

Improving IT Assets Management with ITIL 4 Framework

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Abstract

IT Asset Management (ITAM) is crucial for organizations as it enables efficient utilization of IT resources, cost reduction, and risk mitigation. Horangi, a startup company, recognizes the importance of asset optimization and aims to enhance its ITAM service. To achieve this, researcher conducts research to identify a suitable framework as a solid foundation. ITIL 4, a widely adopted IT service management framework, is chosen, along with the Continual Service Improvement and Service Value Chain models. These models provide guidelines and recommendations to identify weaknesses and improve current processes while enabling continuous improvement in response to the dynamic IT landscape. The research employs a qualitative approach, utilizing in-depth interviews, document research, and the ITIL 4 guidebook. The study aims to provide recommendations and a foundation for developing guidelines and workflows in ITAM within the company. However, a limitation of this research is not much research related to ITIL 4 in ITAM area and cannot proceed until the implementation of recommendations due to funding constraints and approval processes. To overcome this limitation, it is suggested that future research includes the implementation process to obtain more optimal evaluation results.

Keywords: *ITSM; ITAM; ITIL 4; Continual Service Improvement; Service Value Chain.*

1. Introduction

Effective IT asset management is essential for organizations to achieve their business goals. IT asset management entails overseeing an organization's IT assets from the time of purchase until disposal. IT asset management seeks to maximize the value of IT assets to the firm by ensuring their effective and efficient utilization. The effective and efficient administration of an organization's IT assets is referred to as IT asset management. This management includes evaluating the investment's resource efficiency through the management of asset budgets, tools, and resources. To ensure that IT assets are being used effectively and efficiently, asset and data management is a continuous process that necessitates regular monitoring and review [1].

The aim of this study is to conduct a comprehensive analysis, evaluation, and literature review of previous and related research on asset management framework. With comparison of another study, there are several studies related to the Asset Management using different method such as Rational Unified Process, Artificial Intelligence, Managing Machine Learning Assets, Panel Data Analysis and Smart Asset Management [2], [3],

[4], [5], [6] showing the importance of Asset Management especially in IT department.

IT asset management (ITAM) is a critical corporate activity that requires executive approval and support, as well as planning from departments such as finance, human resources, and operations. This comprehensive approach is necessary due to the increasing importance and complexity of the enterprise's technological infrastructure, as well as the need to control costs and manage risk associated with regulatory, cybersecurity, and contractual compliance issues [12]. The strategic approach to ITAM must be practical and align with the organization's overall business strategy. This means that IT assets must be managed throughout their life cycles, from acquisition to disposal, to ensure that they are being used in the most effective and efficient manner possible. This approach must also recognize that IT assets exist to support business services, and their management must be aligned with business objectives.

This research takes a case study at one of the start-up companies in Indonesia. Horangi Pte Ltd is a Singapore-based cybersecurity company focused on developing application software and cloud security for small businesses. This company was founded in 2016 with the aim of meeting

cybersecurity needs in today's digital era [13]. Horangi is also investing significantly in development through collaboration with major companies and is currently targeting the Southeast Asian market [14]. With a vision to simplify access to cloud security and help organizations of all sizes and sizes to innovate with confidence, Horangi is committed to improving the quality of its products and services. To fulfill its vision and mission, one way to do this is to strengthen the management of the company's internal IT services.

Researchers acknowledge the significance of IT Asset Management (ITAM) in Horangi environments, as it facilitates the effective management of their constrained resources, cost control, and risk mitigation. This relevance is exemplified by companies like Horangi, a Cyber Security firm that places utmost importance on Information Security and shares some practices with ITAM. These practices involve safeguarding the organization from security threats and vulnerabilities, such as securing software licenses, controlling access to hardware devices, and ensuring the protection of sensitive data stored on IT assets. Previous research supports these notions [22], [23], [24] and notably, ISO 27001 offers comprehensive guidance to organizations and its importance regarding IT asset management.

Effective management of assets are explained it most importance from another point of view from previous research [25] started with their procurement to their eventual disposal, holds paramount importance from a business perspective. Neglecting this process can potentially lead to security breaches, jeopardizing the reputable brand name of Horangi itself as Cyber Security Company and creating negative impressions during assessments by other companies. Subsequently, earning trust and conducting business with other companies might become an arduous task. To safeguard the company's reputation and build strong relationships with business partners, it is imperative to prioritize and diligently manage assets throughout their lifecycle.

Effective ITAM allows startups to invest in the right tools and technologies to support their business operations while avoiding unnecessary expenses and potential risks. Through the research questions (1) How do Horangi manage their IT assets, and what are the main challenges they face in doing so? Furthermore, (2) How can startups optimize their IT asset management strategies to control costs and maximize resource efficiency to keep business running. The importance of this study aims to create baseline and recommendation to create rules to manage IT Assets whether hardware or software. By managing IT assets

effectively, startups can invest in the right tools and technologies to support their business operations, while also avoiding unnecessary expenses and mitigating potential risks.

The scope of this investigation is limited to one start-up company, Horangi Cyber Security Pte Ltd, a private-owned company. It's understandable that Horangi wants to improve their ITAM in all kinds of process, for example planning, procurement, deployment, maintenance, disposal, cost management and risk and compliance management. This process should be planned in a coordinated with another department and holistic way to ensure effective management of IT assets throughout their life cycles.

2. Research Methodology

2.1 Research Stages

This research is designed as qualitative research that is exploratory in nature, which aims to research, explore, and obtain more knowledge to get recommendation about Horangi Cyber Security company which has started to improve ITAM capabilities. In the context of a structured thesis format, qualitative data refers to information expressed in the form of words. This type of data encompasses various sources, such as interview notes, focus group transcripts, responses to open-ended questions, transcribed video recordings, accounts of product experiences shared on the Internet, news articles, and similar textual representations. The utilization of qualitative data allows researchers to gain insights and in-depth understanding of the subject matter, uncovering valuable perspectives and narratives that enrich the research findings and contribute to a comprehensive analysis.

Data collection was carried out by the unstructured interview method with interview instruments shown in Table 1. The questions aim to understand the current state of IT asset management in a company and identify areas for improvement. These questions can help gain insight into the current state of IT asset management in the company, identify areas for improvement, and develop recommendations for optimizing the process.

The interview was addressed to Vice President of IT and Internal Security and IT Manager. The researcher must consider several criteria in selecting suitable respondents for the study. Some of the established criteria are relevance to the research topic, credibility, possessing authority and access to credible information, holding managerial or executive-level positions. In this case, the respondent criteria are based on expertise, experience in policymaking,

understanding of business processes, and IT department management. In this case, only two individuals at Horangi meet the criteria, namely the Vice President of Internal Security & IT and the IT Manager.

