MIKAILALSYS
Journal of Multidisciplinary Sciences

e-ISSN : 2987-2286
p-ISSN : 2987-3924

Index: Harvard, Boston, Sydney, Copernicus, Sinta 4, Scilit, Semantic, Google, etc

https://doi.org/10.58578/mikailalsys.v4i2.10403

The Effectiveness of Online Circulation Service (SIDARING) in Supporting Services at the Library Unit of Universitas Negeri Padang

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Article Info:

Submitted:	Revised:	Accepted:	Published:
Apr 19, 2026	May 17, 2026	May 29, 2026	Jun 3, 2026

Abstract

The effectiveness of digital circulation services in academic libraries has become increasingly important for supporting accessibility, efficiency, and continuity of library services in the post-pandemic era. However, the implementation of digital systems does not automatically ensure optimal service effectiveness, particularly when user needs and service utilization patterns continue to evolve. This study aims to analyze the effectiveness of the Online Circulation Service (*Sirkulasi Dalam Jaringan*/SIDARING) in supporting services at the Library Unit of Universitas Negeri Padang using the Electronic Service Quality (E-Servqual) framework. A quantitative approach with a descriptive design was employed to obtain an empirical overview of users' perceptions of SIDARING effectiveness. The study involved 100 respondents selected through simple random sampling from a population of 3,794 SIDARING users. Data were collected using a structured questionnaire consisting of 30 items measured on a four-point Likert scale and analyzed using descriptive statistical techniques. The findings indicate that SIDARING generally operates effectively, as reflected in positive evaluations across six E-

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Servqual dimensions: efficiency, fulfillment, system availability, privacy, responsiveness, and contact. Privacy and contact obtained the highest evaluations, indicating strong user trust in data security and communication accessibility, while efficiency, fulfillment, system availability, and responsiveness remained in the high category, suggesting adequate service performance in meeting user needs. The study concludes that SIDARING functions effectively as a digital circulation service that improves convenience, accessibility, and service continuity in academic library environments. This study contributes to digital library service evaluation by demonstrating the applicability of the E-Servqual framework in assessing online circulation services, with practical implications for system optimization, communication improvement, technical maintenance, and user-oriented service innovation.

Keywords: SIDARING; Digital Circulation Service; E-Servqual; Service Effectiveness; Academic Library.

INTRODUCTION

Academic libraries play an essential role in supporting learning, research, and knowledge development by ensuring access to reliable information resources for academic communities. Within higher education institutions, libraries are not merely repositories of printed materials but function as dynamic learning environments that facilitate academic interaction, knowledge exchange, and information literacy development among students and lecturers (Novian & Jumino, 2020). In this context, the circulation service represents one of the most fundamental components of library operations because it directly mediates users' access to collections required for educational and scholarly purposes (Sunyianto & Pasaribu, 2020). Through circulation activities, libraries regulate borrowing, returning, and renewal processes while simultaneously ensuring the effective utilization and sustainability of information resources among users (Arnilah & Vlora, 2024). The strategic role of circulation services has become increasingly significant in higher education institutions due to changing patterns of information access and technological development. Libraries are expected to provide services that are not only accurate and systematic but also adaptive to contemporary academic needs and digital transformation (Febriyanti et al., 2024). The rapid expansion of information technology has gradually shifted library management practices from conventional, face-to-face procedures toward digitally integrated systems capable of facilitating information access beyond spatial and temporal limitations (Nurhayati et al.,

2024). Consequently, circulation services are no longer understood solely as administrative mechanisms for collection management but also as indicators of institutional responsiveness in addressing the evolving expectations of users in the digital era (IFLA-UNESCO, 2022).

The digital transformation of library services accelerated substantially during the COVID-19 pandemic when educational institutions worldwide faced restrictions on physical interaction and mobility. Under these circumstances, academic libraries were compelled to redesign service models to ensure continuity of access to information resources despite physical limitations (Shikali & Muneja, 2022). The pandemic served as a catalyst for the implementation of remote library systems, encouraging institutions to adopt digital circulation platforms capable of facilitating borrowing, returning, and collection renewal through online interaction (Utami, 2022). This transition represented not only a technological adjustment but also a broader institutional effort to maintain educational support systems amid social disruption and uncertainty (Sa'adiah, 2025). Changes in information behavior during and after the pandemic have significantly influenced users' expectations regarding library services. Users increasingly demand systems that provide immediate access, flexibility, convenience, and operational efficiency without requiring physical attendance (Kominfo, 2021). In response to this transformation, university libraries in Indonesia have progressively adopted technology-based service systems intended to maintain accessibility and improve service quality in academic environments (Tjiptasari, 2022). The integration of digital circulation systems is therefore regarded as an important strategy for enhancing library effectiveness and sustaining user engagement within increasingly digitalized educational settings (Fitriani & Rohani, 2023).

