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The Relationship Between Attitude, Research Data Service, and Data Quality: A Study in Indonesian State Higher Education Institutions' Libraries

Objective. Librarians' responses to customer requests reflect their attitude. Encouraging positive attitudes among librarians is crucial for preparing institutions to reach their maximum potential in service delivery, particularly in research data services. Universities need academic library research data services to maintain data quality. These services help academic communities verify and maintain the quality of their data. Institutions, projects, and stakeholders determine the strategic value of data quality dimensions. This study aims to investigate research data services practiced by Indonesian academic librarians and to assess their attitudes, which are crucial for enhancing research data services and improving the quality of research data. **Methods.** Quantitative approach was used in this research. The sampling technique was purposive sampling. SEM-PLS and SmartPLS 3 were used for data analysis. This study focuses on academic librarians working in higher education institutions that are members of the Indonesian Higher Education Library Forum (FPPTI). Respondents were selected from libraries that provide research data services. **Results.** The results show that all constructs in the study were valid and reliable. The results emphasize the critical importance of research data services in the research model and the indirect effect of attitude on data quality through these services. Attitude has a significant impact on the research data service. However, the research data service has a more substantial impact on data quality. **Conclusions.** Fostering positive attitudes through training and supportive environments can improve service delivery and data quality. Strengthening research data services also enhances institutional credibility and academic outcomes.

Keywords: attitude; research data service; data quality; academic library; librarian

Introduction

A significant relationship exists between the attitude of library staff and the value of services provided by library employees (Oden & Owolabi, 2021). The way the library staff responds to customer requests reflects their attitude. In the manner in which library staff members interact with patrons while they are searching for information resources, patrons are more likely to return to the library due to their previous interactions with staff. As a result, the librarians' unfavorable attitude has been directly responsible for the institution's inability to realize its full potential in terms of service delivery, including research data services, over the years. However, librarians believe research data service is an essential service that academic and research libraries should provide, and that it aligns well with the overall purpose and function of the college library. These librarians believe that research data services will increase the visibility of institutional research and have a greater impact on the field (Tenopir, Sandusky, Allard, & Birch, 2013).

The strategic value of data quality dimensions is contingent upon the project, the institutions, and their stakeholders. Data quality dimensions may hold different values for users and data implementations based on their data vision, objectives, and point of view. As a result, a suitable and customized data quality assessment framework, as well as the Research Data Service, are required to control and supervise critical data quality control phases (Hassenstein & Vanella, 2022). Academic libraries' research data services are crucial because they act as hubs for data quality at universities. According to Giarlo (2013), these services can provide research communities with audits and verifications of data quality. Prominent libraries have collaborated

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to develop research data management services and associated tools, models, templates, and guidelines, which have accelerated the development of these services. The scope and complexity of their research data management service are determined by factors such as their financial and technological capabilities, the unique and specific demands of their institution, the existing infrastructure, and their own capabilities (Niu, 2020). There is limited information available regarding the research data services in academic libraries in Indonesia. However, it was found that the Universitas Sebelas Maret Surakarta (UNS) Library, one of Indonesia's academic libraries, offers a specialized research program. By actively engaging in research collaborations with academic professionals, librarians can strengthen their position as research collaborators within their institutions. The Universitas Sebelas Maret Surakarta Library's research consultation and information services program is known as the Scientific Material Clinic, or "Klinik Pustaka Ilmiah" (Nurkamilah & Nashihuddin, 2021). This program encourages librarians to publish more research and facilitates collaboration between researchers and librarians on research projects. According to Tenopir, Pollock, Allard, and Hughes (2016) this research program is one of the types of outreach and collaboration research data services offered by academic libraries. The informational or consultative services of the research data service in academic libraries include outreach and collaboration. Thus, the primary aim is to investigate the research data service practiced by Indonesian academic librarians. Additionally, the study aims to assess the attitudes of academic librarians, which are crucial for enhancing research data services, leading to the quality of research data. Thus, the research questions are:

1. What is the relationship between Attitude, Research Data Service, and Data Quality?
2. How do Attitude, Research Data Service, and Data Quality impact each other?

The hypotheses of the research model are:

H1: There is a significant relationship between Attitude and Research Data Service.
H2: There is a significant relationship between the Research Data Service and Data Quality.

