained in accordance with general ethical guidelines followed. The participants were assured that the data would be used only for research purposes and that the personal identifier (email) would be removed prior to analysis. No other personal information, such as names and personal addresses, was collected for the study.

4. RESULTS AND DISCUSSION

4.1. Use of Others' Research Data

When the research scholars surveyed were asked whether they used others' research data, the researchers from engineering and science were split almost evenly in their responses. Fig. 1 shows that slightly more than half of the science department researchers (52.6%) and nearly half of the engineering department researchers (45.6%) reported using others' research data. However, only 35.9% of AHSS researchers reported using research data from others. The calculated test results (Appendix 2) show that χ^2 (4, n=396)=7.894, with a p-value of 0.092, for respon-

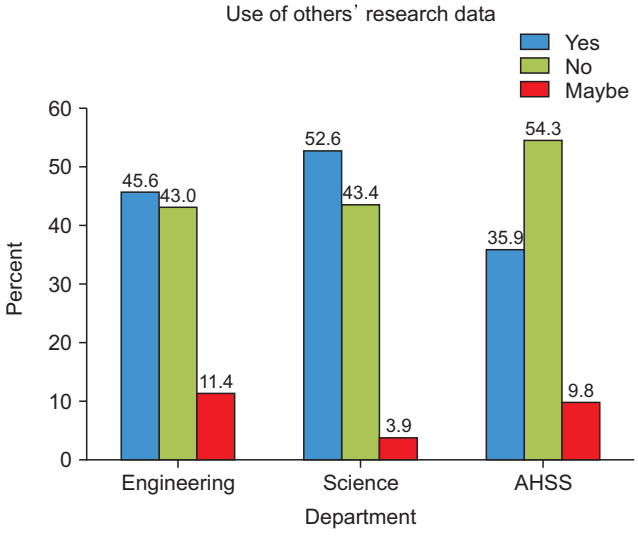


Fig. 1. Use of others' research data. AHSS, arts, humanities, and social sciences.

dents' use of others' research data. The level of significance is higher than the critical value of 0.05. As such, there is no association across departments regarding researchers' use of data from others.

Fig. 1 addresses the present study's research objective regarding respondents' use of research data. It reveals differences in data usage practices across disciplines. While more researchers from science and engineering departments reported using others' research data sets, this practice was much less common among the AHSS respondents. This pattern has been repeatedly observed in previous studies (Ruediger & MacDougall, 2023). This raises the question of why there is less interest in such usage, which warrants further research.

4.2. Importance of Others' Research Data in Own Work

The researchers who had responded that they used research data from others' studies (Fig. 1) were further asked whether they felt this was important for their research. Likert scale options were provided for responses, which ranged from "not important," "slightly important," "somewhat important," to "very important" and "extremely important." A substantial majority (81.4%) of science department scholars opined that it was of significant importance (55.8% responded very important, and 25.6% responded extremely important) (Fig. 2). The majority of engineering department respondents (59%) also held the same opinion (35.4% responded very important, and 23.6% responded extremely important). Over half of the AHSS scholars (53.8%) responded that it was significant

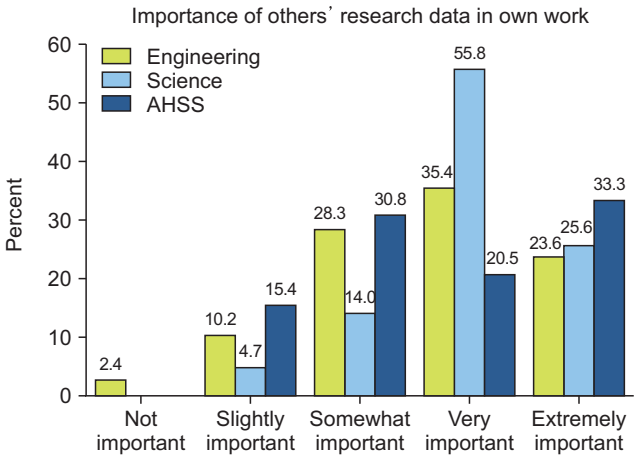


Fig. 2. Importance of others' research data in own work. AHSS, arts, humanities, and social sciences.

(20.5% very important and 33.3% extremely important) (Fig. 2). For the variable of perceived importance of others' research data, the Kruskal–Wallis H test was employed as the response in Likert scale items was ordinal. The test was conducted to assess if there were differences in the degree of importance the respondents gave to the use of others' research data across departments. The calculated values for the test (Appendix 2) yielded χ^2 (2)=1.423 and a p-value of 0.491. As this exceeds the critical value of 0.05 and is therefore statistically not significant, it can be concluded that there is no association across departments in the importance that researchers assign to others' research data in their own work.

Significantly more researchers from the sciences than from engineering and AHSS understood the value of using others' research data sets in their own work. This is to be expected, as research in the sciences operates more collaboratively and involves greater connectivity. Because data use is significantly lower in AHSS disciplines, they may deem its value less important than their Science, Technology, Engineering, and Medicine (STEM) peers (Khan et al., 2023).

4.3. Is Access to Own Research Data Provided

Respondents were asked whether they provided access to their research data in any form (Fig. 3). Options listed for response were "openly accessible," "only some part is openly accessible," "all research data is accessible with some restriction," "only some part of research data is accessible with some restriction," and "have not provided access to my research data." Those who made all their research data openly accessible were slightly higher in number among science researchers (36.8%) than among engineering (26.3%) and AHSS (12%). Respondents who made only some parts of their research data openly accessible were slightly more common in science (36.8%) and engineering (33.8%) than in AHSS (18.5%). Researchers who had made all their research data accessible, albeit with some form of restriction (e.g., password), were minimal in number across AHSS (6.5%), science (2.6%), and engineering (7%). Disappointingly, more than half of the AHSS respondents (56.5%) reported not providing access to their research data. The number of scholars from science (18.4%) and engineering (28.5%) who responded likewise was significantly lower compared to that of AHSS. The calculated value for the variable of access provided to one's own research data was χ^2 (8, n=396)=40.881, p-value<0.001 (Appendix 2). This is lower than the critical value of 0.05. As such, we can deem it statistically signifi-

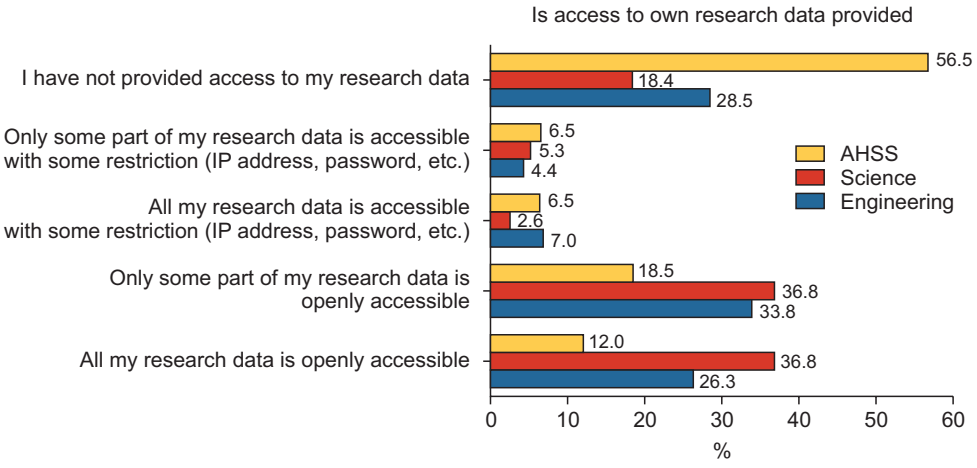


Fig. 3. Access to own research data provided. IP, internet protocol; AHSS, arts, humanities, and social sciences.

cant. Subsequently, it implies that there is an association across departments with relation to access provided to data.

The authors met the study's objective of determining the nature of access to research data. Among AHSS scholars, the use of research data from others, as well as the sharing of their own research data, was observed to be comparatively lower. This finding is similar to that observed in previous studies (Montague-Hellen & Montague-Hellen, 2023), who noted that an indicator of this being a prevalent tendency was that data availability statements have not been as normalized in AHSS research as in STEM. The present study's findings that AHSS researchers lag behind STEM in using others' research data are consistent with the finding that they lag behind in sharing their own data. AHSS researchers seem limited in the use and sharing of research data. It would be ideal for research developers and policymakers to focus on how to undo this tendency and motivate AHSS researchers towards more actively sharing their data as well as making use of datasets.

4.4. Reason(s) for Not Sharing Data

Research scholars in the surveyed sample were asked about their reasons for not sharing research data, if any (Fig. 4). They were invited to select one or more reasons from the multiple options listed, if they found them suitable. The options provided were "time consuming," "misuse of own data," "costs of storing and sharing research data," "not aware of how to share data," "lack of data sharing infrastructure," "data confidentiality," "concerns about data quality," "data privacy concerns," and an open-ended option to add any other reason the respondent may have to not share data. The major reasons chosen by a significant

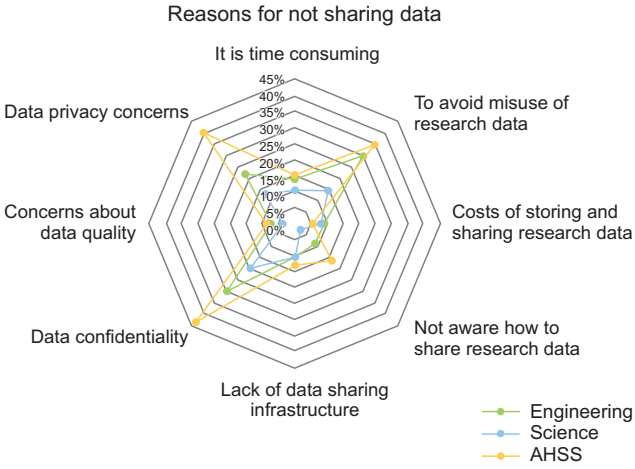


Fig. 4. Reason for not sharing data. AHSS, arts, humanities, and social sciences.

number of respondents was data confidentiality (43.5% of AHSS, 29.8% of engineering, and 19.7% of science scholars), data privacy concerns (40.2% of AHSS, 21.9% of engineering, and 13.2% of science scholars), and to avoid misuse of their research data (34.8% of AHSS, 29.8% of engineering, and 14.5% of science scholars). Thus, across respondents from the AHSS, engineering, and science departments, three major reasons for not sharing the data were data confidentiality, data privacy concerns, and the fear of misuse of their research data. Appendix 2 indicates that the variables "to avoid misuse of your research data" (χ^2=9.37, p=0.009), "not aware how to share my research data with others" (χ^2=9.39, p=0.009), "data confidentiality" (χ^2=11.34, p=0.003), and "data privacy concerns" (χ^2=18.39, p<0.001) are lower than the critical value of 0.05 (for all the variables listed here, the degree of freedom [df] was 2 and the total sample [n] was 396). Therefore, these

 https://doi.org/10.1633/JISTaP.2026.14.2.5

variables are statistically significant. This implies that there is an association in these reasons why researchers hesitate to share data across departments.

However, for the variables "it is time consuming" (χ^2=0.85, p=0.654), "costs of storing and sharing research data" (χ^2=1.26, p=0.532), "lack of data sharing infrastructure" (χ^2=0.45, p=0.797), and "concerns about data quality" (χ^2=1.55, p=0.461) (Appendix 2), their p-value was higher than the critical value of 0.05. As such, these variables are not statistically significant. This indicates that there is no association across departments with regard to these variables.

The findings clearly reveal that significantly more AHSS researchers were hesitant to share their research data than their STEM counterparts. This finding aligns with earlier studies in the topic. Ruediger and MacDougall (2023)'s work confirms this reticence among researchers in the humanities. Díaz et al. (2021)'s study supports similar sentiments shared by researchers in the social sciences. Borycz et al. (2023)'s study also supports this thesis. Tripathi et al. (2017b) noted that a reason researchers hesitate to share data is its confidential nature, and that sharing it could be seen as a breach of trust regarding participants' personal details. Similar to what was found in the present study, data confidentiality and fear of misuse of data were found to be the main reasons for not sharing data in a previous study in the topic (Saeed & Naushad Ali, 2019). Researchers found that one reason for this hesitation and uncertainty in sharing data was fear of not knowing who would use their data or for what purpose. It goes without saying that institutional policies should address such fears and provide some form of guarantee against such hypotheticals. Such worries can be mitigated when researchers work together increasingly towards a common goal (Arend et al., 2014).

4.5. Research Data Loss

When asked whether they had ever lost research data, the majority of research scholars responded they had never lost research data (engineering: 68.4%, science: 64.5%, and AHSS: 59.8%) (Fig. 5). However, a middling number of respondents had (science: 26.3%, engineering: 21.5%, and AHSS: 19.6%). The calculated χ^2 (4, n=396)=8.357, and p=0.079 (Appendix 2) for the variable "have you ever lost research data" is higher than the critical value of 0.05. Therefore, it is not statistically significant. This indicates there is no significant association regarding data loss across the departments.

The question of data loss highlights the finding that the majority of researchers, regardless of department, seem diligent in protecting their research data. However, training them in data loss, recovery, backup, storage, and protection can help elevate the rudimentary mechanisms they currently use (Briney et al., 2020). Librarians could do well to examine the numbers and hold orientation and training sessions on the importance of data preservation, storage, backup, and security mechanisms for research scholars.

4.6. Research Data Back-Up

The authors asked the researchers how often they backed up their research data. The options provided were "yes, regularly," "yes, occasionally," "yes, rarely," and "no."

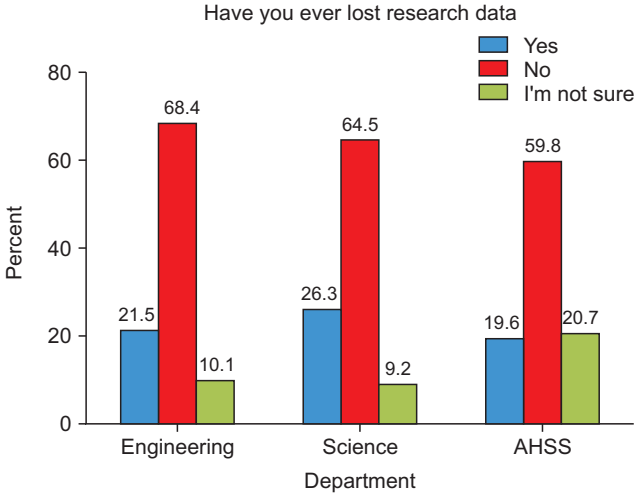


Fig. 5. Have you ever lost research data. AHSS, arts, humanities, and social sciences.

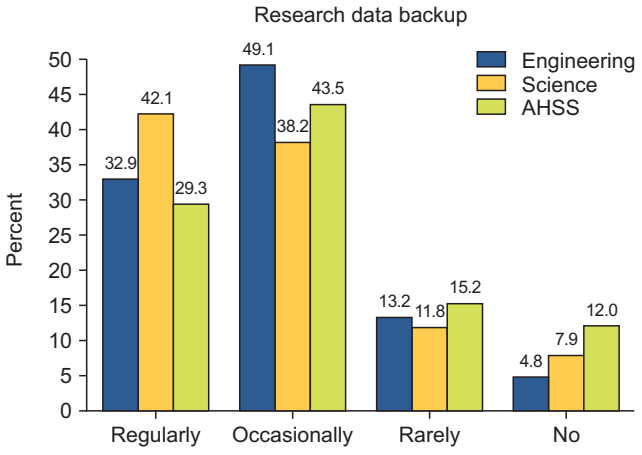


Fig. 6. Research data backup. AHSS, arts, humanities, and social sciences.

A significant number of them back up either regularly or occasionally (Fig. 6). Nearly half of the engineering respondents (49.1%) backed up their data occasionally, followed by 43.5% of AHSS respondents and 38.2% of the science respondents. The authors found that 42.1% of science, 32.9% of engineering, and 29.3% of AHSS respondents backed up their data regularly. Only 12% of AHSS researchers, 7.9% of science researchers, and 4.8% of engineering researchers stated they do not back up their data. The calculated χ^2 (6, n=396)=8.953, and p=0.176 (Appendix 2) for the variable of "research data backup" is higher than the critical value of 0.05. Therefore, it can be concluded that the variable is not statistically significant. This implies that there is no association regarding backup practices of researchers across departments.

A lower number of AHSS researchers seem to back up their data regularly, compared to their STEM peers. Regular backups are crucial for protecting against unexpected data loss caused by system failures and other unforeseen events. The importance of well-managed data is tantamount to a healthy and organic research ecosystem. This means less time spent searching for and less effort spent understanding the data (Briney et al., 2020). Loss of data due to improper storage or forgetting to back up can be disastrous for one's research. Scholars need to be educated about the importance of regular data backups and encouraged to implement them. Librarians can design programs and place greater focus on AHSS researchers.