As part of this broader digital transformation, the Library Unit of Universitas Negeri Padang (UNP) introduced *Sirkulasi dalam Jaringan* (SIDARING), an online circulation service designed to facilitate borrowing, returning, and renewal transactions through internet-mediated communication. SIDARING adopts a communication-based service model in which users identify collections through the Online Public Access Catalog (OPAC), submit borrowing requests through digital communication platforms, and complete circulation activities without direct physical interaction (Ardoni, 2021). The system reflects a service innovation intended to expand access to collections while simultaneously minimizing geographical and temporal barriers that often constrain conventional circulation practices (Yulianti, 2021). SIDARING also reflects broader

developments in digital library management, where online circulation systems increasingly emphasize flexibility, accessibility, and user-centered interaction. Through internet-based communication between librarians and users, digital circulation services have evolved into mechanisms that extend the operational reach of academic libraries while improving convenience and efficiency in collection management (Adri et al., 2023). In this regard, online circulation systems are no longer perceived merely as technological tools but as strategic instruments for improving service quality and supporting institutional adaptation to digital educational ecosystems (Putri et al., 2025).

Nevertheless, the availability of technological systems does not automatically guarantee service effectiveness. The implementation of digital library services frequently reveals discrepancies between technological capabilities and actual patterns of user engagement. Preliminary observations at the Universitas Negeri Padang Library indicate that SIDARING is currently utilized predominantly for online renewal services, whereas borrowing and returning activities continue to be conducted conventionally through direct interaction at service counters. This condition contrasts with the full implementation of SIDARING during the COVID-19 pandemic, when borrowing, returning, and renewal services were effectively conducted through online mechanisms (UPT Perpustakaan UNP, n.d.). This situation raises an important concern regarding the sustainability and effectiveness of digital circulation systems after emergency conditions have subsided. Although SIDARING was initially introduced as a solution to ensure continuity of service during periods of restricted physical mobility, its current utilization pattern suggests that several features may not be functioning optimally in meeting user expectations and service needs (Nuzulita & Mudjiumami, 2023). The limited use of certain digital features potentially reflects a mismatch between the quality of electronic services provided and users' perceptions of convenience, responsiveness, and accessibility during system interaction (Damayanti & Harsono, 2021). From the researcher's perspective, evaluating the effectiveness of SIDARING becomes academically and practically urgent because digital service sustainability cannot be assessed solely through technological availability. A system may technically function well while remaining underutilized due to usability issues, service quality limitations, or unmet user expectations (Maheswari & Siregar, 2021). Therefore, examining how users perceive the effectiveness of SIDARING is necessary to determine whether the system genuinely supports academic circulation activities or merely

operates as a supplementary technological facility without substantial impact on service optimization (Oktaviani et al., 2024).

The need to evaluate the effectiveness of digital circulation systems has attracted increasing scholarly attention, particularly in relation to library automation, online service implementation, and user satisfaction. Previous studies have demonstrated that technology-based library systems contribute positively to improving operational efficiency and service quality. Research on the implementation of INLISLite in regional public libraries revealed that automation systems improve circulation effectiveness and simplify librarians' operational activities while facilitating access for users (Nurmayasari, 2022). Similar findings were identified in research on the application of the *Senayan Library Management System* (SLiMS), where automated circulation services contributed to faster transactions, better collection management, and improved service orderliness in library environments (Yoliadi, 2023). Further empirical evidence also highlights the contribution of web-based systems to library effectiveness. The integration of digital technologies such as QR Code-based information systems has been found to improve information accessibility, increase operational efficiency, and strengthen service convenience for users within university library settings (Aryasi et al., 2024). Likewise, studies concerning the implementation of SLiMS in membership services demonstrate that library automation systems improve administrative efficiency, support systematic data management, and facilitate more organized library operations despite technological adaptation challenges (Ramadani & Rodin, 2025).

Studies conducted during and after the COVID-19 pandemic also emphasize the growing importance of online library services in maintaining service continuity. Research on digital information services in university libraries indicates that online-based service systems significantly contribute to easier access to information, higher service responsiveness, and improved operational effectiveness under conditions of restricted mobility (Sa'adiah, 2025). Similar findings reveal that digital communication systems between librarians and users may strengthen access flexibility and facilitate academic interaction through technology-supported circulation mechanisms (Adri et al., 2023). Although prior studies provide valuable insights regarding digital library services, most existing research predominantly evaluates general automation systems, digital information services, membership management, or circulation technologies in broader institutional contexts. Existing scholarship tends to focus on operational performance, technological

implementation, or general service effectiveness rather than critically examining how specific online circulation systems operate within post-pandemic academic environments (Nurhayati et al., 2024). Consequently, the sustainability and effectiveness of specialized online circulation services remain insufficiently explored, particularly in relation to changing patterns of user utilization after the normalization of physical library activities (Putri et al., 2025).

