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Implementation of IT Service Management (ITSM) in Service Level Management and Capacity and Performance Management Processes

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ABSTRACT

IT Service Management (ITSM) is essential for organizations to address IT challenges and deliver services that meet user needs, improve quality, and reduce costs. For government agencies like Diskominfo Kota Bandung, ITSM offers a structured approach to optimizing IT in service delivery. While Diskominfo follows the Electronic-Based Government Letter (SPBE) guidelines aligned with ISO 20000, it has yet to implement ITIL standards. The organization faces challenges in managing service levels, including the absence of precise Service Level Requirements (SLR) and Service Level Agreements (SLA), and struggles with managing service capacity and performance. These challenges highlight the need for improvements in their ITSM processes. This study evaluates and enhances the ITSM processes at Diskominfo Kota Bandung, focusing on Service Level Management and Capacity and Performance Management, using the ITIL V3 framework as a best practice model. The research adopts a Design Science Research (DSR) methodology to create innovative, actionable solutions. Data was collected through interviews and assessments and analyzed using Capability Maturity Model Integration (CMMI) to identify improvement areas based on ITIL V3. The results show that the Service Level Management process is at Level 1 (Initial), while Capacity and Performance Management is partially at Level 2 (Repeatable). Recommendations are provided for improvements across people, processes, and technology to optimize ITSM practices and achieve higher maturity levels aligned with ITIL V3.

Introduction

The current development of information technology (IT) has a significant influence on every field, both in the field of industry, agencies, and organizations, so that it can provide convenience in every service that will be provided (Fauzi et al., 2023; Sibuea & Tampubolon, 2022). The application of information technology in an organization is believed to increase effectiveness and efficiency in business processes, one of which is the business process of service to customers because the quality of customer service will affect customer satisfaction. (Astuti & Rahayu, 2018; Tan, 2019)Therefore, organizations need to implement IT service management to overcome and solve IT problems and create good and stable IT services. (Maulana, 2023; Rahmawati et al., 2020).

Company services began to develop in this era when they were carried out manually. Sometimes, there are still many obstacles that are not good. However, along with technology development, company services have begun to advance because management is improving; one example is company services related to IT services. Therefore, good IT service management is needed or what can be called IT Service Management (ITSM) (Priyohutomo & Sitokdana, 2020). ITSM is a service management that focuses on the perspective of service users towards the business owned by the company (Khoiriyah, 2022). ITSM does not focus on how IT is used but provides a structured framework for managing IT-related activities and interactions between IT professionals and users. To ensure continuous improvement, organizations need to implement standardized IT frameworks that help direct the service enhancement process effectively (Safrina et al., 2023).

Currently, research on ITSM in Indonesia uses a lot of the development of frameworks and standards in the IT field, namely the Information Technology Infrastructure Library (ITIL), because ITIL is a best practice that is easy to implement in various organizations. (Hayadi et al., 2021). ITIL provides structured guidance for planning, developing, operating, and improving IT services, thereby enhancing efficiency, effectiveness, and service quality (Arribe et al., 2024). In addition, the broad scope of ITIL can also provide helpful guidance and references for various areas that can later be used to develop and improve the goals of IT organizations (Elfadiar & Sutabri, 2023). In the context of ITIL, Capacity and Performance Management is one of the important aspects that aim to ensure that the capacity and performance of IT services can be managed according to the agreed level and Service Level Management to provide clarity regarding the level of service that will be provided to customers.

Service Level Management (SLM) is one of the services available in ITIL V3. Service Level Management (SLM) is the process of setting agreed service targets for businesses and providing the information management needed to ensure these targets are achieved (Aditya & Sanjaya, 2020). The SLM process aims to ensure that the agreed level of IT service delivery can be achieved for both current and future services. Service Level Management is a process that involves approving and documenting IT service level

targets and responsibilities in Service Level Agreements (SLAs) and Service Level Requirements (SLRs) for each IT-related service and activity (Oktiviana & Jayadi, 2023).

Capacity and Performance Management is a center of information related to IT performance and capacity issues. Network and server support handles most of the day-to-day operational tasks, providing critical information on performance for the capacity management process. Capacity and performance management practices aim to ensure that services achieve agreed-upon and expected performance, meeting current and future demands cost-effectively. (Agutter, 2020).

