# Audit of Governance and Service Management of Unisnu Jepara's Library Information System (SIPERPUS) Using ITIL V4 Based on Website

**Afrida Hilda Nuradira[1*], Noor Azizah[2], Joko Minardi[3]**

[1, 2, 3]Department of Information System, Universitas Islam Nahdlatul Ulama Jepara, Indonesia

**Abstract.**

**Purpose:** This research aims to assess the maturity level of governance and service management in the Library Information System (SIPERPUS) at UNISNU Jepara. The objective is to identify strengths and gaps, ensuring better alignment with ITIL V4 best practices.

**Methods:** The research was conducted using a qualitative methodology that incorporated a literature review, user questionnaires, and the creation of a web-based audit application designed specifically for this study. Service practices such as Service Request Management, Service Desk, Change Control, and Service Catalog Management were evaluated using the ITIL V4 framework.

**Result:** The findings indicate that SIPERPUS has independently attained a managed maturity level with well-defined Service Request Management and Service Desk practices. Additional work is required to improve Change Control and Service Catalog Management to increase process integration and make information clearer. The new web-based audit application described in this study demonstrates its capability to systematically evaluate, produce data-based recommendations, and continuously improve digital library services.

**Novelty:** This study introduces a new web-based audit application that conforms to ITIL V4, providing an efficient and reliable alternative to manual audit methodologies. The tool significantly reduces audit time, enhances operational efficiency, and optimizes user satisfaction while improving overall service quality. The study adds to the literature on IT governance audits, specifically in higher education, and presents a scalable approach for institutions striving to meet the standards of Society 5.0.

**Keywords**: ITIL V4, Library information system audit, Service management practices, Maturity level assessment, IT governance

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## INTRODUCTION

services in this digital world. In academia, researching and academic pursuits are vital. Therefore, Library Information Systems have played an integral role in supporting such areas in institutions of higher learning [1]. UNISNU Jepara has implemented SIPERPUS as a solution to optimize library management and services, but a systematic evaluation of it governance and service management has yet to be conducted comprehensively. In particular, 78% of Indonesia's higher education libraries lack structured audit mechanisms for information systems that might affect service quality and the efficiency of IT resources [2]. Digital transformation has also reshaped the management of academic libraries themselves [3]. In the era of Society 5.0, libraries have been transformed into digital ecosystems that meet the information needs of academic communities [4]. This transformation finds embodiment in SIPERPUS, serving as the strategic backbone that underlines support for higher education tri dharma: education, research, and community service.

UNISNU implemented SIPERPUS to modernize its library services, in line with the latest developments in digital libraries in the world. According to the report "Digital Library Trends 2023" from the International Federation of Library Associations (IFLA), 92% of higher education libraries in Southeast Asia have adopted the digital library system [5]. However, technology adoption itself will not guarantee the maximum value and benefits for stakeholders if not complemented by good governance and service management.

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The growing number of users and increasing diversity of digital services have increased the complexity of managing SIPERPUS, leading to challenges in ensuring service continuity, information maintenance, system integration, and optimization of technology management. To address these issues, UNISNU continues to innovate, striving to create a personalized, efficient and responsive digital library experience that meets user expectations.

ITIL V4 is adaptable for IT service management [6]. ITIL V4 also supports digital transformation, cloud computing, and organizational efficiency using AI [7]. The study by Sarwar et al. (2023) depicts that ITSM (IT Service Management), if implemented effectively brings changes in the quality of the services of information technology and hence organizational productivity. In the same way, effective ITSM leads to a reduction in the number of service incidents as asserted from a study by itSMF (IT Service Management Forum) [8].

The priority on IT services should be directed in line with the organizational strategy, demand management, and cost-benefit analysis, which may result in increasing user satisfaction [9]. Setyaningsih (2023) and Harjanto (2024) further underline that assessment and improvement of IT services by ITIL V4, detection of weaknesses, and recommendations for improvement should be provided [10], [11].

The complexity of modern digital services necessitates the use of automated web-based audit tools. In this regard, the "IT Audit Tools Market Analysis 2023" finds that automated tools can increase accuracy in evaluation by 85% and reduce audit time by 60% over manual methods. A web-based audit application, built for ITIL V4, can facilitate evaluation and support continuous improvement [12].

