

Digital Disruption in Audit: The Role of Robotic Process Automation in Reshaping Internal Audit Functions in Malaysia¹

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Abstract

Robotic Process Automation (RPA) has gained significant traction across industries, including the audit sector. As RPA technologies imitate human interaction with digital systems, they introduce new risk dimensions and require auditors to acquire advanced technological competencies. This study investigates the implications of RPA implementation on the Internal Audit Function (IAF) in Malaysia, focusing on three key dimensions: (i) the risks associated with RPA implementation, (ii) changes to internal audit processes, and (iii) the evolving skillsets required of internal auditors. Data were collected through semi-structured interviews with nine experienced professionals in internal audit, IT audit, and RPA. Findings reveal that RPA significantly transforms internal audit practices by introducing novel risks, redefining processes, and demanding new auditor competencies. The study contributes to the broader literature on auditing in the digital era and responds to the growing call for empirical research on the intersection of RPA and audit functions.

Keywords: Robotic Process Automation; Internal Audit Function; Audit Risk; Digital Transformation; RPA Governance; Malaysia

1. Introduction

In recent years, the global business environment has undergone rapid technological, financial, and social transformations. Enterprises are increasingly reshaping their operational and strategic frameworks in alignment with Industry 4.0—a technological revolution driven by automation, artificial intelligence (AI), real-time data, and interconnected digital systems (Epicor, 2020). At the core of this evolution is Robotic Process Automation (RPA), a disruptive technology that automates rule-based and repetitive tasks using software “robots” or virtual agents (Madakam et al., 2019).

RPA systems are capable of mimicking human interactions with digital platforms, executing tasks such as data entry, report generation, and system integration without altering underlying IT infrastructures (Moffitt et al., 2018). These attributes make RPA an attractive and cost-effective automation solution, particularly in functions such as finance, human resources, and internal auditing, where routine, high-volume processes are prevalent.

The global RPA market was valued at approximately USD 1.6 billion in 2019 and is projected to exceed USD 46 billion by 2030 (P&S Intelligence, 2020). In Malaysia, RPA adoption has gained momentum through national initiatives such as the Malaysian Artificial Intelligence Roadmap (2020) and the establishment of RPA Centres of Excellence (CoEs) led by global firms such as Capgemini and Blue Prism (Tan, 2019). These efforts aim to upskill the local workforce and facilitate the integration of intelligent automation across both large enterprises and SMEs, particularly in response to challenges like the COVID-19 pandemic (Amirudin, 2021).

¹ Ng, L. X., Asokan, K. A., & Balasingam, S. A. (2025). Digital disruption in audit: The role of robotic process automation in reshaping internal audit functions in Malaysia. *Ecosocial Studies: Banking, Finance and Cybersecurity*, 7(2), 29–33.

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While RPA offers substantial benefits—cost reduction, productivity enhancement, and operational scalability—it also introduces new risks and complexities, especially in internal auditing. Auditors are now tasked with assessing the integrity and reliability of automated processes, adapting to revised audit methodologies, and acquiring new digital competencies (PwC, 2017a; Bryan, 2019). Consequently, internal audit must evolve not only as a control mechanism but also as a strategic partner in digital transformation initiatives.

This study aims to explore the impact of RPA implementation on internal audit functions within Malaysian organizations. Specifically, it investigates the (1) risk dimensions associated with RPA deployment, (2) process-level changes in auditing practices, and (3) new skill requirements for internal auditors. By doing so, the study responds to growing academic and professional interest in understanding how technological advancements such as RPA are reshaping the audit landscape.

2.0 Problem Statement

In 2016, KPMG and *Forbes* conducted a comprehensive survey involving over 400 Chief Financial Officers (CFOs) and audit committee chairs. The findings revealed that nearly 90% of respondents believed their Internal Audit Functions (IAFs) were not adequately identifying and addressing emerging risks. The consensus among respondents was that internal audit needed to adopt a more proactive role in risk identification and mitigation, rather than simply evaluating existing controls (Chuah & Maes, 2016). Among the greatest challenges identified was the integration of advanced technologies, data analytics, and automation into audit planning and execution.

Over time, technological automation has significantly influenced internal audit processes. The increasing adoption of Robotic Process Automation (RPA) compels IAFs to reassess how they adapt to and govern automated systems. As formerly manual tasks become robotically executed, auditors are faced with reviewing processes that no longer involve human interaction. Consequently, internal auditors are expected to encounter RPA-driven processes more frequently in the coming years.

Despite growing interest in RPA, the academic literature has not yet provided a synthesized framework for understanding its full impact on internal audit. For instance, Duncan and Whittington (2016) highlighted how emerging technologies like cloud computing can challenge IAFs by introducing compliance risks and data governance concerns. Similarly, Moorthy et al. (2011) addressed how auditors must respond to evolving information systems and cybersecurity threats. However, these studies lack a specific focus on the organizational-wide risks posed by RPA adoption.