Table 1. Interview Instruments Overview

Category	Question
Overview	1. What is the framework currently used regarding ITAM practices?
	2. What are the flaws on the current process?
	3. How important having a solid framework to manage IT Asset?
Culture	4. Are there any cultural aspects need to be considered when implementing ITAM practices using any Service Management process?
Practices	5. What are the challenges when implement ITAM practices?
Improvement	6. What kind of specific improvement you envisioned after implement the practices?
Vendor/Third Party	7. What are the regulations to manage assets from third party or other vendor?

The collected data from the interview method is subjected to analysis and discussion in order to answer the research questions. The suggestions for improvement are compiled through a comparison of the company's actions with various theories presented in the literature. Subsequently, the conclusions, derived from the results of analysis and discussions conducted earlier, provide explanations that address the research questions.

2.2 Thematic Analysis

Thematic analysis is a qualitative research method used to identify and analyze recurring themes and patterns in the literature. In the context of a thesis research on IT Asset Management (ITAM) using ITIL 4, this approach involves categorizing the literature based on these identified themes and exploring their relevance to the research question or topic. By employing thematic analysis, researchers can gain valuable insights into the central ideas and arguments prevalent in the literature, contributing to a deeper understanding of the subject matter.

To analyse the literature review collected these are the steps to follow:

- **Familiarization:** The researcher starts by becoming familiar with the data, which in this case includes the literature review related to ITAM and ITIL 4.
 - **Coding:** In this step, the researcher identifies relevant units of text or excerpts from the literature that are related to ITAM and ITIL 4.
 - **Reviewing Themes:** The researcher reviews and refines the identified themes, ensuring they accurately represent the data and capture the key concepts related to ITAM and ITIL 4.
 - **Applying the Thematic Map:** The thematic map helps to understand how themes are interconnected and how they contribute to the overall understanding of ITAM and ITIL 4.
 - **Data Reduction:** This step involves condensing and summarizing the data to focus on the most relevant and significant information related to ITSM, ITAM and ITIL 4.
 - **Interpretation and Synthesis:** The researcher interprets the identified themes in the context of ITAM and ITIL 4.
- While the steps from the start of the selection of cases until conclusions to analyse the interview answers are explained in those steps:
- **Selection of Cases and Area:** Choosing organizations or instances that exemplify the application of ITIL 4 in ITAM.
 - **Data Collection:** Gather data from various sources, including interviews with key stakeholders involved in ITAM implementation, observation of ITAM processes and work documentations.
 - **Transcription:** Transcribe the recorded interviews accurately.
 - **Data Coding:** Use a systematic approach by data familiarization to code the data from the interview transcripts.
 - **Data Analysis:** Look for connections, relationships, and explanations between the themes identified in the interview transcripts and the ITIL 4 framework's principles and practices.
 - **Cross-Case Analysis:** Identify similarities, differences, and general patterns in creating recommendation using ITIL 4.
 - **Theory Building:** Relate the findings to existing ITAM and ITIL 4 theories or concepts from ITIL 4 guidance book using CSI and SVC model to propose new recommendation insights.
 - **Validity and Reliability:** Ensure the validity and reliability of the case study analysis to subject matter expert in company.
 - **Interpretation and Conclusion:** Interpret the results of the case study

analysis by creating the guideline for ITAM process.

2.3 IT Infrastructure Library (ITIL) 4

IT Infrastructure Library (ITIL) version 4 is the latest version released in 2019 and was developed to improve on the previous version, namely version 3. ITIL 4 has evolved into a value system focused approach that can be integrated with other management practices. ITIL version 4 includes several key principles, among others [15]. The purpose of ITIL 4 is to provide guidance to organizations on how to effectively address new challenges in service management and take advantage of modern technology. It is aimed at creating an integrated, flexible, and coordinated system that can effectively manage and govern IT-enabled services [16].

The problem explicitly defined is the need for effective IT Asset Management (ITAM) within organizations. ITAM involves managing the lifecycle of IT assets, including hardware, software, and other technological resources, to ensure optimal utilization, cost control, risk mitigation, and compliance.

The use of the ITIL 4 framework has been demonstrated to offer valuable recommendations and serve as a solid foundation for the development of guidelines and workflows in IT Management by using CSI and SVC model to evaluate and seeking for improvement in their perspective process areas as discussed in previous research and study case [16], [17], [18], [19], [20], [21].

After researching various frameworks, there are many associated with ITAM, such as COBIT, IEC 19770-1, SAM, FITARA, SACM, and CMDB. Although all these frameworks address ITAM, they exhibit distinct focuses. ITIL 4 furnishes extensive guidance for IT service management, encompassing ITAM. Conversely, COBIT centers on IT governance and control, while IEC 19770-1 and SAM concentrate on software asset management. FITARA represents a United States legislation targeting the enhancement of federal IT management, SACM directs its attention toward managing Configuration Items (CIs) for service delivery, and CMDB serves as a centralized repository housing IT asset-related information.

Considering the present circumstances within the company, characterized by its relatively modest size and the absence of an established ITAM framework, the selection of ITIL 4 as the chosen framework derives from its capacity to offer fundamental guidance and best practices in the realm of IT asset management. ITIL 4 facilitates a comprehensive approach to managing IT assets throughout their entire lifecycle, starting

from the procurement phase, and culminating in their proper disposal. Notably, ITIL 4 underscores the significance of comprehending asset dependencies, sustaining precise and up-to-date asset records, optimizing asset utilization, and aligning all endeavors with the four dimensions of ITIL 4, encompassing organizations and people, information and technology, partners and suppliers, and value streams and processes. By embracing ITIL 4, the company seeks to fortify its ITAM practices, bolster overall operational efficiency, and promote a holistic alignment of IT asset management with the organization's broader strategic objectives.

2.4 Service Value System (SVS) and Service Value Chain (SVC)

Service Value System ITIL (SVS) is a model that shows how all components and activities within a company or organization work together to create added value through services that support information technology (IT). This model includes several important elements, such as value, resources, processes, and the result that is produced by IT services. Through the implementation of ITIL's SVS, organizations can maximize the value of their IT investments and improve customer satisfaction and overall business efficiency [12].

