

THE CALIBER OF ELECTRONIC REPOSITORY SERVICES AND THEIR INFLUENCE ON BENEFICIARY SATISFACTION: A SURVEY CONDUCTED IN IRAQI PUBLIC UNIVERSITIES

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Keywords

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Abstract

The study aims to explore how beneficiary satisfaction is being driven by the service quality delivered by digital repositories. The independent variable (quality of digital repository services) was examined by the following characteristics: perceived service quality, information usability, information security, feedback and interaction, tool application, and user experience. The dependent factor, beneficiary satisfaction, was measured using the following categories: integrity; identity or connection/group membership (as used in Two-Step and Value Chain Benefit); structural assurance; performance expectations/reliability; ease of use; desire to reuse. The number of digital repositories examined in this study is a fraction of those associated with 11 public institutions in Iraq. Of the 13 universities, 292 faculty members were selected purposively. A questionnaire-based survey design was used to collect data from the research population. Data from the research sample were analysed using SPSS V28 and AMOS V26. This study concluded that the quality of service in digital repositories has a considerable influence on beneficiary satisfaction. Improving the efficiency of these services increases Beneficiary Satisfaction. This confirms the hypothesis, as a strong relationship has been found between service quality and beneficiary satisfaction. The study recommended that warehouse managers focus on data accuracy and continuous updates, while providing in-depth descriptions of materials to enhance user understanding. This will immediately improve the perceived quality of the information.

1. Introduction

The digital archives are important because they protect the intellectual output of faculty and researchers and publicize it to stakeholders. From late 2014, Iraqi universities began creating digital repositories to collect the intellectual output of their faculty and students' graduation projects at both the intermediate and graduate levels. Nevertheless, individuals overseeing the sites and content of these repositories may occasionally identify deficiencies in service delivery, including the accessibility of content, the breadth of information sources, and access to full-text resources. Iraq has had two innovative initiatives to establish and deploy digital repositories: the Iraqi Academic Journals Repository, overseen by the Ministry of Higher Education and Scientific Research. This archive provides exclusive access to research published in academic journals by scientific societies, universities, and their associated academic entities, including research centers. The second repository is the Iraqi Digital Repository, overseen by the Al-Abbas Holy Shrine. The Holy is a repository dedicated to collecting intellectual outputs, including master's theses, doctoral dissertations, and postgraduate diploma studies, and houses almost 100,000 such documents. These two experiences indicate that both repositories are specialized in a certain sort of information container. University repositories are anticipated to comprehensively encompass all intellectual outputs produced by their researchers and faculty, including patents, books, local and international scientific research, student lectures, master's theses, doctoral dissertations, postgraduate diploma research, and scientific journals published by these institutions.

Additionally, they will preserve other intellectual outputs in various formats, including maps, panels, and audiovisual materials. These repositories provide services to all beneficiaries, both

internal and external to the institution, in accordance with established and publicly communicated usage regulations. Consequently, the issue of the present research arises in its endeavour to address the following primary question: What is the effect of the quality of services offered by university digital repositories on the satisfaction of their beneficiaries? It extends forth. This inquiry prompts many subsidiary questions regarding the extent of availability of digital repositories at all public universities in Iraq, except the Kurdistan Region, the extent and nature of services offered by the repositories under examination, the effect of digital repository service quality on beneficiary satisfaction, and the effect of the dimensions of digital repository service quality on beneficiary satisfaction.

The importance of the research is highlighted through two main aspects. From a scientific perspective, this research helps bridge the knowledge gap regarding the use of digital repositories at the local level, given their importance in complementing previous knowledge efforts. From a practical perspective, this research demonstrates that the results obtained can directly support the efforts of those responsible for establishing and developing these repositories by identifying the strengths and weaknesses of the services they provide to their users. This, in turn, will be reflected in future improvement plans based on users' needs and actual usage.

The research aims to identify the digital repositories available at Iraqi public universities (excluding the Kurdistan Region), identify the services and information resources covered by the researched repositories, and study the impact of the services provided by these repositories on beneficiary satisfaction.

2. Method

To achieve these objectives, the measures presented in Table 1 were adopted, indicating the measures for each variable and its associated dimensions.

Table 1. Illustrates the measures used to determine the dimensions of the research variables.

No.	Variable	Dimensions	Scale
1	Service Quality	Perceived Information Quality Information Usability Information Security Interaction and Feedback Tool Implementation User Experience Integrity	(Yakel et al., 2024)
2	Beneficiary Satisfaction	Identification (Affiliation) Structural Assurance Performance Expectations Ease of Use Reuse Intent	(Zhang, Zhang & Wang, 2025)

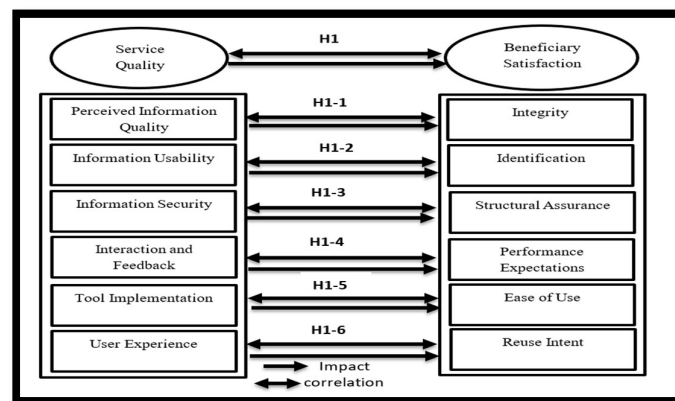


Figure 1. Hypothetical study plan

***Source: Prepared by the researcher based on the mentioned sources.**

The research is based on the main hypothesis (H1), which states that there is a statistically significant effect of service quality on beneficiary satisfaction. From this main hypothesis, several sub-hypotheses emerge, namely that there is a statistically significant effect of perceived service quality on beneficiary satisfaction, a statistically significant effect of ease of use of information on beneficiary satisfaction, a statistically significant effect of information security on beneficiary satisfaction, a statistically significant effect of interaction and feedback on beneficiary satisfaction, a statistically significant effect of implementing tools on beneficiary satisfaction, and a statistically significant effect of user experience on beneficiary satisfaction.

The research is conducted within specific limits. The temporal limits extend from January 2, 2025, to April 31, 2025. The spatial limits cover digital repositories affiliated with Iraqi public universities, excluding the Kurdistan Region. The objective limits of the research focus on the quality of digital repository services and beneficiary satisfaction.