The Bandung City Communication and Information Service (Diskominfo) is a local government agency responsible for managing and developing Bandung's communication and informatics sector. Therefore, public services that use information technology are managed by the Diskominfo of Bandung City, so the Diskominfo needs to ensure that the services provided are of high quality. Currently, the application of information technology in Diskominfo is standardized based on the Electronic-Based Government System (SPBE) by Presidential Regulation of the Republic of Indonesia Number 95 of 2018. The SPBE adopts the ISO 27000-1 framework for information system security and ISO 20000 for information system service management. However, Diskominfo of Bandung City has not implemented the framework standard for providing its services.

The Diskominfo of Bandung City is facing several problems in its service management. One of the main problems is the absence of a formal Service Level Agreement (SLA), which results in the absence of an explicit reference for service quality. This causes difficulties in ensuring that the services provided align with the applicant's expectations. In addition, the existing SOPs cannot guarantee the smoothness and satisfaction of the service due to their limitations in providing reasonable service quality assurance. The absence of SLAs also impacts SLM's ability to measure, monitor, and report on service performance, as well as the absence of a mechanism to measure customer satisfaction or obtain structured feedback for service improvement.

In addition to facing problems in Service Level Management, the Diskominfo of Bandung City cannot estimate what is needed, so the capacity provision process is less than optimal. The lack of predictive reporting and workload analysis also hinders effective capacity planning and management. For this reason, standardized guidelines are needed in service management practices, including Service Level Management and Capacity and Performance Management, which are very important to improve the quality of IT services in the Diskominfo of Bandung City.

This research aims to know the existing conditions in IT Service Management at the Diskominfo of Bandung City based on the Service Level Management and Capacity and Performance Management processes using the ITIL V3 framework, conducting a gap analysis on IT Service Management at the Diskominfo of Bandung City based on the Service Level Management and Capacity and Performance Management processes using the ITIL V3 framework, providing a draft improvement recommendation to improve IT Service Management in the Diskominfo of Bandung City based on the Service Level

Management and Capacity and Performance Management Process using the ITIL V3 framework, providing a roadmap for improvement in IT Service Management improvement at the Diskominfo of Bandung City based on the Service Level Management and Capacity and Performance Management Process using the ITIL V3 framework.

Method

The research method used is a conceptual model consisting of a series of concepts that help to study, understand, describe, and explain the research represented (Fabiani et al., 2019). To illustrate conceptual models, various frameworks can be used, one of which is Design Science Research (DSR). The conceptual model of this study can be seen in Figure 1 below:

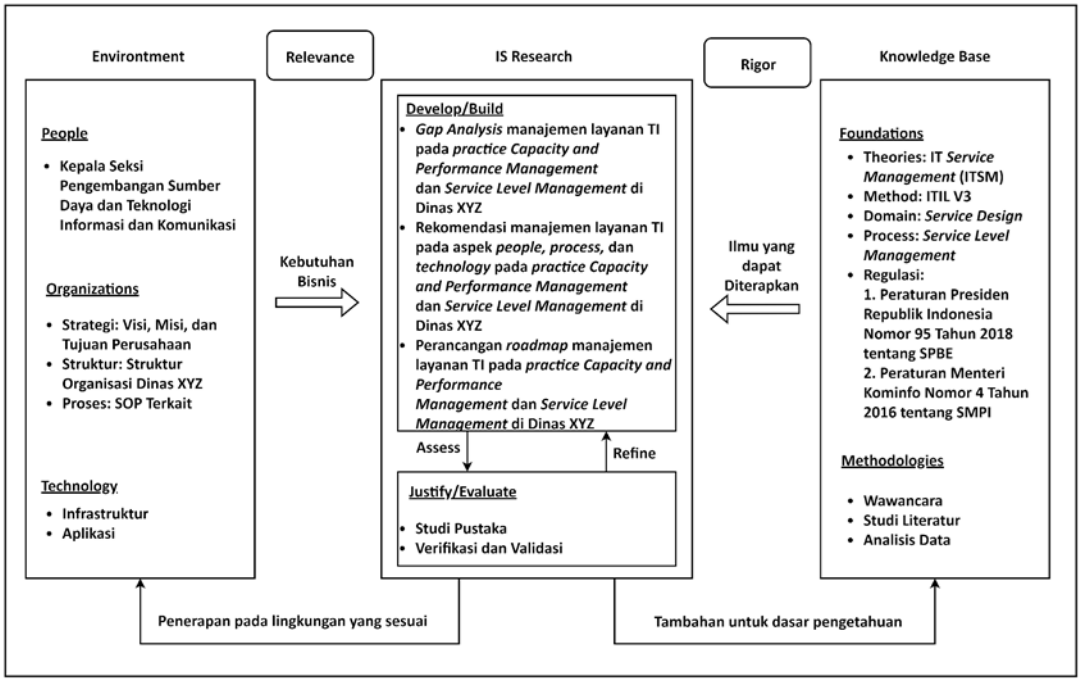

Figure 1 Conceptual Model
Source (Hevner et al., 2004)