This research assesses the governance and management maturity of the UNISNU SIPERPUS services using ITIL V4, analyzing the gap between current practice and best practices. Besides that, it also developed a web-based application to help conduct audits and provide recommendations based on data analysis to further improve the services of SIPERPUS.

In terms of Indonesia's higher education library information systems, the innovation has contributed significantly to the current theory and practice of incorporating an ITIL V4-based maturity assessment for the very first time in a country-specific digital transformation into an audit application through a website. In the context of world trends for smart libraries using IoT, AI, and big data, this study provides theoretical contributions as references for conducting a digital library audit and simultaneously presents practical benefits in the form of evidence-based recommendations and development of audit tools. It is expected that this research will support the standardization and optimization of the management of digital library services at UNISNU JEPARA.

## LITERATURE REVIEW
### Audit
An audit is a systematic process conducted to evaluate the effectiveness, efficiency, and compliance with certain policies or standards within an organization [13] . In this context, it is important to understand that unidentified IT threats can disrupt service processes [14] . Appropriate implementation of information technology can assist organisations in automating processes and improving communication and collaboration, which in turn contributes to operational efficiency [15].

### IT audit and its implementation in IT service management
IT audits play a crucial role in assessing compliance, effectiveness, and efficiency in IT governance. According to study number [7], IT audits help organizations improve risk management and service performance. ITIL V4 provides a structured approach for conducting IT audits, particularly in the Service Management Practices domain, which focuses on optimizing service delivery and incident response. Several studies have demonstrated the effectiveness of ITIL-based audits in improving IT service quality [8].

### ITIL V4
The Information Technology Infrastructure Library (ITIL) is a set of best practices for managing IT services. ITIL V4, the latest version, introduces a more integrated and adaptive approach to service management, focusing on delivering value to customers and fostering cross-functional collaboration within

an organization [16]. ITIL V4 represents a comprehensive framework for IT service management, incorporating core elements such as the Service Value System (SVS) and four key dimensions: organization and people, information and technology, partners and suppliers, and value streams and processes. The SVS ensures that all components and activities within the organization contribute to creating value for stakeholders [6], [17], [18].

**Domains under ITIL V4**
The term "domain" in ITIL has been replaced with "practices." ITIL V4 categorizes 34 practices into three groups: management practices, general management practices, and technical management practices. These categories provide flexible, integrated guidance, enabling organizations to tailor IT service management practices to their specific needs [19], [20].
Service Management Practices focus on IT service management areas such as incident, change, and problem management. General Management Practices have broader applications across various contexts, including project management and risk management. Technical Management Practices deal with technical aspects, including infrastructure and application management [21], [22]. A list of practices can be seen in Table 1.

Table 1. Management practices in ITIL V4

| Manajement Practices | Practices |
| --- | --- |
| General Management Practices | Architecture management. Continual improvement. Information. Security management. Knowledge management. Measurement and reporting. Organizational change management. Portfolio management. Project management. Relationship management. Risk management. Service financial management. Strategy management. Supplier management. Workforce and talent management. |
| Service Management Practices | Availability management. Business analysis. Capacity and performance management. Change Control. Incident Management. IT asset management. Monitoring and event management. Problem Management. Release management. Service catalogue management. Service configuration management. Service continuity management. Service design. Service Desk. Service Level Management. Service Request Management. Service validation and testing. |
| Technical Management Practices | Deployment management. Infrastructure and platform management. Software development and management. |

With this structure, ITIL V4 aims to improve collaboration and integration, creating greater value for stakeholders. Studies indicate that adopting these practices enhances IT service quality and customer satisfaction [22], [23]. Understanding ITIL V4 practices and categories is crucial for organizations striving to optimize their IT service management.

**Maturity level**
Maturity levels evaluate IT service management using five stages: initial, repeatable, defined, managed, and optimizing [24]. The maturity level (ML) can be calculated using equation 1:

$$ML = \frac{\sum_{i=1}^{n} P_i}{n}$$

(1)

Where:
ML: Maturity Level
$\sum_{i=1}^{n} P_i$ : Total Score of All Processes
n       : Total number of processes evaluated

**Gap analysis**
Gap analysis identifies the disparity between an organization's current state and its desired state. This method helps pinpoint gaps, enabling the auditee to devise strategies or steps to bridge these gaps and achieve desired goals [25].