Based on the review of previous studies, a clear research gap can be identified. First, previous investigations mainly discuss automation systems such as INLISLite and SLiMS or evaluate digital services at a general level without specifically examining SIDARING as a unique internet-mediated circulation system in higher education libraries (Nurmayasari, 2022). Second, earlier studies largely emphasize technical implementation and operational effectiveness while paying relatively limited attention to service quality dimensions that shape users' experiences in digital circulation environments (Ramadani & Rodin, 2025). Third, limited scholarly attention has been devoted to understanding the post-pandemic utilization of online circulation services, particularly when users have regained access to face-to-face services and digital systems are no longer employed under emergency conditions (Sa'adiah, 2025). Therefore, a contextual and systematic evaluation of SIDARING becomes necessary to understand whether the service remains effective and relevant in supporting circulation activities beyond the pandemic context. The novelty of this research lies in its specific focus on evaluating the effectiveness of SIDARING as an online circulation service within the Library Unit of Universitas Negeri Padang by employing the Electronic Service Quality (E-Servqual) framework as an analytical perspective. Unlike previous studies that generally assess automation systems or digital services from administrative and technological standpoints, this study specifically examines SIDARING as a digital circulation innovation whose success depends not only on technical functionality but also on users' perceptions of service quality during online interaction (Parasuraman et al., 2005). In addition, this research contributes contextual novelty by examining the sustainability of an online circulation system after the COVID-19 pandemic, when service preferences and utilization patterns may have changed substantially (Oktaviani et al., 2024).

The theoretical foundation of this research is grounded in the E-Servqual model developed to assess service quality within electronic environments. The model proposes that electronic services should be evaluated through dimensions reflecting users'

experiences while interacting with digital systems, including efficiency, fulfillment, system availability, privacy, responsiveness, and contact (Parasuraman et al., 2005). Efficiency refers to the ease and speed of accessing digital features, whereas fulfillment concerns the ability of a service to meet user expectations and operational needs (Tyagi et al., 2023). System availability reflects the reliability and stability of digital systems during operation, particularly in ensuring uninterrupted service access (Baybulatov & Promyslov, 2021). Privacy emphasizes the importance of data protection and information security during user interaction within online systems (Dirnaeni et al., 2021). Responsiveness refers to the promptness of assistance and problem-solving when users experience service difficulties, while contact concerns the accessibility of communication channels between service providers and users during digital interaction (Parasuraman et al., 2005). The adoption of the E-Servqual perspective is considered particularly relevant because the effectiveness of SIDARING cannot merely be assessed through technological existence or administrative performance. Instead, service effectiveness must be understood through users' experiences and perceptions of service quality while engaging with the digital circulation system (Nuzulita & Mudjiumami, 2023). Since online services rely heavily on technological interaction and communication efficiency, evaluating quality dimensions becomes essential for determining whether SIDARING genuinely supports information access, circulation convenience, and academic continuity in higher education environments (Damayanti & Harsono, 2021). Accordingly, this study focuses on analyzing the effectiveness of SIDARING in supporting circulation services at the Library Unit of Universitas Negeri Padang through the analytical framework of E-Servqual. More specifically, the research aims to examine the implementation of SIDARING, evaluate the quality of the service in supporting circulation activities, and analyze the effectiveness of SIDARING based on the benefits generated for users and institutional service sustainability (UPT Perpustakaan UNP, n.d.). Ultimately, this research is expected to contribute both theoretically and practically by providing evidence-based recommendations for strengthening digital circulation services in academic libraries and optimizing technology-based service innovation in higher education institutions.

METHODS

This study employed a quantitative approach with a descriptive research design to examine the effectiveness of the *Sirkulasi Dalam Jaringan* (SIDARING) service in supporting library services at the Universitas Negeri Padang (UNP) Library. A quantitative approach was selected because the research aimed to measure users' perceptions of SIDARING through numerical data collected and analyzed statistically to produce objective and measurable findings. The descriptive design was used to systematically describe the actual implementation and effectiveness of SIDARING without manipulating variables, allowing the study to provide an empirical overview of users' evaluations of the service.