4.7. Research Data Storage Methods

The authors asked survey respondents how they stored their research data (Fig. 7). Multiple-choice options were provided. The options provided were "institute computer," "shared computer in department/institute," "cloud," "institute's digital repository," "external hard disk," "lab/research register," "institutional data repository," "external data repository," "does not store data," and an option to add an answer. Storing data on one's own computer is the primary method, followed by researchers across departments, with 81.5% of AHSS, 69.3% of engineering, and 65.8% of science respondents. The second preferred method is different for each department's scholars (in the institute computer, 50.4% for engineering; in an external hard disk, 44.7% for science; and in cloud storage, 43.5% for

Research data storage methods

Data storage option	Department					
	Engineering (n=228)		Science (n=76)		AHSS (n=92)	
	n	%	n	%	n	%
On my own computer	158	69.3%	50	65.8%	75	81.5%
On my institute computer	115	50.4%	26	34.2%	25	27.2%
On a shared computer in the department or institute	19	8.3%	8	10.5%	2	2.2%
On the cloud storage	102	44.7%	30	39.5%	40	43.5%
In the institute's digital repository	8	3.5%	1	1.3%	5	5.4%
To an external hard disc	89	39.0%	34	44.7%	25	27.2%
Maintaining it in a lab/ research register	13	5.7%	2	2.6%	1	1.1%
Institutional data repository	5	2.2%	2	2.6%	1	1.1%
External data repository (e.g., Mendeley data, Zenodo, Dryad...)	15	6.6%	1	1.3%	6	6.5%
I do not store the research data	1	0.4%	0	0.0%	4	4.3%

Fig. 7. Research data storage methods. AHSS, arts, humanities, and social sciences.

 https://doi.org/10.1633/JISTaP.2026.14.2.5

AHSS respondents). The test results (Appendix 2) show that the variables "own computer" (χ^2=6.288, p=0.043), "on institute computer" (χ^2=16.868, p<0.001), and "external hard disk" (χ^2=6.119, p=0.047), are statistically significant, as the values are lower than the critical value of 0.05 (the df was 2 for all the variables mentioned under Research Data Storage Methods, and the total sample [n] was 396). Therefore, it can be inferred that there is an association across the departments for these variables. However, for the remaining variables of "shared computer in department/institute" (χ^2=5.086, p=0.079), "cloud storage" (χ^2=0.643, p=0.725), "institute's digital repository" (χ^2=2.072, p=0.355), "maintaining in lab/research register" (χ^2=4.082, p=0.13), and "external data repository" (χ^2=3.223, p=0.2), the values are higher than the critical value of 0.05. As such, they are statistically insignificant and imply there is no association across the departments with respect to these variables. A Fisher's exact test, two-sided, was conducted for the following two variables: "institutional data repository" and "I do not store the research data," as it had 40% and 50% of the response cells, respectively, having fewer than five counts. The result for the first variable was not statistically significant as p-value was 0.794, and in the case of "I do not store the research data" it was statistically significant, as p-value was 0.017. Thus, there is no relation between the variable "institutional data repository" and departments. In the case of "I do not store the research data" there is an association across departments.

The study's objective to determine the nature of data storage chosen by the researchers is met here. It was observed that the majority of respondents used their own computer systems for data storage. Only a few respondents were using a repository for RDM, combining the institute's digital repository, its data repository, and an external data repository. The use of a data repository should be encouraged, considering the benefits it offers compared to current preferred storage methods. Effective and efficient data storage is an important aspect of successfully implemented RDM. Storing data in a secure manner so as to protect it from "loss, corruption, or unauthorized access is necessary"; data storage mechanisms include "cloud services, institutional repositories, or dedicated servers" (Dube, 2025).

4.8. Is Stored Research Data FAIR-Compliant

Respondents were asked whether their stored research data met the FAIR principles. As the concept may be unfamiliar to many, the authors presented the question broken down into the four elements of "findable," "accessible," "interoperable," and "reusable," as well as adding a "none of the above" option in the spirit of achieving comprehensiveness.

The majority of the respondents affirmed that their stored data was easily accessible (68.4% of engineering, 62% of AHSS, and 56.6% of science respondents). The second component of the FAIR principle, which received significant agreement from respondents, concerned whether their data was easily findable. Nearly half of the research scholars from each of the three departments responded positively to this (51.3% in science, 50.9% in engineering, and 45.7% in AHSS). Ranking third in FAIR principles in terms of the number of researchers who felt their data was aligned with it was whether their stored data was reusable. A middling number of respondents felt that their data was reusable (25% of science, 24.6% of engineering, and 23.9% of AHSS respondents). The fewest researchers responded that their data met the "interoper-

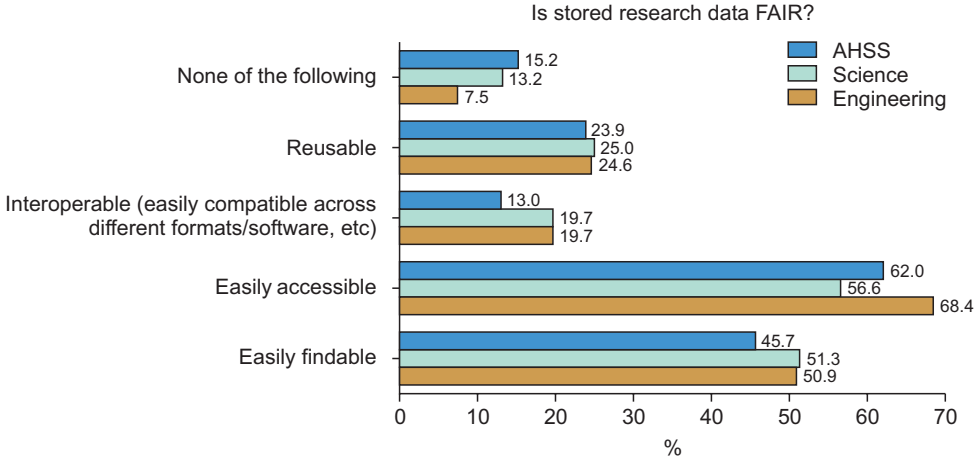


Fig. 8. Is stored research data Findable, Accessible, Interoperable, and Reusable (FAIR)? AHSS, arts, humanities, and social sciences.

ability" criterion (19.7% in science, 19.7% in engineering, and 13% in AHSS) (Fig. 8). The calculated chi-square test results (Appendix 2) showed that the p-values for "easily findable" (χ^2=0.808, p=0.668), "easily accessible" (χ^2=3.877, p=0.144), "interoperable" (χ^2=2.127, p=0.345), "reusable" (χ^2=0.028, p=0.986), and "none of the above" (χ^2=5.051, p=0.08) are all higher than the critical value of 0.05 (for all the variables mentioned here, the df was 2 and the total sample [n] was 396). As such, they are deemed statistically insignificant. This implies there is no significant association across the departments for any of the above variables.

A broader discussion of the FAIR principles is needed, with the involvement of researchers. More awareness and training on implementing FAIR in one's own work will go a long way toward creating a healthier, more productive research ecosystem within one's institute. Librarians should take up the helm on this task and design training programs for researchers (Adams et al., 2023; Nitecki & Alter, 2021).

4.9. Data Management Plan Awareness and Use

The authors asked respondents whether they were aware of what a DMP was. Those unaware of DMP were in the clear majority (Fig. 9). This trend was observed across departments (90.2% of AHSS, 87.7% of engineering, and 81.6% of science respondents). The calculated χ^2 (4, n=396)=5.36, and p=0.252 (Appendix 2) was derived for DMP awareness. This is higher than the critical value of 0.05. Therefore, it is not statistically significant, indicating that there is no association in DMP awareness across the departments in the sample.

The present study sought to understand how aware researchers were of what DMPs are. Significantly higher rates of unawareness were observed across departments when asked about DMP. Earlier studies on the topic have also observed a similar pattern regarding ignorance about DMP amongst researchers (Ünal et al., 2019). Given the high level of unawareness among researchers across disciplines, libraries can arrange a well-structured awareness and training program on DMPs and DMP tools, along with RDM awareness, especially since many funding agencies now require the submission of a DMP with project proposals.

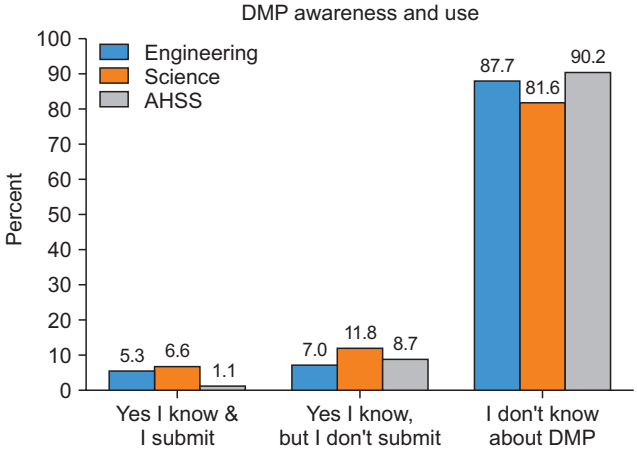


Fig. 9. Data management plan (DMP) awareness and use. AHSS, arts, humanities, and social sciences.

5. CONCLUSION

As the world continues to advance through research, a look at research practices, particularly research data practices, will help guide efforts in the right direction. The present study investigated data practices of early-stage researchers across the disciplines of engineering, sciences, and AHSS. The findings provided insight into disciplinary differences in how researchers use and manage data. An underlying pattern detected across the analyzed data is that AHSS researchers are lagging behind their STEM counterparts in research data practices. Researchers from the sciences and engineering departments were found to be more inclined to use data from others in their own research than their peers in AHSS departments. Researchers from the sciences understood the significance of using others' data far better than those from the engineering and AHSS departments. They also lead in having made their data openly accessible.

Overall, researchers from AHSS were found to be less likely to share their own research data or use others' research data. The most common reasons for hesitation about data sharing were concerns about privacy and confidentiality, and fear of misuse of research data. Multiple studies have confirmed our findings that AHSS researchers are less willing to share their research data than their STEM peers. AHSS scientists usually work on the human aspect, which is more personal-based, and thus compounds the privacy factor. However, whereas STEM scientists' work relies on instruments or shared resources and is dependent on governmental funding, they have all improved in their "willingness to share" (Borycz et al., 2023). Data sharing practices are still relatively recent in AHSS. The present study observed that researchers seem to be more or less diligent in protecting their data and backing it up. They preferred their own computers for storage, and the second-preferred option varied across departments.

 https://doi.org/10.1633/JISTaP.2026.14.2.5

Regarding FAIR compliance, most said their stored data is easily findable and accessible, fewer responded with "reusable" and even less for "interoperable" elements. We found that researchers need more awareness about DMP. In general, we can surmise there is a clear difference in the practices followed by those in STEM and those in AHSS disciplines.

Understanding why the gap exists in the first place will significantly help bridge it. Further studies are required to better understand the differences in research culture and data practices between STEM and AHSS. Learning more about the academic and research environments in STEM and AHSS will open more opportunities to introduce RDM appropriately to researchers. In an era when the world seems to be frantically leaning towards shortcuts in seeking answers, doing due diligence and following proper research methods and practices to achieve empirically tested and validated results seems even more crucial. RDM is rightly the natural step towards ensuring that the research we publish is evidence-based and factually accurate. Without data-driven checks in place to guarantee the veracity of our findings, the entire research ecosystem becomes precariously balanced, on the verge of collapse. A knowledge-based society cannot thrive if it is not based on objectively correct research. Institutions should address researchers' concerns and identify ways to encourage better data management practices. An institute-wide mandate, strictly enforced across institutions, funding agencies, publishers, and others, can help with this, while also raising awareness and improving research practices. Examining in depth the role libraries could play in RDM implementation and in designing training programs within academia will be potent and meaningful for the future roles of librarianship.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

Adams, J., Jones, B., & Foster, H. (2023). Supporting FAIR data management planning across different disciplines at the university of Sheffield. *Data Science Journal*, 22(17), 1-7. https://doi.org/10.5334/dsj-2023-017

Amorim, R. C., Castro, J. A., Rocha da Silva, J., & Ribeiro, C. (2017). A comparison of research data management platforms: Architecture, flexible metadata and interoperability. *Universal Access in the Information Society,* 16(4), 851-862. https://doi.org/10.1007/s10209-016-0475-y

Arend, D., Lange, M., Chen, J., Colmsee, C., Flemming, S., Hecht, D., & Scholz, U. (2014). e!DAL - a framework to store, share and publish research data. *BMC Bioinformatics*, 15(1), 214. https://doi.org/10.1186/1471-2105-15-214

Bhardwaj, R. K., Nazim, M., & Verma, M. K. (2025). Research data management and FAIR compliance through popular research data repositories: An exploratory study. *Data Technologies and Applications*, 59(3), 472-492. https://doi.org/10.1108/dta-12-2022-0477

Borgman, C. L. (2012). The conundrum of sharing research data. *Journal of the American Society for Information Science and Technology*, 63(6), 1059-1078. https://doi.org/10.1002/asi.22634

Borycz, J., Olendorf, R., Specht, A., Grant, B., Crowston, K., Tenopir, C., Allard, S., Rice, N. M., Hu, R., & Sandusky, R. J. (2023). Perceived benefits of open data are improving but scientists still lack resources, skills, and rewards. *Humanities and Social Sciences Communications*, 10(1), 339. https://doi.org/10.1057/s41599-023-01831-7

Briney, K. A., Coates, H., & Goben, A. (2020). Foundational practices of research data management. *Research Ideas and Outcomes*, 6, e56508. https://doi.org/10.3897/rio.6.e56508

Campos-Varela, I., & Ruano-Raviña, A. (2019). Misconduct as the main cause for retraction. A descriptive study of retracted publications and their authors. *Gaceta Sanitaria,* 33(4), 356-360. https://doi.org/10.1016/j.gaceta.2018.01.009

Díaz, O., Riquelme, G., & Rivera, G. (2021). Sharing research data: An analysis of the interest of social scientists in the context of a Mexican University. *Social Sciences*, 10(10), 390. https://doi.org/10.3390/socsci10100390

Dorch, B. (2012). *On the citation advantage of linking to data*. https://hal-hprints.archives-ouvertes.fr/hprints-00714715v1

Dube, T. V. (2025). Research data management in academic libraries: Institutional repositories as a reservoir for research data. *Library Management*, 46(5), 319-331. https://doi.org/10.1108/lm-06-2024-0070

Elango, B., Kozak, M., & Rajendran, P. (2019). Analysis of retractions in Indian science. *Scientometrics*, 119(2), 1081-1094. https://doi.org/10.1007/s11192-019-03079-y

Elsayed, A. M., & Saleh, E. I. (2018). Research data management and sharing among researchers in Arab universities: An exploratory study. *IFLA Journal,* 44(4), 281-299. https://doi.org/10.1177/0340035218785196

Herr, M. (2019). Responding to research misconduct: A primer for LIS professionals. *Science & Technology Libraries,* 38(3), 272-287. https://doi.org/10.1080/0194262x.2019.1644268

Joint Seat Allocation Authority. (2025). *About the institute*.

https://josaa.admissions.nic.in/applicant/seatmatrix/InstProfile.aspx?enc=gNI/L73ZsCSQkVP6SdcUGDYBTmtv/bFTMyf7HVOwnPs=

Junlabuddee, S., & Tuamsuk, K. (2021). Analysis of research data in information science using the topic modeling method. *Journal of Mekong Societies*, 17(1), 89-109. https://so03.tci-thaijo.org/index.php/mekongjournal/article/view/251779

Khan, N., Thelwall, M., & Kousha, K. (2023). Data sharing and reuse practices: Disciplinary differences and improvements needed. *Online Information Review*, 47(6), 1036-1064. https://doi.org/10.1108/oir-08-2021-0423

Lau, H. X., Lee, S. L. C., & Ali, Y. (2021). Effectiveness of data auditing as a tool to reinforce good research data management (RDM) practice: A Singapore study. *BMC Medical Ethics,* 22(1), 103. https://doi.org/10.1186/s12910-021-00662-y

Montague-Hellen, B., & Montague-Hellen, K. (2023). Publishers, funders and institutions: Who is supporting UKRI-funded researchers to share data? *Insights: The UKSG Journal*. 36(4), 1-17. https://doi.org/10.1629/uksg.602

National Academies of Sciences, Engineering, and Medicine. (2017). *Fostering integrity in research*. The National Academies Press.