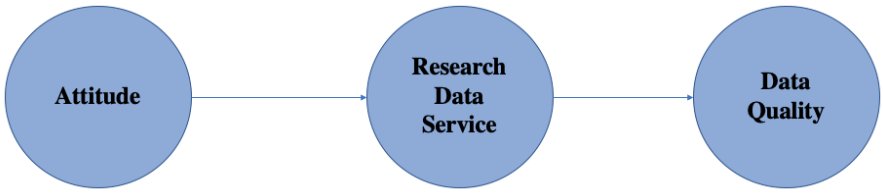

Fig. 1. Research model

Literature Review

Attitude

In 1862, the term "attitude" was supposedly introduced by psychologist Herbert Spencer. Attitude is the degree to which a person is inclined to favorably or positively employ a specific evidence-based practice (EBP) (Fishman, Yang, & Mandell, 2021). According to Getie (2020), an individual's attitudes are the sum of their unique beliefs and feelings about the world around them, which in turn impact their behavior. A person's upbringing, education, experiences, and exposure are just a few of the many variables that can cause them to differ from one another, highlighting the individuality of attitudes. When librarians learn new things and gain experience in their field, their perspectives can shift (Ilori, Owolabi, Oden, & Ogungbade, 2025).

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Research Data Service

The term "research data" denotes the data and files utilized in research projects and publications. These files can consist of documents, images, audio recordings, videos, spreadsheets, and other types of content (Springer Nature, n.d.). Libraries play a pivotal role in the research community by providing a diverse range of research data services. These services, which are often underappreciated, encompass a wide range of activities. They may include institutional data repository management (Reeves Flores, Brodeur, Daniels, Nicholls, & Turnator, 2015), providing data mining and visualization instruments (Koltay, 2016), training in data management plans and research data management service (Tenopir, Birch, & Allard, 2012), guidance on policies (Linde, Noorman, Wessels, & Sveinsdottir, 2014), and assistance with intellectual property and privacy concerns about research data (Vlaeminck, 2013). The services offered can be classified into two categories: informational or consultative services and technical services (Tenopir, Pollock, Allard, & Hughes, 2016). The former encompasses reference services, the development of guidebooks, and consultations with library patrons. The latter entails the establishment and management of a data repository, along with the preparation of datasets for sharing and reutilization. Another study proposed an additional research data service in the library, including bibliometrics services and Research Data Service (Corrall, Kennan, & Afzal, 2013).

Data Quality

The value of research data is heavily dependent on the six dimensions of data quality. These dimensions, which are completeness, uniqueness, timeliness, validity, accuracy, and consistency, play a crucial role in ensuring the value of data (Ramasamy & Chowdhury, 2020; Galih, Hajdu Barát, Bahar, & Febriyanti, 2023). Completeness ensures that all necessary data for a particular application is present or accessible. Uniqueness assesses the frequency of duplications, with data being deemed unique when it appears solely within the dataset. Timeliness ensures that data is available when needed, with variations contingent upon the specific circumstances. Validity is the degree to which the data aligns with the anticipated format, type, and scope. Accuracy defines the extent to which data represent reality, with elevated data accuracy facilitating a reliable study. Consistency is attained when values of data do not contradict each other within or across various datasets, thereby improving the capacity to integrate them from multiple sources (Ramasamy & Chowdhury, 2020).

Methods

Research methodology is a framework with paradigmatic assumptions for conducting research (Sugiyono, 2020). This study employed a quantitative approach. The data for this study were collected through an online survey. This study targeted Indonesian academic librarians. Non-probability sampling, specifically, purposive sampling, was used. Non-probability sampling does not guarantee equal chances for every element or population member to be sampled (Sugiyono, 2020). Purposive sampling selects a sample based on criteria. This method produces population-representative sample results. The focus of this study is on librarians who work in libraries of higher education institutions. The condition of being respondents in this study was academic librarians who are members of the Indonesian Higher Education Library Forum (FPPTI). The second condition was that their academic libraries provide research data services, such as technical and/or non-technical services. This sampling method ensured unbiased data collection from respondents, who may have already been involved in the research data service at their workplaces. Data collection took place between November 2024 and February 2025. The total respondents in this study was 58. This study utilized a questionnaire with closed-ended questions and a seven-

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point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (7). This study employed several statistical tests to evaluate relationships between variables, perform descriptive statistics, and assess the validity and reliability of the data. To examine validity and reliability, Fornell and Larcker (1981) suggested statistical tests, namely Cronbach's alpha, rho_A, Composite reliability, and Average Variance Extracted (AVE). Structural equation modeling partial least square (SEM-PLS) was used to measure the relationship between attitude, research data service, and data quality. This method was employed because SEM-PLS enables the testing of structural and measurement models, as well as the analysis of model relationships, and also works on a small number of respondents (Gefen, Straub, & Boudreau, 2000; Ringle, Sarstedt, Sinkovics, & Sinkovics, 2023). Data processing used SmartPLS version 3.

