

The influence of robotic process automation on IT asset lifecycle management

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Abstract - IT Asset Lifecycle Management (ITALM) is a critical function in modern enterprises, encompassing procurement, deployment, maintenance, auditing, and retirement of IT assets. Effective lifecycle management ensures operational efficiency, regulatory compliance, and cost optimization, yet traditional methods are often manual, error-prone, and resource-intensive. Robotic Process Automation (RPA) has emerged as a transformative technology for automating repetitive and rule-based processes within ITAM, offering opportunities for enhanced accuracy, speed, and consistency. By automating asset discovery, inventory updates, compliance monitoring, and retirement processes, RPA minimizes human error, reduces operational costs, and improves adherence to regulatory standards. Furthermore, RPA enables real-time integration with enterprise systems such as ERP, ITSM, and CMDB, providing centralized visibility and data-driven insights for strategic IT planning. This review examines current research and case studies on the application of RPA in IT asset lifecycle management, analyzing its impact on operational efficiency, financial outcomes, and compliance. Challenges, including integration complexity, data quality issues, and resistance from IT staff, are also discussed. Finally, the article outlines future directions, including AI-enhanced RPA, IoT integration, predictive maintenance, and hybrid human-AI collaboration, which collectively promise to evolve IT asset management into a more autonomous and intelligent process. The findings suggest that organizations adopting RPA strategically can achieve measurable improvements in efficiency, accuracy, cost-effectiveness, and long-term asset value.

Keywords - Robotic Process Automation, IT asset lifecycle management, ITAM, automation, operational efficiency, compliance, AI-enhanced RPA.

I. INTRODUCTION

IT Asset Lifecycle Management Overview

IT Asset Lifecycle Management (ITALM) refers to the systematic process of managing IT assets throughout their lifecycle, from procurement and deployment to maintenance and retirement. Effective ITAM ensures that assets are fully utilized, compliant with regulatory requirements, and aligned with organizational strategies. Efficient management of IT assets reduces operational costs, improves service delivery, and strengthens governance by providing accurate, real-time asset visibility. Conversely, poorly managed IT assets can lead to inefficiencies, underutilization, increased downtime, and higher operational costs. As enterprises increasingly rely on complex IT environments,

maintaining control over thousands of hardware and software assets has become a critical challenge.

Challenges in Traditional ITAM

Traditional ITAM processes are often manual or semi-automated, relying on spreadsheets, ad hoc tools, or basic tracking systems. These approaches are prone to human error, delayed updates, and inconsistent documentation. Maintaining accurate asset inventories, ensuring license compliance, and preparing for audits can be labor-intensive, leading to bottlenecks and compliance risks. Organizations often face difficulties in scheduling maintenance, monitoring asset usage, and optimizing lifecycle costs due to the lack of automation and integrated systems.

Introduction to Robotic Process Automation

Robotic Process Automation (RPA) is a technology that uses software bots to perform rule-based, repetitive tasks across enterprise systems. In ITAM, RPA can automate data entry, asset tracking, compliance checks, maintenance scheduling, and retirement processes. By reducing manual workloads, RPA improves accuracy, accelerates processes, and allows IT staff to focus on strategic tasks that require human judgment.

Objective of the Review

This review examines the influence of RPA on IT asset lifecycle management, focusing on operational efficiency, financial benefits, strategic alignment, and compliance improvements. It also identifies challenges and future opportunities, such as AI-enhanced RPA, IoT integration, and hybrid human-automation workflows, providing a comprehensive understanding of RPA's potential in modern ITAM.

II. BACKGROUND AND LITERATURE REVIEW

ITAM Processes and Traditional Challenges

IT asset lifecycle management consists of stages such as procurement, deployment, maintenance, monitoring, auditing, and retirement. Traditionally, these processes are executed manually or with limited automation. Manual tracking often results in inconsistent asset inventories, delayed reporting, mismanaged maintenance schedules, and inefficient resource allocation. These inefficiencies can lead to compliance violations, financial miscalculations, and operational delays, making it difficult for organizations to maximize asset utilization or reduce total cost of ownership.

Previous Applications of RPA in IT Management

RPA has been applied in IT operations to automate repetitive tasks like license tracking, software updates, inventory reconciliation, and ticket management. Studies and industry reports demonstrate that RPA can reduce human errors, improve processing speed, and streamline IT workflows. For example, RPA bots can automatically extract data from ITSM systems, update asset records in real time, and generate compliance

reports. These capabilities lead to enhanced operational efficiency, higher accuracy, and faster response to organizational needs.

Research Gaps

Despite the clear benefits of RPA, most research has focused on isolated processes within IT management rather than full lifecycle automation. There is limited analysis of how RPA impacts financial optimization, long-term planning, predictive maintenance, or strategic IT decision-making. Addressing these gaps can help organizations fully leverage RPA for holistic IT asset lifecycle management, combining operational efficiency with strategic insights.