**METHODS**
This research was performed qualitatively with literature studies, user questionnaires, and a web-based application. The qualitative approach enables researchers to gain in-depth understanding of the meaning attributed to social or humanitarian issues [26]. The research steps are outlined as follows:

**Research design**

This study investigates the maturity level of service management and governance of UNISNU's Library Information System (SIPERPUS) using the ITIL V4 framework. The goal is to identify gaps between the current state and ITIL V4 best practices while offering technology-based solutions.

**Data collection technique**

Data were collected using user questionnaires, literature studies, and web-based audits. The questionnaire evaluated aspects such as ease of access, service quality, user satisfaction, and SIPERPUS features, using a Likert scale of 1-5. The study used purposive sampling to select respondents who had direct experience using SIPERPUS. This method was chosen to ensure that the collected data accurately reflected the system's usability and service performance. Purposive sampling is commonly used in IT service audits to obtain insights from users with relevant knowledge [22]. The respondents included students, lecturers, and administrative staff who frequently interacted with the library information system (SIPERPUS).

The validity and reliability of the questionnaire were evaluated. Literature related to ITIL V4 and audits of digital library information systems was also reviewed to gain an understanding of relevant concepts and frameworks. To enhance the evaluation process, a web-based audit application was developed, offering data-driven recommendations.

**Data analysis**

The evaluation of the maturity level was conducted by analyzing questionnaire results using equation (2) to calculate the maturity level score for each practice:

$$\boldsymbol{Maturity\ Level} = \frac{Total\ Score\ of\ All\ Processes}{Total\ number\ of\ processes\ evaluated} \tag{2}$$

Additionally, a gap analysis assessed differences between current and target conditions in ITIL V4 practices, forming the basis for improvement recommendations. These gap results informed the design of a web application to support the audit process, featuring automatic evaluation, maturity level reports, and data-based recommendations.

**Research stages**

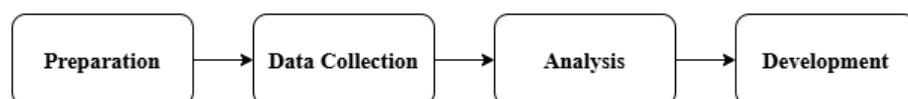The research implementation process is described as follows Figure 1.



Figure 1. Research stages

The first stage is preparation, problem identification, formulation of research objectives, defining the research scope, and conceptual framework development. The second stage is data collection, systematic literature searches, classification, categorization of references, and data organization. The next stage is analysis, content analysis of the collected literature, pattern and theme identification, and synthesis of findings from multiple sources. The last stage is application development, designing the audit application architecture, implementing the ITIL V4 framework in web form, and developing assessment features.

**Criteria/domains used**

This study focuses on Service Management Practices because these practices directly impact the quality of library services and user satisfaction. Unlike General Management Practices and Technical Management Practices, which focus on broader IT governance and infrastructure, Service Management Practices deal specifically with service request management, incident resolution, and change control. These aspects are critical in ensuring seamless and responsive library services [10]. This study uses seven main practices outlined in Table 2.

Table 2. Practices used

| Practice | Description |
|---|---|
| Service Level Management (SLM) | This subdomain focuses on establishing, monitoring, and ensuring service levels in accordance with the service agreement. |
| Incident Management | Manage incidents and service recovery after an interruption or failure. |
| Change Control | Managing change in the IT environment. |
| Problem Management | Identify and address root causes of issues that may affect IT services. |
| Service request management | Manage service requests from users. |
| Service Desk | Provide user support. |
| Service Catalog Management | Maintain a service catalogue containing information about IT services available to users |

**Application development**
The questionnaire results informed the design of a user-centered application (UCD). Its features include user questionnaire submissions, automatic maturity level calculations, and report generation based on the ITIL V4 framework.

**Validation of results**
Validation was conducted by comparing application-based audit results with manual evaluations to ensure consistency.