National Science Board. (2023). *Publications output: U.S. trends and international comparisons*. https://ncses.nsf.gov/pubs/nsb202333

Nature Index. (2025). *2025 Research leaders: Leading countries/territories*. https://www.nature.com/nature-index/research-leaders/2025/country/all/global

Nguyen, L. T., & Tuamsuk, K. (2025). Factors influencing researchers' scientific integrity in scholarly publishing: A path analysis approach. *Research Ethics*, 21(3), 384-407. https://doi.org/10.1177/17470161241257445

Nitecki, D. A., & Alter, A. (2021). Leading FAIR adoption across the institution: A collaboration between an academic library and a technology provider. *Data Science Journal*, 20(6), 1-8. https://doi.org/10.5334/dsj-2021-006

Rehnert, M., & Takors, R. (2023). FAIR research data management as community approach in bioengineering. *Engineering in Life Sciences,* 23(1), e2200005. https://doi.org/10.1002/elsc.202200005

Ruediger, D., & MacDougall, R. (2023). *Are the humanities ready for data sharing?* https://sr.ithaka.org/wp-content/uploads/2023/03/SR-Issue-Brief-Data-Sharing-in-the-Humanities-03062023.pdf

Saeed, S., & Naushad Ali, P. M. (2019). Research data management and data sharing among research scholars of life sciences and social sciences. *DESIDOC Journal of Library & Information Technology*, 39(6), 290-299. https://doi.org/10.14429/djlit.39.06.14997

Sharma, K. (2021). *Eight '2nd gen' IITs set up in 2008-09 struggle for students, admissions 33% of target: CAG*. https://theprint.in/india/education/eight-2nd-gen-iits-set-up-in-2008-09-struggle-for-students-admissions-33-below-target-cag/790759/

Tenopir, C., Allard, S., Douglass, K., Aydinoglu, A. U., Wu, L., Read, E., Manoff, M., & Frame, M. (2011). Data sharing by scientists: Practices and perceptions. *PloS One,* 6(6), e21101. https://doi.org/10.1371/journal.pone.0021101

Tripathi, M., Chand, M., Sonkar, S. K., & Jeevan, V. K. J. (2017a). A brief assessment of researchers' perceptions towards research data in India. *IFLA Journal*, 43(1), 22-39. https://doi.org/10.1177/0340035216686984

Tripathi, M., Shukla, A., & Sonkar, S. K. (2017b). Research data management practices in university libraries: A study. *DESIDOC Journal of Library & Information Technology*, 37(6), 417-424. https://doi.org/10.14429/djlit.37.6.11336

Ünal, Y., Chowdhury, G., Kurbanoğlu, S., Boustany, J., & Walton, G. (2019). Research data management and data sharing behaviour of university researchers. *Information Research*, 24(1), paper isic1818. http://informationr.net/ir/24-1/isic2018/isic1818.html

Vasilevsky, N. A., Minnier, J., Haendel, M. A., & Champieux, R. E. (2017). Reproducible and reusable research: Are journal data sharing policies meeting the mark? *PeerJ*, 5, e3208. https://doi.org/10.7717/peerj.3208

Whyte, A., & Tedds, J. (2011). *Making the case for research data management*. https://www.dcc.ac.uk/sites/default/files/documents/publications/Making%20the%20case.pdf

Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J. W., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., … Mons, B. (2016). The FAIR guiding principles for scientific data management and stewardship. *Scientific Data*, 3(1), 160018. https://doi.org/10.1038/sdata.2016.18

Yeo-Teh, N. S. L., & Tang, B. L. (2024). Research data mismanagement - from questionable research practice to research misconduct. *Accountability in Research,* 31(6), 706-713. https://doi.org/10.1080/08989621.2022.2157268

APPENDIX 1. Some renowned research data management platforms

Platform name	Description
Dryad Digital Repository	It was developed in 2007. It is "a curated, open-access repository aimed at making research data freely reusable and citable." It makes curating, publishing, and preserving research data simple and affordable. All Dryad authors incur a data publishing charge based on the variable costs of curating, publishing, and preserving one dataset. Their data curators review each dataset shared with them to ensure that it is reusable and thoroughly described with appropriate metadata according to FAIR data standards (https://datadryad.org/about)
Harvard Dataverse	It "is a free data repository open to all researchers from any discipline, where one can share, archive, cite, access, and explore research data." Users can make their data accessible to the public or limit access and create their own terms of use. Upon publishing data, the user will be provided with a data citation that includes a DOI. Additionally, the created metadata is made "open and findable" through search engines. Files up to 2.5 GB in any format are accepted (https://support.dataverse.harvard.edu)
Open Science Framework (OSF)	It was developed in 2012 and is a free and open-source software project and platform that supports data sharing and open collaboration across research projects in any discipline and also functions as a workflow system. OSF provides the option to make the entire collaboration publicly accessible (https://osf.io)
Zenodo	It is operated by CERN under the European OpenAIRE program. It supports datasets without restrictions on file types, up to 50 GB, and provides DOI assignments for easy citation: "Zenodo code is itself open source and is built on the foundation of the Invenio digital library, which is also open source. The work-in-progress, open issues, and roadmap are shared openly in GitHub, and contributions to any aspect are welcome from anyone. All metadata is openly available under CC0 license, and all open content is openly accessible through open application programming interfaces" (https://zenodo.org)
Mendeley Data	It is "a free and secure cloud-based communal repository from Elsevier for data storage, sharing, and citation." It is part of the NIH GREI initiative, which promotes FAIR data principles: "Elsevier's Mendeley Data repository is a participating member of the National Institutes of Health (NIH) Office of Data Science Strategy GREI project. The GREI comprises seven established generalist repositories, funded by the NIH, that collaborate to establish consistent metadata, develop use cases for data sharing, train and educate researchers on FAIR data principles and the importance of data sharing, and more." It is powered by Digital Commons Data (https://data.mendeley.com)
Figshare	"Figshare is a provider of repository software" and "serves scholarly publishers, academic institutions, government agencies, non-profits, research funders and pharmaceutical organizations. They partner with organizations to provide repository infrastructure, but it is free for individual researchers" (https://figshare.com)
GigaDB	"GigaDB contains 2,669 discoverable, trackable, and citable datasets that have been assigned DOIs and are available for public download and use." "GigaDB is a data repository supporting scientific publications in the life/biomedical sciences domain. GigaDB organizes and curates' data from individually publishable units into datasets, which are provided openly and in as FAIR manner as possible for the global research community" (https://gigadb.org/about)
IEEE DataPort	"IEEE DataPort is a global research data platform available to individual researchers and institutions, enabling them to perform critical data management functions, including storing valuable research data and accessing research datasets that can be used in research" (https://ieee-dataport.org)
EUDAT	"The EUDAT Collaborative Data Infrastructure (or EUDAT CDI) is one of the largest infrastructures of integrated data services and resources supporting research in Europe. European researchers and practitioners from any research discipline can preserve, find, access, and process data in a trusted environment, as part of the EUDAT CDI. EUDAT provides heterogeneous research data management services and storage resources, supporting multiple research communities as well as individual researchers, through a geographically distributed, resilient network spanning 15 European nations. The data is stored alongside some of Europe's most powerful supercomputers" (https://eudat.eu)
CKAN	It is "an open-source data management system for powering data hubs and data portals. CKAN makes it easy to publish, share and access data…CKAN provides access to data through metadata" (https://ckan.org/faq/essential) (https://ckan.org/features)

FAIR, Findable, Accessible, Interoperable, and Reusable; DOI, digital object identifier.

APPENDIX 2. Statistical test results of the study variables across departments

Hypothesis	Variable	χ^2	df	p-value	Test used	Decision (H_0)
H_{01}	Whether you have used research data from others in your research	7.894	4	0.092	Chi-square	Fail to reject
H_{02}	Importance of others' research data in own work	1.423	2	0.491	Kruskal–Wallis	Fail to reject
H_{03}	Is access to own research data provided	40.881	8	<0.001	Chi-square	Reject
H_{04}	Reasons for not sharing research data					
a	It is time consuming	0.85	2	0.654		Fail to reject
b	To avoid misuse of your research data	9.37	2	0.009		Reject
c	Costs of storing and sharing research data	1.26	2	0.532		Fail to reject
d	Not aware how to share my research data with others	9.39	2	0.009		Reject
e	Lack of data sharing infrastructure	0.45	2	0.797		Fail to reject
f	Data confidentiality	11.34	2	0.003		Reject
g	Concerns about data quality	1.55	2	0.461		Fail to Reject
h	Data privacy concerns	18.39	2	<0.001		Reject
H_{05}	Have you ever lost research data	8.357	4	0.079		Fail to reject
H_{06}	Research data backup	8.953	6	0.176		Fail to reject
H_{07}	Research data storage methods					
a	On my own computer	6.288	2	0.043		Reject
b	On my institute computer	16.868	2	<0.001		Reject
c	On a shared computer in the department or institute	5.086	2	0.079		Fail to Reject
d	On the cloud storage	0.643	2	0.725		Fail to Reject
e	In the institute's digital repository	2.072	2	0.355		Fail to Reject
f	To an external hard disc	6.119	2	0.047		Reject
g	Maintaining it in a lab/research register	4.082	2	0.13		Fail to reject
h	Institutional data repository	0.583	2	0.794	Fisher's exact	Fail to reject
i	External data repository (e.g., Mendeley, Zenodo, Dryad Digital Repository, etc.)	3.223	2	0.2	Chi-square	Fail to reject
j	I do not store the research data	9.238	2	0.017	Fisher's exact	Reject
H_{08}	Is stored research data FAIR-compliant					
a	Easily findable	0.808	2	0.668	Chi-square	Fail to reject
b	Easily accessible	3.877	2	0.144		Fail to reject
c	Interoperable	2.127	2	0.345		Fail to reject
d	Reusable	0.028	2	0.986		Fail to reject
e	None of the above	5.051	2	0.08		Fail to reject
H_{09}	Data management plan awareness and use	5.36	4	0.252		Fail to reject

H_0: There is no significant relationship across the departments and the mentioned variable.
df, degree of freedom; FAIR, Findable, Accessible, Interoperable, and Reusable.

 https://doi.org/10.1633/JISTaP.2026.14.2.5

APPENDIX 3. Survey questionnaire: research data management practices: a comparative study of research scholars from engineering, science, and AHSS

The survey questions were distributed among the research scholars of select Indian Institutes of Technology (IIT) through Google Forms. Total 396 responded to the survey.

1. E-mail: _____
2. Name of IIT:
   - ☐ IIT Madras
   - ☐ IIT Guwahati
   - ☐ IIT Hyderabad
   - ☐ IIT Bhubaneshwar
   - ☐ IIT Tirupati
   - ☐ IIT Bhillai
3. Department:
   - ☐ Engineering
   - ☐ Science
   - ☐ Arts, Humanities, & Social Sciences
4. Whether you have used research data from others in your research
   - ☐ Yes
   - ☐ No
   - ☐ Maybe
5. If yes, was it important to your research
   - ☐ Not Important
   - ☐ Slightly Important
   - ☐ Somewhat Important
   - ☐ Very Important
   - ☐ Extremely Important
6. Have you provided access to your scientific research data?
   - ☐ All my research data is openly accessible
   - ☐ Only some part of my research data is openly accessible
   - ☐ All my research data is accessible with some restriction (IP address, password, etc.)
   - ☐ Only some part of my research data is accessible with some restriction (IP address, password, etc.)
   - ☐ I have not provided access to my research data
7. If you are not sharing your research data, what is the reason (Please select all the applicable options)
   - ☐ It is time consuming
   - ☐ To avoid misuse of your research data
   - ☐ Costs of storing and sharing research data
   - ☐ Not aware how to share my research data with others
   - ☐ Lack of data sharing infrastructure
   - ☐ Data confidentiality
   - ☐ Concerns about data quality
   - ☐ Data privacy concerns
   - ☐ Other: _____
8. Whether you have ever lost your research data
   - ☐ Yes
   - ☐ No
   - ☐ I'm not sure
9. How are you storing your research data? (Please select all the applicable options)
   - ☐ On my institute computer
   - ☐ On a shared computer in the department or institute
   - ☐ On the cloud storage
   - ☐ In the institute's digital repository
   - ☐ To an external hard disc
   - ☐ Maintaining it in a lab/research register
   - ☐ Institutional data repository
   - ☐ External data repository (e.g., Mendeley, Zenodo, Dryad Digital Repository, etc.)
   - ☐ I do not store the research data
   - ☐ Other: _____

10. Are you taking backups of your research data?
   ☐ Yes, regularly
   ☐ Yes, occasionally
   ☐ Yes, rarely
   ☐ No
11. Whether your stored research data is (Please select all the applicable options)
   ☐ Easily Findable
   ☐ Easily Accessible
   ☐ Interoperable (easily compatible across different formats/software, etc.)
   ☐ Reusable
   ☐ None of the above
12. Are you aware of data management plan (DMP)? If yes, whether you are providing the DMP while submitting proposal for the grant
   ☐ Yes, I know & I submit
   ☐ Yes, I Know, but I don't submit
   ☐ I don't know about DMP

 https://doi.org/10.1633/JISTaP.2026.14.2.5

JISTaP https://www.jistap.org
Journal of Information Science Theory and Practice

RESEARCH PAPER
J Inf Sci Theory Pract 14(2): 97-116, 2026

eISSN : 2287-4577 pISSN : 2287-9099

https://doi.org/10.1633/JISTaP.2026.14.2.6

Exploring Platform-Mediated Health Information Behavior: ADHD Self-Diagnosis Intention on Video-Based Social Media Among Korean Young Adults

Jung Sun Seo
Department of Library and Information Science, Yonsei University, Seoul, Korea
E-mail: seoooo0316@yonsei.ac.kr

Jee Yeon Lee*
Department of Library and Information Science, Yonsei University, Seoul, Korea
E-mail: jlee01@yonsei.ac.kr

ABSTRACT

Amidst growing concerns about the quality of video-based social media (VSM) information and rising adult attention-deficit/hyperactivity disorder (ADHD) diagnoses, this study empirically investigates the structural mechanisms of platform-mediated health information behavior. Specifically, the authors examine how pre-existing psychosocial vulnerabilities (including metacognitive beliefs about health anxiety, medical mistrust, and anticipated stigma), platform-mediated channels, and platform affordances relate to the intention to self-diagnose ADHD. Data were collected via an online survey from 216 South Korean young adults in their 20s and 30s without prior formal diagnoses. Multiple regression and bootstrapping-based mediation analyses were conducted to explore these structural relationships. Key findings indicate that social media dependency, exposure frequency, and a user preference for short-form videos are significantly and positively associated with the intention to self-diagnose. Notably, the analyses reveal that information-seeking intention, social media dependency, and exposure frequency significantly mediate the relationship between the users' pre-existing vulnerabilities and their self-diagnosis intention. Rather than viewing this phenomenon merely as a passive internalization of misinformation, these results reframe VSM-based self-diagnosis as an active, compensatory information behavior utilized to navigate offline social barriers. Consequently, this study highlights the urgent need for algorithm-conscious health information curation by information professionals and targeted e-health literacy interventions to guide vulnerable users toward evidence-based clinical support.

Keywords: video-based social media, online mental health information, self-diagnosis, adult attention-deficit/hyperactivity disorder, health information behavior, information seeking

Received: February 11, 2026 **Revised:** March 17, 2026
Accepted: March 20, 2026 **Published:** June 30, 2026

***Corresponding Author:** Jee Yeon Lee
https://orcid.org/0000-0001-6885-4684
E-mail: jlee01@yonsei.ac.kr

All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

© 2026 [Jung Sun Seo, Jee Yeon Lee] This article is distributed under the Creative Commons Attribution License (CC BY), allowing unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. It is published by the Korea Institute of Science and Technology Information & Yonsei University's Research Institute for Academic Library Development.

1. INTRODUCTION

Video-based social media (VSM), encompassing platforms like YouTube and TikTok, has become a primary information source for contemporary users, fundamentally reshaping the landscape of information creation and consumption (Gallup Korea, 2023; Zheng et al., 2025). These platforms, characterized by algorithmically curated multimodal content (Fu et al., 2024), provide users with unprecedented access to a vast array of topics, among which mental health has emerged as a particularly prominent and rapidly expanding area (Caron, 2022).

1.1. Video-Based Social Media in the Health Information Context

Moving beyond mere entertainment, VSM has firmly established itself as a pivotal channel for health and medical information, deeply influencing how individuals seek, perceive, and manage their well-being. The accessibility and familiarity of VSM have significantly heightened public awareness of mental disorders, including those previously under-recognized in certain demographics, such as adult attention-deficit/hyperactivity disorder (ADHD) (Boseley, 2021; Caron, 2022; Eagle & Ringland, 2023). This digital environment offers benefits like reducing the stigma associated with mental health conditions (Caron, 2022) and providing support for individuals facing barriers to traditional medical care (Eagle & Ringland, 2023).

However, the structural characteristics of VSM, where content engagement often outweighs factual accuracy, raise significant concerns about the quality and reliability of the health information being disseminated (Marengo et al., 2021; Yeung et al., 2022; Zhou et al., 2021). Much of the health-related content, particularly on platforms like TikTok, is based on personal experiences, which, while subjectively valid, often misaligns with established clinical criteria or presents oversimplified narratives (Aragon-Guevara et al., 2025; Fraticelli et al., 2021). For instance, studies have found that a significant portion of popular VSM content on ADHD is misleading (Yeung et al., 2022) and that such inaccurate content frequently achieves higher engagement than evidence-based information (McCashin & Murphy, 2023; Thapa et al., 2018). The frequent exposure to such information, amplified by platform algorithms, can shape users' perceptions and subsequent health behaviors (Zeballos Rivas et al., 2021). This "infodemic" can lead to paradoxical outcomes where users' confidence in their knowledge increases even as their accurate understanding of a disorder decreases (Schiros et al., 2025), fostering misplaced confidence and anxiety (Boseley, 2021; Gupta & Ariefdjohan, 2021; Yeung et al., 2022).

1.2. Need for the Study: The Rise of Platform-Mediated Self-Diagnosis

Within this challenging information environment, platform-mediated health information behavior (HIB) has emerged as a critical area of study. In this research, the authors explicitly define this concept as the processes by which users seek, evaluate, and act upon health information within algorithmically structured digital environments, where the platform itself actively shapes the conditions of information exposure and users' subsequent decision-making. One of the most significant subsequent behaviors to emerge from these platform-mediated processes is the user's tendency to engage in self-diagnosis (Boseley, 2021; Caron, 2022; Eagle & Ringland, 2023). The current study approaches self-diagnosis not as a purely medical phenomenon, but as a complex information-driven behavior. It results directly from users' exposure to and interaction with online content and involves problem-solving processes central to information behavior research, such as information seeking, evaluation (or lack thereof), and the personal application of information (Kim & Grunig, 2011). The potential for such behavior to cause harm—ranging from pathologizing normal experiences (Yeung et al., 2022) and fostering distrust in medical professionals (Boseley, 2021; Gupta & Ariefdjohan, 2021) to causing individuals to avoid or delay professional diagnosis and appropriate treatment (Eagle & Ringland, 2023)—underscores the urgent need to understand its drivers.

This phenomenon is particularly evident with ADHD, which has become notably prominent on VSM platforms, garnering over 20.6 billion views globally (Hartnett & Cummings, 2024). Although historically diagnosed in childhood, the rate of adult ADHD diagnoses has risen substantially, a trend likely exacerbated by the increasing availability of self-diagnosis information on platforms like TikTok and YouTube (Babcock, 2021; Boseley, 2021; Gilmore et al., 2022). Driven by concerns over the potential harms of this trend, prevalent clinical and educational discourses have often adopted a deficit-based perspective, characterizing VSM-based self-diagnosis merely as a passive internalization of misinformation or the over-pathologizing of normal experiences (Foster & Ellis, 2024; Shashua, 2025). However, reducing this phenomenon to an irrational trend or passive susceptibility overlooks the active information-seeking processes of users. While re-

cent psychological and sociological studies have attempted to overcome this limitation by qualitatively exploring users' identity exploration or the affective characteristics of the platforms (Holroyd, 2026; Rouffaer, 2024), there remains a critical gap in empirically elucidating the structural mechanisms through which users' internal vulnerabilities and social barriers translate into concrete HIB. Consequently, there is an urgent need for an empirical investigation that structurally analyzes this phenomenon from an information behavior perspective, identifying the multi-dimensional factors that drive the intention to self-diagnose (ISD).