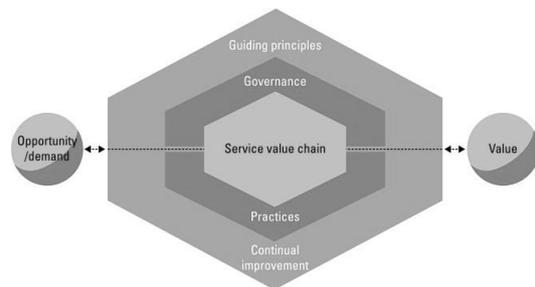


Figure 2. Service Value System [12]

In the ITIL framework, the guiding principles serve as the basis for creating a common understanding and approach to service management across an organization, from strategic decision-making to daily operations. The principles lay the foundation for an organization's culture and behavior. Governance activities are also included in the ITIL Service Value System (SVS) to ensure alignment of operations with the organization's strategic direction. Continual improvement is supported in every aspect of the ITIL SVS, providing organizations with a straightforward and practical model for maintaining resilience and agility amidst constant change [16].

Meanwhile, The Service Value Chain is a crucial component of ITIL v4, encompassing six value chain activities that are instrumental in the

creation of products, services, and ultimately, value. These activities form the core of IT service management and contribute to the overall success of an organization. These activities are, plan, improve, engage, design and transition, build and obtain, then deliver and support.

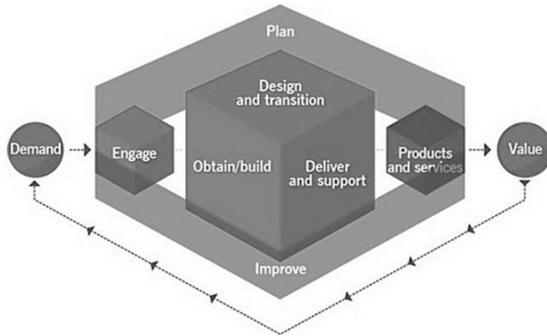


Figure 3. Service Value Chain [16]

In the context of service management, the ITIL service value chain offers a model for the development, provision, and ongoing enhancement of services. The model consists of six primary activities that can be combined in various ways to create multiple value streams. This flexibility makes the service value chain capable of accommodating different methodologies, such as DevOps and centralized IT, to meet the requirements of multimodal service management. The adaptable nature of the value chain allows organizations to respond to changing stakeholder demands in the most effective and efficient ways.

The activities within the Service Value Chain in ITIL v4 play a vital role in the value creation process for organizations. Each activity represents a distinct step that transforms inputs into outputs, contributing to the overall value delivered. These inputs can originate from external demand or be the outputs of preceding activities within the value chain. It is important to note that the activities are interconnected, creating a continuous flow of triggers and dependencies that drive further action and value creation within the organization. Effectively executing these value chain activities, organizations can streamline their processes, optimize resource allocation, and create value that aligns with customer expectations and organizational goals.

2.5 Four Dimension of ITIL 4

ITIL version 4 covers the four dimensions needed to facilitate effective and efficient assessment for customers and all parties related to the organization's products and services [15]. To maintain a balanced and effective Service Value System (SVS), an organization must allocate adequate focus to each of the four dimensions.

These four dimensions must be managed in harmony to balance their contribution to an effective SVS, these dimensions are **Organizations & People, Information & Technology, Partners & Suppliers** lastly, **Value Streams & Processes**.

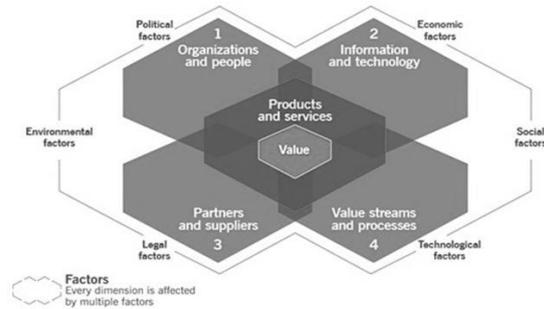


Figure 4. Four Dimension of ITIL [11]

In managing and improving the Service Value System (SVS), it is crucial to consider the four dimensions of service management for all services. These dimensions are not only applicable to specific services but also to the SVS in general. Thus, it is important to address each dimension when managing and improving the SVS at all levels.

Not addressing all four dimensions of the ITIL SVS adequately can result in undeliverable services or failure to meet quality and efficiency expectations. If the value streams and processes dimension is not considered holistically, it can lead to wasteful work or conflicting efforts. Ignoring the partners and suppliers' dimension may result in outsourced services that do not align with the organization's needs. The four dimensions are not rigidly defined and can overlap, and their interactions can be unpredictable depending on the complexity and uncertainty of the organization's operations [16].

2.6 Continual Service Improvement

In ITIL 4, CSI (Continuous Service Improvement) plays a crucial role in the overall management of IT services. It is a dedicated phase within the service lifecycle that focuses on the continuous improvement of services, processes, and practices. CSI aims to drive efficiency, effectiveness, and value realization by identifying areas for improvement and implementing appropriate changes [16].

The CSI approach involves a structured and iterative process of monitoring, analyzing, and implementing improvements. It starts by defining measurable objectives and aligning them with the organization's strategic goals. These objectives act as benchmarks for assessing the effectiveness of current services and identifying areas that require

enhancement.

To support CSI activities, organizations employ various performance measurement techniques and tools. Key performance indicators (KPIs) are established to measure service performance, identify bottlenecks, and monitor progress. Data is collected, analyzed, and transformed into meaningful insights to identify trends, patterns, and areas of improvement. This analysis helps to prioritize improvement initiatives and allocate resources effectively.

CSI encourages a culture of continual learning and improvement within the organization. It emphasizes the importance of communication, collaboration, and knowledge sharing among various stakeholders. Regular feedback from customers, users, and IT staff is sought to identify pain points, gather suggestions, and understand evolving needs. This feedback is valuable for driving improvement initiatives and delivering services that meet or exceed customer expectations.



Figure 5. Continual Service Improvement [16]

The implementation of CSI initiatives follows a structured approach that includes planning, implementing, and reviewing changes. Effective change management practices are employed to minimize disruption and ensure that improvements are successfully implemented. Regular reviews and audits are conducted to assess the impact of implemented changes and verify if desired outcomes have been achieved. Lessons learned from these reviews are fed back into the improvement cycle to drive further enhancement.

CSI in ITIL 4 is not a one-time activity but rather a continual process that integrates with other stages of the service lifecycle. It promotes a proactive approach to service management, encouraging organizations to embrace innovation,

embrace new technologies, and adapt to changing business needs. By focusing on continual improvement, organizations can achieve greater efficiency, higher service quality, and increased customer satisfaction, thereby maximizing the value of their IT services.