The research community comprised all public universities in Iraq, excluding those in the Kurdistan Region, that have developed digital repositories for their intellectual output. These included 11 out of 23 public institutions: the University of Baghdad, Al-Mustansiriya University, Al-Iraqiya University, the University of Karbala, the University of Babylon, the University of Diyala, the University of Al-Qadisiyah, the University of Anbar, the University of Fallujah, the University of Basra, and the Northern Technical University. The universities that do not possess digital repositories are the University of Nahrain, the University of Technology, Al-Muthanna University, the University of Dhi Qar, the University of Maysan, the University of Tikrit, the University of Mosul, the University of Kufa, the University of Wasit, the University of Kirkuk, the Middle Technical University, and the Southern Technical University. It is important to note that these 12 institutions, which do not have established digital repositories for their intellectual production, currently rely on the Iraqi Digital Repository established by the Al-Abbas's (p) Holy Shrine in early 2019. This repository contains only theses and dissertations from Iraqi institutions, amounting to approximately 81,000 records. Universities continue to rely heavily on these theses and dissertations and provide links to the repository through their official websites. A purposive sample of academics from the eleven institutions identified in the research community was selected based on their actual use of digital repository services at their own institutions or at other universities providing similar services. To obtain a representative sample, a preliminary survey was conducted involving 310 faculty members. These participants were contacted through official email addresses available in academic profiles published on the websites of the universities included in the study. The data collection instrument, in the form of a questionnaire, was subsequently distributed to the sample through Google Forms. A total of 292 responses were received, corresponding to the final study sample, as shown in the table below.

Table 2. Analysis of demographic data for the study sample

No.	Description	Category	repetition	%
1	Gender	Males	195	66.8%
		Females	97	33.2%
2	Age Group	35-25	83	28.4%
		45-36	112	38.4%
		55-46	69	23.6%
		56 and above	28	9.6%
3	Certification	Master's	160	54.8%
		PhD	132	45.2%
4	Academic Title	Assistant Lecturer	78	26.7%
		Lecturer	117	40.1%
		Assistant Professor	75	25.7%
		Professor	22	7.5%
5	Number of Times Used	1-3 times per week	104	35.6%
		4-6 times per week	119	40.8%
		7-10 times per week	44	15.1%
		More than 10 times	25	8.6%
6	Technology Proficiency	Weak	15	5.1%
		Average	27	9.2%
		Good	93	31.8%
		Very Good	97	33.2%
		Excellent	60	20.5%

Source: Field study compiled by the researcher

The Table 2 above indicates that male participants constituted 66.8% (195 individuals) of the sample, while female participants accounted for 33.2% (97 individuals). The largest age group was 36–45 years, representing 38.4% (112 individuals) of the respondents, suggesting that most participants possessed a considerable level of professional experience. In contrast, the smallest age group was those aged 56 years and above, comprising 9.6% (28 individuals), indicating the inclusion of a smaller number of senior and highly experienced academics. Regarding educational background, respondents holding a master's degree formed the largest group at 54.8% (160 individuals), followed by those with doctoral degrees at 45.2% (132 individuals). These findings indicate that most participants were highly educated and capable of providing informed responses based on their academic knowledge and professional experience. In terms of academic rank, the largest proportion of respondents held the position of Instructor, accounting for 40.1% (117 individuals), reflecting the substantial involvement of teaching and research staff in the study. Conversely, Professors represented the smallest proportion at 7.5% (22 individuals), which may reflect either the smaller size of this academic group or their relatively lower participation in repository-related activities. Concerning repository usage frequency, the most common category was "4–6 times," representing 40.8% (119 individuals) of the sample, indicating that most participants were regular users of digital repositories. Meanwhile, the category "more than 10 times" accounted for the smallest proportion at 8.6% (25 individuals), suggesting that only a limited number of participants were intensive users. Finally, the results show that 33.2% (97 individuals) rated their ability to use digital technologies as "very good," while only 5.1% (15 individuals) reported a "weak" level of technological proficiency. These findings suggest that most of the research sample possessed strong digital skills, enabling them to effectively utilize digital repository services and adapt to technological developments.

Data collection for this research was carried out through both theoretical and practical approaches. The theoretical aspect relied on books, journal articles, and previous studies related to the research variables, published in both print and electronic formats. The practical aspect adopted the scales presented in Table 1 due to their suitability to the nature of the current research, the characteristics of the study sample, and the requirements of the local environment.

A five-point Likert scale was used to measure the degree of the research sample's responses to the questionnaire dimensions. In addition, several statistical methods were employed to analyze the collected data, including the arithmetic mean, percentage weight, relative importance, standard deviation, structural equation modelling, and regression coefficient. These methods were used to describe the data, assess the relationships among variables, and test the research hypotheses.

3. Results and Discussion

3.1. Test the validity of the study tool

The validity of the study tool refers to the ability of a measurement instrument to accurately assess the concept it was designed to measure. According to established measurement theory, complete validity indicates that the instrument is free from all forms of measurement error, whether random or systematic. To ensure the validity of the measurement instrument, specific criteria were adopted in this study. In addition, the reliability of the instrument was evaluated based on its ability to consistently and accurately measure the intended construct, while ensuring that all essential elements were comprehensively covered and that the wording of the instrument was clear and precise. To assess reliability, the researcher conducted a pilot test involving 40 questionnaires and applied Cronbach's alpha to measure internal consistency. Cronbach's alpha values range from 0 to 1, with higher values indicating stronger internal consistency. According to Hair et al. (2010) and findings from previous research, a Cronbach's alpha value of 0.70 or higher is generally considered acceptable, while a value of 0.50 or higher may be sufficient for preliminary analyses in exploratory or contributory research (Nunnally & Bernstein, 1994).

Table 3. The results of the Cronbach's alpha test for the exploratory sample.

Independent and Dependent Variables	Components of variables	Number of items	Cronbach's alpha coefficient	Validity coefficient
Service Quality	Perceived Information Quality	5	92.4%	85.4%
	Information Usability	5	94.4%	89.2%
	Information Security	5	94.9%	90.1%
	Interaction and Feedback	5	89.3%	79.8%
	Tool Implementation	5	91.5%	83.8%
	User Experience	5	94.9%	90.0%
	Integrity	5	96.1%	92.4%
Beneficiary Satisfaction	Identification (Affiliation)	5	93.9%	88.1%
	Structural Assurance	5	90.7%	82.3%
	Performance Expectations	5	88.8%	78.8%
	Ease of Use	5	95.4%	91.1%
	Reuse Intent	5	92.4%	85.3%
survey		60	86.4%	92.9%

Source generated by the researcher utilising the SPSS software

The Table 3 shows that all values fell within the acceptable limits, indicating that the measurement instrument demonstrated an adequate level of validity and reliability for use in the study.