1.3. Objectives and Scope of the Study

To address this need, rather than proposing a new theoretical model, the primary objective of this study is to construct and test an exploratory empirical framework that traces the sequential pathway of platform-mediated HIB, utilizing VSM-based ADHD self-diagnosis as a case. Adopting a multidisciplinary approach, this research draws upon established concepts from media system dependency theory, the elaboration likelihood model (ELM), health psychology, and sociology. By applying these concepts, this study examines how users' pre-existing psychosocial vulnerabilities, digital channel usage, and platform affordances predict the ISD, further exploring the potential pathways linking these multi-dimensional factors. By elucidating the mechanisms that lead individuals from information exposure to self-diagnosis intention, this study seeks to provide a foundational understanding of an emergent digital health phenomenon, offering crucial insights for information scientists, healthcare professionals, and platform designers navigating this new information ecosystem. The scope of this study is specifically focused on young adults in their 20s and 30s who actively use VSM and have not received a prior formal diagnosis of ADHD, as this demographic is situated at the center of the current digital self-diagnosis trend (Boseley, 2021; Gilmore et al., 2022; Lee, 2023).

2. LITERATURE REVIEW

2.1. Social Media and Adult Attention-Deficit/Hyperactivity Disorder

ADHD, characterized by inattention, hyperactivity, and impulsiveness, is now recognized to persist into or even begin in adulthood (Agnew-Blais et al., 2016; Das et al., 2012; Moffitt et al., 2015; Song et al., 2021). Social media (SM) has significantly increased ADHD awareness, offering timely and anonymous information that can reduce stigma and promote help-seeking (Boseley, 2021; Hartnett & Cummings, 2024; Yeung et al., 2022).

However, the VSM information environment surrounding ADHD is complex and often problematic. Unfiltered information can lead to misinformation, self-mislabeling, and avoidance of professional diagnosis and appropriate treatment (Eagle & Ringland, 2023). A significant portion of ADHD content, particularly on platforms like TikTok and YouTube, is considered misleading as it is often created by non-experts. Alarmingly, this inaccurate content frequently achieves higher popularity and engagement than evidence-based information, receiving significantly more views, likes, and shares (McCashin & Murphy, 2023; Yeung et al., 2022; Zhou et al., 2021). There are also broader concerns about this trend contributing to ADHD overdiagnosis (Kazda et al., 2021) and misdiagnosis (Yeung et al., 2022), and delays between online information exposure and professional consultation can make individuals resistant to other treatments (Foster & Ellis, 2024).

Beyond these concerns regarding content quality and popularity, recent empirical studies have further illuminated the structural and psychological mechanisms that facilitate these self-diagnostic behaviors. Research has explored the "affective economy" of ADHD-related content on TikTok, where personal narratives of neurodivergence create validating spaces that encourage users to adopt diagnostic labels (Holroyd, 2026). The role of algorithmic curation has been identified as a critical driver in this process, as artificial intelligence (AI)-powered recommendation systems personalize health information environments and reinforce users' health-related intentions (Zheng et al., 2025). This environment is further complicated by the fact that platforms like TikTok remain significantly underutilized by public health authorities and medical professionals, leaving the health discourse largely to individual creators (McCashin & Murphy, 2023). From a practical perspective, these SM-inspired self-diagnoses have begun to significantly impact professional psychological practices, presenting both challenges and opportunities for clinical validation (Foster & Ellis, 2024).

Driven by these interwoven algorithmic, psychological, and informational dynamics, this multifaceted environment necessitates a deeper understanding of the processes by which users adopt and act upon online health information. A significant behavioral outcome of this information adoption process is the tendency toward self-diagnosis (Gupta & Ariefdjohan, 2021), which appears prevalent but

is not yet comprehensively explored from an information behavior perspective. The current study examines how various individual, platform, and social factors are associated with users' information-seeking intentions (IIS) and, subsequently, their ISD.

To address this research question, the subsequent literature review systematically explores these multifaceted variables through an integrated theoretical lens. This study first establishes an overarching theoretical framework grounded in library and information science (LIS) to contextualize platform-mediated information behavior (Section 2.2). Following this conceptual foundation, the remaining subsections are presented sequentially to align with the empirical development of the exploratory research questions, structured around three overarching dimensions of the platform-mediated information environment. First, the review explores pre-existing psychosocial vulnerabilities, encompassing internal cognitive states (Section 2.3) and socio-cultural barriers (Sections 2.4, 2.8). Second, it examines platform-mediated information channels, focusing on Social media dependency (SMD) (Section 2.5) and social media exposure (SME) (Section 2.7). Finally, the analysis turns to information evaluation and platform affordances (Section 2.6). Together, by anchoring these multidimensional factors within the established theoretical framework, this study investigates how they concurrently relate to the ISD, while also exploring the dynamic structural associations among them.

2.2. Platform-Mediated Health Information Behavior: An Extension of Library and Information Science Information Behavior Models

While psychological and media theories offer valuable insights into specific aspects of digital health behaviors, incorporating an overarching framework from LIS can provide a more comprehensive understanding of the VSM self-diagnosis process. To this end, this study adopts an integrative LIS perspective, bridging foundational concepts from early information behavior models with contemporary frameworks of nonlinear and platform-mediated information seeking.

According to Wilson (1999), human information behavior is often driven by secondary needs arising from underlying psychological, cognitive, or affective motives within a specific context. Wilson (1999) suggests that various "intervening variables"—such as psychological, demographic, interpersonal, and environmental factors—can act as either barriers or facilitators to information seeking. In the context of this study, pre-existing psychosocial vulnerabilities, including health anxiety associated with metacognitive beliefs (MCBs), medical mistrust (MM), and anticipated stigma, are considered as potential intervening variables. While these factors may traditionally act as barriers that discourage individuals from seeking professional medical advice, within the digital landscape, they might serve as facilitators. They can prompt individuals to engage in alternative information-seeking behaviors to resolve their cognitive uncertainty.

While Wilson (1999)'s macro-model provides a foundational understanding of how psychological barriers can trigger alternative information seeking, the specific dynamics within the VSM environment can be more clearly elucidated by integrating the nonlinear model of information-seeking behavior (Foster, 2004). Foster (2004) conceptualizes information behavior not as a sequential, step-by-step search, but as a dynamic, iterative, and holistic process where information is often acquired through opportunistic encounters. In this model, a user's "internal context"—comprising their cognitive and affective states, such as feelings of anxiety or mistrust—continuously interacts with the external information environment. In the VSM context, algorithmic curation facilitates these nonlinear encounters, potentially leading users with underlying psychosocial vulnerabilities—such as MM or anticipated stigma—to passively discover and interact with ADHD content without an explicit initial search query (Foster, 2004).

Furthermore, recent literature extending HIB frameworks into the SM context heavily emphasizes the interplay between user perceptions and platform characteristics. According to systematic reviews of health information-seeking models, contemporary frameworks increasingly incorporate media-specific variables, reflecting the critical role that affective factors and platform trust play in shaping digital health behaviors (Lalazaryan & Zare-Farashbandi, 2014; Jia et al., 2021). This perspective aligns with recent empirical findings indicating that younger generations, as digital natives, exhibit significantly higher engagement with online health information, where their behaviors are distinctly driven by risk perceptions (e.g., salience) and critical evaluations of channel characteristics, such as platform trustworthiness (Chang et al., 2024). Building upon this academic shift, the current study seeks to move beyond examining isolated individual psychological factors by explicitly integrating platform-specific variables—namely, SME and the unique characteristics of VSM (e.g., short-form video formats [SFVs])—into its empirical framework.

Ultimately, the culmination of these complex information behaviors—often conceptualized in LIS as the "information processing and use" stage (Wilson, 1999)—can be directly linked to the ISD in this study. From this integrated LIS perspective, VSM-based self-diagnosis may not be solely a passive acceptance of misinformation. Instead, it can be viewed as an active, albeit constrained, information processing behavior where users, driven by offline social barriers and guided by dynamic platform affordances, evaluate and apply algorithmically curated health information to their personal circumstances.

2.3. Metacognitive Beliefs on Health Anxiety

Metacognition is "thinking about thinking," and MCBs are beliefs people hold about their thought processes (Keen et al., 2022). Negative MCBs, for example, include the conviction that thoughts are uncontrollable or can cause illness (Wells, 2002). Negative MCBs have been shown to be associated with cyberchondria, a symptom characterized by excessive online medical searches and health anxiety (Fergus & Spada, 2017). Individuals with high health anxiety strongly believe they cannot fully control their beliefs or thoughts about illnesses, which leads them to excessively worry and ruminate about their own health conditions (Bailey & Wells, 2015). Beyond remaining a mere belief, such thoughts can also lead individuals to perceive the necessity of engaging in repeated online health information searches until the perceived information deficit is resolved (Brown et al., 2020). Moreover, individuals who believe they cannot control their own minds and do not trust their judgments may prefer SM use over offline interactions (e.g., face-to-face conversations and social relationships), potentially triggering problematic SM use (Balıkçı et al., 2020).

Thus, individuals with negative MCBs about health are predicted to persistently acquire disease-related information on SM (Fergus & Spada, 2018). Furthermore, they may not only passively accept such information but also deeply rely on it. By driving these persistent and reliant online information behaviors, negative MCBs ultimately increase the likelihood of self-perception and self-diagnosis of mental disorders based on their own physical symptoms and lifestyle habits rather than seeking expert consultation or clinical diagnosis offline. Therefore, this study explores how negative MCBs about health anxiety (MCB-HA) are associated with the ISD ADHD via VSM.

2.4. Medical Mistrust

Offline social belief systems often translate into online behaviors. For instance, recent research has shown that strong sociocultural factors such as religiosity and social conformity significantly predict online information sharing and verification behaviors (Khalil et al., 2025). Similarly, pre-existing social beliefs like MM and anticipated stigma can act as powerful drivers for individuals to seek health information and engage in self-diagnosis through VSM. Tendencies to mistrust the medical system (MMS) and healthcare providers (MMP) can heighten susceptibility to misinformation found on SM (Pierre, 2020) and appear to influence behaviors related to seeking professional medical help (Nah et al., 2024).

In the digital information environment, the shift of information trust toward user-generated content (UGC) is a widely observed behavioral trend across various domains; for example, studies have shown that users often perceive UGC as possessing higher validity and legitimacy than conventional formal sources (Aydin, 2020; Kitsios et al., 2022). This tendency extends to the health domain, where users increasingly determine the information quality and trustworthiness of health content based on peer experiences, relatability, and visually appealing formats, rather than relying on verified medical expertise (Freeman et al., 2023). For individuals harboring high MM, this reliance on UGC is significantly amplified. Because they actively doubt the intentions and reliability of formal healthcare providers, they are even more likely to completely reallocate their trust toward UGC and uncritically accept the health information shared by their peers. However, placing such unchecked trust in online health information without engaging in critical assessment can exacerbate problematic behaviors, including excessive health-related searching and a propensity to self-diagnose—often conceptualized as cyberchondria (Laato et al., 2020; Zheng & Tandoc, 2022; Zheng et al., 2023).

MMS not only refers to a lack of trust in healthcare itself but also stems from the belief that healthcare professionals and institutions may act against rather than for the best interests of patients (Jaiswal & Halkitis, 2019). While historically examined within specific marginalized communities (Brenick et al., 2017; Kalichman et al., 2016; Thorburn et al., 2012), MM is increasingly recognized as a broader phenomenon among the general public, often fueled by concerns over illness-related stigma or systemic instabilities in healthcare (Jaiswal & Halkitis, 2019). Given this context, individuals harboring such mistrust may be more inclined to seek alternative health information outside formal medical channels. In today's digital landscape, this tendency could naturally extend to a greater reliance

on UGC on algorithmic platforms like VSM. Therefore, it is plausible that heightened MM is associated with alternative online information seeking, which in turn may relate to a higher ISD. With these points in mind, this research investigates the ways in which MMS and MMP relate to users' VSM-based ISD for ADHD.

2.5. Social Media Dependency

SMD, a concept derived from media system dependency theory proposed by Ball-Rokeach and DeFleur (1976), generally refers to the extent to which individuals perceive that SM helps achieve important goals in daily life (Kim & Jung, 2017). The relationship of dependency between users and mass media develops based on the intensity of motivations to obtain information believed to be useful in achieving personal goals within specific contexts (Ball-Rokeach et al., 1984). Higher dependency on media, therefore, suggests the increased effectiveness of media messages (Morton & Duck, 2001) and indicates that individuals may be more susceptible to their behaviors and beliefs being affected by opinions disseminated in the media (Ho et al., 2015).

In the context of COVID-19, Handarkho et al. (2022)'s study, which assumed that individuals who consider SM as a primary source of information trust the content shared on platforms, highlighted that SMD had a significant and immediate impact on personal trust in COVID-19 information. Additionally, Kim and Jung (2017) found that individuals with a high tendency toward SMD are more likely to actively engage as storytellers on SM and pay more attention to and discuss topics that have been exposed on SM, even in the offline domain. Building on this previous research, this study assumes that strong SMD may be associated with practical and active health-related behaviors, thereby seeking to determine how SMD correlates with VSM-based ISD for ADHD.

2.6. Platform Characteristics

The characteristics of VSM platforms—spanning creators, content, and physical format—are critical in shaping users' self-diagnosis intentions. Users are often more drawn to content from creators sharing personal experiences than to information from experts, as these narratives are perceived as more relatable and trustworthy (Freeman et al., 2023; Yeung et al., 2022). However, this preference carries significant risks, as UGC can oversimplify complex conditions and spread misinformation, thereby increasing the likelihood of inaccurate self-diagnosis (Aragon-Guevara et al., 2025).

The influence of video length further complicates this dynamic, a concept well-explained by the ELM (Petty & Cacioppo, 1986). While long-form videos (LFVs) may allow for the deep, critical evaluation associated with central route processing, the fast-paced and emotionally engaging nature of SFVs encourages peripheral route processing. This makes users more susceptible to persuasion by compelling but potentially misleading heuristic cues, such as personal anecdotes, rather than objective facts (Fu et al., 2024; Petty & Cacioppo, 1986). This interplay of preferred creator types, content styles, and video formats likely influences the ISD. Accordingly, this study seeks to identify how specific platform characteristics—namely, creator type, content type, and video length—differentiate the degree of VSM-based ISD for ADHD.

2.7. Social Media Exposure

While SMD focuses on a user's internal psychological dependency, SME refers to the external and environmental frequency of encountering specific content. In the VSM ecosystem, SME is primarily driven by algorithmic curation, which determines the objective volume and repetition of information exposure regardless of the user's initial psychological intent. Unlike traditional health information seeking, AI-powered SM platforms employ an 'information finds me' approach, passively pushing content based on users' past engagement traces (Zheng et al., 2025). VSM algorithms tailor audiovisual content to users' preferences, enhancing engagement but not filtering for quality, leading to frequent exposure to inaccurate information (Yeung et al., 2022). Consequently, this algorithmic exposure frequently creates echo chambers, trapping users in homophilic health content loops (Zheng et al., 2025). Furthermore, users often perceive these algorithmic feeds (e.g., TikTok's For You Page) as a "runaway train" over which they have little control, constantly inundating them with mental health content once initial engagement occurs, while prioritizing popularity and engagement metrics over clinical validity (Milton et al., 2023).

Additionally, by contributing to selective exposure to content, these algorithms exacerbate users' tendency to accept information that aligns with their existing beliefs and attitudes while ignoring contradictory information (van Strien et al., 2016). Given that the quality of health information disseminated on almost all VSM platforms is generally poor (Suarez-Lledo & Alvarez-Galvez, 2021), frequent exposure to such information is more likely to lead users to match their physical and mental symptoms with those of ADHD as discussed on SM, while disregard-

 https://doi.org/10.1633/JISTaP.2026.14.2.6

ing other possibilities. Moreover, prolonged exposure to harmful or inaccurate content has been associated with worse mental health symptoms (Fekih-Romdhane et al., 2020; Mongkhon et al., 2021), and continued exposure to SM content created by users who actually suffer from mental illness may increase the risk of developing psychopathology in individuals who are relatively vulnerable from a mental health perspective (Griffith & Stein, 2021; McCashin & Murphy, 2023). This empirical evidence suggests that the frequency of exposure to SM content about mental disorders could influence the perception of symptoms or lead individuals to believe they have such symptoms. Accordingly, this study aims to clarify the relationship between the frequency of exposure to ADHD content on VSM (SME) and the ISD.

2.8. Anticipated Stigma

Anticipated psychiatric stigma remains a significant barrier to seeking formal medical help (Clement et al., 2015; Magaard et al., 2017; Schomerus et al., 2019). When individuals perceive themselves as potentially belonging to a stigmatized category, such as those with mental illnesses, they often attempt to conceal it, leading to internal distress and social isolation (Pachankis, 2007). However, the intrinsic desire to understand and alleviate one's psychological symptoms may persist even when formal clinical avenues are intentionally avoided. In this context, VSM may function as a compensatory information environment. Platforms like YouTube and TikTok can offer a sense of relative anonymity and algorithmically curated communities where users might explore mental health content without the perceived risk of offline exposure (Milton et al., 2023). By bypassing traditional medical gatekeepers, individuals with high anticipated stigma may safely consume validating narratives from peers who share similar hidden struggles (Eagle & Ringland, 2023; Holroyd, 2026). Consequently, this reliance on VSM as a safe haven for health information seeking—linked to the fear of societal stigma—is likely to be positively associated with a higher ISD, potentially serving as an accessible alternative to professional medical evaluation. Accordingly, this study aims to explore how anticipated psychiatric stigma relates to VSM-based ISD for ADHD.

2.9. Summary of Research Questions

Based on the multidisciplinary literature reviewed above, this study explores the structural mechanisms of platform-mediated HIB without positing predetermined directional hypotheses, reflecting the exploratory nature of this emergent phenomenon. The specific research questions guiding this study are consolidated as follows:

RQ1. How do pre-existing psychosocial vulnerabilities, platform-mediated information channels, and platform affordances relate to the information behaviors of VSM users regarding ADHD, specifically in association with their IIS and subsequent ISD?