The study focused on a single research variable, namely the effectiveness of SIDARING services, which was operationalized through six indicators derived from the electronic service quality framework (*e-service quality*), including *efficiency, fulfillment, system availability, privacy, responsiveness,* and *contact*. The *efficiency* dimension measured accessibility, ease of navigation, speed of use, information retrieval, and procedural simplicity. *Fulfillment* assessed service suitability, result accuracy, clarity of information, punctuality, and consistency of service delivery. *System availability* referred to system stability, responsiveness, accessibility across devices, minimal technical disruption, and availability when needed. *Privacy* examined account security, personal data protection, confidentiality, and trust in system safeguards. Meanwhile, *responsiveness* evaluated the promptness and effectiveness of staff assistance in addressing service problems, whereas *contact* focused on the accessibility and effectiveness of communication channels between users and service providers. These indicators functioned as the conceptual basis for instrument development and were aligned with the study objective of assessing SIDARING effectiveness. The population consisted of all SIDARING users at Universitas Negeri Padang recorded from September to December 2025, totaling 3,794 individuals. Due to practical limitations in reaching the entire population, the study employed a sampling procedure using the *simple random sampling* technique, which provided equal opportunities for each population member to be selected. Sample determination was calculated using the Slovin formula, resulting in a total of 100 respondents. This sampling technique was chosen to ensure objective representation and minimize selection bias in the quantitative research process. The participants included users who had accessed SIDARING services and were considered capable of providing evaluations based on their service experiences.

Data collection was conducted using a structured questionnaire consisting of 30 items distributed across the six research indicators and measured using a four-point Likert scale ranging from strongly disagree to strongly agree. The questionnaire served as the primary research instrument to capture respondents' perceptions regarding SIDARING service effectiveness. In addition, primary data were obtained directly from respondents through questionnaires and interviews, while secondary data were collected from relevant scientific references, including books, articles, and previous studies related to digital library services. Prior to analysis, the instrument underwent validity and reliability testing to ensure measurement accuracy and consistency. Validity testing was conducted using the Product Moment correlation technique, in which all questionnaire items exceeded the required correlation threshold ($r > 0.202$) and were therefore declared valid. Reliability testing employed Cronbach's Alpha, with all items producing coefficients above 0.60, indicating that the instrument was reliable for data collection. The research was conducted using SIDARING user data recorded between September and December 2025, indicating a research duration of approximately four months. Data analysis followed several systematic stages, including data examination, tabulation, descriptive statistical analysis, and conclusion drawing. The examination stage involved editing and checking questionnaire completeness to ensure data accuracy. Subsequently, tabulation was performed to organize responses into structured numerical categories and percentage distributions. Descriptive statistical analysis was then applied to summarize data through frequency distribution and percentage interpretation to describe patterns of respondents' perceptions concerning SIDARING effectiveness. Finally, conclusions were formulated based on systematically processed data to ensure alignment between the research findings and the objective of evaluating the effectiveness of SIDARING services in supporting library operations at Universitas Negeri Padang.

RESULTS

1. Validity Test

Table 1. Validity Test Results

Item	Pearson Correlation	R table	Description
1	478	0,202	Valid
2	359	0,202	Valid

Item	Pearson Correlation	R table	Description
3	315	0,202	Valid
4	462	0,202	Valid
5	442	0,202	Valid
6	385	0,202	Valid
7	484	0,202	Valid
8	530	0,202	Valid
9	380	0,202	Valid
10	522	0,202	Valid
11	291	0,202	Valid
12	395	0,202	Valid
13	353	0,202	Valid
14	509	0,202	Valid
15	430	0,202	Valid
16	339	0,202	Valid
17	408	0,202	Valid
18	363	0,202	Valid
19	435	0,202	Valid
20	312	0,202	Valid
21	449	0,202	Valid
22	531	0,202	Valid
23	461	0,202	Valid
24	402	0,202	Valid
25	330	0,202	Valid
26	418	0,202	Valid
27	348	0,202	Valid
28	401	0,202	Valid
29	424	0,202	Valid
30	454	0,202	Valid

source: Compiled by the researcher (2026)

Table 1. Validity Test Results show that all questionnaire items are valid, as each Pearson correlation value is greater than the *r*-table value (0.202). The Pearson correlation values range from 0.291 to 0.531, indicating that all 30 questionnaire items meet the validity criteria and are appropriate for measuring the research variable, namely the effectiveness of the Online Circulation Service (SIDARING). Since all *r*-count values exceed the *r*-table

threshold, each item is considered valid and suitable for use in data collection and further analysis.