An empirical study entitled *An Empirical Examination of Data Reuser Trust in a Digital Repository* was conducted to identify the factors influencing trust in data reuse within digital repositories. The study investigated the perspectives of 245 quantitative social science academics who had reused data from a single digital repository. Using principal component analysis (PCA), three key dimensions of trust were identified, namely integrity, which reflects the repository's professional conduct and ethical standards; identification, which refers to the extent to which users feel a sense of belonging or affiliation with the repository; and structural assurance, which represents the existence of rules and administrative infrastructures that foster confidence in the repository environment. The findings revealed that both trust and performance expectations significantly influence users' intentions to reuse digital repositories in the future. The study concluded that building user trust depends not only on the repository's technical and organizational infrastructure but also on the quality of the relationship established between the repository and its user community. Furthermore, the research is considered one of the first evidence-based studies to develop a model of user trust in digital repositories, thereby contributing to the literature on digital service quality and user behavior (Yakel et al., 2024).

A qualitative study entitled *Organisational and Technology Factors that Impact Effective Service Provision in Trusted Digital Repositories: A Qualitative Study* was conducted to identify the factors that enhance service efficiency in university digital repositories. The study employed an interpretive qualitative approach and collected data through semi-structured interviews with nine respondents from organizations in southwestern Nigeria, followed by thematic analysis. The findings suggest that digital repositories should not merely function as information storage spaces waiting to be searched but should instead be developed as trusted sources that facilitate scientific research and academic knowledge creation. The study identified several influential factors that can be grouped into two broad categories. The first category consists of organizational factors, including cohesive regulatory frameworks, stakeholder engagement, and sustainable financial support for repository operations. The second category comprises technological factors, such as the implementation of technical standards and trust certifications for digital repositories, which enhance the legitimacy and quality of the services provided. These findings emphasize the importance of both organizational and technological support in ensuring the effectiveness and trustworthiness of digital repository services (Ajibade & Owolabi, 2024).

A study entitled *Longitudinal Attributes of the BePress Digital Commons R1 and R2 Institutional Repositories* examined the growth and utilization of institutional repositories at Carnegie R1 and R2 institutions using the BePress Digital Commons platform between 2017 and 2023. The researchers collected data from selected repositories in 2017, 2019, 2021, and 2023, including information on

the number of items, download statistics, the presence of journals, theses, and dissertations, as well as changes in BePress clientele over time. The findings highlighted the importance of establishing institutional repositories with appropriate technological specifications and scalability to accommodate future growth while maintaining consistent repository data. The study further emphasized the need for repository functionalities that support the effective administration, maintenance, and expansion of digital collections, particularly considering the continued growth of institutional repositories and ongoing discussions regarding the ownership and governance of scholarly communication infrastructure (Ghaphery et al., 2024).

A study entitled *Utilisation and Beneficiary Contentment with Library Information Resources and Services at the Federal University of Kashere Library* investigated the utilization of library information resources and the level of user satisfaction with library services at the Federal University of Kashere Library in Gombe State, Nigeria. The study employed a survey method involving 3,920 registered library users, from which a sample of 350 respondents was determined using a sample size calculator. Four research questions guided the investigation, and data were collected through a structured questionnaire. Of the 350 questionnaires distributed, 342 were returned and considered valid, resulting in a response rate of 97.7%. The findings revealed that most respondents used the library daily for academic purposes, preferred print and secondary information sources over electronic resources, expressed higher satisfaction with periodical, circulation, and reference services, and reported lower satisfaction with electronic resource services. Based on these findings, the study recommended that library management strengthen user education and support programs to encourage the effective use of information resources, particularly electronic resources such as e-books, e-journals, newspapers, and electronic databases. The study also suggested extending library operating hours to improve user access to available services and resources (Akinwae & Abdulmajid, 2023).

A study entitled *AHP-Based Evaluation of Discipline-Specific Information Services in Academic Libraries Under Digital Intelligence* examined an assessment methodology for evaluating the quality of specialist information services in academic libraries within the context of digital intelligence and artificial intelligence. The study employed established service quality evaluation frameworks, including LibQUAL+TM, WebQUAL, and E-SERVQUAL, supplemented by expert interviews to identify the operational characteristics of specialist information services in university libraries. Based on this analysis, the researchers developed a performance evaluation model encompassing six dimensions: perceived information quality, information usability, interactive feedback, tool implementation, security, and user experience. Fifteen indicators were selected, and their relative weights were determined using the Analytic Hierarchy Process (AHP). The study further applied a fuzzy comprehensive evaluation method to conduct an empirical assessment of specialist information services at Tsinghua University Library in China, thereby validating the proposed evaluation framework. The findings indicated that the overall quality of specialist information services at Tsinghua University Library was good, with tool implementation, perceived information quality, and information usability emerging as the most influential factors affecting service quality. The study also emphasized the importance of enhancing user experience, strengthening communication and feedback mechanisms, and establishing robust data protection procedures to ensure that professional information services effectively meet users' diverse needs and improve service performance (Zhang et al., 2025).

A series of prior studies were examined that pertained to present research, including the quality of digital repository services and beneficiary satisfaction. The prior studies guided the current research by analysing the most significant discoveries in the domain of research dimensions. Several of these studies served as validated metrics in the present research to investigate its practical dimension, along with observations on the sample selection methodology and data processing strategy. Consequently, this research builds on prior academic endeavours on the quality of digital repositories. The current study distinguishes itself by examining this variable and its effect on Beneficiary Satisfaction in the Iraqi setting. To the researcher's knowledge, no study has integrated the research variables and measurements within the local environment.

3.2. Theoretical Aspect of Research

3.2.1. The Beginnings of Digital Repositories

The initial digital repositories emerged at research centers between the mid-1970s and 1980s. They were referred to as projects for electronic document preservation or electronic archiving, rather than as digital repositories (Arms, 2000). In early 1991, Paul Ginsparg founded arXiv.org to facilitate the exchange of pre-publication articles in physics. This marked the inception of academic digital repositories (Ginsparg, 2011). Significant digitisation initiatives, such as NCSTRL and the D-Lib Program, emerged in the mid-1990s. These initiatives facilitated the advancement of electronic publishing technology and automated information aggregation (Lagoze & Van de Sompel, 2001). From 2000 to 2002, the most significant attempts to promote and build institutional repositories arose. For instance, (D Space, 2002) and (E Prints, 2000) (Lynch, 2003; Open Archives Initiative, 2002). In late 2002, the Open Archives Initiative (OAI) was established and created the OAI-PMH. A protocol for the exchange of metadata across repositories, facilitating seamless integration and access to repository contents. Subsequently, initiatives to facilitate the creation of repositories culminated in the Berlin Declaration of 2003, which articulated formal endorsement by academic institutions for open access policies and the development of institutional repositories (Max Planck Society, 2003). Following 2010, the establishment of the greatest global digital repositories occurred, with their scope broadening to encompass research data and the principles of FAIR DATA (Wilkinson et al., 2016).

