

Assignment 2

Leveraging Artificial Intelligence in IT Service Management (ITSM)

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1. Research Title

Leveraging Artificial Intelligence in IT Service Management (ITSM): Towards Smarter, Scalable, and Trustworthy Digital Operations

2. Problem Statement

Problem Domain:

The problem domain of this research lies at the intersection of **Artificial Intelligence (AI)** and **IT Service Management (ITSM)**. Modern enterprises depend on continuous and reliable IT services to sustain their operations. As digital infrastructure grows in scale and complexity, traditional ITSM approaches are increasingly inadequate to manage the volume, velocity, and variety of IT incidents, requests, and changes.

Description of the Problem:

Contemporary ITSM environments are characterised by an overwhelming number of service tickets, repetitive Level 0 and Level 1 support requests, and recurring system failures. Human-driven service desk operations suffer from slow Mean Time to Resolution (MTTR), inconsistent ticket routing, and reactive — rather than proactive — incident management. Smith et al. (2025) demonstrate that without intelligent automation, server failure prediction remains reactive, resulting in significant system downtime. Jones and Lee (2024) further reveal that a substantial portion of service requests — such as password resets — occupy valuable human resources despite being entirely automatable. Brown et al. (2025) confirm that manual ticket classification is prone to errors, contributing to misrouted incidents and delayed resolutions.

Significance of the Problem:

The significance of this challenge is underscored by the direct impact of IT service disruptions on organisational productivity, customer satisfaction, and financial performance. Wang et al. (2024) quantify this by showing that proactive, AI-driven incident management can reduce the total monthly incident volume by 30%, translating into measurable cost savings and improved service quality. As organisations accelerate digital transformation, the gap between the demand for IT services and the capacity of conventional ITSM systems continues to widen, making this a critical area of inquiry.

Existing Solutions:

Several technological solutions have been proposed and partially implemented to address these challenges. AIOps platforms — which integrate machine learning with IT operations — have been developed for anomaly detection and predictive failure management (Smith et al., 2025). Natural Language Processing (NLP)-powered chatbots have been deployed to handle routine support requests and improve first-contact resolution rates (Jones & Lee, 2024). Machine learning models, specifically Support Vector Machines (SVM), have been applied to automate ticket classification and routing, achieving accuracy rates of up to 92% (Brown et al., 2025). Additionally, big data analytics frameworks have been used for retrospective root-cause analysis to prevent recurring incidents (Wang et al., 2024).

Justification for Further Research:

Despite these advances, critical gaps remain. A significant concern, raised by Garcia (2025), is the presence of algorithmic bias and a lack of transparency in AI-driven decision-making, which erodes organisational trust in automated ITSM systems. Furthermore, Miller (2026) highlights that purely autonomous AI systems fail to leverage the contextual judgment of experienced technicians, advocating instead for a human-AI collaboration model. Existing solutions also suffer from practical limitations: high computational costs, dependency on high-quality training data, and the absence of real-time implementation frameworks (Wang et al., 2024; Brown et al., 2025). There is, therefore, a clear and compelling need to develop a comprehensive, scalable, and ethically governed AI framework that bridges the gap between full automation and human oversight in ITSM environments.

3. Research Objectives

The primary goal of this research is to **develop a comprehensive, trustworthy, and scalable AI-driven framework for IT Service Management** that enhances operational efficiency while preserving human oversight and ethical accountability. The following objectives are formulated to achieve this goal:

1. To investigate the current challenges and limitations of traditional ITSM systems in managing large-scale, complex digital infrastructure environments.
2. To analyse the effectiveness of existing AI-based solutions — including AIOps, NLP chatbots, and machine learning models — in addressing ITSM inefficiencies, based on evidence from the literature.
3. To identify the ethical, governance, and transparency risks associated with deploying AI for automated decision-making in IT service delivery contexts.
4. To design a Human-AI Collaboration (HAC) model that integrates AI capabilities with human expertise to improve ticket resolution accuracy, reduce MTTR, and support proactive incident management.
5. To propose a scalable and resource-efficient AI framework for ITSM that addresses the key challenges of data quality dependency, computational cost, and real-time applicability identified in existing solutions.
6. To validate the proposed framework by evaluating its alignment with identified problem challenges and its potential generalisability across diverse IT service environments.

4. Literature Review

4.1 Summary of Research Papers

Paper 1: AIOps: Real-world Applications and Future Directions in ITSM

- **Summary:** This paper investigates the integration of AI for IT Operations (AIOps) within the ITSM framework to automate incident management. The authors develop a prototype for predictive anomaly detection using real-time telemetry data.
- **Key Findings:** The system successfully predicted 85% of server failures before they occurred, significantly reducing downtime.