2. Reliability Test

Table 2. Reliability Test Results

Variabel	Cronbach's alpha	Description
Effectiveness of the Online Circulation Service (SIDARING)	0,829	Reliabel

source: Compiled by the researcher (2026)

Table 2. Reliability Test Results show that the instrument has a high level of reliability, with an average Cronbach's Alpha value of 0.829 across 30 questionnaire items. Since the alpha value exceeds 0.70, the questionnaire is considered reliable and consistent for measuring the research variable, namely the effectiveness of the Online Circulation Service (SIDARING).

3. Effectiveness service circulation in network (SIDARING)

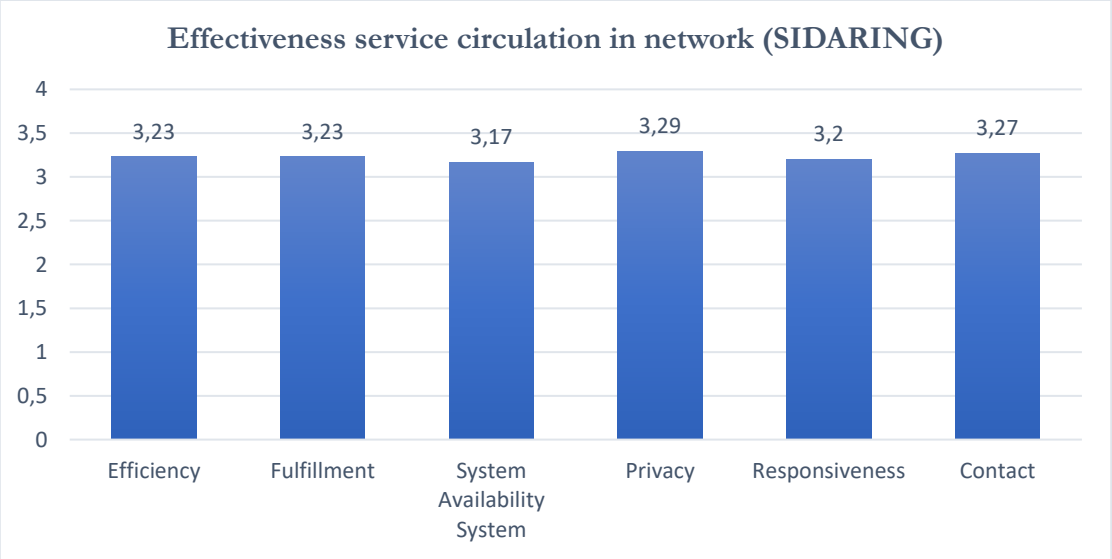


Figure 1. Scores of the Effectiveness service circulation in network (SIDARING)

Figure 1. Scores of the Effectiveness service circulation in network (SIDARING) shows the mean scores of the six E-Servqual dimensions used to evaluate SIDARING effectiveness at the Universitas Negeri Padang Library Unit. *Privacy* obtained the highest score (3.29), indicating strong user trust in data security and confidentiality, followed by *contact* (3.27), reflecting effective communication and access to assistance. *Efficiency* and *fulfillment* received equal mean scores (3.23), showing that users perceived SIDARING as easy to use and capable of meeting service needs. *Responsiveness* scored 3.20, indicating good staff support in handling user concerns, while *system availability* had the lowest score (3.17),

although it still remained in the high category, suggesting that the system generally functioned effectively despite minor technical limitations.

DISCUSSION

The findings of this study demonstrate that the effectiveness of the online circulation service (SIDARING) at the UPT Library of Universitas Negeri Padang can generally be categorized as high, as reflected in the positive evaluation across all dimensions of the E-Servqual model, namely efficiency, fulfillment, system availability, privacy, responsiveness, and contact. The overall findings indicate that SIDARING has functioned as a digital circulation service capable of supporting user access to library services more flexibly, efficiently, and systematically in a technology-based academic environment. This result confirms that the implementation of digital service systems in academic libraries has become an important strategy for strengthening accessibility, continuity, and quality of library services in the digital era (Parasuraman et al., 2005). In the context of university libraries, the adoption of online circulation systems not only reflects institutional adaptation to technological change but also represents efforts to improve user satisfaction and service quality through a more accessible and responsive information infrastructure.