3.2.2. The Concept and Importance of Digital Repositories

An institutional digital repository is a digital archive of the intellectual output generated by academics, research staff, and students of an institution, accessible to users both within and outside the institution, with minimal access barriers (Gobbur, 2007). Alternatively, it might be characterised as a specialist system for storing, organising, maintaining, and facilitating access to digital content. These assets may include academic papers, databases, photographs, audio files, and video files. Digital repositories serve as reliable sources of information and ensure long-term preservation and accessibility (Nasidi & Jika, 2023). Another way to define it is that these are digital tools, designed to manage and store such information content, online as a permanent collection of useful resources for the entity's different audiences. These include institutional repositories such as university, theme, household, and government repositories, as well as digital libraries and commercial repositories (Dwivedi & Pachauri, 2023). Their main goal is to ensure the long-term preservation and accessibility of digital assets. Numerous categories of digital repositories exist. The present study posits that digital repositories are specialist storage locations established by entities that generate or oversee the production of information, utilising specialised software to preserve and manage informational material. These repositories are frequently provided at no cost to organisations that utilise their services, but this is accompanied by a need to safeguard the intellectual property rights of information creators.

A multitude of factors must be taken into account while creating digital repositories, including repository services and access to their contents, the quality of repository operations such as intake, description, preservation, access, and reuse, deposit policies, naming agreements, and repository content management, as well as issues related to trust, authentication, and source credibility. In addition, the implementation of open-source information access systems is an important consideration to ensure the effectiveness, accessibility, and sustainability of digital repositories (Gobbur, 2007).

The importance of establishing digital repositories lies in their role in preserving institutional digital assets and ensuring their long-term availability, accessibility, and sustainability. Digital repositories assist institutions in developing integrated and coordinated systems for the collection, identification, storage, and retrieval of intellectual outputs. They also enhance learning opportunities and promote interdisciplinary collaboration by providing permanent and unrestricted access to research outputs, thereby facilitating the effective reuse of research findings. Furthermore, digital repositories support global movements toward openness and the free exchange of information, contributing to innovation and the wider dissemination of knowledge. They also facilitate the implementation of e-learning and distance learning approaches. In addition, digital repositories support the management of intellectual property rights, licensing agreements, and copyright

compliance while protecting the rights of content creators and owners. They further help maintain the integrity of digital files by preventing damage, unauthorized modification, and data loss, thereby ensuring the reliability and security of preserved information resources (Dwivedi & Pachauri, 2023).

Two factors indicate the quality of digital repository services: the first concerns their adherence to international standards set by specialist associations and organisations in the field of quality services for digital repositories and libraries. The second trend concerns the extent to which the services offered in these repositories align with beneficiaries' expectations and actual needs, thereby leading to beneficiary satisfaction with the services rendered. The present research examines the degree to which the services of the analysed repositories align with the expectations and real requirements of beneficiaries.

3.2.3. Dimensions of Digital Repository Service Quality

The present research adopts the scale developed by Zhang, Zhang, and Wang (2025) because it is considered the most appropriate for the characteristics of the research community and the nature of the study. The scale comprises six dimensions: perceived information quality, information usability, information security, interaction and feedback, tool application, and user experience. Perceived information quality refers to users' evaluation of the information obtained from the repository, which is influenced by factors such as accuracy, adequacy, reliability, user perception, and the diversity of available information. Information usability reflects the degree to which the repository is easy to use, navigate, and access, as well as its effectiveness in presenting information in various formats, since the usability of repository content is a key determinant of repository effectiveness and directly affects the benefits gained by users. Information security concerns the protection of information, whether digital or physical, from unauthorized access, modification, deletion, theft, or misuse, thereby ensuring the confidentiality, integrity, and controlled accessibility of repository resources. Interaction and feedback represent important aspects of digital repository service quality, where interaction refers to the level of communication between users and the repository system that enhances accessibility and efficiency, while feedback refers to the information generated from this interaction that contributes to performance improvement, service development, and the fulfillment of beneficiary expectations. Tool application refers to the variety, quality, and adaptability of the tools available within the repository to support the display, analysis, and utilization of repository services and resources. Finally, user experience reflects the overall perception of beneficiaries regarding repository services, encompassing their experiences in accessing information and achieving their objectives, which in turn influences their willingness to continue using and revisiting the repository in the future (Zhang et al., 2025).

3.2.4. The Concept and Importance of Customer Satisfaction

Customer satisfaction is often associated with a comprehensive assessment of service performance or quality. Satisfaction is contributing to the user's experience with a certain service, the degree to which it is advantageous to them, or the extent to which it fulfils their real requirements. The phrase "good service" often denotes a service that reliably meets user satisfaction (Ng, Hasbi, & Ahmad, 2013). It also denotes the degree to which a product or service satisfies the user's needs, expectations, and preferences. In both traditional and electronic libraries, client satisfaction is a crucial outcome of information service delivery. Customer satisfaction is manifested in users' emotions following the utilisation of library resources or the digital repository, as well as in the influence of these emotions on their propensity to revisit and engage with information services (Onwubiko, 2021). Beneficiary satisfaction, as delineated in the current research, is characterised by the affirmative state and sentiments articulated by beneficiaries following their engagement with digital repository services, motivating them to seek similar experiences in the future should they require additional services.

The importance of measuring beneficiary satisfaction can be highlighted through its contribution to several organizational objectives. It reflects the value and effectiveness of the efforts invested in establishing and operating services, serving as an important indicator of service sustainability and the success of initiatives aimed at ensuring their continuity. Beneficiary satisfaction is also a dynamic measure that supports continuous improvement, as feedback from beneficiaries reveals the strengths and weaknesses of the services provided and guides efforts to enhance service quality. Furthermore, measuring satisfaction helps build trust and strengthen

loyalty between beneficiaries and service providers. It also contributes to organizational efficiency by enabling managers to identify actual user needs, determine which services are most in demand, and optimize the allocation of resources by reducing investment in less-utilized services. In addition, the assessment of beneficiary satisfaction provides decision-makers with valuable information about service users and usage patterns, allowing them to anticipate future needs in terms of quantity, quality, and service direction, thereby ensuring that services continue to align with the real needs and expectations of beneficiaries.

3.2.5. Dimensions of Beneficiary Satisfaction

The Yakel et al. (2024) study was used to measure the dependent variable, beneficiary satisfaction. This metric is composed of six dimensions: integrity, identity or belonging — quite important to customers — structural assurance, performance or outcome expectations, ease of use (usefulness), and intention to reuse. The researcher adapted these measures to match the current study, which aims to examine how warehouse services affect beneficiaries' satisfaction. We will follow the following sequence of dimensions (Yakel, Faniel, and & Robert, 2024).