**RESULTS AND DISCUSSIONS**
In this section, we discuss solutions that can solve the problem in the selected domain. Then assess each identified area to check whether it is at the desired level.
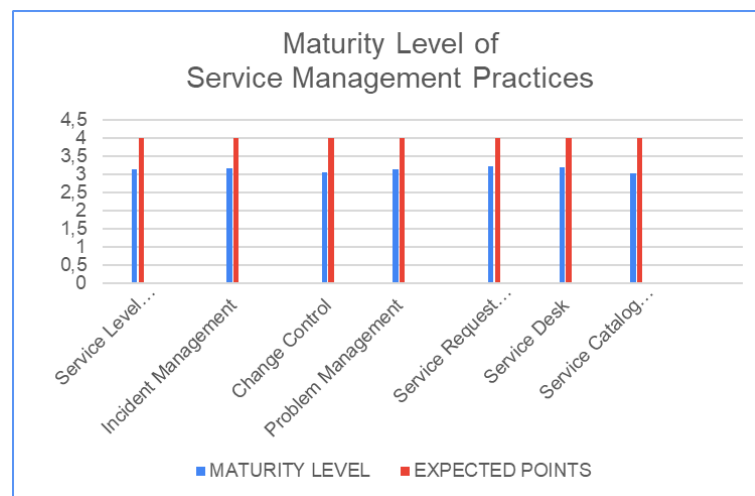
**Maturity level**



Figure 2. Maturity level chart

The research results concluded that the ITIL V4 service maturity level at SIPERPUS UNISNU Jepara was already in quite good performance in several practices, as seen in the chart in Figure 2. The maturity level of service level management (SLM) is recorded as 3.14, while technology-based information services that align with the library's vision have a recorded value of 3.16. The performance of SIPERPUS as a scientific information centre is somewhat higher than average (3.17), while the book lending service still meets research needs adequately (3.05). The capability for storing and providing access to academic research outcomes is also remarkably strong (3.17). This aligns with research indicating that adopting good service management practices can improve service quality and end-user satisfaction [27].

Incident management is a close third with a maturity level of 3.16. The incident reporting process is functioning well (3.14), the incident reporting system is better than average (3.08), and the management of service outages is effective (3.23). Post-incident service recovery also performs well (3.20). This mirrors findings showing that adopting a strong incident management framework helps organizations achieve operational efficiency and improve customer satisfaction [28].

Change Control has a maturity level of 3.07. Change implementation can still be improved (2.91), although communication during change is effective (3.30), and transparency in the change process is adequate (3.01). Good communication during the change process minimizes resistance and supports successful change implementation [29]. Thus, while SIPERPUS shows room for growth, it has made great strides in this area.

Problem management appears stable at a 3.14 maturity level. Identification of root causes impacting IT services is effective (3.08), handling issues is slightly above average (3.10), and the speed in identifying issues is commendable (3.17). The capability to address complex problems is likewise commendable (3.20). Research indicates that effective problem management can mitigate the impact of incidents and improve service quality [30].

Service request management is the domain with the highest maturity level, at 3.23. Service requests are easy to submit (3.39), their status is clear (3.10), and the initial response is relatively fast (3.20). Similarly, the Service Desk scored well, achieving a maturity level of 3.20 due to its strong incident resolution (3.20), quick response to reports (3.35), and adequate service access (3.04). This highlights the significance of IT service request management in enhancing the user experience [19], [27].

Service catalogue management shows a maturity level of 3.05. Information completeness in the catalogue is fairly good (3.08), service discoverability is adequate (3.01), and service description clarity is average (3.00). However, satisfaction with the catalogue's visual design was higher (3.15), though service description information requires improvement (2.98). Research highlights that a well-structured service catalogue enhances user satisfaction and access to services [31].

Overall, SIPERPUS achieved a maturity level of 3.14, placing it in the managed range. The top achievements are in service request management and the service desk, which demonstrated excellent handling of user requests and technical support. However, change control and service catalogue management are priority areas for improvement, particularly regarding change implementation and clarifying catalogue information. Research indicates that improvements in these areas can drive overall IT service management enhancements [32].

**Gap analysis**

Table 3. Gap results

| Practices | maturity level | Expected Point | gap |
|---|---|---|---|
| Service Level Management (SLM) | 3.14 | 4 | 0.86 |
| Incident Management | 3.16 | 4 | 0.84 |
| Change Control | 3.07 | 4 | 0.93 |
| Problem Management | 3.14 | 4 | 0.86 |
| Service request management | 3.23 | 4 | 0.77 |
| Service Desk | 3.20 | 4 | 0.80 |
| Service Catalog Management | 3.05 | 4 | 0.95 |

Once maturity level results are established, the next step involves a gap analysis comparing existing conditions with desired outcomes based on ITIL V4 practices. A clearer view of the governance and service management conditions at SIPERPUS is provided in Table 3, which displays audit calculations across several service management aspects. The data reveals that while most service management aspects—like Service Level Management (SLM)—are well-implemented, integration between activities and components requires improvement for technology-based services to align better with the library's vision.