Results and Discussion

This study investigated the correlations between Attitude, Research Data Service, and Data Quality to address the research objectives that were established. The findings reveal significant correlations among these constructs, indicating that their interactions are mutually dependent and have a significant impact. The subsequent sections present the findings, highlighting the interrelations and effects of each factor, followed by a discussion of their implications.

Table 1

Years of working

	Frequency	Percent
< 5 years	14	24.1
5 – 9 years	5	8.6
10 - 14 years	8	13.8
15 - 19 years	11	19.0
> 19 years	20	34.5

Based on Table 1, the second highest number is relatively junior librarians who have been working in higher education institutions for less than five years. Most of the respondents in this study are senior librarians who have worked for more than fifteen years. A total of eleven respondents have been working as academic librarians for 15 to 19 years. A total of twenty respondents have been working as academic librarians for more than nineteen years.

Table 2

Providing research data service

	Frequency	Percent
Some	13	22.4
Yes	45	77.6

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Based on the data presented in Table 2, 45 of the respondents assert that their academic libraries offer both technical and non-technical research data services. On the other hand, thirteen respondents claim that their academic libraries offer only one of the two types of research data services, either technical or non-technical services.

Table 3

Validity and reliability results

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Attitude	0.918	0.928	0.960	0.924
Data Quality	0.980	0.981	0.982	0.798
RDS	0.938	0.944	0.945	0.537

The measurement model demonstrates high reliability and validity for every construct. Cronbach's Alpha, rho_A, and Composite Reliability values for Attitude, Data Quality, and Research Data Service all exceed 0.90, indicating high internal reliability. The Average Variance Extracted (AVE) values indicate convergent validity, with Attitude (0.924) and Data Quality (0.798) explaining a significant proportion of variance. Research Data Service has an AVE of 0.537, which is acceptable. However, it implies slightly lower convergent validity than the other constructs. Thus, the results indicate that all constructs are reliably measured.

Table 4

R-square results

	R^2	R^2 Adjusted
Data Quality	0.521	0.512
RDS	0.470	0.460

R^2 values represent the proportion of variance in the dependent variable that the model explains. The R^2 for Data Quality is 0.521, with an adjusted value of 0.512, indicating that the predictors account for approximately 52% of the variance. The Research Data Service model exhibits a moderate level of explanatory power, as evidenced by an R^2 value of 0.470 and an adjusted R^2 value of 0.460. This means that approximately 47% of its variance is explained.

Table 5

Hypotheses results

	β	t-value	p-value	f^2
Attitude → RDS	0.685	8.916	0.000	0.886
RDS → Data Quality	0.722	9.450	0.000	1.087

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The path coefficients (β) serve as indicators of the strength and direction of the relationships between constructs in the model. The coefficient of 0.685 from Attitude to Research Data Service indicates a strong positive correlation, suggesting that a higher value of Attitude corresponds with a higher value of Research Data Service. The coefficient of 0.722 from the Research Data Service to Data Quality indicates a robust positive correlation, demonstrating that enhancements in Research Data Service are closely associated with improved Data Quality. Both path coefficient values exceed 0.50, indicating considerable power and a significant relationship between the constructs. These results underscore the critical importance of the Research Data Service in the model and the indirect influence of Attitude on Data Quality through its effect on the Research Data Service. The indirect effect of Attitude on Data Quality is 0.495, a substantial proportion. The indirect effect of Attitude on Data Quality, calculated at 0.495, implies the proportion of Attitude's influence that is mediated through Research Data Service. Attitude influences Research Data Service, which in turn affects Data Quality, thereby having a significant impact on Data Quality in the model. Thus, Research Data Service mediates the relationship between Attitude and Data Quality.