RQ2. How are negative MCB-HA associated with the ISD ADHD via VSM?

RQ3. In what ways do MMS and MMP relate to users' VSM-based ISD for ADHD?

RQ4. How does SMD correlate with VSM-based ISD for ADHD?

RQ5. How do specific platform characteristics—namely, creator type (RQ5a), content type (RQ5b), and video length (RQ5c)—differentiate the degree of VSM-based ISD for ADHD?

RQ6. What is the relationship between the frequency of exposure to ADHD content on VSM (SME) and the ISD?

RQ7. How does anticipated psychiatric stigma relate to VSM-based ISD for ADHD?

3. METHODOLOGY

3.1. Methods

ADHD has long been known as a disorder that manifests in childhood. However, there has been a recent increase in self-diagnosis and screening rates for ADHD among young adults. Some suggest that this trend may be influenced by the abundance of ADHD-related content on SM (Boseley, 2021; Lee, 2023). Therefore, this study focuses on adult users, particularly those in their 20s and 30s. To ensure relevance, the sample was limited to VSM users who had not previously received a professional ADHD diagnosis or treatment.

Based on the theoretical framework and research questions established in the previous sections, the conceptual model for this study is presented in Fig. 1. This framework explicitly illustrates the proposed associations between pre-existing psychosocial vulnerabilities, platform-mediated channels, and the subsequent ISD ADHD, providing a visual roadmap for empirical testing.

3.2. Composition of Survey Tool

The survey items for the study were chosen as described below. Excluding the introductory questions on demographic characteristics, general VSM usage, prior

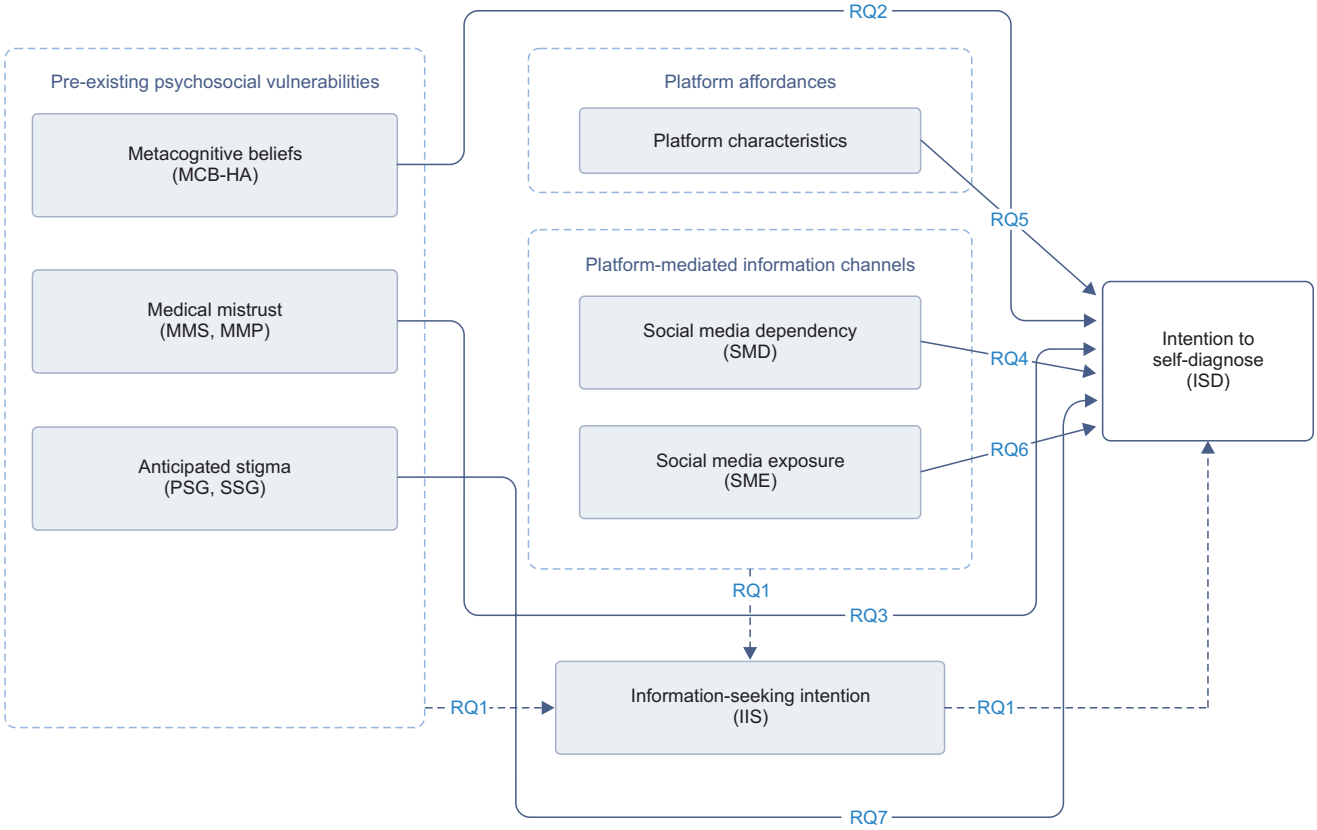


Fig. 1. Conceptual framework. Solid lines represent direct relational pathways to ISD evaluated in this study (RQs 2-7); dashed lines represent the overarching proposed mediation pathways via information-seeking intention (RQ1). MCB-HA, metacognitive beliefs on health anxiety; MMS, mistrust in the medical system; MMP, mistrust in medical providers; PSG, primary social group; SSG, secondary social group.

medical history, and specific exposure checks to the stimulus videos, the survey consisted of a total of 71 structured items measured on a Likert scale. To ensure the cross-cultural validity of the original English scales utilized in this study, the translation process involved rigorous consultation with English language and literature majors and professional translators to maintain both semantic equivalence and contextual appropriateness.

To assess MCB-HA, the authors used five items from the Korean version of the Metacognitions Questionnaire-Health Anxiety (Bailey & Wells, 2015), validated by Kim (2021). These items, focusing specifically on the belief that thoughts can cause illness, were rated on a 5-point Likert scale and have demonstrated acceptable reliability (Cronbach's α=0.72-0.78).

MM was measured across two dimensions: MMS and MMP. For the former, this study used a robust seven-item factor (α=0.76) from the Korean-translated Medical Mistrust Inventory (LaVeist et al., 2009). For the latter, the authors adapted the Wake Forest Trust in Physicians Scale (Hall et al., 2002) to measure public trust, a method that has shown high reliability (α=0.87-0.88) in previous research (Gao et al., 2023).

SMD was evaluated using 21 items from Kim and Jung (2017), where participants rated SM's usefulness on a 5-point scale. To measure preferences for platform characteristics, participants viewed actual ADHD-related videos from platforms like YouTube and TikTok before rating their preferences regarding creator, content, and physical attributes. SME was self-reported based on methods from Olagoke et al. (2020) capturing total and platform-specific use over the past week.

Anticipated stigma was measured using two factors from the Endorsed and Anticipated Stigma Inventory (Vogt et al., 2014). The authors adapted the terminology to distinguish between concerns of stigma from "primary social groups" (e.g., family and friends) and "secondary social groups" (e.g., school and workplace). Finally, IIS was assessed with items adapted from Kim and Grunig (2011), while the dependent variable, ISD, was measured using

 https://doi.org/10.1633/JISTaP.2026.14.2.6

five modified items from Park (2023) on a 7-point Likert scale. Park (2023)'s original generic self-diagnosis items were structurally modified to be strictly ADHD-focused.

Prior to the main data collection, a pre-test was conducted with a panel of five individuals representing the target demographic. This step was taken to evaluate the face validity, clarity of the translated phrasing, and overall comprehension of the questionnaire. Minor wording adjustments were subsequently made based on their feedback to ensure the survey's reliability and natural flow in Korean.

3.3. Sample and Procedure

Data were collected via an online survey distributed for three weeks in May 2024 on platforms popular with young adults in South Korea. While VSM platforms such as YouTube and TikTok operate globally, this empirical investigation focuses on the information behavior of users within the socio-cultural context of South Korea. This study was conducted in strict adherence to ethical principles for research involving human subjects. Prior to participation, all respondents were provided with a detailed information sheet and gave their informed consent. The survey began with a consent form that clearly outlined the study's purpose, ensured the anonymity of responses, and affirmed the voluntary nature of participation, including the right to withdraw at any time. To ensure data quality, the authors removed duplicates and overly fast responses, and also excluded eight participants with prior ADHD medical consultations, resulting in a final sample of 216 valid responses. Although there are no fixed rules for determining sample sizes in questionnaire validation, the current sample (n=216) is deemed statistically robust. Methodological studies demonstrate that factor stability relies fundamentally on absolute sample size and strong factor loadings (>0.60) rather than the subject-to-item ratio (Guadagnoli & Velicer, 1988), a standard widely adopted in contemporary empirical research (e.g., Theocharis et al., 2023).

This study strictly complied with the official ethical review procedures of the affiliated institution. In accordance with the institutional policy, researchers are required to complete an online self-assessment to determine whether a study qualifies for an exemption based on its low-risk nature. For such categories, the university delegates the authority for ethical review and formal determination to the respective departmental review committee. Prior to the initiation of the study, the research plan underwent a review by the departmental committee at Yonsei University. In accordance with the institution's internal regulations at the time, the committee determined that the study was exempt from a full Institutional Review Board review, precluding the issuance of a specific Institutional Review Board exemption number.

To encourage involvement, participants were offered a chance to win various prizes. This study's sample (see Table 1) was predominantly female (82.9%) and in their mid-20s (26.4%). The majority held a bachelor's degree (55.6%). YouTube was the primary VSM platform for 74.1% of respondents. This demographic data, consistent with broader trends among individuals in their 20s and 30s, suggests the sample is representative (Gallup Korea, 2023).

Table 1. Demographic and social media usage characteristics of respondents (n=216)

Variable	Value
Sex	
Male	37 (17.1)
Female	179 (82.9)
Age (yr)	
20-23	32 (14.8)
24-26	57 (26.4)
27-29	48 (22.2)
30-33	47 (21.8)
34-36	17 (7.9)
37-39	15 (6.9)
Educational level	
Middle school or lower	0 (0.0)
High school graduate	5 (2.3)
University enrolled	54 (25.0)
University graduate	120 (55.6)
Postgraduate degree	37 (17.1)
Primary video-based social media	
YouTube	160 (74.1)
Instagram	49 (22.7)
X	2 (0.9)
TikTok	5 (2.3)
Other	0 (0.0)

Values are presented as number (%).

Table 2. Validity

Variable	Measurement items	1	2	3	4	5	6	7
AS (PSG)	Would avoid talking to me	0.829	0.047	0.255	-0.061	0.058	0.032	0.088
	Would avoid being around me	0.815	0.028	0.270	0.064	0.020	0.087	-0.008
	Would think I am faking it	0.813	0.153	0.070	-0.029	0.055	0.080	0.089
	Would be afraid of me	0.796	0.159	0.139	0.002	-0.049	0.015	-0.013
	Would consider me untrustworthy	0.790	0.019	0.338	0.058	0.047	0.011	0.110
	Would feel uncomfortable around me	0.743	0.110	0.339	0.074	0.045	0.056	-0.108
	Would think less of me	0.715	0.146	0.026	0.083	-0.006	0.065	-0.130
MMP	Do everything possible	-0.019	0.801	0.036	0.000	-0.007	-0.018	0.040
	Thorough and careful	0.249	0.788	0.033	-0.071	-0.067	0.024	0.099
	Level of medical skills	0.218	0.783	-0.013	-0.028	-0.008	0.019	0.050
	Puts the patient first	0.047	0.760	0.129	0.067	-0.011	0.053	0.202
	Trust in their medical decisions	0.179	0.675	0.037	0.032	0.147	0.129	-0.023
	Total honesty	0.040	0.671	0.109	0.085	0.120	0.064	0.310
	Prioritizes convenience over medical needs	0.058	0.650	0.140	0.041	0.066	0.033	0.312
	Complete trust in the doctor	-0.009	0.573	0.294	-0.158	0.165	0.251	0.094
AS (SSG)	Limit my work opportunities	0.129	0.114	0.816	0.101	0.093	-0.027	0.127
	Assign me less important tasks	0.103	0.103	0.787	0.117	0.175	0.016	0.059
	Uncomfortable around me	0.466	0.048	0.739	-0.004	-0.026	0.124	0.009
	Think I am unable to work	0.114	0.073	0.735	0.159	0.069	-0.011	0.131
	Would treat me unfairly	0.272	0.156	0.732	0.064	-0.011	0.031	0.051
	Would avoid being around me	0.513	0.084	0.716	0.004	0.026	-0.002	0.076
	Would avoid talking to me	0.490	0.082	0.678	-0.013	-0.006	-0.004	0.048
ISD	Help judge my condition	0.074	-0.083	0.028	0.844	0.064	0.139	0.071
	Determine if I have ADHD	0.011	-0.072	0.078	0.843	-0.028	0.051	0.043
	Accept opinions on my symptoms	-0.002	0.047	0.076	0.826	0.091	0.165	0.034
	Compare with my symptoms	-0.005	0.025	0.121	0.785	0.123	0.215	-0.001
	Suspect having ADHD symptoms	0.040	0.104	0.096	0.694	0.162	0.293	0.023
MCB-HA	Belief that thoughts cause sickness	0.111	0.062	0.065	0.055	0.830	0.065	0.089
	Worrying leads to disease	0.160	0.010	0.039	0.074	0.795	0.038	0.024
	Thoughts directly harm health	-0.158	0.109	0.129	0.117	0.780	-0.026	-0.013
	Thoughts affect health status	-0.018	0.052	0.026	0.077	0.724	-0.030	0.080
IIS	Intend to check updated info	0.110	0.122	0.057	0.323	-0.021	0.844	-0.003
	Intend to visit other SM	0.059	0.117	-0.012	0.347	0.062	0.843	0.078
	Intend to search for more info	0.163	0.148	0.003	0.399	-0.012	0.757	0.102
MMS	Covers up mistakes	-0.064	0.255	0.203	0.063	0.065	0.035	0.748
	Deceives or misleads patients	-0.046	0.251	0.123	0.063	0.142	0.008	0.689
	Conducts harmful experiments	0.299	0.349	-0.075	0.015	-0.108	0.166	0.550
	Protects patient privacy	-0.064	0.454	0.270	0.064	0.131	0.033	0.475

AS, anticipated stigma; PSG, primary social group; MMP, mistrust in medical providers; SSG, secondary social group; ISD, intention to self-diagnose; ADHD, attention-deficit/hyperactivity disorder; MCB-HA, metacognitive beliefs on health anxiety; IIS, information-seeking intention; SM, social media; MMS, mistrust in the medical system.

 https://doi.org/10.1633/JISTaP.2026.14.2.6

3.4. Validity and Reliability

To ensure the validity of the measurement model, an exploratory factor analysis (EFA) was conducted using IBM SPSS Statistics 27 (IBM Co., Armonk, NY, USA). While principal component analysis (PCA) is technically a data reduction technique, it is extensively employed as a practical alternative to common factor analysis in the exploratory phases of social science and information research. The robustness of this widespread convention is supported by seminal methodological guidelines, such as Hair et al.'s Multivariate Data Analysis, which remains one of the most cited methodological references (Black & Babin, 2019). Furthermore, contemporary methodological literature indicates that PCA and common factor analysis are statistically highly similar and typically yield essentially identical pattern solutions and substantive interpretations in practical applications (Sarstedt & Mooi, 2019). The analysis employed PCA with varimax rotation. The Kaiser–Meyer–Olkin test for sampling adequacy yielded a value of 0.86, well above the 0.5 threshold, and Bartlett's test of sphericity was significant ($p<0.001$), confirming the data's suitability for factor analysis. After removing seven items that compromised validity, the remaining multi-item constructs all demonstrated acceptable internal consistency, with Cronbach's alpha coefficients exceeding the 0.70 threshold. To enhance the transparency and replicability of the construct operationalization, the final mapping between the latent constructs and their retained measurement items, along with their factor loadings, is consolidated in Table 2. Furthermore, the reliability coefficients for these final measures are presented in Table 3.

Table 3. Reliability

Variable	Cronbach's α	Items
SMD	0.859	21
MCB-HA	0.810	4
MMS	0.708	4
MMP	0.886	8
Anticipated stigma (PSG)	0.924	7
Anticipated stigma (SSG)	0.918	7
IIS	0.906	3
ISD	0.886	5

SMD, social media dependency; MCB-HA, metacognitive beliefs on health anxiety; MMS, mistrust in the medical system; MMP, mistrust in medical providers; PSG, primary social group; SSG, secondary social group; IIS, information-seeking intention; ISD, intention to self-diagnose.

3.5. Data Analysis

To examine the research questions, the authors adopted a sequential analytical pipeline comprising EFA, followed by multiple regression and bootstrapping-based mediation analyses. This specific approach was strategically selected for two primary methodological reasons.

First, given the exploratory nature of applying various psychological and media constructs to the novel context of VSM-based ADHD self-diagnosis, EFA was deemed the most appropriate initial step to clearly establish and validate the underlying factor structure of the adapted measures. Following the validation of the measurement model, and prior to the main analyses, Harman's single-factor test was conducted to address potential common method variance (CMV) arising from single-source self-report data. An unrotated PCA of all study variables yielded a single factor explaining only 25.10% of the total variance, well below the 50% threshold, indicating that CMV is not a major concern in this study. Second, utilizing composite scores derived from the EFA in the PROCESS macro (v4.2) with 5,000 bootstrap resamples provides a highly robust and focused method for testing the specific indirect (mediating) pathways central to the research questions, thereby maximizing statistical power.

