

A Study on Automation in Audits & Compliance

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Abstract

The audits and compliance are integral part of business policies and quality assurance. They help to keep the health of firm fit and fine for future growth. The organizations face mounting pressure to ensure continuous compliance and maintain audit readiness across sectors such as IT, healthcare, and finance within an increasingly complex regulatory landscape. Traditional compliance management approaches, reliant on manual oversight, extensive documentation, and periodic reviews, are often inefficient, error-prone, and insufficient to address dynamic operational demands. This study explores emerging trends in AI-driven compliance systems, particularly within banking and healthcare, while also addressing governance challenges and ethical considerations. It provides valuable insights for compliance officers, IT managers, auditors, and researchers aiming to develop robust, audit-ready governance frameworks. Technologies such as Electronic Health Records (EHRs), Robotic Process Automation (RPA), and Artificial Intelligence (AI) have been progressively integrated into digital transformation initiatives aligned with Vision 2030 objectives. There remains a notable gap in empirical research evaluating their real-world effectiveness and adoption, especially in comparative analyses between public and private healthcare institutions.

Keywords: *Audit Automation, Compliance Management, AI-Driven Compliance, Regulatory Technology (RegTech), Robotic Process Automation (RPA), Electronic Health Records (EHR), Digital Governance Frameworks*

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1. Introduction

Robotic Process Automation (RPA), Artificial Intelligence (AI), and Electronic Health Records (EHRs) have emerged as transformative automation technologies addressing inefficiencies in traditional compliance systems. These tools enhance operational accuracy by automating documentation, enabling real-time monitoring, and streamlining audit processes across sectors such as healthcare and finance. Their deployment aligns with the digital transformation goals of Saudi Vision 2030, which emphasizes modernization of public services and healthcare infrastructure. Evidence indicates that AI-enabled compliance systems significantly improve audit quality and reduce manual errors in complex regulatory environments (Issa et al., 2016). A significant disparity exists between public and private healthcare organizations in Saudi Arabia regarding the adoption of automation technologies. Private institutions, supported by greater financial resources and strategic agility, tend to implement advanced systems more rapidly, whereas public institutions often encounter bureaucratic and infrastructural constraints. These differences affect compliance efficiency and audit readiness across sectors. Research highlights that organizational readiness and digital capability play a crucial role in determining successful adoption and performance outcomes of such technologies (Khin & Ho, 2019). Audit automation seeks to transform traditional auditing practices by leveraging advanced technologies to improve efficiency, speed, and

analytical accuracy. Automation tools handle repetitive tasks such as data extraction, reconciliation, and transaction analysis, allowing auditors to focus on higher-value activities like risk assessment and strategic decision-making. This shift enhances transparency, reduces operational costs, and strengthens governance frameworks in highly regulated industries (Kokina & Davenport, 2017).

2. Background of Study

Robotic Process Automation (RPA), Artificial Intelligence (AI), and Electronic Health Records (EHRs) have emerged as critical enablers in transforming compliance and audit mechanisms within highly regulated industries. With the rapid expansion of regulatory frameworks in sectors such as healthcare, finance, and information technology, organizations are increasingly required to adopt dynamic and technology-driven solutions. Automation technologies facilitate real-time data processing, enhance traceability, and improve the reliability of compliance reporting systems. In healthcare, for instance, EHRs have revolutionized patient data management while ensuring adherence to regulatory standards and audit requirements. Similarly, AI-powered analytics enable predictive compliance monitoring, thereby reducing the likelihood of regulatory breaches (Brynjolfsson & McAfee, 2017). The global push towards digital transformation has further accelerated the adoption of automation technologies, particularly in alignment with national development strategies such as Saudi Vision 2030. This initiative emphasizes the modernization of public services, healthcare infrastructure, and governance mechanisms through advanced digital solutions. Private healthcare institutions often demonstrate higher levels of technological readiness due to better financial resources, strategic flexibility, and competitive market pressures (Vial, 2019). Despite the growing importance of automation in compliance and auditing, there remains a lack of comprehensive empirical evidence assessing its real-world impact, particularly in the context of Saudi Arabia's healthcare sector. While theoretical frameworks and conceptual studies highlight the potential benefits of automation technologies, limited research has been conducted to evaluate their effectiveness in reducing compliance errors, improving audit efficiency, and enhancing governance practices. The concerns related to data privacy, ethical governance, and system integration remains critical barriers to widespread adoption (Moffitt, Rozario, & Vasarhelyi, 2018).