Design Science Research (DSR) is a problem-solving approach that aims to increase knowledge by creating innovative artifacts. DSR combines design with scientific research methods to produce innovative solutions that can be implemented effectively. This approach has an important role in research in information systems (Hevner et al., 2004). The conceptual model in this study is prepared based on the DSR method, which consists of 3 parts: the environment, the basis of science, and Information Systems (SI) research. This model provides a clear picture of the research to be carried out. The data collection process is carried out to obtain relevant information. It is then processed to

obtain the desired results and used in IT Service Management (ITSM) analysis and design.

Data Collection and Processing

Data collection in this research consists of primary and secondary data. Primary data was obtained directly through surveys, interviews, and questionnaires to understand the condition of IT services, the challenges faced, and the need to develop and improve IT service management processes at Diskominfo of Bandung City. Secondary data was collected from other sources such as websites, books, and organizational documents to provide an overview of the internal structure, applicable procedures, and support analysis and recommendations based on previous research and ITIL V3 guidelines to strengthen analysis and recommendations in managing IT services at Diskominfo of Bandung City.

In this research, data processing is carried out using the results of interviews, literature studies, and analysis of IT service conditions based on guidelines, standards, and work structures related to Capacity and Performance Management and Service Level Management. Data analysis will be carried out by evaluating the current state of IT services and identifying IT service needs based on the level of assessment results that refer to the ITIL V3 framework. Table 1 shows the assessment-level components used in this research.

Table 1. Assessment Level Component

Level	Description
Level 1: Initial	The process meets the objectives but does not use standardized methods.
Level 2: Repeatable	Processes are implemented in a managed way. They are planned, monitored, and adjusted according to objectives, and their work products are well-defined, controlled, and maintained.
Level 3: Defined	The process is implemented using a predefined process and can achieve the process results.
Level 4: Managed	The process is measured and operated within predefined boundaries to achieve its process outcomes.
Level 5: Optimizing	Existing processes have achieved best practices through continuous improvement to meet relevant business objectives.

Source: Data Processed

In this research, after completing the data collection and data processing process, it will proceed to the stage of preparing recommendations based on the assessment results and continue with the evaluation method by verifying and validating related data collection and processing, as well as validating the results of designing recommendations that have been made.

Results and Discussion

Analysis of Assessment Results

After obtaining the assessment results based on the ITIL V3 framework, the analysis results regarding the implementation of Service Level Management and Capacity

and Performance Management at Diskominfo of Bandung City are shown in Table 2 below.

Table 2. Assessment Result Analysis

Process	Assessment Result Analysis
Service Level Management	Based on the Service Level Management assessment, the current process has not met Level 1 (Initial), indicating that improvements are still needed to reach Level 2 (Repeatable). In the Process Performance aspect, Diskominfo understands the services provided but cannot guarantee the agreed service quality and does not have an adequate customer satisfaction measurement system. Despite efforts to maintain good relations with customers and service cost efficiency, this aspect only meets 75% of the expected criteria. At Level 2, Work Product Management shows that Diskominfo has not been able to document and agree on Service Level Requirements (SLR) and Service Level Agreements (SLA). Without these documents, monitoring service performance and mitigating SLA violations cannot be done optimally. In addition, recording customer complaints, comments, and appreciation is not yet available, and the customer satisfaction measurement system is still ineffective, with a fulfillment rate of only 40%. Service reports and customer satisfaction surveys have also not been conducted regularly, causing the feedback handling structure to remain weak, with a fulfillment level of only 35%. To achieve Level 2 (Repeatable), Diskominfo needs to improve formal documentation, develop and implement SLAs and SLRs, and build a better customer satisfaction monitoring system to ensure continuous improvement of IT services.
Capacity and Performance Management	Based on the Capacity and Performance Management assessment, Diskominfo has met most of the objectives at Levels 1 (Initial) and 2 (Repeatable). However, there are still aspects that need to be improved. In Process Management, Diskominfo has developed and maintained a capacity plan that matches current and future business needs, with a 90% fulfillment rate. Documented guidelines and measures to improve capacity and service performance help maintain the suitability of needs and resources. At Level 2, Performance Management is well established, with a 100% fulfillment rate. However, in Work Product Management, Diskominfo has only partially defined the Capacity Management Information System (CMIS) to monitor response time and system downtime, so the fulfillment level has only reached 69%. Improvements are still needed to make capacity forecasts, predictive reports, and workload analysis more systematic. With improvements in unmet aspects, Diskominfo can more effectively manage the capacity and performance of IT services to meet current and future business needs.