- Drawbacks: The implementation requires high computational resources and complex integration with existing legacy systems.

Paper 2: Enhancing User Experience through AI-Powered Virtual Support Agents

- Summary: This study evaluates the effectiveness of Natural Language Processing (NLP) in resolving Level 0 support tickets via Chatbots.
- Key Findings: Automating routine requests like password resets improved service speed by 60% and increased user satisfaction scores.
- Drawbacks: The Chatbot struggled with ambiguous user queries and required human intervention for 20% of cases.

Paper 3: Machine Learning for Automated Ticket Classification and Routing

- Summary: The researchers proposed a machine learning model based on Support Vector Machines (SVM) to classify incoming IT tickets automatically.
- Key Findings: The model achieved 92% accuracy in routing tickets to the correct technical teams, reducing manual triage effort.
- Drawbacks: The model's performance was highly dependent on the quality and cleanliness of historical ticket data.

Paper 4: Proactive Problem Management using Predictive Analytics in ITSM

- Summary: This research focuses on identifying the root causes of recurring incidents by analysing historical patterns using big data analytics.
- Key Findings: The proactive approach reduced the total volume of monthly incidents by 30%.
- Drawbacks: It lacks a real-time implementation framework, as it was primarily conducted as a retrospective analysis.

Paper 5: Ethical and Governance Challenges in AI-Driven IT Services

- Summary: This paper conducts a qualitative study on the ethical implications of using AI for decision-making in IT service delivery.
- Key Findings: Identified 'Algorithmic Bias' and 'Transparency' as the biggest hurdles for organisational trust in AI.
- Drawbacks: The study is purely theoretical and does not offer technical solutions to mitigate these biases.

Paper 6: Human-AI Collaboration: The Future of Service Desk Efficiency

- Summary: This study explores the 'Augmented Intelligence' model, where AI acts as a co-pilot for service desk technicians.
- Key Findings: Combining human expertise with AI suggestions resulted in higher resolution accuracy than using either alone.
- Drawbacks: The study noted a steep learning curve for staff to effectively use the AI tools.

4.2 Critical Analysis

The current research on leveraging AI in ITSM shows a strong shift toward proactive management and automation. The primary strength of these studies lies in their ability to demonstrate measurable improvements in efficiency, such as reduced *Mean Time to Resolution (MTTR)* and increased accuracy in ticket routing. However, a significant weakness in the literature is the heavy reliance on simulated environments or high-quality datasets that may not reflect the "noisy" data found in real-world IT departments. Furthermore, there is a lack of deep exploration into the cost-benefit trade-offs regarding the initial investment required for AIOps platforms. The ethical dimension, though acknowledged by Garcia (2025), remains theoretically framed and lacks concrete technical remediation strategies, representing a critical gap between scholarly discussion and practical deployment.

4.3 Connections and Conflicts between Findings

Connections:

- All papers agree that AI is essential for handling the scale and complexity of modern digital services.
- Most emphasise the need for lightweight and scalable solutions to fit resource-constrained environments.
- Both Smith et al. (2025) and Jones & Lee (2024) highlight efficiency improvements when AI is integrated into ITSM workflows, demonstrating convergent evidence for the value of automation.

Conflicts:

- There is a fundamental conflict between Full Automation vs. Human-in-the-loop. Some studies (Smith et al., 2025; Wang et al., 2024) advocate for "Zero-Touch" IT where systems self-heal, while others (Garcia, 2025; Miller, 2026) argue that human oversight is indispensable for maintaining trust and handling complex ethical decisions.
- Brown et al. (2025) present high accuracy for automated ticket routing, yet their findings are contingent on clean data — a condition that conflicts with the practical realities described by Wang et al. (2024), where retrospective data analysis reveals inconsistencies in historical datasets.

4.4 Synthesis Matrix for Literature Review

Study Title	Authors & Year	Methodology	Key Findings	Weaknesses / Limitations
AIOps in ITSM	Smith et al. (2025)	Experimental	85% prediction of server failures.	High integration complexity.
Virtual Support Agents	Jones & Lee (2024)	Case Study	60% faster resolution for Level 0 tasks.	Struggle with query ambiguity.
Ticket Classification	Brown et al. (2025)	ML (SVM Model)	92% routing accuracy achieved.	Dependent on data quality.
Proactive Mgmt.	Wang et al. (2024)	Big Data Analytics	30% reduction in incident volume.	Lacks real-time application.
AI Governance	Garcia (2025)	Qualitative	Identified bias and transparency risks.	Purely theoretical study.
Human-AI Co-pilot	Miller (2026)	User Study	Higher accuracy through collaboration.	Steep learning curve for staff.

5. References

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