2.7 IT Asset Management

The objective of the IT asset management practice is to effectively manage the entire lifecycle of all IT assets, from planning to retirement, with the aim of optimizing value, cost control, risk management, and supporting decision-making related to procurement, re-use, retirement, and disposal of assets, as well as compliance with regulatory and contractual requirements [1].

The scope of IT asset management encompasses various areas, including software, hardware, networking, cloud services, and client devices. Additionally, it may also extend to non-IT assets such as buildings or information if they have a financial value and are necessary for providing IT services. Furthermore, IT asset management can encompass operational technology (OT), which involves devices that are part of the Internet of Things, that were not previously considered IT assets but now include embedded computing capability and network connectivity [12].

Effective use of ITAM can impact in many areas like financial and cyber security aspects, in the financial services sector, security engineers face challenges in identifying assets across the enterprise and keeping track of their status and configurations, including hardware and software. This information was obtained through consultations with security engineers and highlights the need for improved asset management strategies in this industry. The financial services sector faces challenges in managing their diverse set of hardware and software, which includes subsidiaries, branches, third-party partners, contractors, temporary workers, and guests. These challenges are attributed to the lack of total control by the host organization, making it difficult to track the assets across the enterprise and their status and configurations [13].

Meanwhile this challenges solution can be found based on cyber security aspect, providing application programming interfaces to communicate with other security devices and systems such as firewalls, intrusion detection, and identity and access management systems, automatically detecting and alerting when unauthorized devices attempt to access the network, also known as asset discovery, enabling administrators to define and control the hardware and software that can be connected to the corporate

environment and finally, recording and tracking attributes of assets while doing the audit each period [13].

3. Result and Discussion

3.1 Current IT Asset Management Process

The purpose of the IT asset management practice, within the context of the organization, is to strategically plan and effectively manage the complete lifecycle of all IT assets. The practice serves to assist the organization in achieving several key objectives, including the maximization of value, the control of costs, the management of risks, the facilitation of decision-making processes concerning the acquisition, re-use, retirement, and disposal of assets, as well as compliance with regulatory and contractual obligations. Assessing the current condition of organization workflow or standard operating procedure (SOP) will help to analyze and give recommendation regarding needs to be fixed based on the gap analysis using ITIL 4 framework.

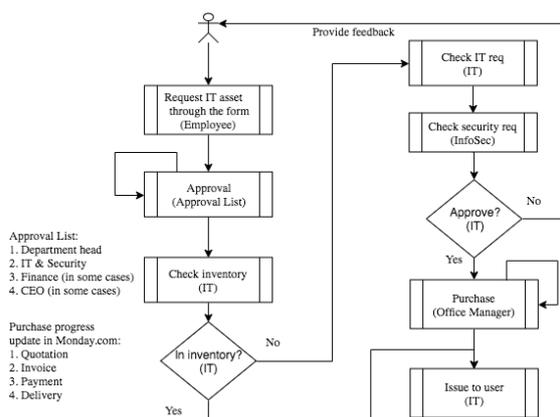


Figure 5. Current Procurement Workflow Process [14]

Horangi, as a work-from-anywhere (WFA) company, adopts a unique approach to its IT infrastructure by relying primarily on cloud-based solutions, specifically Infrastructure as a Service (IaaS). This strategic decision enables Horangi to effectively support its business operations. By leveraging IaaS, Horangi, being a startup, benefits from improved budget efficiency since there is no need to invest heavily in expensive hardware, storage, or dedicated physical spaces. From a security standpoint, IaaS offers enhanced safety measures and simplified management processes. Moreover, the flexibility of IaaS aligns well with Horangi's dynamic nature, allowing seamless implementation of changes and adjustments to meet the company's evolving needs.

Within the company, most assets are documented using third-party applications such as spreadsheets and management apps, rather than utilizing dedicated asset management software from reputable vendors such as Invgate Assets, Asset Panda, and others. The process documentation pertaining to asset procurement, tracking, and management is stored on Confluence, a software platform primarily utilized for knowledge documentation and collaboration purposes as shown on figure 6. However, several issues exist within this setup. Firstly, the documentation is not regularly updated, leading to potential inaccuracies and outdated information. Additionally, certain critical topics such as software/license management, vendor management, asset lifecycle, security, and risk lack clear and comprehensive documentation. These gaps in documentation pose challenges to the effective management and governance of company assets.

Gap analysis helps to identify the difference or "gap" between the current performance or capabilities and the desired performance or goals. By understanding these gaps, organizations can develop strategies and action plans to bridge the identified gaps and achieve their desired outcomes. In this research, gap analysis is conducted based on the background and the company's current situation as previously described. Gap analysis serves as a tool to assess the existing integrity and to plan the data collection process related to the identified issues [15].

After conducting the interview based on questions from table 1, while the further conclusions are explained on the CSI model. These are the conclusions:

- Currently IT don't use any specific framework for ITSM especially for ITAM.
- Procurement guideline still following the basic workflow of procurement, not considering some aspects like vendors, feedback, verification, and improvement from users.
- Having an important guideline and recommendation based on world known ITSM aspects will be great in the future.
- The ITAM process need to be adapt with WFH environment.
- The challenges are how company is focusing on other aspects, funding, sales rather than internal operation.
- No regulations properly documented related to the third-party vendor used to procure.

Table 2. Gap Analysis Table

Identification	Results
Expectation	The objective of this study is to achieve maximum value from all IT assets within Horangi, ensure cost control, and establish a robust regulatory, guidance and workflow process.
Reality	Lack of firm control, inadequate documentation, insufficient regulation, and unclear understanding of the asset lifecycle.
Problem	Not yet implementing specific practices of IT Asset Management using a trusted and proven framework.

3.2 Assessing Current and Future States with CSI Model

Upon conducting a thorough gap analysis, it becomes evident that the adoption of ITAM best practices in organizations extends beyond establishing robust policies and regulations. It is equally crucial to emphasize the importance of continual improvement. Moreover, when implementing the ITIL 4 framework, it is advisable to build upon the existing foundation rather than starting from scratch.

It is important to bear in mind that the extent and specifics of each stage of the model will differ considerably depending on the subject and the nature of the improvement depending on its company culture, vision, and mission. It should be acknowledged that this model can serve as a workflow, while also functioning as a high-level prompt for a well-founded thought process to effectively manage improvements. The flow aims to establish a connection between improvements and the organization's objectives, appropriately prioritize them, and ensure that the implemented improvement actions yield sustainable outcomes[12].