3. Scope and Significance of Study

The scope of this study encompasses an in-depth examination of automation technologies such as Robotic Process Automation (RPA), Artificial Intelligence (AI), and Electronic Health Records (EHRs) within the domain of audit and compliance management, particularly in the healthcare sector. It focuses on analyzing their adoption, implementation practices, and effectiveness in enhancing audit readiness, reducing compliance errors, and improving operational efficiency across both public and private healthcare institutions. By comparing institutional differences, especially within the framework of Saudi Vision 2030, the research aims to identify sector-specific barriers and enablers influencing digital transformation. The scope also includes assessing the role of automation in facilitating real-time monitoring, continuous auditing, and data-driven decision-making. Prior research highlights that automation technologies significantly reshape compliance ecosystems by enhancing transparency and efficiency (Schmitz & Leoni, 2019). The significance of this study lies in its contribution to both academic literature and practical policy formulation in the field of audit automation and compliance management. It provides valuable insights for compliance officers, auditors, healthcare administrators, and policymakers by highlighting the tangible benefits and challenges associated with the integration of automation technologies. The findings are expected to support the development of robust, audit-ready governance frameworks that align with evolving regulatory requirements and digital transformation agendas (Bromberg, Godwin, & Ramsay, 2017).

4. Objectives of Study

- To examine the role of automation technologies such as Robotic Process Automation (RPA), Artificial Intelligence (AI), and Electronic Health Records (EHRs) in enhancing audit efficiency and compliance management
- To analyze the extent of adoption and implementation of automation-driven compliance systems in public and private healthcare institutions
- To evaluate the effectiveness of automation technologies in reducing compliance errors, improving documentation accuracy, and ensuring real-time audit readiness
- To compare the differences in technological adoption, infrastructure, and governance practices between public and private healthcare organizations
- To identify the key challenges, barriers, and ethical concerns associated with the integration of AI and RPA in compliance and auditing systems

5. Review of Literature

The present study is grounded in the evolving landscape of auditing and compliance, where technological advancements such as Artificial Intelligence (AI) and automation tools are transforming traditional practices. Historically, auditing has been a labor-intensive process focused on verifying financial accuracy and ensuring regulatory compliance through manual examination of records and documents. However, with the rapid expansion of digital systems and increasing cybersecurity threats, the scope of auditing has widened to include IT security, risk management, and data protection. Automation technologies have significantly enhanced the efficiency and reliability of audit processes by enabling faster data processing, continuous monitoring, and real-time compliance verification. The integration of advanced technologies has also increased the importance of developing skilled auditors capable of leveraging digital tools effectively (Bertino, 2018).

The concept of auditing itself has evolved from a basic financial verification mechanism to a comprehensive system of internal and external controls. Internal audits play a crucial role in strengthening organizational processes, governance frameworks, and risk management systems, while external audits provide independent assurance regarding the accuracy of financial statements and regulatory compliance. Both forms of auditing are essential for maintaining accountability and organizational credibility. This transformation highlights the growing importance of integrating technology into auditing standards and practices to meet the demands of modern business environments (Vasarhelyi & Romero, 2014).

The increasing adoption of automation technologies has redefined the efficiency and effectiveness of audit processes across industries. Organizations are leveraging automation to reduce audit time, minimize operational costs, and improve the accuracy of compliance reporting. Automated systems enable continuous auditing, real-time threat detection, and faster identification of anomalies, thereby strengthening risk management frameworks. The COVID-19 pandemic further accelerated the need for digital auditing solutions, as organizations shifted towards remote operations and faced new compliance challenges. This study aims to examine the role of automation in auditing, its effectiveness in improving compliance, and the challenges associated with its implementation in contemporary organizational settings (Lacurezeanu et al., 2020).

6. Research Methodology:

The study evaluates the various machine learning algorithms based on their computational efficiency, accuracy, and usability in financial audits by compiling a variety of distinct peer-reviewed articles, business reports, and available data. Without using primary data, the study uses statistical analysis and

existing data to try to find patterns and trends in automated audits. The effectiveness of automated technologies in IT security audits will be examined using a descriptive methodology. This will combine quantitative measures of accuracy and efficiency with the qualitative insights of industry practitioners.

7. Discussion and Analysis

Automation in compliance auditing is supported by a wide range of advanced tools and technologies that enhance efficiency, accuracy, and transparency. Organizations increasingly rely on audit management software to systematically plan, execute, and monitor compliance activities, thereby reducing manual intervention and improving audit coordination. Emerging innovations such as blockchain technology contribute to improved transparency and data integrity in compliance audits by ensuring tamper-proof recordkeeping, while cloud-based solutions allow secure storage, remote accessibility, and real-time analysis of audit data. A practical illustration can be observed in a global financial institution that successfully implemented automation to transform its compliance audits. The organization achieved a 40% reduction in audit time, minimized human errors through automated processes, enabled real-time monitoring for proactive risk management, and realized substantial cost savings. These advancements demonstrate how automation technologies can strengthen governance frameworks and provide organizations with a competitive advantage in regulatory compliance.