Source: Data Processed

Gap Analysis

Gap analysis is carried out to make it easier to improve the existing ones. This analysis compares the current level of information technology (IT) management

capability (as-is) with the expected level of capability (to-be) (Yuliana et al., 2023). Therefore, after analyzing the assessment results obtained through interviews with the Diskominfo of Bandung City, the researcher analyzed several gap findings from the assessment process results. The gap analysis can be seen in Table 3 below.

Table 3. GAP Analysis

Practice	Gap Analysis
Service Level Management	1. Service provision cannot be ensured at the agreed level without a formal agreement. 2. The absence of a Service Level Requirement (SLR) results in a lack of clarity regarding the service standards that must be met 3. The lack of a Service Level Agreement (SLA) in service delivery leads to an absence of an explicit agreement on the expected service level. 4. Customer satisfaction measurements of the provided service levels have not yet been conducted. 5. Service level improvements are not being carried out due to the absence of an SLA, making it challenging to initiate structured enhancements to service quality.
Capacity and Performance Management	1. The lack of a Capacity Management Information System (CMIS) results in an unclear overview of actual service capacity, making it challenging to implement effective capacity adjustments. 2. The absence of documented reports on forecasting capacity requirements and service performance hinders proactive planning and decision-making. 3. The lack of a workload analysis report restricts comprehensive resource utilization and service efficiency assessment.

Source: Data Processed

Recommendations

After conducting a gap analysis, the next step is to provide an appropriate recommendation design to address the gaps that have been found. The draft recommendations aim to enable organizations to improve the quality of their IT services. In preparing the draft recommendations, it is necessary to know in advance the recommendation components that will be used based on the ITIL V3 guidelines. In general, there are three aspects of recommendations in ITIL V3: People Aspect, Process Aspect, and Technology Aspect. These three aspects need to be explicitly managed according to the organization's needs to improve the quality and efficiency of its IT service management.

People Aspect Recommendations Design

This people aspect describes the management of human resources that can be implemented at Diskominfo of Bandung City to support the development of its IT service management. This aspect includes every individual managing IT services (Cronholm et al., 2017). In designing recommendations for this people aspect, researchers will provide recommendations such as adding roles, responsibilities, skills, and awareness to improve service management at Diskominfo of Bandung City.

In this recommendation, there is a job description based on competencies from SFIA version 8. SFIA (Skills Framework for the Information Age) version 8. With seven levels of responsibility, SFIA helps organizations effectively manage skills, career planning, and workforce development. Table 4 is a proposed draft recommendation on the people aspect of the Service Level Management process.

Table 4. People Aspects Service Level Management Process

Role	Competency	Level	Responsibility	Skill & Awareness
Service Level Manager	*Service Level Management* (SLMO)	5	Responsible for managing SLAs and SLRs, ensuring that service needs are identified, documented, and fulfilled by established agreements.	Training is required to comprehensively manage Service Level Management, including SLA, SLR, SIP, and SQP.
Service Level Analyst	*Business Intelligence* (BINT)	4	Assist the Service Level Manager in managing and monitoring SLAs and SLRs through data analysis and reporting that support informed service improvement decisions.	Training is needed to conduct service performance data analysis and reporting to support informed decision-making for service improvements.
Customer Management Officer	*Service Level Management* (SLMO)	3	Serve as the primary liaison between customers and the IT service team, ensuring that agreed-upon SLAs meet customer service needs effectively.	Training is necessary to ensure customer service needs are effectively identified, documented, and fulfilled.
Kepala Bidang Aplikasi	*Technology Service Management* (ITMG)	6	Oversee the SLA and SLR management process within the application domain, ensuring service requirements align with business objectives.	Training is essential to overseeing the overall SLA and SLR management process within the application domain and ensuring that service requirements align with business objectives.