For Incident Management, reporting procedures and systems are operational. However, disruption handling and service recovery lack integration, preventing optimal incident response scores. Addressing this gap could lead to more efficient and seamless incident handling.

In Change Control, while changes are implemented and communicated, integration between change activities and other processes remains suboptimal. This indicates the need for clearer and more effective change steps. Similarly, for Problem Management, root cause identification and issue handling are functional but require better integration to address complex problems more quickly and effectively.

Service request management shows strong performance, with effective submission and handling processes. Nevertheless, integrating service request and fulfillment activities is crucial for faster responses and clearer status updates. The Service Desk, too, performs well in resolving incident reports, yet full integration is necessary to improve user data accessibility and completeness.

Lastly, in Service Catalogue Management, the catalogue contains fairly comprehensive service details. However, to enhance user satisfaction, service information must be better integrated with user needs. Overall, while most service management elements are well-executed, enhancing integration across all activities and components is key to achieving optimal governance and service management outcomes at SIPERPUS.

**Website implementation**
The website developed features a user-friendly interface, designed to support the governance and service management audit process efficiently. The design integrates key features aligned with the ITIL V4 framework, ensuring that all audit activities are conducted in a structured and responsive manner. The website includes three primary roles or actors (admin, auditor, and auditee) each with distinct responsibilities that influence the functions or features they can access. The following is the implementation of the ITIL V4 framework for auditing governance and service management of web-based information systems:
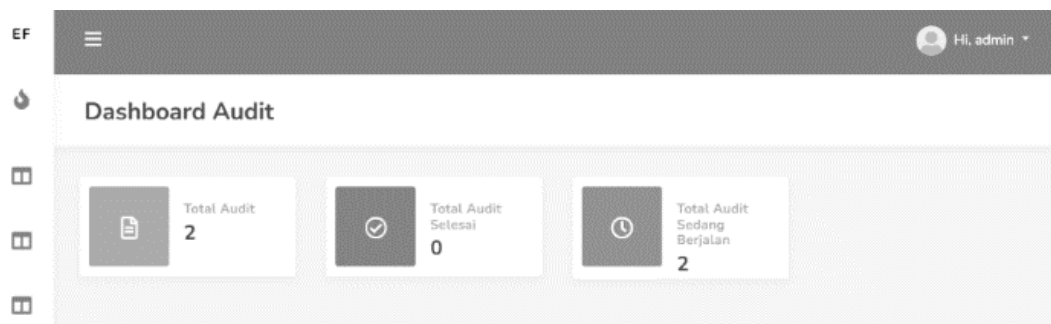


Figure 3. ITIL V4 audit website home page

Figure 3 is the homepage view, which contains the total audits, the number of completed audits, and the ongoing audits. On the left side is the sidebar found on all pages. This page can be accessed by all users.
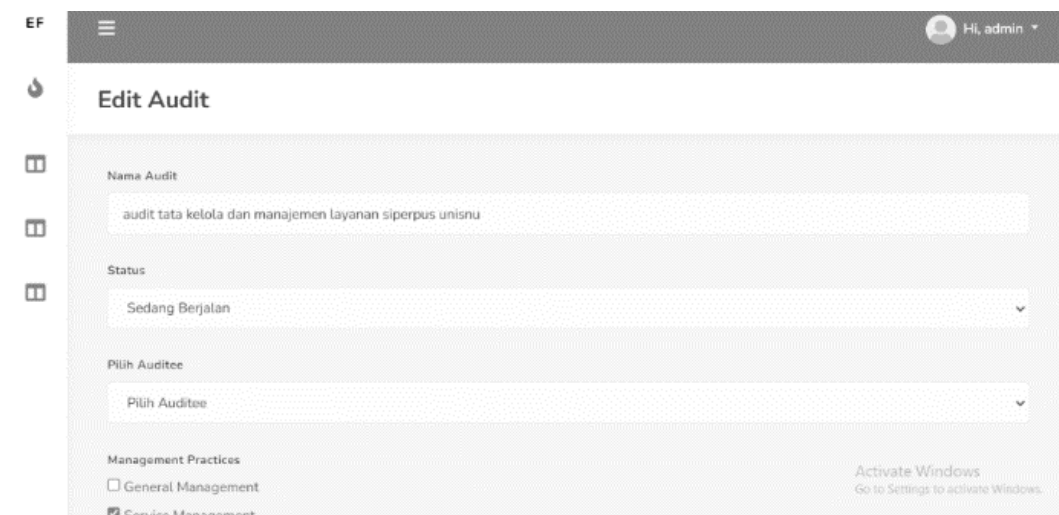