The dimensions of beneficiary trust and continued use of digital repository services encompass several interrelated factors. **Integrity** represents an essential component of beneficiary trust and loyalty, reflecting fairness in transactions, transparency in communicating repository services, and honesty in fulfilling commitments made to beneficiaries regarding the services and processes provided. Integrity also contributes to the long-term sustainability of digital repository services. **Identification or affiliation** refers to the extent to which beneficiaries feel connected to and aligned with the repository, resulting in greater satisfaction with its long-term performance and usefulness. This sense of belonging fosters beneficiary loyalty, as users perceive the repository as a trustworthy and valuable resource that meets their needs and expectations. **Structural assurance** includes the organizational, technical, and administrative mechanisms that enable beneficiaries to trust that repository services operate reliably, securely, and systematically. This involves adherence to established policies, standards, planning procedures, infrastructure requirements, and the protection of user privacy. **Performance expectation** reflects beneficiaries' beliefs that the use of repository services can enhance their academic and professional activities by providing faster access to information, more accurate and up-to-date resources, reduced time and effort in data collection, improved research outputs, and more effective completion of academic tasks. **Ease of use** refers to the simplicity, convenience, and accessibility of repository services, allowing users to utilize them without significant effort. This is typically achieved through user-friendly interfaces, clear usage guidelines, and responsive support personnel who can assist beneficiaries when needed. Finally, **reuse intention** captures the willingness of users to continue utilizing repository services in the future based on previous positive experiences, perceptions of usefulness, accessibility, and trustworthiness, thereby ensuring the repository remains a valuable source of information as users' research and academic needs evolve over time.

3.3. Practical aspect of the research: Analysis of sample responses and hypothesis testing

3.3.1. Descriptive statistics for the study variables

We computed the arithmetic mean and standard deviation for each statement and axis to examine the research data. An arithmetic mean above the theoretical mean of 3 signifies concordance with the items. The averages, standard deviations, and relative significance of the study statements are presented in the table below. A high level of homogeneity among the sample members' replies is often signified by standard deviations near 1. Furthermore, all arithmetic means exceed the hypothetical mean, reinforcing the strong consensus regarding the research variables.

Descriptive analysis of the service quality variable in digital warehouses

The mean response for the service quality variable in digital repositories was 3.536, with a standard deviation of 0.746 and an agreement rate of 70.7%, as shown in the table below. The data confirmed the robust consensus of stockholders about service quality, as they were at least as high as their theoretical mean (3), indicating their satisfaction with compliance and uniformity.

The analysis was conducted at the dimension level and revealed variations in respondents' perceptions of digital repository service quality. The interaction and feedback dimension achieved the highest ranking, with a mean score of 3.754, a standard deviation of 0.632, and an agreement rate of 75.1%, indicating that beneficiaries were highly satisfied with the repository's ability to respond to inquiries and handle surveys or reports of problems, reflecting the effectiveness of its communication and support mechanisms. Information usability ranked second, with a mean score of 3.684, a standard deviation of 0.682, and an agreement rate of 73.7%, demonstrating that clear information presentation, easy accessibility, and coherent organization contribute positively to the user experience. The user experience dimension ranked third, with a mean score of 3.642, a standard deviation of 0.703, and an agreement percentage of 72.8%, suggesting that users perceive the repository as beneficial to their research activities, are willing to share their experiences with others, and would encourage colleagues to use it due to its efficiency and speed. Perceived information quality ranked fourth, with a mean score of 3.456, a standard deviation of 0.768, and an agreement rate of 69.1%, indicating that users generally trust the quality, accuracy, currency, and reliability of the information provided by the repository. The information security dimension ranked fifth, with a mean score of 3.374, a standard deviation of 0.815, and an agreement rate of 67.5%. Although it received a comparatively lower score, the findings suggest that the repository is still considered capable of protecting user privacy, maintaining information integrity, and ensuring the credibility of information sources. Finally, the tool application dimension ranked sixth and last, with a mean score of 3.306, a standard deviation of 0.876, and an agreement rate of 66.1%. This indicates that the repository's available features, such as saving favorites, intelligent recommendation systems, advanced search functions, and supporting documentation, do not yet fully meet user expectations, although respondents generally expressed a positive evaluation of this dimension.

Table 4. Means and standard deviations of the service quality variable in digital repositories

Independent Dimensions	Mean	S.D	Agreement rate	C.V	Dimensions arrangement
1 Perceived Information Quality	3.456	0.768	69.1%	22.2%	4
2 Information Usability	3.684	0.682	73.7%	18.5%	2
3 Information Security	3.374	0.815	67.5%	24.2%	5
4 Interaction and Feedback	3.754	0.632	75.1%	16.8%	1
5 Tool Implementation	3.306	0.876	66.1%	26.5%	6
6 User Experience	3.642	0.702	72.8%	19.3%	3
Overall quality of services in digital warehouses	3.536	0.746	70.7%	21.1%	

Source generated by the researcher utilising the SPSS software

Descriptive analysis of the beneficiary satisfaction variable

The following table presents descriptive statistics for the beneficiary satisfaction with the Digital Repositories variable. The average response was 3.522 ± 0.765 with 70.4% concordance rate. The arithmetic mean was above the theoretical average (mean=3), indicating that most samples were satisfied with digital repository services and had good agreement.

At the dimensional level, the findings revealed varying degrees of agreement among respondents. The intention to reuse dimension achieved the highest ranking, with a mean score of 3.648, a standard deviation of 0.632, and an agreement rate of 73.0%, indicating that users intend to continue using the repository as a primary source for research, include it among their preferred information resources, and follow its future developments because they perceive it as useful. The structural assurance dimension ranked second, with a mean score of 3.622, a standard deviation of 0.685, and an agreement rate of 72.4%, reflecting users' confidence in the security of their intellectual property, the reliability of repository services, compatibility across different devices, and the systematic organization of information. The integrity dimension ranked third, with a mean score of 3.594, a standard deviation of 0.728, and an agreement rate of 71.9%, demonstrating a strong consensus that the repository clearly explains access rights and licensing policies, provides equitable services to all users, and ensures that resource descriptions accurately correspond to the information made available. The ease of use dimension ranked fourth, with a mean score of 3.562, a standard deviation of 0.796, and an agreement rate of 71.2%, suggesting that users consider the repository easy to navigate, supported by multiple search options, straightforward downloading procedures, and local language support, all of which contribute positively to the user experience. The identification or belonging dimension ranked fifth, with a mean score of 3.402, a standard deviation

of 0.842, and an agreement rate of 68.0%, indicating that users value receiving notifications about newly published content and readership activity related to their work, as well as opportunities to disseminate their research and engage with repository materials. Finally, performance expectation received the lowest ranking, with a mean score of 3.302, a standard deviation of 0.904, and an agreement rate of 66.0%. Although the mean score remained above the hypothetical average, the result suggests that users perceive room for improvement in providing unique resources, supporting learning activities, expanding citation opportunities, and facilitating easier access to information.