Source: Data Processed

The recommendations for the Capacity and Performance Management process for the people aspect are shown in Table 5 below.

Table 5. People Aspects Capacity and Performance Management Process

Role	Competency	Level	Responsibility	Skill & Awareness
Capacity and Performance Officer	*Capacity Management* (CPMG)	5	Responsible for ensuring that IT infrastructure capacity can meet current and future business needs effectively and efficiently.	Training is required for adequate Capacity and Performance Management to ensure that IT infrastructure efficiently meets current and future business needs.

Source: Data Processed

Process Aspect Recommendation Design

This aspect of the process focuses on managing processes critical to the effective delivery of IT services, ensuring their successful implementation at Diskominfo Bandung City to support its IT service management's continuous development and improvement (Cronholm et al., 2017). In designing these process aspect recommendations, the researcher will propose a comprehensive set of guidelines, including policies, procedures, work instructions, and records, to optimize and improve service management practices at Diskominfo of Bandung City to align with its strategic goals. Table 6 is a proposed draft recommendation on the process aspect of the Service Level Management process.

Table 6. Process Aspects Service Level Management Process

Policy	Procedure	Record
Develop and compile a Service Level Management Policy that incorporates the following key points: 1. SLR and SLA negotiation and documentation 2. SLR and SLA monitoring 3. Handling of SLR and SLA Violations 4. Service Improvement 5. Review of SLR and SLA 6. SLR and SLA Implementation and Evaluation 7. Customer Satisfaction Management	Developing an SLA proposal and approval procedure involves identifying requirements, drafting, reviewing with stakeholders, and obtaining formal approval.	The Service Level Agreement (SLA) document formalizes service levels, roles, and responsibilities while providing a framework for measuring and evaluating performance.
	Developing an SLR proposal and approval procedure includes identifying requirements, drafting, reviewing, revising, and obtaining approval.	The Service Level Requirement (SLR) document defines customer needs, sets performance targets, and serves as the basis for SLA development.
	Measuring customer satisfaction involves conducting surveys, analyzing responses, evaluating results, and improving service quality.	The Customer Satisfaction Feedback document records survey results and feedback to identify service improvements and meet customer expectations.
	Service Improvement procedures involve analyzing surveys and complaints, identifying improvements, and planning service enhancements.	The Service Improvement Plan document outlines action plans for enhancing service quality based on performance analysis and customer feedback.
	Creating a Service Quality Plan involves defining standards,	The Service Quality Plan document establishes quality

	documenting KPIs, monitoring, and ensuring continuous evaluation.	standards, control processes, and metrics to maintain and improve service quality.

Source: Data Processed

The process aspect recommendations designed for the Capacity and Performance Management process are shown in Table 7 below.

Table 7. Process Aspects Capacity and Performance Management Process

Procedure	Record
Develop clear procedures for monitoring and adjusting service capacity using CMIS by tracking performance, analyzing trends, and optimizing resource allocation.	The CMIS document records and manages IT service capacity data, including trends, forecasts, and optimization recommendations, supporting proactive monitoring and adjustments to meet demand.
Develop procedures for forecasting service capacity through data analysis, trend monitoring, and predictive modeling to ensure optimal resource allocation.	The Predictive Report documents IT service capacity forecasts, identifying future needs, potential bottlenecks, and recommended actions based on historical data and trends.
Develop procedures for conducting workload analysis by collecting performance data, evaluating resource utilization, identifying trends, and optimizing capacity planning.	The Workload Analysis document records IT system workload data, including usage patterns, resource distribution, and identification of high-demand areas for optimization.

Source: Data Processed

Technology Aspect Recommendations Design

This technology aspect describes the application of technology that can support the provision of IT services needed to manage IT services more effectively, which can be implemented in the future at Diskominfo of Bandung City. (Adhitra & Ridwan, 2024)This aspect is needed to ensure that technology services can achieve the company's business goals (Cronholm et al., 2017). In designing this technology aspect recommendation, the researcher will provide recommendations, such as tools and features available in the tools, to improve service management at the Diskominfo of Bandung City.