From the efficiency dimension, the study revealed that users perceived SIDARING as effective in facilitating access to library circulation services. The mean score of 3.23 indicates a high category, suggesting that users considered the system relatively easy to access, navigate, and utilize during service interactions. Particularly, the navigation feature received the highest score, implying that users experienced relatively few obstacles in locating menus or features needed for circulation-related services. This finding indicates that interface simplicity and accessibility contribute significantly to user perceptions of digital service effectiveness. In digital service environments, efficiency is commonly associated with ease of use, speed, and users' ability to accomplish desired tasks with minimal effort (Parasuraman et al., 2005). Consequently, the relatively high evaluation of efficiency in SIDARING implies that the system has successfully reduced procedural barriers often found in conventional circulation processes. Nevertheless, although efficiency obtained a high score, several indicators remained within the moderate upper range rather than achieving a consistently very high category. This finding suggests that there is still room for improvement regarding accessibility optimization and procedural

simplification. The relatively lower score in system accessibility may indicate occasional difficulties in user interaction with the system interface or adaptation among new users unfamiliar with online library platforms. Such findings align with studies emphasizing that perceived ease of use strongly influences users' acceptance and satisfaction toward digital systems (Maheswari & Siregar, 2021; Pattiwael, 2021). Therefore, enhancing user-centered interface design and simplifying digital workflows may further strengthen service effectiveness.

The fulfillment dimension also demonstrated a high level of effectiveness, reflected in a mean score of 3.23. The results indicate that SIDARING has been perceived as capable of meeting users' expectations in terms of service suitability, information clarity, consistency, and timeliness. Notably, service consistency received one of the highest evaluations, suggesting that users value predictable and stable service experiences when interacting with digital library systems. This result may be interpreted as evidence that service reliability contributes substantially to user trust and service satisfaction. According to Parasuraman et al. (2005), fulfillment refers to the extent to which digital services successfully deliver promised functions and meet user expectations in a consistent manner. In academic library contexts, fulfillment becomes particularly significant because students depend on circulation systems to support academic activities, including borrowing, returning, and accessing institutional resources efficiently. However, despite the generally positive perception, the relatively lower score associated with service suitability indicates that not all users considered SIDARING fully aligned with their specific needs. This finding may reflect variations in users' expectations or differences in technological familiarity across faculties and educational backgrounds. Since library users possess heterogeneous information needs, digital services should continuously adapt to evolving expectations to remain relevant and useful (Nurhayati et al., 2024). Therefore, periodic evaluations involving user feedback may contribute to service refinement and more personalized system improvements.

The system availability dimension obtained a high category with a mean score of 3.17, indicating that respondents generally perceived SIDARING as sufficiently available and functional during use. Users particularly appreciated the system's flexibility across different devices, which received the highest score among indicators in this dimension. This finding implies that SIDARING successfully accommodates the mobility and technological habits of contemporary university students who increasingly rely on

smartphones, tablets, and laptops to access academic services. Flexible device compatibility is a critical component of digital service sustainability because it ensures inclusivity and uninterrupted access regardless of technological preferences (Baybulatov & Promyslov, 2021).

Despite this positive perception, indicators related to system stability and minimal technical disturbances obtained relatively lower scores. This finding suggests that occasional system errors, slow responses, or disruptions may still affect user experiences. From a digital service perspective, system availability is closely related to reliability and continuity of access. Interruptions in digital systems may negatively affect user trust and reduce service satisfaction, particularly when services are expected to be accessible at all times (Danjuma et al., 2022). Therefore, strengthening server stability, optimizing technical maintenance, and conducting regular system monitoring may improve user experiences and reduce service interruptions. Among all dimensions examined, privacy emerged as one of the strongest components of SIDARING effectiveness, achieving a very high category with a mean score of 3.29. Users expressed considerable trust regarding personal data protection, transaction security, and account safety during service utilization. The high evaluation of privacy reflects users' confidence that SIDARING safeguards sensitive information adequately. In digital library services, privacy plays a crucial role because online systems inherently involve personal account information, borrowing histories, and institutional identification data. When users perceive that their information is protected, they are more likely to engage with digital services confidently and continuously (Ardiansyah & Wahyono, 2021).

The strong performance of the privacy dimension also indicates that SIDARING has succeeded in establishing institutional credibility through secure digital interactions. Data protection and confidentiality have become increasingly significant concerns in technology-mediated services, including libraries, as digital transformation expands information exchange and user-system interaction (Damayanti & Harsono, 2021). Therefore, maintaining privacy standards and communicating security measures transparently remain important to preserve user trust in the long term. Overall, the findings presented in these three dimensions—efficiency, fulfillment, and system availability, strengthened by the privacy dimension—indicate that SIDARING contributes positively to digital circulation services at the UPT Library of Universitas Negeri Padang. The system appears capable of facilitating user access while simultaneously supporting continuity,

convenience, and confidence in digital service delivery. Nevertheless, the presence of relatively lower scores within several indicators suggests that digital service effectiveness should not be interpreted as static but rather as a continuously evolving process requiring adaptation, evaluation, and service innovation according to user expectations and technological developments.