In accordance with the guiding principles, the continual improvement model is applicable to the entire SVS, encompassing all products, services, service components, and relationships within the organization. This model facilitates an iterative approach to improvement, breaking down work into manageable segments with distinct objectives that can be incrementally accomplished. These objectives need to be addressed by Horangi's are:

1. What is the vision? – Aligned with its overarching vision, Horangi aims to establish itself as a company that empowers customers to innovate fearlessly. To accomplish this, internal operations must be strengthened and

continually improved. Enhancing IT asset management (ITAM) is one of the strategic initiatives that can be pursued to achieve maximum value and elevate organizational capabilities to new heights. By adhering to the ITIL 4 framework, the existing regulations can be reinforced and established as a solid foundation for the future, despite the rapid changes in the field of IT. This ensures that the organization maintains regulatory compliance and adapts to evolving technological landscapes.

2. Where are we now? – In the current state, Horangi lacks a recognized modeling framework for ITAM, relying instead on policies derived from NIST or SOC 2. These frameworks primarily serve as measurement standards and guidelines, with a greater emphasis on cyber security risk management rather than providing specific guidance for ITAM practices and utilization.

3. Where do we want to be? – To achieve maximum value, better asset visibility, cost optimization and meet regulatory and contractual requirement, company have a vision to their goals:

- **Accurate Inventory Information**, to ensure effective management of IT assets, it is imperative to maintain a comprehensive assets register. This register should encompass essential information such as asset labeling, associated costs, licenses, warranties, assigned responsibilities, as well as regulations governing the utilization of assets both within and outside the company.
- **Cost Optimization**, to optimize costs, it is crucial to establish a systematic approach for determining the necessary quantity of assets to be procured, including spares. By implementing effective asset lifecycle management practices, the company can minimize unnecessary purchases of hardware and licenses, thereby optimizing the budget allocation and ensuring cost efficiency.
- **Risk Mitigation and Policies**, the integration of IT asset management practices with other management disciplines, such as service configuration, incident, change control, and vendor management, facilitates streamlined audit processes. Furthermore, effective risk management strategies significantly contribute to the overall success of IT asset management practices.

4. How do we get there? – In order to achieve the predefined objectives, several approaches can be employed. These include conducting a comprehensive gap analysis to identify the underlying issues, determining areas in need

of improvement, formulating a well-defined improvement plan, enhancing existing work processes, evaluating progress, monitoring outcomes, and continuously striving for further enhancements.

5. **The actions taken.** – To address the identified challenges, a series of structured steps must be undertaken. These include conducting a thorough review and analysis of the existing issues, establishing clear and specific objectives, validating, and verifying the accuracy of current data, updating documentation and relevant processes, providing necessary training, and raising awareness about ITAM, and implementing a robust monitoring system to gather feedback for continuous improvement.
6. **Did we get there?** – If successful development and implementation of the enhanced processes, got a good and measured metrics accompanied by valuable feedback, it can be concluded that the predetermined objectives have been accomplished. The organization achieved standardization of asset management procedures by precisely defining protocols for asset request, procurement, deployment, tracking, and retirement. These protocols encompassed the integration of workflows, approval mechanisms, and standardized documentation templates, ensuring uniformity and adherence to established guidelines.
7. **How to keep momentum going?** – In order to maintain a robust and adaptable framework in the future, the organization's established guidelines and policies should be comprehensive, taking into consideration the rapidly evolving nature of the IT landscape. This entails enhancing the precision of asset tracking and data collection, conducting regular validation and audits of the collected data, continuously updating documentation and processes to reflect any changes, and actively soliciting feedback and incorporating lessons learned from employees and relevant ITAM-related cases.

3.3 Proposing New Process

The company can enhance its processes by providing detailed definitions for the "Actions Taken" component of Continual Service Improvement (CSI) and using the aspects of Service Value Chain (SVC) activities in ITIL 4. This step emphasizes the implementation of specific actions aimed at addressing identified areas of improvement within the ITAM processes. By utilizing the "Actions Taken" step of CSI, the

company can effectively drive the execution of targeted and measurable actions to enhance its ITAM processes. This approach ensures that improvement efforts are aligned with the company's ITAM objectives.

3.3.1 Plan

IT asset management plays a crucial role as a strategic practice in enabling the organization to effectively comprehend and control costs and value. By aligning policies with other practices such as service financial management, risk management, information security management, and governance management, the organization can enhance the synchronization and effectiveness of IT asset management.

- Defining the primary objectives of IT asset management in the company, enhancing asset tracking accuracy, establishing a robust and adaptable streamline process, and optimizing lifecycle management practices.
- Identify and establish synchronization with key stakeholders such as Finance, Administration, IT, Internal Security, and Vendors.
- Enhance the efficiency of audit and monitoring processes while exploring opportunities for improvement in the field of IT Asset Management.

3.3.2 Improve

The objective of this step is to analyze the existing IT asset management (ITAM) process within the company and identify areas that can be improved. The impact on IT assets will be considered, and the proposed improvements will specifically focus on enhancing IT asset management practices to effectively understand, manage costs, and maximize the value derived from the assets.

- Assess the current IT asset management (ITAM) process, specifically focusing on areas such as tracking, procurement, configuration, lifecycle management, and cost optimization.
- Prioritize assets for cost optimization based on their impact, potential, and financial investment.
- Maximize the alignment and effectiveness of functions with stakeholders, key performance indicators (KPIs), matrices, regulations, and policies.
- Monitor, collect data, measure the impact, and continuously improve by actively seeking feedback from both internal and external users.

3.3.3 Engage

The objective of this step is for the company to prioritize engaging with relevant stakeholders, gathering their input, and ensuring their active involvement in the ITAM process.

- Identify key stakeholders involved in ITAM, such as IT teams, Internal Security, Admin, Finance, Cyber Security Operations, and another internal or external users.
- Schedule weekly/monthly meeting, discussion and engage communication with another stakeholder to gain insight, feedback or collaboration regarding ITAM process.
- Maintain up-to-date documentation and effectively communicate any process updates to the stakeholders.

3.3.4 Design and Transition

The objective of this step is to design and implement ITAM processes, practices, and tools that align with stakeholder expectations in terms of quality, cost-efficiency, and time to market.

- Develop a robust and adaptable process as a baseline that encompasses various aspects of IT asset management, including software and hardware management, lifecycle management, cost optimization, vendor management, and clearly defined stakeholder responsibilities for each asset owned.
- Establish effective communication with all stakeholders, informing them about adjustments, transitions, change management processes, and the benefits associated with them, ultimately seeking their approval and mutual support.
- Monitor the implementation of the new process, track Key Performance Indicators (KPIs) and Service Level Agreements (SLAs), and collect feedback to evaluate the effectiveness of the change and identify areas for further improvement.
- Document the new ITAM process using ITIL 4 as a framework and remain receptive to suggestions for improvement, considering the rapid pace of change in the IT landscape.