The t-values and p-values demonstrate the statistical significance of model construct relationships. The relationship between Attitude and Research Data Service, with a p-value of 0.000, is highly significant, indicating that Attitude consistently and positively impacts Research Data Service. The relationship between Research Data Service and Data Quality, also with a p-value of 0.000, is not only significant but also provides a strong foundation for the findings. These findings not only support the hypothesized model but also underscore the crucial role of the Research Data Service in mediating improvements in Attitude and Data Quality.

The f^2 values indicate the estimated effect sizes of the predictors on the endogenous constructs in the model. Research Data Service is significantly influenced by Attitude, as evidenced by an f^2 value of 0.886, which suggests that it makes a substantial contribution to explaining the variance in Research Data Service. A value of 1.087, however, indicates that Research Data Service has a significantly greater effect on the Data Quality variable, highlighting the strength of this relationship.

Attitude has a significant relationship with library services, including the research data service, which aligns with Oden and Owalobi's research (2021). Academic librarians must maintain a positive attitude to realize the full potential of research data service delivery. Since research data services in academic libraries can be the centre of audits and data quality verification (Giarlo, 2013) it is important to have the right attitude towards research data services. The results of this study indicate that Indonesian academic librarians have a positive attitude towards research data services, which leads to improved data quality.

Conclusions

Attitude has a positive effect on the Research Data Service, which in turn positively impacts data quality, as indicated by strong and statistically significant path coefficients. Attitude affects Data Quality indirectly through the Research Data Service, according to the mediation results. Research Data Service is the most crucial construct in this study, as its large effect sizes demonstrate its role as a mediator and driver of quality outcomes. This study demonstrates that the Attitude and Research Data Service has a significant influence on data quality, both theoretically and practically.

This study enhances the theoretical understanding of how attitudes influence the effectiveness and quality of academic library services. It supports research that shows librarians' attitudes are important to library service delivery, especially in this case, research data service, and

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data quality through structured service and activities. In practice, academic libraries can improve research data services and data quality by fostering librarian development, training, and an encouraging work environment to improve librarian attitudes. Research data services are increasingly tied to audits, compliance, and institutional credibility; therefore, improving the services enhances library effectiveness and academic results.

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Взаємозв'язок між ставленням бібліотекарів до роботи, службою обробки дослідницьких даних та якістю даних: дослідження в бібліотеках державних закладів вищої освіти Індонезії

Мета. Відповіді бібліотекарів на запити клієнтів відображають їхнє ставлення. Заохочення позитивного ставлення серед бібліотекарів має вирішальне значення для підготовки установ до досягнення максимального потенціалу в наданні послуг, особливо у сфері послуг з обробки дослідницьких даних. Університетам потрібні послуги з обробки наукових дослідницьких даних в академічних бібліотеках для підтримання якості даних. Ці послуги допомагають академічним спільнотам перевіряти та підтримувати якість своїх даних. Установи, проєкти та зацікавлені сторони визначають стратегічну цінність показників

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якості даних. Мета цього дослідження – дослідити послуги з обробки наукових дослідницьких даних, що надаються індонезійськими бібліотекарями академічних бібліотек, та оцінити їхнє ставлення, яке має вирішальне значення для вдосконалення послуг з обробки наукових дослідницьких даних та підвищення якості наукових дослідницьких даних. **Методика.** У цьому дослідженні було використано кількісний підхід. Метод вибірки – цільова вибірка. Для аналізу даних було використано SEM-PLS та SmartPLS 3. Це дослідження зосереджується на бібліотекарях, які працюють у вищих навчальних закладах, що є членами Індонезійського форуму бібліотек вищих навчальних закладів (FPPTI). Респонденти були обрані з бібліотек, які впроваджують послуги з надання даних для досліджень. **Результати** показують, що всі конструкти в дослідженні були валідними та надійними. Вони підкреслюють критичну важливість служб обробки дослідницьких даних у дослідницькій моделі та непрямий вплив ставлення на якість даних через ці служби. Ставлення має значний вплив на службу обробки дослідницьких даних. Однак служба обробки дослідницьких даних має більш істотний вплив на якість даних. **Висновки.** Сприяння формуванню позитивного ставлення через навчання та сприятливе середовище може покращити надання послуг та якість даних. Посилення послуг з обробки дослідницьких даних також підвищує інституційну надійність та покращує академічні результати.

Ключові слова: ставлення; послуги з обробки дослідницьких даних; якість даних; академічна бібліотека; бібліотекар

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