RPA in IT Asset Lifecycle Management: Components and Functions

Core RPA Functionalities

Robotic Process Automation (RPA) provides the foundational capabilities for automating repetitive, rule-based tasks in IT asset lifecycle management. Core functionalities include workflow orchestration, data extraction, system integration, automated reporting, and task scheduling. Bots can interact with multiple enterprise systems, including ERP, ITSM, and CMDB platforms, allowing centralized and synchronized asset management. By mimicking human interactions with software interfaces, RPA bots can perform high-volume operations consistently, reducing the risk of errors and ensuring process standardization. Additionally, RPA allows for configurable rules and triggers that automate routine tasks such as record updates, license monitoring, and maintenance scheduling, freeing IT personnel to focus on strategic decision-making.

Asset Discovery and Inventory Updates

A critical function of RPA in ITAM is automated asset discovery and real-time inventory updates. Bots can scan networks to detect newly deployed hardware or software, validate their configurations, and automatically update CMDB or ERP records. This minimizes discrepancies caused by delayed or missed manual updates and ensures real-time visibility of all IT assets. Automated inventory reconciliation reduces the need for physical audits and supports accurate reporting of asset availability, utilization, and compliance. It also helps identify

redundant or underutilized resources, allowing organizations to optimize their IT portfolios and reduce unnecessary expenditures.

Compliance and Audit Automation

RPA supports compliance management by continuously monitoring software licenses, configurations, and asset allocation. Bots can automatically generate audit-ready reports, track expiration dates, and flag non-compliant assets. Automated compliance ensures adherence to internal policies, ITIL standards, and regulatory frameworks such as GDPR or ISO. By reducing manual intervention, organizations minimize errors and the risk of non-compliance penalties.

Deployment, Maintenance, and Retirement

Beyond tracking, RPA can streamline deployment, maintenance, and retirement processes. Bots can schedule software updates, patches, and routine maintenance activities. For retiring assets, RPA can automatically update records, remove assets from databases, and ensure secure disposal in line with organizational policies. Integration with ITSM tools allows proactive monitoring, ensuring that all lifecycle stages are executed efficiently and consistently. By automating these critical functions, organizations can improve asset utilization, reduce downtime, and maintain operational continuity.

Impact on Operational Efficiency

Process Automation

RPA significantly enhances operational efficiency by automating repetitive tasks across the IT asset lifecycle. Manual processes such as inventory tracking, procurement workflows, and maintenance scheduling are labor-intensive and prone to delays. RPA bots accelerate these processes, reducing the time required for asset updates and enabling IT teams to respond more quickly to organizational needs. Automation ensures that standard procedures are executed consistently, eliminating variability caused by human error.

Error Reduction and Accuracy

Error reduction is a key operational benefit of RPA in ITAM. Automated workflows prevent mistakes in asset data entry, licensing updates, and compliance

reporting. Accurate data is critical for maintaining SLA adherence, scheduling preventive maintenance, and supporting financial and strategic planning. By providing standardized, error-free processes, RPA improves the reliability of IT asset management and reduces risks associated with manual operations.

Case Studies and Evidence

Empirical evidence demonstrates the operational gains of implementing RPA in ITAM. Studies show organizations achieving up to 50% reduction in manual labor, faster deployment cycles, and improved asset utilization. Continuous real-time monitoring allows IT teams to proactively address issues, schedule maintenance efficiently, and ensure compliance. Automation also improves response times for IT service requests, contributing to higher organizational productivity and enhanced service quality.

Workflow Optimization

RPA enables better allocation of human resources by offloading routine tasks, allowing IT staff to focus on complex problem-solving and strategic initiatives. Streamlined workflows lead to shorter asset lifecycles where procurement, deployment, and retirement are handled more efficiently. This operational optimization not only reduces costs but also improves overall IT service quality, creating a more agile and responsive IT environment.

Financial and Strategic Benefits

Cost Optimization

RPA drives significant cost savings in IT asset lifecycle management by minimizing manual labor, reducing errors, and optimizing asset utilization. By ensuring accurate tracking of assets and licenses, organizations avoid unnecessary purchases and reduce operational waste. Automated retirement processes prevent underutilized assets from incurring additional costs, while proactive maintenance reduces downtime and associated financial losses.

Strategic Alignment

Accurate and real-time asset data provides organizations with actionable insights for strategic planning. IT departments can align procurement,

deployment, and maintenance schedules with business objectives, ensuring ITAM supports organizational goals. Enhanced data visibility allows executives to make informed decisions about asset allocation, budget planning, and IT investments, maximizing return on investment (ROI).