3.3.5 Obtain/ Build

The objective of this step is to establish IT asset management practices that facilitate asset procurement, ensuring traceability throughout the asset lifecycle to ensure timely availability and got

to meet specifications.

- Analyzing of the current ITAM process, identify gaps and deficiencies, and determine areas that require enhancements, additions, or removals.
- Conduct research and benchmarking on IT asset management practices in other companies and adapt them to align with the specific needs and culture of our own company.
- Develop detailed and specific workflows for each ITAM process, ensuring a comprehensive understanding of the distinct aspects of each process.
- Explore and evaluate software or tools that can optimize asset management within the company based on functionality, integration capabilities and cost effectiveness. Additionally, hiring individuals with expertise in ITAM can contribute to the effective implementation of asset management practices.
- Implement barcode or formal forms to facilitate easy tracking and administration, ensuring user compliance with the policy.
- Conduct regular audits of software, hardware, and cloud assets to assess their usage, impact, and cost-effectiveness.
- Automation to increase accuracy and efficiency for assets tracking, license renewal and reminder.
- Periodically review and update the ITAM process to align and help with business goals and process.

3.3.6 Deliver and Support

The objective of this step is to effectively locate, track, and manage IT assets within the organization, ensuring their proper movement, status control, and delivery of services in alignment with agreed specifications and stakeholders' expectations.

- Within the company, assign specific responsibilities and provide training to raise awareness among individuals about the importance of IT Asset Management (ITAM) activities.
- Conduct regular assessments of the existing ITAM process, identifying areas for improvement aligned with the organization's business goals and objectives.
- Enhance the efficiency and accuracy of asset tracking by implementing automation, streamlining the audit process.
- Establish a formal process for the delivery and documentation of assets, capturing detailed

- information such as specifications, ownership, and costs.
- Ensure monthly checks are conducted to verify and update hardware, software, and cloud asset data, maintaining its accuracy.
- Develop relevant metrics that align with Key Performance Indicators (KPIs) or Service Level Agreements (SLAs), including metrics for cost savings, asset utilization, and the asset lifecycle process.

The implementation of a new ITAM process using ITIL 4 SVC framework offers organizations a structured and validated approach to enhance asset management, operational efficiency, and alignment with business objectives. This research proposes a comprehensive implementation strategy that includes thorough assessment and planning, management support, employee training, effective communication, phased rollout, documentation, regular audits, and continuous improvement tailored to the specific needs of the company.

3.4 Theoretical Implication

Theoretical implications play a crucial role in research as they allow researchers to contextualize their work within the broader academic discourse, giving it significance and relevance within the scholarly community. By exploring theoretical implications, researchers can demonstrate how their findings contribute to existing knowledge and theories in the field. This opens avenues for future researchers to build upon the findings, facilitating the continuous development and refinement of theories and concepts in the respective field of study.

The research on the theoretical implications of utilizing ITIL 4 with the CSI and SVC models in IT Asset Management (ITAM) area yields multifaceted results. First, it serves to validate and enhance existing ITAM theories by showcasing the alignment and effectiveness of ITIL 4 in optimizing ITAM practices. The research identifies potential gaps and challenges within current ITAM approaches, thus creating opportunities for further theoretical advancements and innovative solutions. Additionally, the integration of ITIL 4 with ITAM

is emphasized, highlighting the significance of situating ITAM within the broader context of IT service management. This integration fosters the development of more comprehensive strategies for efficient IT asset management. Finally, the research has practical implications as it encourages industry professionals to embrace ITIL 4 as a guiding framework, leading to improved IT service delivery and enhanced organizational performance within the IT industry.

3.5 Practical Implication

The research on the practical implications of utilizing ITIL 4 with the CSI and SVC models in IT Asset Management (ITAM) area demonstrates significant advantages for organizations. Firstly, this integration enables companies to enhance the efficiency of their ITAM processes by aligning them with ITIL 4 guidelines, resulting in improved resource utilization and cost savings. Moreover, the adoption of CSI and SVC models fosters a culture of continuous improvement, empowering organizations to proactively address challenges and remain adaptable. Additionally, ITIL 4 facilitates better risk management and compliance adherence, effectively minimizing potential threats and regulatory violations. Lastly, the customer-centric approach enhances client relationships and overall user experience. In conclusion, implementing ITIL 4 with CSI and SVC models in ITAM can lead to streamlined processes, enhanced risk management, and improved customer satisfaction, thus benefiting organizations in the dynamic IT landscape.

This research cannot proceed to the implementation stage due to limitations related to the company's focus on acquisitions. This results will be longer in approval processes and budget constraints. However, guidelines have been developed, provided, jointly evaluated, and received feedback from the IT Manager and Vice President of IT and Internal Security. Based on the study's findings on the current condition of incident and service request management in the company, the following are the recommended service guidelines that can be proposed for adoption in the future which shown on table 3.

Table 3. Guidelines for IT Service Recommendations in IT Asset Management.

Introduction	
Description	This regulation outlines the procedures for managing IT assets within the scope of IT Asset Management IT services..