Following the validation of the measurement model, this study conducted regression analyses to identify the most salient predictors. While the initial inclusion of all predictor variables was strictly theory-driven based on the multidisciplinary framework, backward stepwise elimination was employed to identify the most parsimonious model. Methodologically, backward elimination is preferred over other stepwise methods for exploratory purposes as it reduces the risk of excluding important suppressor variables (Field, 2013). To ensure the robustness of this final model, methodological assumptions including the absence of severe multicollinearity among the retained predictors were carefully evaluated (Sarstedt & Mooi, 2019).

Subsequently, utilizing composite scores derived from the EFA, mediation analyses were performed using the PROCESS macro (v4.2) to evaluate the sequential relationships. Employing 5,000 bootstrap resamples provides a highly robust and focused method for testing the specific indirect (mediating) pathways central to the research questions, thereby maximizing statistical power. Given the novelty of platform-mediated ADHD self-diagnosis, this overarching sequential approach was strategically utilized to explore the structural pathways. Therefore, the resulting model should be interpreted as an exploratory

identification rather than a definitive confirmatory model, underscoring the need for future studies to validate these findings using confirmatory approaches with independent samples (Stefana et al., 2025).

4. RESULTS

RQ1 posits that factors associated with users' VSM-based ADHD self-diagnosis may be related to ADHD's ISD through the mediating role of IIS. To investigate this potential pathway, the authors examined the mediating effect of IIS on the relationship between individual, platform, and social factors and ISD. The authors performed a mediation analysis using the PROCESS macro v4.2 program with bootstrap verification. The bootstrap was set to 5,000 iterations with a 95% confidence interval. The relationships showing significant indirect effects are presented in Table 4. When conducting each mediation analysis, to isolate the unique indirect effect of the focal predictor, the remaining independent variables within the conceptual model (e.g., MM, MCBs, or anticipated stigma, depending on the specific model) were entered as covariates. This control mitigates potential confounding effects among the concurrent psychosocial factors. The results showed that IIS mediated the relationship between the three predictors (MMS, MMP, and anticipated stigma [primary social group]) and the outcome variable (ISD).

RQ2, RQ3, RQ4, RQ6, and RQ7 aim to explore the direct and indirect relationships between pre-existing psychosocial vulnerabilities, platform-mediated channels, and users' VSM-based ADHD self-diagnosis. Based on the correlation analysis results, multiple regression and mediation analyses were conducted using predictor variables that showed significant correlations with the outcome variable. All statistical analyses were performed using IBM SPSS Statistics 27, and the results are presented in Tables 5 and 6.

Addressing RQ2, the results indicate that the relationship between MCB-HA and VSM-based ADHD self-diagnosis was significantly mediated by SMD and SME. Similarly, concerning RQ3, MM was linked to self-diagnosis through the mediation of SMD, SME, and IIS. Regarding RQ4 and RQ6, the multiple regression analysis revealed significant positive associations. Among all factors, SMD showed the strongest association with ISD (β=0.264), followed by SME (β=0.243). These findings suggest that greater dependency on and exposure to ADHD information on SM are associated with higher self-diagnosis intentions. A stepwise regression model, using backward elimination, explained 17.2% of the variance in ISD

Table 4. Mediation analysis results

Predictor variable	Mediator	*B*	SE	95% CI	
				LL	UL
MMS	IIS	0.1160**	0.0408	0.0407	0.2001
MMP	IIS	0.1372**	0.0441	0.0531	0.2260
Anticipated stigma (PSG)	IIS	0.1122**	0.0408	0.0323	0.1912

SE, standard error; CI, confidence interval; LL, lower limit; UL, upper limit; MMS, mistrust in the medical system; MMP, mistrust in medical providers; PSG, primary social group; IIS, information-seeking intention.
**p<0.01.

Table 5. Multiple regression analysis results

Outcome	Predictor	*B*	SE	β	t
ISD	(Constant)	-1.967	0.386	-	-5.094
	SMD	0.457	0.109	0.264	4.197***
	AS (SSG)	0.113	0.064	0.113	1.775
	SME	0.143	0.038	0.243	3.793***
	F=14.704 (p<0.001***, 0.01**, 0.05*), R^2=0.172, $_{adj}R^2$=0.161				

Outcome, outcome variable; predictor, predictor variable; SE, standard error; ISD, intention to self-diagnose; SMD, social media dependency; AS, anticipated stigma; SSG, secondary social group; SME, social media exposure.
*p<0.05, **p<0.01, ***p<0.001.

 https://doi.org/10.1633/JISTaP.2026.14.2.6

Table 6. Mediation analysis results

Predictor	Mediator	Outcome	*B*	SE	95% CI	
					LL	UL
MCB-HA	SMD	ISD	0.0828***	0.0313	0.0290	0.1498
	SME	ISD	0.0380*	0.0199	0.0034	0.0811
MMS	SMD	ISD	0.0678**	0.0269	0.0223	0.1290
	SME	ISD	0.0598**	0.0227	0.0202	0.1096
MMP	SMD	ISD	0.0470*	0.0267	0.0000	0.1047
	SME	ISD	0.0454*	0.0220	0.0046	0.0910
Anticipated stigma (PSG)	SME	ISD	0.0773**	0.0277	0.0269	0.1353
Anticipated stigma (SSG)	SME	ISD	0.0534**	0.0209	0.0174	0.1000

The lower bound of 0.0000 for the MMP → SMD → ISD pathway reflects the default four-decimal truncation of the SPSS PROCESS macro. This indicates a microscopic positive value that does not cross zero, maintaining marginal statistical significance.
Predictor, predictor variable; Outcome, outcome variable; SE, standard error; CI, confidence interval; LL, lower limit; UL, upper limit; MCB-HA, metacognitive beliefs on health anxiety; SMD, social media dependency; SME, social media exposure; ISD, intention to self-diagnose; MMS, mistrust in the medical system; MMP, mistrust in medical providers; PSG, primary social group; SSG, secondary social group.
*p<0.05, **p<0.01, ***p<0.001.

Table 7. Comparison of mean differences in ISD by video length preference (n=216)

Outcome	Group	Sample size	*M*	SD	t	p-value
ISD	SFVs	157	4.1873	1.27152	2.173*	0.031
	LFVs	59	3.7492	1.44346		

Outcome, outcome variable; SD, standard deviation; ISD, intention to self-diagnose; SFV, short-form video; LFV, long-form video.
*p<0.05.

(R^2=0.172, adjusted R^2=16.1%). Prior to interpreting the multiple regression models, key diagnostic assumptions were rigorously verified. Variance inflation factor (VIF) values were all well below the conventional threshold of 10 (maximum VIF=1.05), indicating the absence of severe multicollinearity. The independence of residuals was confirmed by a Durbin-Watson statistic of 1.86, which falls within the ideal range of 1.5 to 2.5. Furthermore, visual inspections of the normal P-P plots and scatterplots of standardized residuals confirmed that the assumptions of normality and homoscedasticity were adequately met.

Finally, an independent samples t-test was conducted to address RQ5, exploring potential differences in ISD based on content characteristics. While creator and content type showed no significant effect on ISD, a significant difference was found based on video length (t=2.173, p<0.05). Specifically, a preference for SFVs was associated with a significantly higher level of ISD (*M*=4.1873) compared to LFVs (*M*=3.7492). Consequently, while creator and content types did not yield significant differences, a distinct association was observed regarding video length preference (Table 7). The analysis results are summarized in Fig. 2.

5. DISCUSSION

This study provides an empirical lens into the complex information behaviors on VSM and their consequential relationship with users' health perceptions and intentions, with the tendency toward ADHD self-diagnosis serving as a critical outcome. The findings of this study illuminate how VSM functions as a powerful information environment where user dependency, exposure frequency, and platform characteristics converge to predict significant health-related cognitions and behaviors.

5.1. The Centrality of Video-Based Social Media Dependency and Exposure

The results reveal that dependency on SM is the most potent predictor of the ISD. This suggests that as users come to perceive VSM as integral to achieving daily goals (Kim & Jung, 2017), this reliance naturally extends into the critical domain of health information. Crucially, this dependency is not arbitrary but emerges as a key informa-

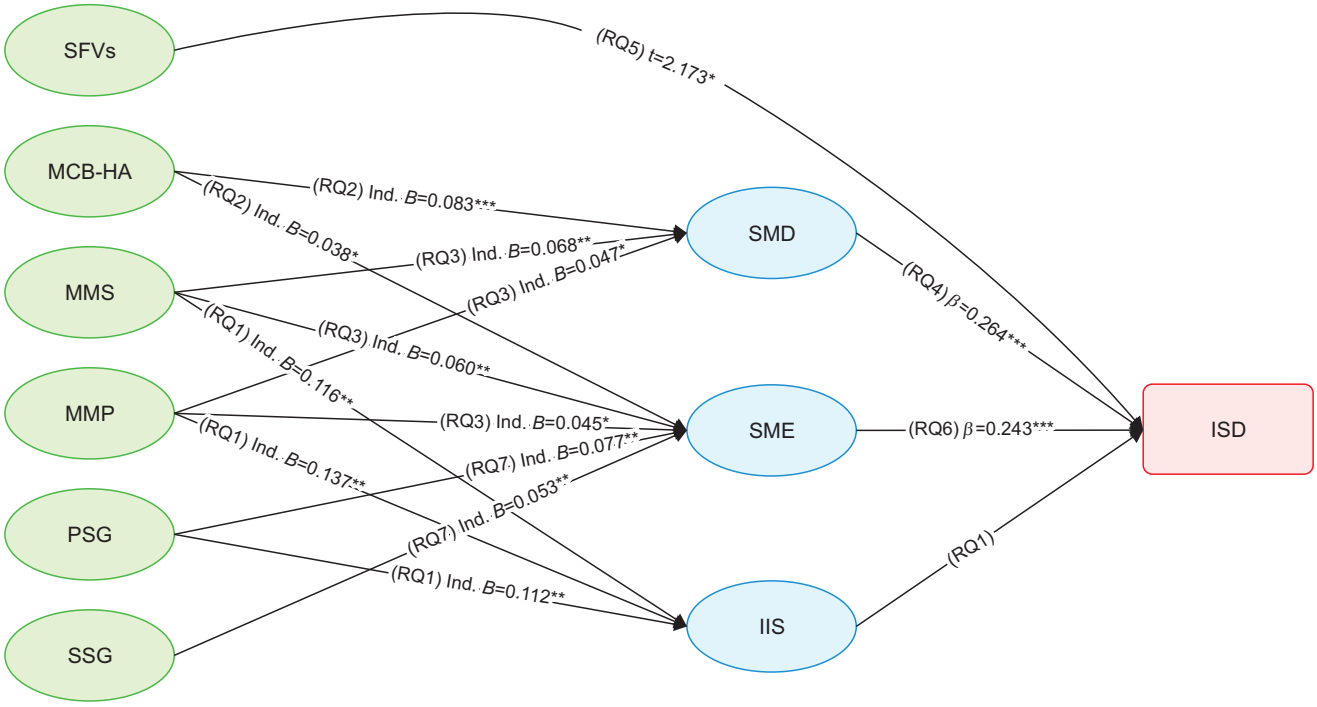


Fig. 2. Path diagram displaying the indirect and direct effects on intention to self-diagnose. Predictor variables=light green ellipses; mediator variables=light blue ellipses; outcome variable=light red rectangle. Paths are labeled with corresponding Research Question (RQ) numbers. Values denoted as 'Ind. *B*' represent the unstandardized indirect effects from the bootstrapping mediation analysis (Tables 4 and 6). Direct relationships are presented with standardized coefficients (β) or t-values. SFVs, short-form videos; MCB-HA, metacognitive beliefs on health anxiety; MMS, mistrust in the medical system; MMP, mistrust in medical providers; PSG, primary social group; SSG, secondary social group; SMD, social media dependency; SME, social media exposure; IIS, information-seeking intention; ISD, intention to self-diagnose. *p<0.05, **p<0.01, ***p<0.001.

tion pathway for individuals with pre-existing beliefs, such as MM and negative MCB-HA. This suggests that VSM is actively chosen as an alternative information source by users who are already skeptical of or anxious about traditional healthcare systems. Consequently, these individuals may become highly dependent on VSM for health guidance, a behavior that is associated with self-diagnosis and subsequent engagement in non-evidence-based or non-professional treatments (Schiros et al., 2025). Similarly, users who believe their thoughts can cause illness may find the relatable, experiential content on VSM particularly compelling, deepening their dependency and potentially contributing to issues such as symptom overgeneralization (Yeung et al., 2022) or heightened anxiety. Parallel to dependency, the sheer frequency of exposure to ADHD-related content on VSM is directly associated with self-diagnosis intention. This finding is consistent with research showing that repeated exposure to specific media content can heighten users' perceived vulnerability and risk perceptions regarding the targeted health issues (Olagoke et al., 2020).

5.2. Psychosocial Pathways: Bypassing Traditional Healthcare Barriers

Within the digital "infodemic," the constant stream of content appears to be linked to user perceptions and behaviors through sheer volume and repetition, potentially altering their understanding of what is normative (Qin et al., 2025; Zeballos Rivas et al., 2021). Mediation results reveal a critical dynamic in this process: VSM exposure provides the primary pathway through which anticipated stigma is associated with self-diagnosis intention. Individuals who fear the social repercussions of seeking formal medical help (Clement et al., 2015) appear to utilize the readily accessible information on VSM as a substitute, effectively using the platform as a discreet information-seeking tool to bypass perceived social barriers.

Crucially, these findings must be interpreted within the context of the study's specific sample—predominantly young Korean women who are already active VSM users. The pronounced associations between anticipated stigma, SMD, and self-diagnosis intention may be particularly salient in this demographic. This reflects the intersection

of their high digital literacy, existing algorithmic familiarity, and the specific socio-cultural context of Korea, where collective norms and mental health stigma remain significant. Furthermore, because the respondents were already consumers of ADHD-related content, their baseline receptivity to such information was likely higher than that of the general public. Thus, rather than representing a universal VSM user experience, the results more accurately illuminate the specific associative pathways through which a highly engaged, digitally fluent, and potentially vulnerable demographic navigates sociocultural barriers to health information.

While utilizing VSM allows these individuals to bypass such immediate social barriers, the downstream consequences of these information-driven behaviors remain deeply complex. The outcomes can be varied, potentially including the misidentification of other health conditions as ADHD, facing new barriers to formal care even after an accurate informal assessment, or contributing to broader narratives of overdiagnosis. Because the fear of stigma actively directs users toward VSM—where they are vulnerable to frequent exposure to potentially misleading ADHD content—it becomes essential to consider interventions that simultaneously address both the quality of online information and the underlying social deterrents to professional care.

5.3. Implications for Information Practice and Clinical Care

This necessity is further underscored by the role of platform architecture and its association with information outcomes. The findings of this study that a preference for SFVs is associated with a significantly higher ISD highlights how the brief and engaging format encourages reliance on heuristic cues rather than deep, critical evaluation. This reliance on superficial cues, a key dynamic in online health information adoption (Jin et al., 2025), can foster immediate identification with presented symptoms, reinforcing the risk of pathologizing normal experiences. Consequently, there is a critical need for media literacy interventions tailored to the specific cognitive challenges posed by SFV content.

In light of these architectural and social challenges, the proactive involvement of librarians and health information professionals appears warranted. The results indicate that individuals exhibiting high MM and anticipated stigma choose VSM as an alternative pathway to bypass perceived barriers. Thus, libraries and public health information centers should transition toward developing "verified health information curation" specifically designed for the SFV format. For groups skeptical of the medical establishment, public institutions might consider "algorithm-based information outreach" to infiltrate the VSM ecosystem with evidence-based content and rectify information imbalances.

Finally, the findings suggest that healthcare professionals should reconsider patients' self-diagnostic attempts as a proactive manifestation of "e-health literacy" rather than primarily a challenge to clinical authority. Rather than framing these digital information practices strictly in terms of risk or dysfunction, symptom recognition and VSM-based health information seeking can also function as adaptive entry points to professional care. By utilizing the VSM content patients encounter as a clinical tool to build rapport, practitioners can effectively bridge the gap between initial online exposure and formal consultation, guiding users toward evidence-based clinical care.

6. CONCLUSION

In conclusion, this study provides an empirical exploration of how established psychosocial and media theories apply to the emerging context of platform-mediated HIB, utilizing the ISD ADHD within the VSM ecosystem as a focused case. Moving beyond general observations, the analysis demonstrates that interpretive health judgments do not occur in a vacuum but emerge from a sequential and compounding information pathway: Pre-existing vulnerabilities, such as MM and anticipated stigma, foster SMD and direct users toward repeated, algorithmically curated exposure to ADHD content. When this frequent exposure intersects with the heuristic information processing encouraged by SFV formats, users are significantly more likely to map online narratives onto their own experiences, facilitating the self-attribution of symptoms. By framing self-diagnosis as a complex outcome of digital information consumption, this research underscores the profound influence of platform design, algorithmic exposure, and user trust on health-related behaviors. Understanding these specific dynamics is essential for mitigating the potential risks associated with an increasingly user-driven health information landscape.

Building upon these findings, this study empirically demonstrates that the ISD ADHD via VSM is not merely a product of algorithm-driven exposure, but rather a complex interaction between users' underlying psychosocial vulnerabilities—particularly anticipated stigma and MM—and their dependency on these digital platforms.

Consequently, this research suggests shifting away from the deficit-based perspective that views VSM-based health information seeking merely as a passive acceptance of misinformation or an irrational judgment. Instead, it should be recognized as an adaptive coping mechanism and a deliberate information behavior utilized by individuals to navigate existing social barriers. By illuminating these associative pathways, the findings underscore the dual nature of VSM as both a potential risk for symptom overgeneralization and an adaptive gateway to professional care. As digital HIB continue to evolve, it is imperative for health information professionals and clinicians to move beyond deficit-based views. Instead, stakeholders must collaboratively develop algorithm-conscious information curation and tailored e-health literacy interventions that effectively guide vulnerable users from informal online exploration toward evidence-based clinical support.