Figure 4.  Add/edit view

This page is used to add new audits and edit existing audits. Users can write the audit name, select the audit status option, the date the audit was run, select the auditee who will receive the audit report, and select the management practice to be used in the audit as shown in Figure 4.
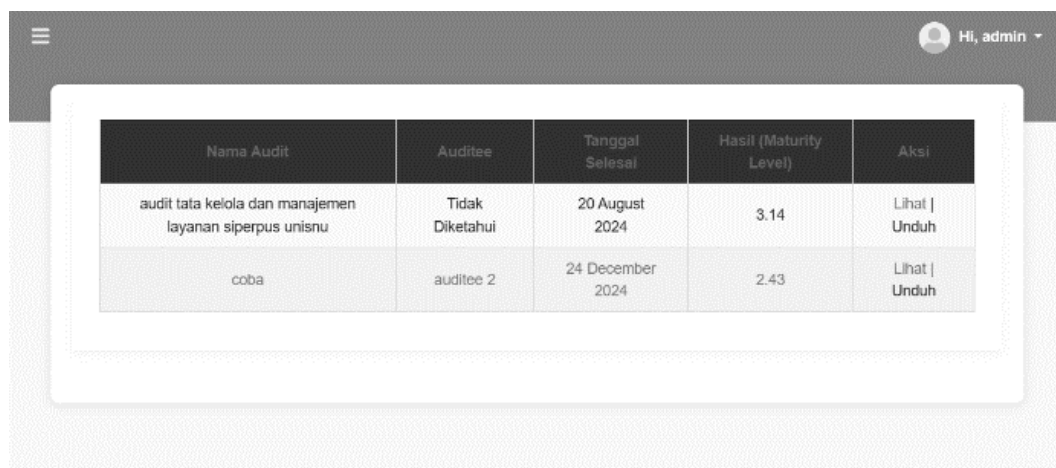
Figure 5. Table in add/edit page

Still on the same page in Figure 5, it shows the process of selecting practices, filling in the expected points, questions, and filling in the questionnaire results obtained.
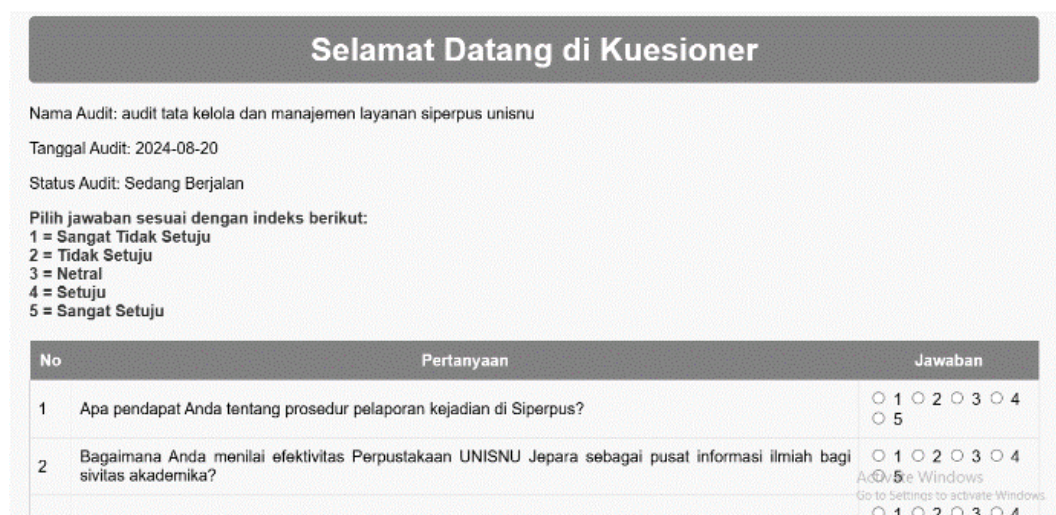

Figure 6. Audit list view

Figure 6 is the audit list page that is run, on this page users can delete audits that are no longer needed and make edits by clicking the "edit" button which will be redirected to the pages contained in Figure 4 and Figure 5. The pages in Figure 3 to Figure 5 can only be seen by admins and auditors.