Purpose	<ol style="list-style-type: none"> 1. ITAM aims to optimize the lifecycle of IT assets, from acquisition to disposal, while ensuring compliance and maximizing value.. 2. Ensure effective and efficient asset management in accordance with established policies and standards. 3. The regulation covers both physical and virtual assets, including hardware, software, licenses, and digital resources.
Alignment with ITIL 4 SVC	<p>Plan: Planning in ITAM involves developing strategies and policies for the entire lifecycle management of IT assets, including acquisition, utilization, maintenance, and disposal. (Point 1)</p> <p>Engage: Engaging in ITAM means collaborating with stakeholders, including IT teams, users, and asset managers, to ensure that asset management practices are aligned with established policies and standards. (Point 2)</p> <p>Design and Transition: Designing and transitioning in ITAM involve creating and implementing processes, procedures, and controls to manage both physical and virtual IT assets effectively. (Point 3)</p>
Continual Service Improvement and Service Value Chain	
Continual Service Improvement	Increase the value of IT Asset Management in a sustainable manner through process improvements, service quality, and operational efficiency.
Service Value Chain	Describes a series of activities that are interrelated and contribute to providing service value to customers.
Process and Steps for IT Asset Management	
General Process	Assets Identification, Assets Procurement, Assets Acquisition, Maintenance and Disposal.
Activities	<ol style="list-style-type: none"> 1. Identify and document the requirements for new IT assets based on business needs, technological advancements, and asset lifecycle considerations. 2. The procurement process follows established procedures, which may involve obtaining quotations, negotiating contracts, and ensuring compliance with legal and regulatory requirements. 3. Accurate and up-to-date asset information is crucial for effective tracking, maintenance, and reporting throughout the asset lifecycle. 4. Asset monitoring and audit activities involve regular checks to ensure that assets are in good working condition and meet the required performance standards 5. Oversees the maintenance process, tracks maintenance activities, and ensures that assets are well-maintained throughout their lifecycle. 6. Repair activities may involve troubleshooting, replacement of faulty components, or coordination with external vendors or service providers. 7. The policy outlines the steps to be followed during asset disposal, including data sanitization, decommissioning, and environmentally responsible disposal methods. 8. Proper documentation of the disposal process ensures transparency, auditability, and compliance with regulatory requirements.
Alignment with ITIL 4 SVC	<p>Plan: Involves identifying the specific requirements for new IT assets based on the organization's business needs and considering the technological advancements available (Point 1)</p> <p>Engage: Engaging in ITAM means collaborating with stakeholders (Point 2)</p> <p>Design and Transition: Creating and implementing processes to ensure accurate and up-to-date asset information. Monitoring and auditing assets are critical activities to maintain their performance, identify potential issues, and facilitate effective decision-making during the asset lifecycle. (Point 3 and 4)</p> <p>Obtain/Build: Overseeing the maintenance activities and ensuring assets are well-maintained throughout their lifecycle. (Point 5 and 6)</p>

	Deliver and Support: Managing the end-of-life processes, such as asset disposal and Proper documentation ensures transparency and compliance with relevant requirements. (Point 7 and 8)
Tools	
Tools	Specific Asset Management Software
Recommended Functionality	<ol style="list-style-type: none"> 1. Provide real-time visibility into hardware, software, and network assets, allowing organizations to maintain accurate and up-to-date inventories. 2. Facilitating better decision-making and change management 3. Track license entitlements, manage software deployments, and ensure compliance with licensing agreements. 4. Help organizations maintain security and ensure that assets are running on the latest software versions, reducing vulnerabilities and enhancing system performance. 5. Manage and secure mobile devices within an organization. 6. Track contract details, monitor expiration dates, and ensure compliance with contractual terms and license agreements
Alignment with ITIL 4 SVC	<p>Plan: Planning in IT Asset Management (ITAM) involves providing real-time visibility into hardware, software, and network assets, ensuring accurate and up-to-date inventories (Point 1, 3 and 6)</p> <p>Engage: Providing real-time visibility into assets and license entitlements, organizations can make informed decisions about software deployments, license compliance, and contract management (Point 2)</p> <p>Design and Transition: Involve managing asset security and software updates to reduce vulnerabilities and enhance system performance. (Point 4 and 5)</p> <p>Obtain/Build: Ensuring real-time visibility into hardware, software, and network assets. Accurate and up-to-date inventories are essential for effective asset management, procurement, and deployment. (Point 1)</p> <p>Deliver and Support: Maintaining compliance and managing software assets effectively. (Point 3)</p>
Roles and Responsibilities	
Roles	Asset Manager, Asset Administrator, User.
Responsibilities	<ol style="list-style-type: none"> 1. The IT Asset Manager is responsible for overseeing the overall management of IT assets within the organization. 2. The IT Asset Administrator plays a key role in maintaining accurate and up-to-date information about IT assets. 3. Users or custodians are responsible for the proper use, care, and security of IT assets assigned to them.
Alignment with ITIL 4 SVC	<p>Plan: Planning involves defining roles and responsibilities. (Point 1)</p> <p>Engage: Engaging in ITAM includes collaboration between various stakeholders. (Point 2)</p> <p>Design and Transition: Designing and transitioning in ITAM involves defining roles and responsibilities for asset usage and management. (Point 3)</p>
Reporting and Analysis	
Reports	Reports may include asset inventory data, such as the number and types of assets, asset utilization, and asset lifecycle information
Analysis	Asset analysis may involve identifying underutilized assets, identifying potential cost-saving measures, and evaluating asset lifecycle management strategies.
Monitoring	Compliance monitoring includes verifying adherence to licensing agreements, software usage compliance, and adherence to regulatory requirements related to asset management.
Audit and Review	Audits and reviews may also involve assessing the effectiveness of asset management processes, identifying areas for improvement, and ensuring adherence to policies and standards

Alignment with ITIL 4 SVC	<p>Plan: Report and Analysis need to be planned well to help company decision making.</p> <p>Engage: Monitoring the activities and communicate results with various stakeholders.</p> <p>Design and Transition: Audit and review identify areas for improvement and ensures that asset management practices align with established policies and standards.</p>
Evaluation and Improvement	
Evaluation	<ol style="list-style-type: none"> 1. Key performance indicators (KPIs) may include asset utilization, compliance with policies and regulations, cost savings, and customer satisfaction. 2. Performance evaluations are conducted periodically to measure the effectiveness of asset management practices against established targets and benchmarks. 3. Lessons learned from evaluations and improvement initiatives are documented and shared with relevant teams.
Continuous Improvement	<p>Improvement actions may involve updating policies and procedures, enhancing training programs, optimizing asset utilization strategies, or implementing new tools and technologies.</p>
Alignment with ITIL 4 SVC	<p>Plan: KPIs, such as asset utilization, compliance, cost savings, and customer satisfaction, help in evaluating the effectiveness of ITAM initiatives and guide decision-making for improvement. (Point 1)</p> <p>Improve: Performance Evaluation, documenting and sharing lessons learned from evaluations and improvement initiatives ensure that valuable insights and best practices are captured and shared with relevant team. (Point 2, 3 and Continuous Improvement section)</p> <p>Deliver and Support: Delivering and supporting ITAM involves taking improvement actions based on the findings from evaluations and lessons learned.</p>

This research explores the Guidelines for IT Service Recommendations in IT Asset Management, which were formally approved and documented on company wiki (Confluence) by the IT Manager as a fundamental resource to establish improved Standard Operating Procedures (SOPs) and to ensure smooth compliance during SOC 2 Audit. The question can be answered mostly related to IT Service Management and IT Asset Management such as:

1. Does Horangi have a robust IT service management framework?
2. Does Horangi review and verify the configuration information of its hardware and software on a regular basis to ensure it is accurate and up to date?
3. Does the IT service management framework comprise the governance structure, processes and procedures for IT service management activities including configuration management, technology refresh management, patch management, change management, software release management, incident management and problem management?
4. Is there a technology refresh plan for the replacement of hardware and software before they reach end-of-support (EOS)?
5. Does Horangi review and verify the configuration information of its hardware and software on a regular basis to ensure it is accurate and up to date?