7. LIMITATIONS AND FUTURE RESEARCH

Despite these contributions, this study has several limitations. First, the cross-sectional, self-reported design precludes strict causal inferences and cannot entirely eliminate CMV or potential reverse causation (e.g., users with prior suspicions actively seeking ADHD content). Second, by capturing only the ISD, the proposed model (which explains a modest 17.2% of variance) leaves actual clinical outcomes and other unmeasured determinants—such as true subclinical symptoms or offline influences—for future investigation. Finally, the sample's skewness toward young Korean females limits broad generalizability. Given these constraints and the explicitly exploratory nature of this analysis, future studies must employ longitudinal designs, more diverse samples, and confirmatory factor analysis to formally validate the preliminary patterns identified herein.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGEMENTS

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2025S1A5C3A05025824). The funders had no role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; or in the decision to submit the article for publication.

REFERENCES

Agnew-Blais, J. C., Polanczyk, G. V., Danese, A., Wertz, J., Moffitt, T. E., & Arseneault, L. (2016). Evaluation of the persistence, remission, and emergence of attention-deficit/hyperactivity disorder in young adulthood. *JAMA Psychiatry,* 73(7), 713-720. https://doi.org/10.1001/jamapsychiatry.2016.0465

Aragon-Guevara, D., Castle, G., Sheridan, E., & Vivanti, G. (2025). The reach and accuracy of information on autism on TikTok. *Journal of Autism and Developmental Disorders,* 55(6), 1953-1958. https://doi.org/10.1007/s10803-023-06084-6

Aydin, G. (2020). Social media engagement and organic post effectiveness: A roadmap for increasing the effectiveness of social media use in hospitality industry. *Journal of Hospitality Marketing & Management,* 29(1), 1-21. https://doi.org/10.1080/19368623.2019.1588824

Babcock, M. (2021). *A survey to assess ADHD symptoms and detect feigning in adult ADHD: Initial scale development* (doctoral dissertation). Antioch University Seattle, Seattle, WA, USA.

Bailey, R., & Wells, A. (2015). Development and initial validation of a measure of metacognitive beliefs in health anxiety: The MCQ-HA. *Psychiatry Research,* 230(3), 871-877. https://doi.org/10.1016/j.psychres.2015.11.035

Ball-Rokeach, S., Rokeach, M., Grube, J. W. (1984). *The great American values test : Influencing behavior and belief through television*. Free Press.

Ball-Rokeach, S. J., & DeFleur, M. L. (1976). A dependency model of mass-media effects. *Communication Research,* 3(1), 3-21. https://doi.org/10.1177/009365027600300101

Balıkçı, K., Aydın, O., Sönmez, İ., Kalo, B., & Ünal-Aydın, P. (2020). The relationship between dysfunctional metacognitive beliefs and problematic social networking sites use. *Scandinavian Journal of Psychology,* 61(5), 593-598. https://doi.org/10.1111/sjop.12634

Black, W., Babin, B. J. (2019). Multivariate data analysis: Its approach, evolution, and impact. In B. J. Babin, & M. Sarstedt (Eds.) *The great facilitator: Reflections on the contributions of Joseph F. Hair, Jr. to marketing and business research* (pp. 121-130). Springer.

Boseley, M. (2021). *TikTok accidentally detected my ADHD. For 23 years everyone missed the warning signs*. https://www.theguardian.com/commentisfree/2021/jun/04/tiktok-accidentally-detected-my-adhd-for-23-years-everyone-

missed-the-warning-signs

Brenick, A., Romano, K., Kegler, C., & Eaton, L. A. (2017). Understanding the influence of stigma and medical mistrust on engagement in routine healthcare among black women who have sex with women. *LGBT Health,* 4(1), 4-10. https://doi.org/10.1089/lgbt.2016.0083

Brown, R. J., Skelly, N., & Chew-Graham, C. A. (2020). Online health research and health anxiety: A systematic review and conceptual integration. *Clinical Psychology: Science and Practice*, 27(2), e12299. https://doi.org/10.1111/cpsp.12299

Caron, C. (2022). *Teens turn to TikTok in search of a mental health diagnosis*. https://www.nytimes.com/2022/10/29/well/mind/tiktok-mental-illness-diagnosis.html

Chang, L., Fung, T. K., Leung, H. M., & Lai, P. Y. (2024). Generational differences in health information behaviors during the COVID-19 crisis: A Hong Kong study. *Global Media and China,* 9(3), 303-324. https://doi.org/10.1177/20594364241238635

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., Morgan, C., Rüsch, N., Brown, J. S., & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine,* 45(1), 11-27. https://doi.org/10.1017/S0033291714000129

Das, D., Cherbuin, N., Butterworth, P., Anstey, K. J., & Easteal, S. (2012). A population-based study of attention deficit/hyperactivity disorder symptoms and associated impairment in middle-aged adults. *PloS One,* 7(2), e31500. https://doi.org/10.1371/journal.pone.0031500

Eagle, T., & Ringland, K. E. (2023, October 22-25). "You can't possibly have ADHD": Exploring validation and tensions around diagnosis within unbounded ADHD social media communities. In S. Azenkot, E. Brady, & M. Wolters (Eds.), ASSETS '23: Proceedings of the 25th International ACM SIGACCESS Conference on Computers and Accessibility (pp. 1-17). Association for Computing Machinery.

Fekih-Romdhane, F., Ghrissi, F., Abbassi, B., Cherif, W., & Cheour, M. (2020). Prevalence and predictors of PTSD during the COVID-19 pandemic: Findings from a Tunisian community sample. *Psychiatry Research*, 290, 113131. https://doi.org/10.1016/j.psychres.2020.113131

Fergus, T. A., & Spada, M. M. (2017). Cyberchondria: Examining relations with problematic Internet use and metacognitive beliefs. *Clinical Psychology & Psychotherapy,* 24(6), 1322-1330. https://doi.org/10.1002/cpp.2102

Fergus, T. A., & Spada, M. M. (2018). Moving toward a metacognitive conceptualization of cyberchondria: Examining the contribution of metacognitive beliefs, beliefs about rituals, and stop signals. *Journal of Anxiety Disorders*, 60, 11-19. https://doi.org/10.1016/j.janxdis.2018.09.003

Field, A. P. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage.

Foster, A. (2004). A nonlinear model of information-seeking behavior. *Journal of the American Society for Information Science and Technology,* 55(3), 228-237. https://doi.org/10.1002/asi.10359

Foster, A., & Ellis, N. (2024). TikTok-inspired self-diagnosis and its implications for educational psychology practice. *Educational Psychology in Practice,* 40(4), 491-508. https://doi.org/10.1080/02667363.2024.2409451

Fraticelli, L., Smentek, C., Tardivo, D., Masson, J., Clément, C., Roy, S., Dussart, C., Bourgeois, D., & Carrouel, F. (2021). Characterizing the content related to oral health education on TikTok. *International Journal of Environmental Research and Public Health*, 18(24), 13260. https://doi.org/10.3390/ijerph182413260

Freeman, J. L., Caldwell, P. H. Y., & Scott, K. M. (2023). How adolescents trust health information on social media: A systematic review. *Academic Pediatrics,* 23(4), 703-719. https://doi.org/10.1016/j.acap.2022.12.011

Fu, L., Lei, L., & Chen, L. (2024). Text, short video, or long video? Effects of attention to various types of social media on public knowledge of dual carbon: A multigroup comparison based on environmental concern levels. *Environmental Communication,* 18(5), 610-627. https://doi.org/10.1080/17524032.2023.2298939

Gallup Korea. (2023). *Market 70 2023 (2) Utilization of 18 types of media, contents, and social network services #SNS*. https://www.gallup.co.kr/gallupdb/reportContent.asp?seqNo=1430

Gao, P., Wu, H., Fan, Z., & Tao, M. (2023). Exploring the relationship between intolerance of uncertainty and trust in physicians from spousal and parent-child perspectives. *Psychology Research and Behavior Management*, 16, 2173-2186. https://doi.org/10.2147/PRBM.S413821

Gilmore, R., Beezhold, J., Selwyn, V., Howard, R., Bartolome, I., & Henderson, N. (2022). Is TikTok increasing the number of self-diagnoses of ADHD in young people? *European Psychiatry,* 65(S1), S571-S571. https://doi.org/10.1192/j.eurpsy.2022.1463

Griffith, F. J., & Stein, C. H. (2021). Behind the hashtag: Online disclosure of mental illness and community response on Tumblr. *American Journal of Community Psychology,* 67(3-4), 419-432. https://doi.org/10.1002/ajcp.12483

Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin,* 103(2), 265-275. https://doi.org/10.1037/0033-

2909.103.2.265

Gupta, R., & Ariefdjohan, M. (2021). Mental illness on Instagram: A mixed method study to characterize public content, sentiments, and trends of antidepressant use. *Journal of Mental Health (Abingdon, England),* 30(4), 518-525. https://doi.org/10.1080/09638237.2020.1755021

Hall, M. A., Zheng, B., Dugan, E., Camacho, F., Kidd, K. E., Mishra, A., & Balkrishnan, R. (2002). Measuring patients' trust in their primary care providers. *Medical Care Research and Review,* 59(3), 293-318. https://doi.org/10.1177/1077558702059003004

Handarkho, Y. D., Widyastuti, D. A. R., & Harjoseputro, Y. (2022). The effect of the social aspect, media dependency, and uncertainty against the formation of trust toward information in social network sites: A case study of COVID-19 information in Indonesia. *The Electronic Journal of Information Systems in Developing Countries*, 88(1), e12196. https://doi.org/10.1002/isd2.12196

Hartnett, Y., & Cummings, E. (2024). Social media and ADHD: Implications for clinical assessment and treatment. *Irish Journal of Psychological Medicine,* 41(1), 132-136. https://doi.org/10.1017/ipm.2023.40

Ho, S. S., Liao, Y., & Rosenthal, S. (2015). Applying the theory of planned behavior and media dependency theory: Predictors of public pro-environmental behavioral intentions in Singapore. *Environmental Communication,* 9(1), 77-99. https://doi.org/10.1080/17524032.2014.932819

Holroyd, D. (2026). 'Why is everyone self-diagnosing with ADHD nowadays?': The affective economy of ADHD TikTok. *Continuum,* 40(2), 238-251. https://doi.org/10.1080/10304312.2025.2544777

Jaiswal, J., & Halkitis, P. N. (2019). Towards a more inclusive and dynamic understanding of medical mistrust informed by science. *Behavioral Medicine (Washington, D.C.),* 45(2), 79-85. https://doi.org/10.1080/08964289.2019.1619511

Jia, X., Pang, Y., & Liu, L. S. (2021). Online health information seeking behavior: A systematic review. *Healthcare (Basel, Switzerland)*, 9(12), 1740. https://doi.org/10.3390/healthcare9121740

Jin, J., Chen, Q., & Yan, X. (2025). Do the certainty tone and seniority of physicians matter in patients' information adoption in online health communities? *Information Technology & People,* 38(1), 442-471. https://doi.org/10.1108/itp-01-2022-0034

Kalichman, S. C., Eaton, L., Kalichman, M. O., Grebler, T., Merely, C., & Welles, B. (2016). Race-based medical mistrust, medication beliefs and HIV treatment adherence: Test of a mediation model in people living with HIV/AIDS. *Journal of Behavioral Medicine,* 39(6), 1056-1064. https://doi.org/10.1007/s10865-016-9767-1

Kazda, L., Bell, K., Thomas, R., McGeechan, K., Sims, R., & Barratt, A. (2021). Overdiagnosis of attention-deficit/hyperactivity disorder in children and adolescents: A systematic scoping review. *JAMA Network Open,* 4(4), e215335. https://doi.org/10.1001/jamanetworkopen.2021.5335

Keen, E., Kangas, M., & Gilchrist, P. T. (2022). A systematic review evaluating metacognitive beliefs in health anxiety and somatic distress. *British Journal of Health Psychology,* 27(4), 1398-1422. https://doi.org/10.1111/bjhp.12609

Khalil, A., Abdallah, S., Hijazi, R., & Sheikh, K. (2025). Trust but verify: The effect of religiosity and social conformity on verification of content shared via social media. *Information Technology & People,* 38(1), 70-86. https://doi.org/10.1108/itp-11-2022-0827

Kim, J., & Grunig, J. E. (2011). Problem solving and communicative action: A situational theory of problem solving. *Journal of Communication,* 61(1), 120-149. https://doi.org/10.1111/j.1460-2466.2010.01529.x

Kim, S. Y. (2021). *The effect of metacognitive beliefs on health anxiety in middle aged women* (doctoral dissertation). Seoul Women's University, Seoul, Korea.

Kim, Y., & Jung, J. (2017). SNS dependency and interpersonal storytelling: An extension of media system dependency theory. *New Media & Society,* 19(9), 1458-1475. https://doi.org/10.1177/1461444816636611

Kitsios F., Mitsopoulou, E., Moustaka, E., & Kamariotou, M. (2022). User-generated content behavior and digital tourism services: A SEM-neural network model for information trust in social networking sites. *International Journal of Information Management Data Insights*, 2(1), 100056. https://doi.org/10.1016/j.jjimei.2021.100056

Laato, S., Islam, A. K. M. N., Islam, M. N., & Whelan, E. (2020). What drives unverified information sharing and cyberchondria during the COVID-19 pandemic? *European Journal of Information Systems,* 29(3), 288-305. https://doi.org/10.1080/0960085x.2020.1770632

Lalazaryan, A., & Zare-Farashbandi, F. (2014). A review of models and theories of health information seeking behavior. *International Journal of Health System and Disaster Management*, 2(4), 193-203. https://doi.org/10.4103/2347-9019.144371

LaVeist, T. A., Isaac, L. A., & Williams, K. P. (2009). Mistrust of health care organizations is associated with underutilization of health services. *Health Services Research,* 44(6), 2093-2105. https://doi.org/10.1111/j.1475-6773.2009.01017.x

Lee, M. L. (2023). *'Do I have ADHD too?'..Self-diagnosis and psychiatry visit 2030 ↑* . https://www.yna.co.kr/view/AKR20231108127400004

Magaard, J. L., Seeralan, T., Schulz, H., & Brütt, A. L. (2017). Factors associated with help-seeking behaviour among individuals with major depression: A systematic review. *PloS One,* 12(5), e0176730. https://doi.org/10.1371/journal.pone.0176730

Marengo, D., Montag, C., Sindermann, C., Elhai, J. D., & Settanni, M. (2021). Examining the links between active Facebook use, received likes, self-esteem and happiness: A study using objective social media data. *Telematics and Informatics*, 58, 101523. https://doi.org/10.1016/j.tele.2020.101523

McCashin, D., & Murphy, C. M. (2023). Using TikTok for public and youth mental health–a systematic review and content analysis. *Clinical Child Psychology and Psychiatry,* 28(1), 279-306. https://doi.org/10.1177/13591045221106608

Milton, A., Ajmani, L., DeVito, M. A., & Chancellor, S. (2023, April 23-28). "I see me here": Mental health content, community, and algorithmic curation on TikTok. In A. Schmidt, K. Väänänen, T. Goyal, P. O. Kristensson, A. Peters, S. Mueller, J. R. Williamson, & M. L. Wilson (Eds.), *CHI '23: Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-17). Association for Computing Machinery.

Moffitt, T. E., Houts, R., Asherson, P., Belsky, D. W., Corcoran, D. L., Hammerle, M., Harrington, H., Hogan, S., Meier, M. H., Polanczyk, G. V., Poulton, R., Ramrakha, S., Sugden, K., Williams, B., Rohde, L. A., & Caspi, A. (2015). Is adult ADHD a childhood-onset neurodevelopmental disorder? Evidence from a four-decade longitudinal cohort study. *The American Journal of Psychiatry,* 172(10), 967-977. https://doi.org/10.1176/appi.ajp.2015.14101266

Mongkhon, P., Ruengorn, C., Awiphan, R., Thavorn, K., Hutton, B., Wongpakaran, N., Wongpakaran, T., & Nochaiwong, S. (2021). Exposure to COVID-19-related information and its association with mental health problems in Thailand: Nationwide, cross-sectional survey study. *Journal of Medical Internet Research,* 23(2), e25363. https://doi.org/10.2196/25363

Morton, T. A., & Duck, J. M. (2001). Communication and health beliefs: Mass and interpersonal influences on perceptions of risk to self and others. *Communication Research,* 28(5), 602-626. https://doi.org/10.1177/009365001028005002

Nah, S., Williamson, L. D., Kahlor, L. A., Atkinson, L., Upshaw, S. J., & Ntang-Beb, J. L. (2024). The roles of social media use and medical mistrust in black Americans' COVID-19 vaccine hesitancy: The RISP model perspective. *Health Communication,* 39(9), 1833-1846. https://doi.org/10.1080/10410236.2023.2244169

Olagoke, A. A., Olagoke, O. O., & Hughes, A. M. (2020). Exposure to coronavirus news on mainstream media: The role of risk perceptions and depression. *British Journal of Health Psychology,* 25(4), 865-874. https://doi.org/10.1111/bjhp.12427

Pachankis, J. E. (2007). The psychological implications of concealing a stigma: A cognitive-affective-behavioral model. *Psychological Bulletin,* 133(2), 328-345. https://doi.org/10.1037/0033-2909.133.2.328

Park, S. (2023). *The effect of product type and influence type on consumers' intentions to accept product information* (master's thesis). Soongsil University, Seoul, Korea.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (vol. 19, pp. 123-205). Academic Press.

Pierre, J. M. (2020). Mistrust and misinformation: A two-component, socio-epistemic model of belief in conspiracy theories. *Journal of Social and Political Psychology,* 8(2), 617-641. https://doi.org/10.5964/jspp.v8i2.1362

Qin, K., Mollen, S., Waterlander, W., Cai, S., & Smit, E. (2025). Social perceptions going online: Exploring the impact of social media food content exposure on perceptions of food norms. *Appetite*, 206, 107803. https://doi.org/10.1016/j.appet.2024.107803

Rouffaer, S. (2024). *'TikTok taught me': A study on women's psychological and social motivations to self-diagnose with ADHD through social media* (master's thesis). Utrecht University, Utrecht, Netherlands.