Continuing from the previous discussion, the responsiveness dimension further highlights the effectiveness of SIDARING in supporting circulation services through timely assistance and user support. The findings indicate that responsiveness was categorized as high, with a mean score of 3.22, suggesting that users generally perceived library staff and service mechanisms as adequately responsive in addressing service-related concerns. This result implies that SIDARING not only functions as a technological system but also operates as a service environment in which human interaction remains relevant despite digitalization. In electronic service contexts, responsiveness reflects the ability of institutions to provide prompt assistance, solve problems, and maintain communication with users when difficulties arise (Parasuraman et al., 2005). Therefore, the relatively positive evaluation of responsiveness suggests that SIDARING has succeeded in balancing technological efficiency with interpersonal service support.

The high perception of responsiveness may also indicate that users felt supported when encountering operational challenges in the system. Timely assistance contributes to reduced uncertainty and enhances users' confidence in continuing to utilize online services. In library environments, responsiveness becomes especially important because users often encounter technical issues, circulation misunderstandings, or information access barriers that require immediate clarification. Previous studies concerning digital service quality emphasize that user satisfaction is not solely determined by system functionality but also by institutional willingness to provide rapid and relevant responses during service encounters (Damayanti & Harsono, 2021; Nuzulita & Mudjiumami, 2023). Consequently, responsiveness may be interpreted as an essential mediator between technological systems and positive user experiences. Nevertheless, the results also reveal that responsiveness did not reach the very high category, indicating that opportunities for improvement remain. Several respondents still reported moderate evaluations concerning the speed and effectiveness of staff responses. This finding may reflect limitations in service capacity, communication mechanisms, or operational procedures in handling complaints and inquiries. Considering the increasing expectations of digital users, universities and academic

libraries are expected to establish more proactive communication systems, including integrated support channels, automated responses, or real-time assistance services. Improving responsiveness may therefore contribute significantly to strengthening perceptions of digital service reliability and institutional accountability.

The contact dimension similarly achieved a very high category, with a mean score of 3.28, indicating that users perceived communication accessibility and institutional support mechanisms positively. The findings demonstrate that respondents considered SIDARING effective in facilitating access to service contacts, communication channels, and staff assistance whenever support was required. This result suggests that users did not experience substantial barriers in reaching library personnel or obtaining service-related information. Within the E-Servqual framework, contact reflects the accessibility of communication between service providers and users, particularly when automated systems alone are insufficient to resolve issues (Parasuraman et al., 2005). In digital library systems, the availability of contact channels becomes increasingly important because online interactions may reduce opportunities for direct face-to-face communication.

The very high evaluation of contact indicates that SIDARING successfully complements digital circulation services with accessible human interaction. Such a result is particularly important because technology-based services often risk becoming impersonal or difficult to navigate without adequate support structures. The availability of communication channels reinforces user confidence and contributes to perceptions of institutional care and reliability. This finding supports previous studies indicating that effective communication between library staff and users remains a key determinant of service satisfaction, even within highly digitized environments (Adri et al., 2023; Oktaviani et al., 2024). Thus, the contact dimension strengthens SIDARING's effectiveness by ensuring that digital interactions remain user-oriented rather than purely system-oriented. When analyzed holistically, the findings reveal that all six dimensions of E-Servqual demonstrated positive outcomes, with privacy and contact emerging as the strongest dimensions, followed closely by efficiency, fulfillment, responsiveness, and system availability. These findings suggest that SIDARING has generally fulfilled its role as a digital circulation service capable of supporting user needs in the university library environment. However, the differences in scores among indicators also indicate that service effectiveness remains multidimensional and dynamic. Certain dimensions, particularly

system availability and responsiveness, may require further optimization to achieve more consistent performance across service components.

The findings of this study generally support previous research concerning digital library services and information systems. Research on SIDARING utilization at Universitas Negeri Padang highlighted the importance of internet-mediated communication in strengthening service quality and facilitating information access within library settings (Adri et al., 2023). Likewise, studies examining web-based circulation services emphasize that digital systems improve accessibility, efficiency, and user convenience, particularly when supported by responsive institutional communication (Aryasi et al., 2024). The present study extends these findings by demonstrating that SIDARING effectiveness can be systematically explained through the E-Servqual framework, thereby providing a multidimensional understanding of electronic service quality in academic libraries. Furthermore, the results align with research on digital service quality and user satisfaction, which argues that service effectiveness is strongly influenced by perceptions of convenience, trust, reliability, and communication (Maheswari & Siregar, 2021; Dirnaeni et al., 2021). The particularly high evaluation of privacy reinforces the argument that trust constitutes a fundamental component of technology acceptance. Users are more likely to adopt digital systems when they perceive their personal information and service interactions as secure. Similarly, strong contact and responsiveness evaluations indicate that human-centered service remains essential even in increasingly digitalized environments.