The creation of a workflow for ITAM procurement based on ITIL 4, CSI, and SVC models offers essential advantages for organizations aiming to optimize their asset management practices. Firstly, the workflow provides a visual representation of the step-by-step process, promoting clarity and transparency among all stakeholders involved. It ensures that employees, management, and relevant teams understand their roles and responsibilities throughout the procurement journey, fostering a unified and coherent approach.

Moreover, the workflow enhances operational efficiency by eliminating ambiguities and unnecessary delays. It enables swift decision-making and timely actions, leading to quicker procurement processes and reduced operational downtime. This efficiency empowers organizations to respond promptly to business needs and opportunities, enhancing their overall performance and competitiveness. Proposed new workflow is shown on figure 6 below

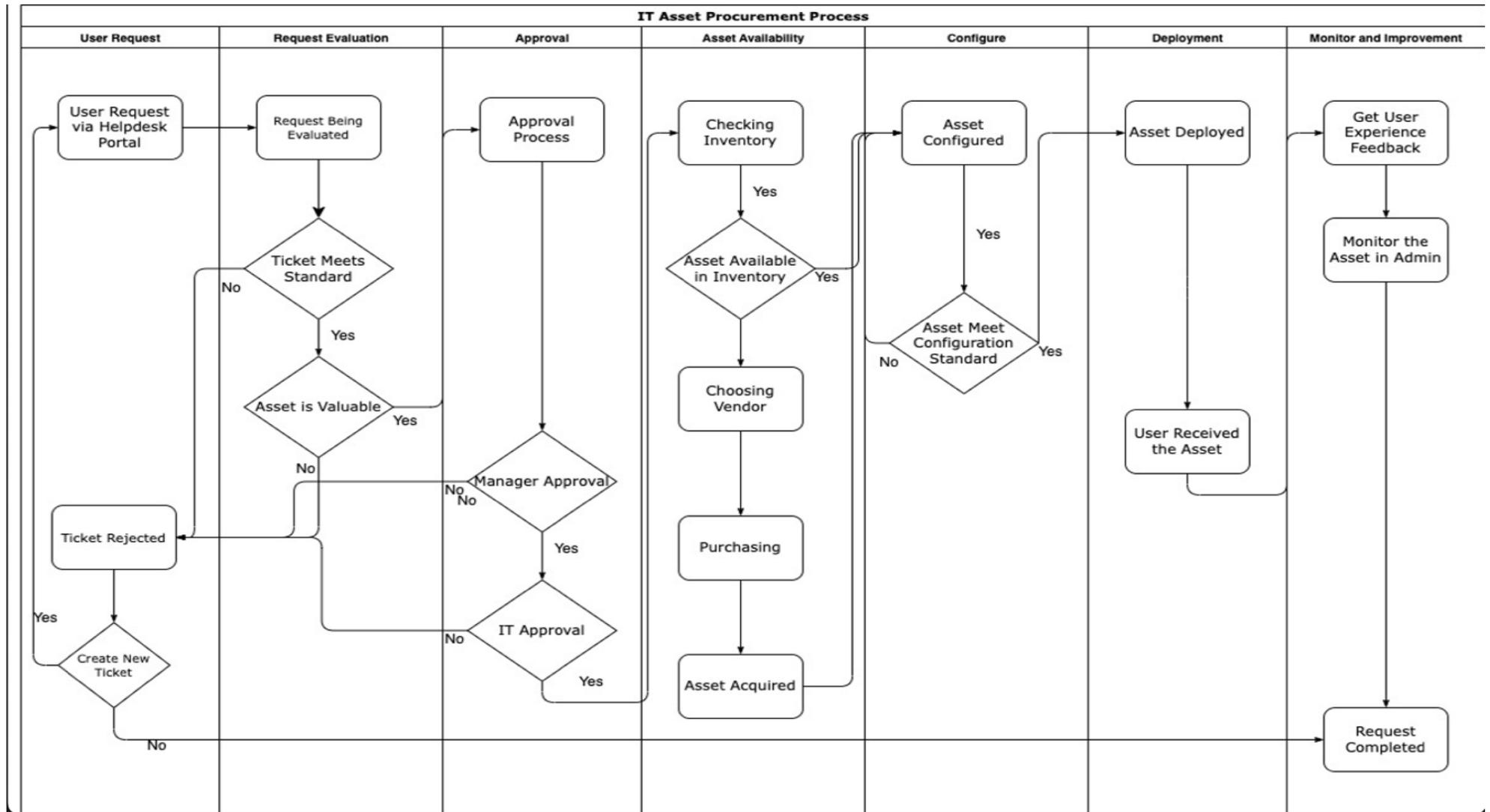


Figure 6. New Procurement Workflow Process

4. Conclusion

IT Service Management (ITSM) has widely adopted the Information Technology Infrastructure Library (ITIL) as a framework. With the release of ITIL 4, the latest version of IT best practice, it offers guidance to individuals and organizations to elevate their ITSM capabilities. Startups can also benefit from ITIL 4, as it provides them with a structured and scalable framework for implementing IT Asset Management (ITAM) practices. By leveraging ITIL 4, startups can establish efficient and effective ITAM processes, align with industry best practices, and derive value from their IT assets.

ITIL 4 offers significant advantages for companies, including a comprehensive framework, scalability, flexibility, industry best practices, a focus on value, and a commitment to continuous improvement. By utilizing the Continual Service Improvement (CSI) and Service Value Chain (SVC) models, companies can help to establish a new process that emphasizes standardization, incorporates best practices, adopts a lifecycle approach, and aligns with business processes. This approach considers the potential for improvement and ensures that the company's ITAM practices are optimized for success.

The findings of this research contribute valuable guidelines and recommendations aimed at establishing a robust and seamless IT Asset Management (ITAM) process to improve current process. While, in the context of ITIL 4, there is no strict prescription or specific guidance provided regarding the selection of technology, applications, and tools. Conclusions, this flexibility allows organizations to customize the entire process according to their unique requirements and specific needs.

One limitation of this study is that organizations prioritize other business matters, such as client acquisition to expand business, over the implementation of ITAM processes. Then, the research or study case related to using ITIL 4 and its implementation are limited. While the recommendations for a new ITAM process may be acknowledged, the actual implementation awaits approval from the company and top-level management. Therefore, it is suggested that the proposed process undergoes thorough implementation and evaluation phases to ensure successful integration within the organization.

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