Table 5. Means and standard deviations of the beneficiary satisfaction variable

No.	dependent Dimensions	Mean	S.D	Agreement rate	C.V	Dimensions arrangement
1	Integrity	3.594	0.728	71.9%	20.3%	3
2	Identification (Affiliation)	3.402	0.842	68.0%	24.8%	5
3	Structural Assurance	3.622	0.685	72.4%	18.9%	2
4	Performance Expectations	3.302	0.904	66.0%	27.4%	6
5	Ease of Use	3.562	0.796	71.2%	22.3%	4
6	Reuse Intent	3.648	0.632	73.0%	17.3%	1
Total beneficiary satisfaction		3.522	0.765	70.4%	21.7%	

Source generated by the researcher utilising the SPSS software

3.3.2. Confirmatory Factor Analysis

Confirmatory factor analysis (CFA), a type of structural equation modelling (SEM), was used to assess the factorial validity of the research variables. This study enables the evaluation of the validity of measurement models developed from previous theoretical frameworks, rather than exploratory factor analysis. The research utilised the maximum likelihood method for parameter estimation, employing AMOS V26. The analysis assesses the degree to which the covariance matrix of the variables aligns with the hypothesised matrix of the model, generating various goodness-of-fit indices to ascertain the consistency of the proposed model with the data.

Model quality indicators: In confirmatory factor analysis, the main way to assess the quality of a model is to see how well the observed covariance matrix of the variables fits the hypothesized model matrix. This approach yields many statistical indicators that demonstrate the adequacy of fit. The suggested model is either approved or rejected for the data based on the marker values. The table below provides the goodness-of-fit indices for the structural research model.

Table 6. Goodness-of-fit indicators

Acceptable Level	Goodness-of-fit Measures
< 0.08	Root-mean-squared error of approximation (RMSEA)
Statistically not significant at 0.05	$\chi^2 =$ Chi-square
$1 < \chi^2/df < 5$	χ^2/df
≥ 90	Normal fit index (NFI)
≥ 90	Goodness of fit index (GFI)
≥ 90	Tucker-Lewis Index (TLI)
≥ 90	Comparative fit index (CFI)
≥ 90	Adjusted goodness of fit index (AGFI)
>0.05	P Close

Source generated by the researcher utilising (Hair et al., 2010)

Table 7. Results of the confirmatory practical analysis of the research variables

Items	path	Dimensions	Estimate	S.E.	C.R.	P
X11	<---		.566	.109	6.119	***
X12	<---		.442	.103	4.878	***
X13	<---	Perceived Information Quality	.679	.129	7.058	***
X14	<---		.521	.126	5.684	***
X15	<---		.739			
X21	<---		.485	.175	4.514	***
X22	<---		.702	.222	5.508	***
X23	<---	Information Usability	.663	.219	5.369	***
X24	<---		.825	.240	5.792	***
X25	<---		.484			
X31	<---		.559	.125	6.434	***
X32	<---	Information Security	.530	.136	6.115	***
X33	<---		.468	.128	5.432	***

X34	<---		.562	.123	6.466	***
X35	<---		.703			
X41	<---		.756	.193	7.981	***
X42	<---		.533	.187	6.029	***
X43	<---	Interaction and Feedback	.489	.181	5.592	***
X44	<---		.485	.157	5.554	***
X45	<---		.627			
X51	<---		.586	.133	6.356	***
X52	<---		.602	.137	6.498	***
X53	<---	Tool Implementation	.483	.155	5.396	***
X54	<---		.732	.159	7.548	***
X55	<---		.625			
X61	<---		.710	.361	4.760	***
X62	<---		.633	.253	4.579	***
X63	<---	User Experience	.799	.302	4.917	***
X64	<---		.691	.268	4.720	***
X65	<---		.404			
Y11	<---		.823			
Y12	<---		.855	.090	11.940	***
Y13	<---	Integrity	.770	.087	10.630	***
Y14	<---		.421	.111	5.265	***
Y15	<---		.551	.074	7.111	***
Y21	<---		.594			
Y22	<---		.755	.155	7.265	***
Y23	<---	Identification (Affiliation)	.779	.164	7.404	***
Y24	<---		.718	.145	7.037	***
Y25	<---		.746	.150	7.212	***
Y31	<---		.604			
Y32	<---		.475	.103	4.076	***
Y33	<---	Structural Assurance	.650	.150	6.735	***
Y34	<---		.516	.114	5.626	***
Y35	<---		.600	.111	6.339	***
Y41	<---		.690			
Y42	<---		.583	.107	7.092	***
Y43	<---	Performance Expectations	.607	.118	7.380	***
Y44	<---		.524	.107	6.400	***
Y45	<---		.876	.150	10.385	***
Y51	<---		.694			
Y52	<---		.587	.109	7.278	***
Y53	<---	Ease of Use	.669	.101	8.265	***
Y54	<---		.558	.100	6.928	***
Y55	<---		.747	.132	9.188	***
Y61	<---		.713			
Y62	<---		.708	.109	8.328	***
Y63	<---	Reuse Intent	.620	.110	7.325	***
Y64	<---		.767	.118	8.967	***
Y65	<---		.654	.110	7.721	***

Source generated by the researcher utilising the (AMOS) software

The table and figure below illustrate that our model is reliable and valid. We used goodness-of-fit criteria higher than the required indicators to check this, as Hair et al. (2010) suggested above (Hair et al., 2010).

The goodness-of-fit index (GFI) was 1.00, indicating a perfect fit. The chi-square to freedom ratio was 4.975, and the root mean square error of approximation (RMSEA) was 0.073. Also, all component regression weights were greater than 0.40, indicating that the model fit the data quite well.

3.3.3. Hypotheses of influence

We employed linear regression analysis and structural equation modelling (SEM) to examine the interrelationships among the elements in this study. Regression analysis is a statistical technique used to investigate the relationship between a dependent variable and one or more independent

variables, and to develop a mathematical model that describes this relationship. We employed AMOS V26 software (Afthanorhan et al., 2014) for structural equation modelling. This aimed to ascertain the direct effects of the research variables, specifically the quality of services in digital repositories and user satisfaction.

H1: Hypothesis Main hypothesis: "Service quality has a statistically significant effect" on beneficiary satisfaction. A structural model was developed to demonstrate the impact of digital repository service quality on beneficiary satisfaction. Inferential statistics indicate that the quality of digital repository services influences beneficiary satisfaction. The regression coefficients ($\alpha = 1.423$, $\beta = 0.742$) produced an estimated F value of 39.765. This surpasses the tabulated (F) value of 3.86. The R² result indicates that the quality of digital repository services accounts for 53.8% of the variations in beneficiary satisfaction. The service quality variable (β) in digital repositories has a t-value of 8.461. The value of (β) remains constant, indicating that a one-unit enhancement in the quality of services within digital repositories results in a 74.2 percent rise in beneficiary satisfaction. This substantiates the idea that a substantial correlation exists between service quality and beneficiary satisfaction.