Theoretically, this study contributes to the development of library and information science by demonstrating the applicability of the E-Servqual model in evaluating digital circulation services within higher education libraries. While E-Servqual has been widely employed in electronic commerce and online service evaluation, its application in academic library environments remains relatively limited. Therefore, this study broadens the contextual understanding of E-Servqual by illustrating how efficiency, fulfillment, system availability, privacy, responsiveness, and contact collectively shape perceptions of digital library effectiveness. The findings further reinforce arguments suggesting that library services should be interpreted not merely as information provision systems but as integrated digital service ecosystems influenced by both technological and human-service factors. Practically, the study offers important implications for library administrators and policymakers at Universitas Negeri Padang. Since privacy and contact obtained the strongest evaluations, institutional strategies should maintain and further strengthen these

dimensions through continued security enhancement and communication accessibility. At the same time, system availability and responsiveness require greater attention, particularly concerning technical maintenance, server optimization, and faster service support. Libraries may consider developing more responsive digital support mechanisms, such as integrated helpdesk services, live assistance, or automated complaint systems to reduce response delays and improve service continuity.

Methodologically, this study demonstrates the usefulness of descriptive quantitative approaches combined with the E-Servqual model in assessing user perceptions of library service effectiveness. The use of Likert-scale measurements allowed for systematic analysis of multiple service dimensions and facilitated comprehensive evaluation of digital circulation quality. Nevertheless, despite these strengths, several limitations should be acknowledged. First, this study relied exclusively on quantitative survey data, thereby limiting opportunities to explore users' deeper experiences, expectations, and contextual interpretations regarding SIDARING usage. Second, the study involved respondents from a single institution, namely Universitas Negeri Padang, which may limit the generalizability of findings to other library contexts with different technological infrastructures or service cultures. Third, the research focused primarily on users' subjective perceptions rather than objective measurements of system performance, such as actual response time, system uptime, or technical reliability indicators. Therefore, future studies are encouraged to integrate mixed-method approaches involving interviews, observations, or system analytics to obtain richer and more comprehensive understandings of digital circulation effectiveness. Comparative studies across universities may also provide broader perspectives concerning best practices and contextual variations in digital library services. Despite these limitations, the present study remains important because it demonstrates that SIDARING has contributed substantially to improving circulation services at the UPT Library of Universitas Negeri Padang while simultaneously highlighting areas requiring further institutional improvement and innovation.

CONCLUSION

This study on the effectiveness of the Online Circulation Service (SIDARING) in supporting library services at the Library Unit of Universitas Negeri Padang demonstrates that, overall, SIDARING has functioned effectively and received positive evaluations from

users. Based on the six dimensions of the E-Servqual model—efficiency, fulfillment, system availability, privacy, responsiveness, and contact—all service dimensions were categorized as high to very high. These findings indicate that SIDARING has effectively supported library services through ease of access, fulfillment of user needs, system accessibility, service security, staff responsiveness, and communication effectiveness. The privacy and contact dimensions achieved very high evaluations, reflecting strong user confidence in data security and service communication, while efficiency, fulfillment, system availability, and responsiveness were rated highly, indicating that the system has adequately supported users' service experiences.

The findings address the primary objective of the study, namely to describe the effectiveness of SIDARING in supporting library services at Universitas Negeri Padang. The results suggest that SIDARING functions not only as a digital circulation platform but also as a mechanism for improving service efficiency, user convenience, and accessibility within the academic library environment. Theoretically, this study strengthens the application of the E-Servqual framework in evaluating digital library services, particularly online circulation systems. Practically, the findings provide an evaluative basis for library administrators to maintain service quality while improving areas that still require enhancement, especially system stability, the reduction of technical disruptions, and the optimization of response speed in handling user concerns.

The implications of this study emphasize the importance of user-oriented digital service quality in enhancing user satisfaction and sustaining modern library services. Accordingly, the Library Unit of Universitas Negeri Padang is encouraged to continuously improve SIDARING through technological infrastructure enhancement, stronger data protection, improved communication channels, and continuous training for service personnel. Future studies are recommended to expand the analytical scope by incorporating additional variables, involving broader respondent groups, or applying mixed-method approaches to provide a more comprehensive understanding of digital library service effectiveness.

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