Predictive Analytics and Insights

RPA-generated data serves as the foundation for predictive analytics in ITAM. Organizations can forecast maintenance requirements, anticipate hardware failures, and schedule asset replacements proactively. Predictive insights enable better lifecycle planning, optimize resource allocation, and reduce unplanned outages. This strategic approach transforms ITAM from a reactive function to a proactive, data-driven discipline that supports operational continuity and organizational growth.

Enhanced ROI

Through cost savings, improved asset utilization, and operational efficiency, RPA enhances the ROI of IT assets. Organizations benefit from longer asset lifespans, reduced downtime, and lower compliance penalties. Strategic insights derived from RPA data enable better budgeting and resource planning, further contributing to financial sustainability.

Challenges and Limitations

Implementation and Integration Challenges

Integrating RPA with legacy ITAM systems, ERP platforms, and ITSM tools can be complex and resource-intensive. Organizations require skilled personnel for designing, deploying, and maintaining RPA workflows. Initial implementation may demand significant investment in technology and training.

Automation Risks

While RPA excels at repetitive tasks, it may struggle with complex, non-standard processes. Over-reliance on automation without adequate human oversight can result in errors or missed exceptions. Ensuring robust exception handling protocols is critical to maintain operational integrity.

Human Factors and Change Management

Resistance from IT staff is a common barrier to adoption, often stemming from concerns over job

displacement or unfamiliarity with automation technologies. Effective change management, including training, communication, and engagement, is essential to ensure staff acceptance and collaboration with RPA systems.

Data Governance and Compliance

High-quality, accurate data is fundamental for successful RPA deployment. Poor data integrity, inconsistent standards, or regulatory violations can compromise automation outcomes. Organizations must implement strong data governance, privacy, and compliance frameworks to safeguard sensitive asset information while maintaining RPA efficacy.

Future Directions

The evolution of IT asset lifecycle management is poised to be significantly influenced by advancements in automation, artificial intelligence, and emerging technologies, with RPA serving as a foundational enabler. One of the most promising directions is the integration of AI with RPA. While traditional RPA excels at executing rule-based, repetitive tasks, AI-enhanced RPA can introduce predictive capabilities, anomaly detection, and autonomous decision-making. For example, AI algorithms can analyze historical asset data to predict hardware failures, identify underutilized resources, or recommend optimal replacement schedules. This convergence allows organizations to move from reactive asset management toward a proactive and intelligent lifecycle approach.

Another key development is the integration of IoT-enabled assets into automated ITAM workflows. Sensors embedded in hardware can provide real-time insights into asset performance, usage patterns, and environmental conditions. RPA bots can leverage this live data to trigger maintenance, schedule updates, or initiate asset reallocations automatically, reducing downtime and improving resource efficiency. Real-time monitoring also enhances compliance by ensuring that assets meet organizational and regulatory standards continuously.

Hybrid human-RPA collaboration models are expected to gain prominence. While RPA can handle

high-volume routine tasks, complex exceptions and strategic decision-making will still require human expertise. This collaborative approach ensures efficiency without compromising quality, while enabling IT staff to focus on analytical, governance, and strategic responsibilities.

Finally, the use of advanced analytics on RPA-generated data will drive strategic asset management. Predictive insights can inform procurement decisions, budgeting, and lifecycle optimization. By leveraging historical trends and real-time information, organizations can anticipate risks, allocate resources effectively, and plan IT investments strategically.

Collectively, these future directions point toward a more autonomous, intelligent, and resilient IT asset management ecosystem, capable of improving operational efficiency, reducing costs, enhancing compliance, and supporting long-term organizational goals. Organizations that embrace AI-driven RPA, IoT integration, and advanced analytics will gain a competitive edge by transforming ITAM into a proactive, strategic enabler of enterprise IT operations.

III. CONCLUSION

RPA has emerged as a transformative technology in IT asset lifecycle management, automating repetitive and rule-based tasks across procurement, deployment, maintenance, and retirement stages. By reducing manual labor, minimizing errors, and ensuring accurate, real-time asset data, RPA enhances operational efficiency, SLA compliance, and overall service quality. Beyond operational benefits, it supports strategic decision-making by providing actionable insights for budgeting, asset utilization, and IT investment planning, thereby improving ROI and aligning ITAM with organizational goals.

Successful adoption requires a balanced approach, combining automation with human oversight, robust governance, continuous staff training, and integration with existing enterprise systems to manage exceptions and ensure compliance. Looking

forward, the integration of AI with RPA, coupled with IoT-enabled real-time monitoring and predictive analytics, promises a shift from reactive to proactive and autonomous asset management. These advancements will create intelligent, scalable, and resilient ITAM ecosystems capable of optimizing resource allocation, reducing operational costs, enhancing compliance, and supporting strategic enterprise objectives in increasingly complex IT environments.

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