Figure 7. Report page

Figure 7 is page that shows a list of audits and their maturity levels. All admins and auditors have full access to the report, while auditees can only view the report if it has been selected by the admin/auditor. Reports can be viewed directly through the website and can also be downloaded.



Figure 8. Questionnaire filling page

The last page in Figure 8 is the page used to fill out the questionnaire by the respondent. The results of this filling will be connected to the audit table according to the choice / scale that is selected by the respondent. This page can be accessed without having to fill in a username and password, but must use a link or link that already has a token created by the system.

**Interpretation and practical implications**

The results showed that the governance and management of UNISNU Jepara SIPERPUS services were generally at the managed maturity level (3.14). Best practices are seen in Service request management and Service Desk, while Change Control and Service Catalog Management show gaps that require further attention.

Interpretation of the findings indicates the presence of both well-performing and low-performing practices. Good performing practices include Service request management (3.23), which recorded the highest score and reflects an efficient and responsive service request management process. A structured service request system is proven to improve the user experience and operational efficiency of [9] . In addition, the Service Desk (3.20) also showed superior performance, especially in terms of the speed of response to incident reports, which contributed to user satisfaction as per the findings [8].

On the other hand, low-performing practices include Change Control (3.07) and Service Catalog Management (3.05), indicating the need for improvement. Lack of integration in the change process and completeness of information on the service catalogue are the main barriers. This indicates the need for emphasis on transparency and documentation of changes, as expressed by [7].

The results of this study support previous studies that highlight the importance of the ITIL framework in improving IT service governance. The implementation of ITIL V4, with its more adaptive and value-orientated approach, proved to be relevant for managing complex digital library systems[10] . On the other hand, this study uncovered ITIL V4 adoption challenges, such as staff training and procedure customization. These findings are in line with the literature which mentions that IT framework implementation often requires significant investment of time and resources [12].

The practical significance of the findings is multifaceted. Firstly, the excellence in service request management can serve as a scalable model for other universities aiming to enhance the efficiency of their library services. A structured system minimizes user waiting times and builds trust in the service. Additionally, developing change processes through better integration within Change Control can enhance efficiency and reduce resistance to change, paving the way for more dynamic service management in the future. Improvements to service information through revisions of Service Catalog Management will make it easier for users to understand and access available services, thereby improving their overall user experience.

The recommendations for improvement include three key steps. First, providing ITIL V4-based training to library staff to enhance their understanding and skills in change and service management. Second, enhancing the web-based audit application by incorporating analytics features to support real-time identification and resolution of gaps. Third, conducting periodic evaluations through regular audits to monitor the implementation of recommendations and ensure continuous improvement in line with ITIL V4 standards.

This research offers significant value by demonstrating how the ITIL V4 framework can be adapted to manage and evaluate digital library services in higher education. Moreover, the proposed technology-based solution has the potential for broad application across other educational institutions, serving as a benchmark for developing IT-based services in the education sector.

**CONCLUSION**
The research finds that the implementation of governance and service management audit of Library Information System (SIPERPUS) at UNISNU Jepara with ITIL v4 framework was able to find the level of maturity of services on many key practices. The overall maturity of SIPERPUS was 3.14, which belongs to the moderate category. Service Request Management and Service Desk practices exhibit the highest performance, delivering services that are responsive and in sync with user expectations. The practices of Change Control and Service Catalog Management, however, must still be improved, especially in process integration and completeness of service information. These findings are in line with the research objectives, which aim to assess the strengths and gaps in SIPERPUS services while providing data-driven recommendations to improve IT governance and service management.

This research proves the need for a systematic and structured audit mechanism to ensure that SIPERPUS services can run optimally as expected and in accordance with ITIL v4 best practice standards. Audits based on ITIL v4 help to identify gaps between the actual current state and desired objectives and more targeted recommendations for improvements. Furthermore, the web-based audit application developed in this research would serve as an example of a practical solution to implement the audit process and support continuous improvement of services.

So the results of this study provide theoretical contributions to the science of digital library information system auditing, as well as practical benefits for UNISNU in improving the quality of SIPERPUS governance and service management. The implementation of the recommendation also is expected to enhance user satisfaction and support UNISNU's vision as a center of excellence in the management of digital-based library services.

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