Table 8. Regression model between service quality in digital repositories and beneficiary satisfaction

						Independent Variable
Sig	R Square	F-CAL	(t)	β	α	
0.000	0.538	39.765	8.461	0.742	1.423	Service Quality in Digital Repositories
						Tabular (F)
						Tabular (t)
						Sample Size
						Decision

Source generated by the researcher utilising the SPSS software

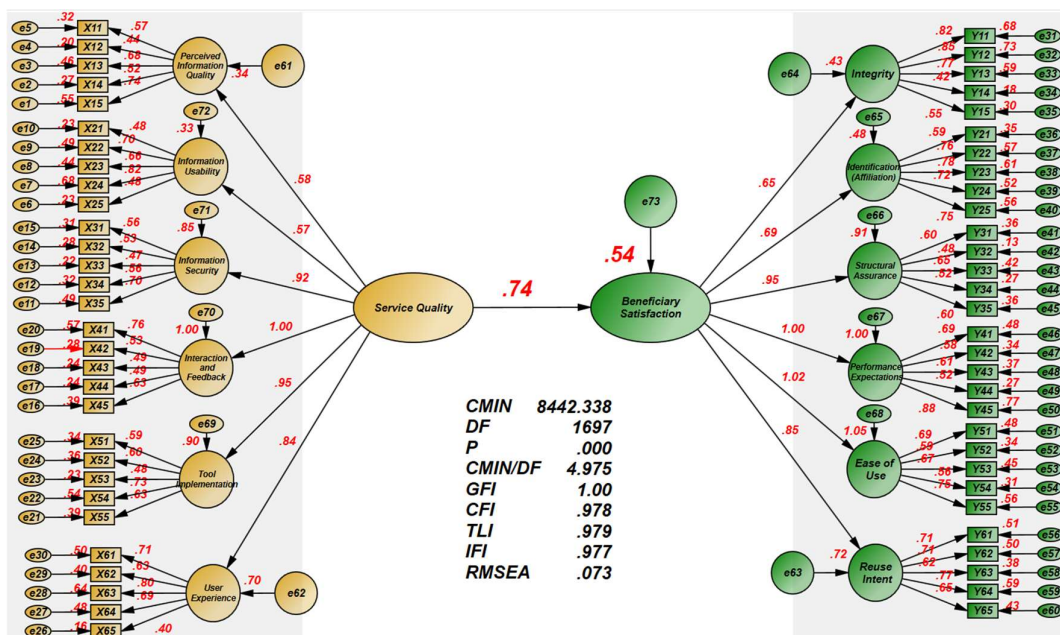


Figure 2. Analysis of the impact of service quality in digital repositories on beneficiary satisfaction

Source generated by the researcher utilising the (AMOS) software

The basic hypothesis generates these sub-hypotheses. These assumptions were tested using a multiple regression model:

Sub-hypothesis (H1-1): "There is a statistically significant effect" of perceived service quality on beneficiary satisfaction in its aspects (integrity, identity or belonging, structural assurance, performance expectations, ease of use, and desire to reuse).

The table below presents inferential data on the relationship between perceived service quality and beneficiary satisfaction. The regression parameters were ($\alpha = 1.651$) and ($\beta = 0.642$). The model also explains 47.2% of the variation in the response variable. The estimated (F) value of 24.654 was larger than the tabulated value of 3.86, indicating that the model was significant. The (t) value for the variable (β) was also recorded. Service rating (7.245). This exceeds the computed t-value of 1.96, indicating the stability of the importance of (β). A one-unit improvement in perceived service quality results in a 64.2% rise in beneficiary satisfaction, as shown by the (β) value. The hypothesis "There is a significant effect between perceived service quality and beneficiary satisfaction" is supported. This suggests that improving repository management directly increases service quality. The repository provides reliable, error-free, and current information to do this. The repository also provides bibliographic data and abstracts for sources, which boosts beneficiary satisfaction. This is the regression equation:

$$y = a + bx$$

$$y = 1.651 + 0.642x$$

Sub-hypothesis (H1-2): "There is a statistically significant effect" of information ease on beneficiary satisfaction (integrity, identity, belonging, structural assurance, performance expectations, ease of use, desire to reuse). The table below presents inferential data on the relationship between information ease and beneficiary satisfaction. The regression parameters were ($\alpha = 1.298$) ($\beta = 0.567$). The model also explains 38.7% of the variance in the responder variables. The estimated extracted (F) value of 28.546 was more than its calculated value of 3.86, indicating that the model is significant. The (t) result for (β) for information ease of use was (7.522), above the tabulated (1.96). This explains the stability of (β) significance, as shown by increasing the ease of use of information by one unit leads to a 56.7% rise in beneficiary satisfaction (β value). Accepting the hypothesis (there is a substantial effect between information ease of use and beneficiary satisfaction), as seen above, warehouse management is more interested in information simplicity of use. The warehouse presents information logically according to accepted topic groupings and provides a simple user interface for convenient access. Also, the warehouse's simple information presentation boosts beneficiary satisfaction. This is the regression equation:

$$y = a + bx$$

$$y = 1.298 + 0.567x$$

H1-3: Third sub-hypothesis "There is a statistically significant effect" of information security on beneficiary satisfaction in categories such as integrity, belonging, structural assurance, performance expectations, ease of use, and reuse intentions. The table below presents inferential data on information security and beneficiary satisfaction. The regression parameters were ($\alpha = 0.965$) ($\beta = 0.432$). The model also explains 48.9% of the variance in the responder variables. The model is important since the estimated extracted (F) value of 24.852 was bigger than its calculated value of 3.86. The (t) value for information security (β) was 7.543, higher than the tabulated 1.96. This explains the stability of (β) significance, as shown by strengthening information security by one unit, customer satisfaction increases by 43.2% (β value). Information security has a significant impact on user satisfaction, supporting the theory. The above shows that repository management prioritises information security. When needed, the repository provides permanent access, ensures the content and source of the resources, and helps the repository create a personal account for each user with a unique password. Each of these variables directly improves consumer happiness. This is the regression equation:

$$y = a + bx$$

$$y = 0.965 + 0.432x$$

H1-4: Fourth sub-hypothesis. The study found a significant impact of interaction and feedback on beneficiary satisfaction across several categories, including integrity, identity, structural assurance, performance expectations, ease of use, and desire to reuse. The table below presents inferential statistics on beneficiary satisfaction by interaction and feedback. The regression parameters were ($\alpha = 1.304$) and ($\beta = 0.549$). The model also explains 41.9% of the variation in the response variable. According to the estimated (F) value recovered (28.650), the model is significant and greater than its tabular value (3.86). For the interaction and feedback variable, the (t) value for (β) was 5.932, which is higher than the tabulated value of 1.96. By increasing contact and feedback by one unit, beneficiary satisfaction increases by 54.9%, indicating a steady significance of (β). The hypothesis (interaction and feedback significantly affect beneficiary satisfaction) is supported. The above shows warehouse management's heightened interest in engagement and feedback. The warehouse's entity conducts regular opinion polls to assess the quality of services provided and beneficiaries' opinions thereof, and allows users to report file errors and broken links. All of these elements directly boost beneficiary satisfaction. This is the regression equation:

$$y = a + bx$$

$$y = 1.304 + 0.549x$$

H1-5: The fifth sub-hypothesis "There is a statistically significant effect" of using the tools on beneficiary satisfaction in terms of integrity, belonging, structural guarantee, performance expectations, convenience of use, and reuse intentions. The table below shows inferential data on beneficiary satisfaction after tool use. The regression parameters were ($\alpha = 1.012$) ($\beta = 0.521$). 33.2 The model explains a percentage of the response variable. The model is important because the estimated extracted (F) value of 26.328 was larger than the calculated value of 3.86. The (t) value for (β) for the tool application variable was (8.531), exceeding the tabulated (1.96). This explains the stability of (β) importance, as seen by its value. Increasing tool use by one unit increases beneficiary satisfaction by 52.1%. The hypothesis (tools significantly affect beneficiary satisfaction) can be accepted. This shows that warehouse management under investigation is more interested in using tools. The warehouse uses a sophisticated subject suggestion engine and advanced search capabilities to support different benefit groups in doing this. All these elements directly boost beneficiary satisfaction. This is the regression equation:

$$y = a + bx$$

$$y = 1.012 + 0.521x$$

H1-6: The sixth sub-hypothesis "There is a statistically significant effect" of user experience on beneficiary satisfaction in categories such as integrity, belonging, structural assurance, performance expectations, ease of use, and reuse intention. The table below presents inferential data on user experience and beneficiary satisfaction. The regression parameters were ($\alpha = 0.832$) ($\beta = 0.357$). 35.7 The model explains a percentage of the response variable. The estimated extracted (F) value of 28.433 was more than the tabulated value of 3.86, indicating model significance. The user experience variable (β) had a higher (t) value (5.002) than the tabulated value (1.96). Increasing user experience by one unit results in a 35.7% rise in Beneficiary Satisfaction, indicating the consistency of the relevance of (β). The concept that user experience affects user happiness is supported. Increased attention to repository management improves user experience, as shown above. In addition to supporting user orientations and research, repository management considers user feedback on usage issues. All these variables boost user happiness. This is the regression equation:

$$y = a + bx$$

$$y = 0.832 + 0.357x$$

Table 9. Analysis of the impact of service quality dimensions in digital repositories on beneficiary satisfaction

Dependent variable	Dimensions in digital repositories						Indicator
	User Experience	Tool Implementation	Interaction and Feedback	Information Security	Information Usability	Perceived Information Quality	
Beneficiary satisfaction	0.832	1.012	1.304	0.965	1.298	1.651	(α)
	0.357	0.521	0.549	0.432	0.567	0.642	(β)
	0.297	0.332	0.419	0.489	0.387	0.472	(R2)
	28.433	26.328	28.650	24.852	28.546	24.654	(F)
	5.002	8.531	5.932	7.543	7.522	7.245	(t)
	0.000	0.000	0.000	0.000	0.000	0.000	P
	3.86						(F)
	1.96						Tabular (t)
	292						Tabular Sample Size
		“Accept the alternative hypothesis.”	“Accept the alternative hypothesis.”	“Accept the alternative hypothesis.”	“Accept the alternative hypothesis.”	“Accept the alternative hypothesis.”	“Accept the alternative hypothesis.”

Source generated by the researcher utilising the SPSS software

4. Conclusion

The conclusions and recommendations of this study were derived from the practical framework and the results of the statistical analyses conducted on the collected data. The findings indicate a high degree of consensus and similarity among respondents regarding the quality of digital repository services, suggesting that beneficiaries are generally satisfied with the services provided. Although some variation in responses was observed, the overall results demonstrate positive perceptions of repository services and their significance to users. The analysis further revealed that digital repository service quality has a substantial and direct effect on beneficiary satisfaction, confirming that improvements in service quality lead to measurable increases in user satisfaction. The findings support the hypothesis that perceived service quality significantly influences beneficiary satisfaction, indicating that users who perceive services as reliable, accurate, and up to date tend to report higher satisfaction levels. The results also demonstrate that information usability plays a crucial role in enhancing user satisfaction, as accessible, clearly organized, and easily retrievable information contributes to a more positive user experience. Information security was found to have a statistically significant effect on beneficiary satisfaction, showing that stronger protection of information resources, continuous access to content, and secure user accounts increase users' confidence and satisfaction. In addition, interaction and feedback were shown to significantly influence satisfaction, as effective communication channels, regular surveys, and mechanisms for reporting issues help ensure that user needs are understood and addressed. The study also confirmed a significant effect of tool implementation on beneficiary satisfaction, indicating that advanced search functions, intelligent recommendation systems, and user-oriented repository tools enhance the usability of repository services and improve user experiences. Finally, user experience was found to have a strong impact on beneficiary satisfaction, suggesting that repositories that respond effectively to user concerns and support academic and research activities create positive experiences that translate into greater satisfaction and continued engagement with repository services. Based on these findings, several recommendations are proposed to enhance the quality of digital repository services and increase beneficiary satisfaction. Repository managers should continue improving the usability of repository systems by developing user-friendly interfaces that present information clearly and facilitate efficient interaction with repository services. Efforts should also be made to ensure that repository content remains accurate, consistent, reliable, and up to date, while providing detailed descriptions of available resources to improve users' perceptions of information quality. Greater attention should be given to information security by implementing stronger protection mechanisms, ensuring secure access to repository content, and safeguarding user data through measures such as robust authentication systems and password protection. In addition, repositories should establish continuous communication channels with users through regular surveys, feedback mechanisms, and issue-reporting platforms to ensure that user needs are identified and addressed effectively. The

implementation of advanced technologies, including intelligent recommendation systems and sophisticated search tools tailored to different user groups, is also recommended to facilitate efficient information retrieval and improve overall service effectiveness. Furthermore, repository management should continuously monitor user feedback regarding repository experiences and actively support users in their academic and research activities. Such efforts will contribute to enhanced user engagement, increased satisfaction, stronger user retention, and the long-term success of digital repository services.

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