Sarstedt, M., & Mooi, E. (2019). Principal component and factor analysis. In M. Sarstedt & E. Mooi (Eds.), *A concise guide to market research: The process, data, and methods using IBM SPSS Statistics* (pp. 257-299). Springer.

Schiros, A., Bowman, N., & Antshel, K. (2025). Misinformation mayhem: The effects of TikTok content on ADHD knowledge, stigma, and treatment-seeking intentions. *European Child & Adolescent Psychiatry,* 34(11), 3521-3533. https://doi.org/10.1007/s00787-025-02769-8

Schomerus, G., Stolzenburg, S., Freitag, S., Speerforck, S., Janowitz, D., Evans-Lacko, S., Muehlan, H., & Schmidt, S. (2019). Stigma as a barrier to recognizing personal mental illness and seeking help: A prospective study among untreated persons with mental illness. *European Archives of Psychiatry and Clinical Neuroscience,* 269(4), 469-479. https://doi.org/10.1007/s00406-018-0896-0

Shashua, A. (2025). *Scroll, self-diagnose, repeat: TikTok, ADHD misinformation, and the rise of illusory symptoms*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5399427

Song, P., Zha, M., Yang, Q., Zhang, Y., Li, X., & Rudan, I.; Global Health Epidemiology Reference Group (GHERG). (2021).

The prevalence of adult attention-deficit hyperactivity disorder: A global systematic review and meta-analysis. *Journal of Global Health*, 11, 04009. https://doi.org/10.7189/jogh.11.04009

Stefana, A., Damiani, S., Granziol, U., Provenzani, U., Solmi, M., Youngstrom, E. A., & Fusar-Poli, P. (2025). Psychological, psychiatric, and behavioral sciences measurement scales: Best practice guidelines for their development and validation. *Frontiers in Psychology*, 15, 1494261. https://doi.org/10.3389/fpsyg.2024.1494261

Suarez-Lledo, V., & Alvarez-Galvez, J. (2021). Prevalence of health misinformation on social media: Systematic review. *Journal of Medical Internet Research,* 23(1), e17187. https://doi.org/10.2196/17187

Thapa, P., Thapa, A., Khadka, N., Bhattarai, R., Jha, S., Khanal, A., & Basnet, B. (2018). YouTube lens to attention deficit hyperactivity disorder: A social media analysis. *BMC Research Notes,* 11(1), 854. https://doi.org/10.1186/s13104-018-3962-9

Theocharis, Y., Boulianne, S., Koc-Michalska, K., & Bimber, B. (2023). Platform affordances and political participation: How social media reshape political engagement. *West European Politics,* 46(4), 788-811. https://doi.org/10.1080/01402382.2022.2087410

Thorburn, S., Kue, J., Keon, K. L., & Lo, P. (2012). Medical mistrust and discrimination in health care: A qualitative study of Hmong women and men. *Journal of Community Health,* 37(4), 822-829. https://doi.org/10.1007/s10900-011-9516-x

van Strien, J. L. H., Kammerer, Y., Brand-Gruwel, S., & Boshuizen, H. P. A. (2016). How attitude strength biases information processing and evaluation on the web. *Computers in Human Behavior*, 60, 245-252. https://doi.org/10.1016/j.chb.2016.02.057

Vogt, D., Di Leone, B. A., Wang, J. M., Sayer, N. A., Pineles, S. L., & Litz, B. T. (2014). Endorsed and Anticipated Stigma Inventory (EASI): A tool for assessing beliefs about mental illness and mental health treatment among military personnel and veterans. *Psychological Services,* 11(1), 105-113. https://doi.org/10.1037/a0032780

Wells, A. (2002). *Emotional disorders and metacognition: Innovative cognitive therapy*. Wiley.

Wilson, T. D. (1999). Models in information behaviour research. *Journal of Documentation,* 55(3), 249-270. https://doi.org/10.1108/eum0000000007145

Yeung, A., Ng, E., & Abi-Jaoude, E. (2022). TikTok and attention-deficit/hyperactivity disorder: A cross-sectional study of social media content quality. *Canadian Journal of Psychiatry,* 67(12), 899-906. https://doi.org/10.1177/07067437221082854

Zeballos Rivas, D. R., Lopez Jaldin, M. L., Nina Canaviri, B., Portugal Escalante, L. F., Alanes Fernández, A. M. C., & Aguilar Ticona, J. P. (2021). Social media exposure, risk perception, preventive behaviors and attitudes during the COVID-19 epidemic in La Paz, Bolivia: A cross sectional study. *PloS One,* 16(1), e0245859. https://doi.org/10.1371/journal.pone.0245859

Zheng, H., Chen, X., Jiang, S., & Sun, L. (2023). How does health information seeking from different online sources trigger cyberchondria? The roles of online information overload and information trust. *Information Processing & Management,* 60(4), 103364. https://doi.org/10.1016/j.ipm.2023.103364

Zheng, H., Luo, C., Song, S., Ou, M., & Hansen, P. (2025). The algorithmic influence: What drives people to use AI-powered social media as a source of health information? *International Journal of Human–Computer Interaction,* 41(23), 15145-15157. https://doi.org/10.1080/10447318.2025.2495115

Zheng, H., & Tandoc, E. C. (2022). Calling Dr. Internet: Analyzing news coverage of cyberchondria. *Journalism Practice,* 16(5), 1001-1017. https://doi.org/10.1080/17512786.2020.1824586

Zhou, C., Xiu, H., Wang, Y., & Yu, X. (2021). Characterizing the dissemination of misinformation on social media in health emergencies: An empirical study based on COVID-19. *Information Processing & Management,* 58(4), 102554. https://doi.org/10.1016/j.ipm.2021.102554

Call for Paper

Journal of Information Science Theory and Practice (JISTaP)

We would like to invite you to submit or recommend papers to Journal of Information Science Theory and Practice (JISTaP, eISSN: 2287-4577, pISSN: 2287-9099), a fast track peer-reviewed and no-fee open access academic journal published by Korea Institute of Science and Technology Information (KISTI) and Yonsei Unviersity's Research Institute for Academic Library Development (RIALD). KISTI is a government-funded research institute that provides science and technology information (STI) services to support advanced R&D activities for researchers across Korea. RIALD is a leading research institute specializing in AI-driven data analytics, intelligent information services, data hub development, and information policy. It builds upon Yonsei University's longstanding excellence and leadership in research and education in the field of library and information science in Korea.

JISTaP aims at publishing original studies, review papers and brief communications on information science theory and practice. The journal provides an international forum for practical as well as theoretical research in the interdisciplinary areas of information science, such as information processing and management, knowledge organization, scholarly communication and bibliometrics.

We welcome materials that reflect a wide range of perspectives and approaches on diverse areas of information science theory, application and practice. Topics covered by the journal include: information processing and management; information policy; library management; knowledge organization; metadata and classification; information seeking; information retrieval; information systems; scientific and technical information service; human-computer interaction; social media design; analytics; scholarly communication and bibliometrics. Above all, we encourage submissions of catalytic nature that explore the question of how theory can be applied to solve real world problems in the broad discipline of information science.

Co-Editors in Chief : Gary Marchionini & Jee Yeon Lee

Please click the "Online Submission" link in the JISTaP website (http://www.jistap.org), which will take you to a login/account creation page. Please consult the "Author's Guide" page to prepare your manuscript according to the JISTaP manuscript guidelines.

Any question? Hyekyong Hwang (managing editor) : jistap@kisti.re.kr

JISTaP
Journal of Information Science Theory and Practice

Information for Authors

The Journal of Information Science Theory and Practice (JISTaP), which is published quarterly by the Korea Institute of Science and Technology (KISTI) and Yonsei University's Research Institute for Academic Library Development (RIALD), welcomes materials that reflect a wide range of perspectives and approaches on diverse areas of information science theory, application and practice. JISTaP is an open access journal operated under an Open Access Policy. See the section on Open Access for detailed information on the Open Access Policy.

A. Originality and Copyright

All submissions must be original, unpublished, and not under consideration for publication elsewhere. Once an article is accepted for publication, all papers are accessible to all users at no cost. If used for other researches, its source should be indicated in an appropriate manner and the content can only be used for uncommercial purpose under Creative Commons license.

B. Peer Review

All submitted manuscripts undergo a single-blind peer review process in which the identities of the reviewers are withheld from the authors.

C. Manuscript Submission

Authors should submit their manuscripts online via AccessON Peer Review Management System Plus (ACOMS^{+}). Online submission facilitates processing and reviewing of submitted articles, thereby substantially shortening the paper lifecycle from submission to publication. After checking the manuscript's compliance to the Manuscript Guidelines, please follow the "Online Submission" hyperlink in the top navigation menu to begin the online manuscript submission process.

D. Open Access and Creative Commons License Statement



All JISTaP content is Open Access, meaning it is accessible online to everyone, without fee or authors' permission. Open Access articles are automatically archived in the Korea Institute of Science and Technology Information (KISTI)'s Open Access repository (AccessON). All JISTaP content is published and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/). Under this license, the authors retain full ownership of their work, while permitting anyone to use, distribute, and reproduce the content in any medium, as long as the original authors and source are cited. For any reuse, redistribution, or reproduction of a work, users must clarify the license terms under which the work was produced.

E. Manuscript Guidelines

Manuscripts that do not adhere to the guidelines outlined below will be returned for correction. Please read the guidelines carefully and make sure the manuscript follows the guidelines as specified. We strongly recommend that authors download and use the manuscript template in preparing their submissions.

1. Page Layout :

All articles should be submitted in single column text on standard Letter Size paper (21.59 × 27.94 cm) with normal margins.

2. Length :

Manuscripts should normally be between 4,500 and 9,000 words (10 to 20 pages).

3. File Type :

Articles should be submitted in Microsoft Word format. To facilitate the manuscript preparation process and speed up the publication process, please use the manuscript template.

4. Text Style :

- Use a standard font (e.g., Times New Roman) no smaller than size 10.
- Use single line spacing for paragraphs.
- Use footnotes to provide additional information peripheral to the text. Footnotes to tables should be marked by superscript lowercase letters or asterisks.

5. Title Page :

The title page should start with a concise but descriptive title and the full names of authors along with their affiliations and contact information (i.e., postal and email addresses). An abstract of 150 to 250 words should appear below the title and authors, followed by keywords (4 to 6).

Author1
Affiliation, Postal Address. E-mail
Author2
Affiliation, Postal Address. E-mail

ABSTRACT
A brief summary (150-250 words) of the paper goes here.

Keywords: 4 to 6 Keywords, separated by commas.

6. Numbered Type :

1. INTRODUCTION

All articles should be submitted in single column text on standard letter size paper (21.59 × 27.94 cm) with normal margins[1. Text should be in 11-point standard font (e.g., Times New Roman) with single line spacing. [1 Normal margin dimensions are 3 cm from the top and 2.54 cm from the bottom and sides.

2. SECTIONS

The top-level section heading should be in 14-point bold all uppercase letters.

2.1. Subsection Heading 1

The first-level subsection heading should be in 12-point bold with the first letter of each word capitalized.

2.1.1. Subsection Heading 2

The second-level subsection heading should be in 11-point italic with the first letter of each word capitalized.

7. Figures and Tables :

All figures and tables should be placed at the end of the manuscript after the reference list. To note the placement of figures and tables in text, "Insert Table (or Figure) # here" should be inserted in appropriate places. Please use high resolution graphics whenever possible and make sure figures and tables can be easily resized and moved.

Figure

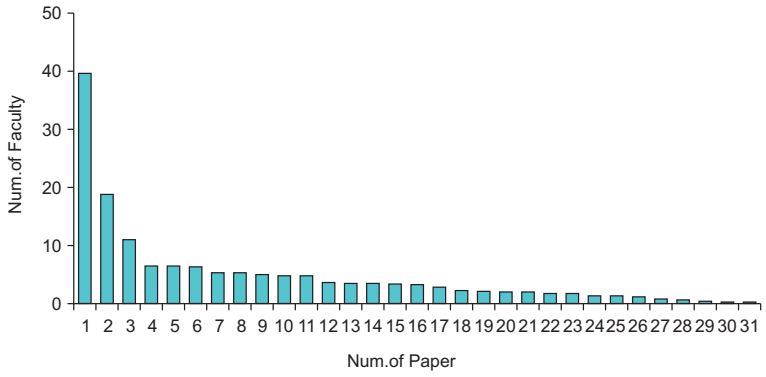


Fig. 1. Distribution of authors over publication count.

Table

Table 1. The title of table goes here

Study	Time period study	Data
Smith Wesson (1996)	1970 - 1995	684 papers in 4 SSCI journals
Reeves [a (2002)	1997 - 2001	597 papers in 3 SSCI journals
Jones Wilson [b (2011)	2000 - 2009	2,166 papers in 4 SSCI journals

[a Table footnote a goes here
[b Table footnote b goes here

8. Acknowledgements :

Acknowledgements should appear in a separate section before the reference list.

9. Conflicts of Interest :

Authors of manuscripts must disclose any potential conflicts of interest at the time of submission. Statements on conflict of interest have no influence on the editorial decision to publish.

10. Citations :

Citations in text should follow the author-date method (authors' surname followed by publication year).

- Several studies found... (Barakat et al., 1995; Garfield, 1955; Meho & Yang, 2007).
- In a recent study (Smith & Jones, 2011)...
- Smith and Jones (2011) investigated...

11. Reference List :

Reference list, formatted in accordance with the American Psychological Association (APA) style, should be alphabetized by the first authors last name.

Journal article

- Author, A., Author, B. & Author, C. (Year). Article title. *Journal Title*, volume(issue), start page-end page.
- Smith, K., Jones, L. J., & Brown, M. (2012). Effect of Asian citation databases on the impact factor. *Journal of Information Science Practice and Theory*, 1(2), 21-34.

Book

- Author, A., & Author, B. (Year). *Book title*. Publisher Name.
- Smith, K., Jones, L. J., & Brown, M. (2012). *Citation patterns of Asian scholars*. Sage.

Book chapter

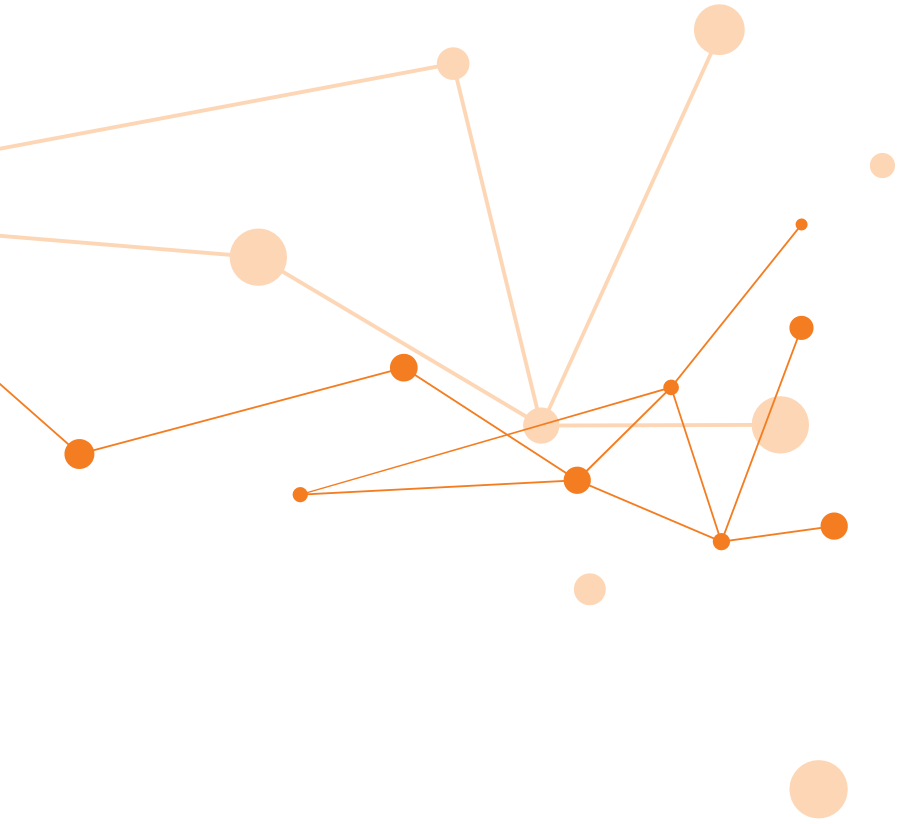
- Author, A., & Author, B. (Year). Chapter title. In A. Editor, B. Editor, & C. Editor (Eds.), *Book title* (pp. xx-xx). Publisher Name.
- Smith, K. & Brown, M. (2012). Author impact factor by weighted citation counts. In G. Martin (Ed.), *Bibliometric approach to quality assessment* (pp. 101-121). Springer.

Conference paper

- Author, A., & Author, B. (Year, Month Day). Article title. In A. Editor & B. Editor (Eds.), *Conference title* (pp. xx-xx). Publisher Name.
- Lin, H., Sun, B., Wu, J. & Xiong, H. (2016, June 24-26). Topic detection from short text: A term-based consensus clustering method. In B. Yang (Ed.), *2016 13th International Conference on Service Systems and Service Management (ICSSSM 2016)* (pp. 1-6). IEEE.

Online document

- Author, A., & Author, B. (Year). *Article title*. URL.
- Smith, K. & Brown, M. (2010). The future of digital library in Asia. *Digital Libraries*, 7,111-119. http://www.diglib.org/publist.htm.



JISTaP

Journal of Information Science
Theory and Practice

(02456) 66 Hoegi-ro, Dongdaemun-gu, Seoul, Republic of Korea
(T) +82-2-3299-6104 (F) +82-2-3299-6067
https://www.kisti.re.kr

(03722) 421 Widang Hall, Yonsei University, 50 Yonsei-ro,
Seodaemun-gu, Seoul, Republic of Korea
(T) +82-2-2123-2405 (F) +82-2-393-8348
https://thelibrary.yonsei.ac.kr