ServiceNow was selected to help Diskominfo manage its services in this technology aspect recommendation. ServiceNow was chosen for its ability to transform IT by automating and standardizing business processes while ensuring integration across the organization. The platform helps create a unified system of record for IT, reducing operational costs and enhancing efficiency. Additionally, analysts recognize ServiceNow as a leader in IT Service Management (ITSM) for offering a unified cloud platform that automates the entire lifecycle of IT services, project management, personnel, resources, risks, and other critical areas (Nechyporenko, 2013). Table 8 is a proposed draft recommendation on the technology aspect of the Service Level Management process.

Table 8. Technology Aspects Service Level Management Process

Technology Recommendation	Tools	Features/ Module	Description
Implement ITSM tools to create SLAs and deliver at the service level.	ServiceNow	*Service Level Management*	This module allows for defining and managing Service Level Agreements (SLAs), ensuring that promised service levels are met and monitored effectively. ServiceNow's SLA Management module facilitates automatic setting, tracking, and monitoring SLAs.
Implement tools that can assist in managing SLAs and SLRs.	ServiceNow	*Service Level Management*	This module assists in managing both Service Level Agreements (SLAs) and Service Level Requirements (SLRs). With Service Level Management, Diskominfo can establish, track, and ensure compliance with agreed service performance to meet user or customer expectations.
Implement tools to create surveys and manage surveys.	ServiceNow	*Customer Service Management*	This tool enables the creation and management of surveys to gauge customer satisfaction. It plays a key role in collecting feedback from service users, which can be utilized to improve service quality.
Implement tools to make decisions that trigger service improvements based on customer satisfaction, complaints, and compliments.	ServiceNow	*Continual Service Improvement*	The Continual Service Improvement module supports identifying, planning, and implementing ongoing service improvements based on customer satisfaction data, complaints, and compliments. This allows Diskominfo to enhance the quality of its services continually.
Implement tools to create and store documents that can be used continuously.	ServiceNow	*Document Improvement*	This module streamlines IT service-related documents' creation, management, and storage. It ensures that necessary documentation is consistently updated and accessible to support service operations.

Source: Data Processed

The technology aspect recommendations for the Capacity and Performance Management process are shown in Table 9 below.

Table 9. Technology Aspects Capacity and Performance Management Process

Technology Recommendation	Tools	Features/ Module	Description
Implement tools to manage the capacity and performance of integrated services.	ServiceNow	*Capacity Management*	This module facilitates the integrated management of capacity and service performance. Diskominfo can effectively monitor and optimize capacity usage by utilizing this tool, ensuring optimal service performance.
Implement tools that can predict future capacity requirements.	ServiceNow	*Predictive Intelligence*	This module leverages predictive intelligence technology to forecast future capacity requirements based on current trends and usage patterns. Diskominfo can proactively plan the necessary capacity to meet anticipated service demands.
Implement tools that can monitor and analyze application and workload performance.	ServiceNow	*Predictive Intelligence*	This module enables real-time monitoring and analysis of application and workload performance. Diskominfo can promptly identify and address performance issues by utilizing these tools before they affect service users.

Source: Data Processed

Conclusion

Based on the results of research conducted related to IT Service Management at the Diskominfo of Bandung, which focuses on the Service Level Management and Capacity and Performance Management processes using ITIL V3, it can be concluded that the implementation of Service Level Management at Diskominfo of Bandung City has not yet reached Level 1, with 75% fulfillment for basic service understanding and customer relationships, 40% for performance management, and 35% for work product management, requiring improvements to reach Level 2. Meanwhile, Capacity and Performance Management has achieved most of the Level 1 objectives with 90% fulfillment, Level 2 in performance management with 100%, and work product management with 69%. However, some areas still need improvement to manage IT service capacity and performance more effectively. There is a gap in both aspects, preventing the achievement of ideal conditions according to ITIL V3, mainly due to the absence of standards and documentation for SLAs and SLRs, unstructured customer satisfaction measurement, and a lack of planning for continuous service and quality improvement. The researcher recommends adding new roles, creating policies and procedures related to SLA and SLR management, and improving customer satisfaction measurement for Service Level Management, while for Capacity and Performance Management, the recommendations include new roles in CMIS management, forecasting procedures, and workload analysis. Additionally, technological tools are suggested to

integrate all processes into a single system. These recommendations are implemented in a roadmap divided into four quarters, prioritized based on urgency, starting in early 2025.

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