Despite its numerous benefits, automation in compliance auditing presents several operational and strategic challenges that organizations must address. Integrating automation tools with legacy systems often proves complex and time-consuming, while the effectiveness of automated audits heavily depends on the quality and integrity of underlying data. Continuous compliance monitoring, enabled through automation, offers a proactive solution by allowing organizations to track adherence to regulations in real time and detect deviations promptly. This approach reduces compliance risks and enhances organizational resilience. Industry reports indicate that a significant proportion of organizations are adopting continuous monitoring practices, leading to a noticeable decline in compliance-related incidents.

Figure No: 1



The figure highlights the growing impact of automation in compliance auditing, particularly in enhancing efficiency, reducing risks, and promoting continuous monitoring practices. A significant 61% of organizations are either implementing or planning to implement continuous compliance monitoring systems, indicating a strong shift toward proactive and technology-driven governance models. This trend

reflects the increasing reliance on advanced tools such as Artificial Intelligence (AI) and Robotic Process Automation (RPA) to ensure real-time tracking of compliance requirements. Continuous monitoring allows organizations to identify deviations instantly, thereby minimizing regulatory risks and improving decision-making processes. Furthermore, the adoption of such systems aligns with global digital transformation strategies, where organizations prioritize agility, transparency, and responsiveness in compliance management. The data demonstrates tangible performance improvements resulting from automation. Organizations using continuous compliance monitoring report a 17% reduction in compliance-related incidents, highlighting its effectiveness in risk mitigation. More notably, automation tools such as Chef InSpec contribute to an 80% reduction in compliance audit time, emphasizing the efficiency gains achieved through technological integration. These improvements not only reduce operational costs but also enable audit teams to focus on strategic and analytical tasks rather than routine processes.

Figure No: 2



The chart titled “Findings by Checklist” presents a Pareto-style analysis of audit findings across multiple compliance areas, highlighting both the frequency of issues (bars) and their cumulative impact (line graph). The highest number of findings is observed in ISO 9001 audits, followed by Health & Safety audits, indicating that these domains contribute the most to overall compliance gaps. Together, the first few categories account for a significant proportion of total findings, as reflected in the cumulative percentage rising sharply to around 70% within the first four categories. This distribution suggests that organizations can achieve substantial improvements in compliance performance by prioritizing key high-impact areas. The use of automation tools integrated with Artificial Intelligence (AI) can further enhance this prioritization by identifying recurring patterns and enabling predictive risk assessment. As the chart progresses, the number of findings across categories such as Behaviour Survey, Forklift Inspection, HSE Monthly Assessment, and Spill Prevention Log remains relatively low, yet collectively they contribute to reaching 100% cumulative impact. This reflects the long-tail nature of compliance issues, where smaller, less frequent problems still require attention for comprehensive audit coverage. The visualization emphasizes the importance of continuous compliance monitoring and targeted intervention strategies. By leveraging automation technologies such as RPA and data analytics, organizations can systematically address high-frequency issues while maintaining oversight of lower-risk areas.

8. Finding of Study

- The findings of the study clearly indicate that automation technologies such as Robotic Process Automation (RPA), Artificial Intelligence (AI), and data-driven compliance tools have significantly transformed the efficiency and effectiveness of audit processes. A major observation is the substantial reduction in audit time, with automation tools enabling up to 80% faster completion of compliance audits. This improvement allows organizations to conduct more frequent audits without increasing resource allocation. The continuous compliance monitoring systems have contributed to a 17% reduction in compliance-related incidents, demonstrating their effectiveness in proactive risk identification and mitigation.
- Another key finding is the uneven adoption of automation technologies between public and private sector organizations. Private institutions tend to implement advanced audit automation systems more rapidly due to better financial capacity, technological readiness, and strategic flexibility, whereas public sector organizations often face structural and budgetary constraints. This disparity impacts audit efficiency, compliance accuracy, and overall governance effectiveness. Furthermore, while automation reduces human error and enhances data accuracy, challenges such as integration with legacy systems, data quality issues, and privacy concerns remain significant barriers.
- The analysis of checklist-based audit findings highlights that a majority of compliance issues are concentrated in a few critical areas, such as ISO 9001 audits and Health & Safety audits, which contribute significantly to overall risk exposure. This supports the application of the Pareto principle in compliance management, where addressing high-frequency issues can lead to substantial improvements in overall audit outcomes. Automation technologies further strengthen this approach by enabling predictive analytics, real-time monitoring, and continuous auditing.

9. Conclusion:

The study indicates that automation technologies such as Robotic Process Automation (RPA), Artificial Intelligence (AI), and advanced data analytics have fundamentally reshaped compliance auditing by improving efficiency, accuracy, and responsiveness to regulatory requirements. Automation enables real-time monitoring, continuous auditing, and faster processing of large datasets, thereby significantly reducing audit time, operational costs, and human error. The integration of these technologies supports the transition from traditional, reactive audit practices to proactive and predictive compliance frameworks, enhancing organizational transparency and governance.

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