RPA enables internal auditors to move beyond traditional, reactive auditing techniques toward more continuous and predictive assurance approaches. Moffitt et al. (2018) outlined opportunities for RPA to improve audit reliability but emphasized the need to redesign assurance procedures. Ernst & Young (2018) further argued that audit professionals must reevaluate their strategies to incorporate RPA-driven workflows. Nonetheless, these theoretical insights have yet to be empirically tested in the Malaysian context. This leads to the second research question: how does RPA implementation alter the structure and methodology of internal audit processes?

Although existing research explores RPA in accounting (e.g., Cooper et al., 2019) and highlights its potential to enhance efficiency and control, there is limited empirical focus on how RPA reshapes auditor capabilities. Lois et al. (2020) pointed out the need for skills development and training in auditing systems fit for the digital age. However, there remains a knowledge gap regarding the competencies internal auditors must acquire in organizations that have adopted RPA. Hence, a third research question arises: what skillsets are required of internal auditors in an RPA-driven environment?

As the third line of defense, the Internal Audit Function plays a critical role in providing independent and objective assurance over an organization's risk management, internal control systems, governance mechanisms, and operational efficiency. The implementation of RPA introduces both new responsibilities and opportunities for IAFs to innovate audit programs that are aligned with technological advancements. Early engagement of IAFs in RPA initiatives ensures robust communication, effective risk assessment, and shared accountability in governance and process design.

3.0 Research Objectives

This study aims to examine the transformation of the Internal Audit Function in response to the adoption of Robotic Process Automation. The specific objectives are as follows:

- (i) To identify the key risk areas associated with RPA implementation within organizations.
- (ii) To investigate the changes in internal audit processes resulting from RPA adoption.
- (iii) To explore the skills required by internal auditors in an RPA-integrated environment.

4.0 Research Questions

The study addresses the following research questions:

- (i) What are the key risk areas in RPA implementation across organizational systems?
- (ii) How does RPA adoption modify the internal audit process in affected organizations?
- (iii) What competencies and skills are required by internal auditors in response to RPA-driven transformations?

5.0 Significance of the Study

This study contributes to both academic literature and professional practice by shedding light on how RPA influences internal audit functions in the Malaysian context. By examining risk dimensions, procedural changes, and required auditor competencies, the research offers valuable insights for audit practitioners, governance professionals, and policymakers. Additionally, it provides a foundational framework for future studies on digital transformation within internal audit and promotes a better understanding of how emerging technologies can enhance organizational assurance functions. The findings will also support audit functions in proactively designing effective audit programs, improving governance mechanisms, and aligning with technological advancements to enhance enterprise resilience.

5.1 Theoretical Contribution

This study explores the impact of organizational-wide Robotic Process Automation (RPA) implementation on the Internal Audit Function (IAF), contributing to the theoretical foundation of internal audit research in the context of Industry 4.0. It offers a foundational evaluation of how automation technologies affect audit mechanisms, providing deeper insights for scholars and practitioners interested in the evolution of internal auditing in response to digital transformation. Specifically, the study adds to the limited body of work addressing the intersection of RPA and audit assurance frameworks.

5.2 Academic Contribution

The study aims to enhance academic understanding of the effects of RPA on internal auditing, particularly for accounting and auditing students and academic institutions. By providing an empirical investigation into the implications of RPA for audit processes, risks, and competencies, it supports curriculum development and fosters academic engagement with emerging auditing technologies. Additionally, the study creates opportunities for future research by outlining key areas where empirical gaps persist, thus paving the way for more focused investigations in the field.

5.3 Managerial Contribution

From a practical standpoint, this study provides internal audit professionals with valuable insights into the implications of RPA adoption, particularly in terms of identifying key risk areas, understanding changes in audit procedures, and recognizing the evolving skill requirements for auditors. These findings assist audit departments in proactively designing control frameworks and annual audit plans that are aligned with technological advancements. Moreover, the results help internal audit organizations develop strategies for effectively navigating and governing the adoption of new digital tools in their audit environments.

6.0 Scope and Limitations of the Study

This research focuses on the implementation of RPA across organizational operations and its implications for the Internal Audit Function, which represents the third line of defense in governance models. The study aims to investigate how enterprise-wide RPA adoption influences internal audit by examining three independent variables: (i) key risk areas, (ii) changes to audit processes, and (iii) skills required by auditors. The dependent variable is the performance and transformation of the IAF.

The study adopts a qualitative research design, utilizing primary data collected through semi-structured interviews. A total of nine participants were selected based on their experience and expertise in internal audit, IT audit, and RPA development in Malaysia. Interviews consisted of open-ended questions designed to elicit in-depth responses.

Given the novel nature of RPA and the evolving state of its adoption, this study is exploratory in scope. It does not assess broader organizational performance or technological integration strategies beyond the IAF. The study is limited to a specific timeframe—August 2020 to March 2021—due to research constraints, which may affect the currency of the data. Additionally, access to up-to-date literature was limited, as RPA research in the auditing context remains scarce, particularly for the years between 2015 and 2021. Confidentiality obligations further restricted the availability of certain interview data.

Future research may expand the scope to examine how IAFs can optimize audit performance using RPA, evaluate cost-benefit analyses, or explore the role of RPA in continuous auditing and real-time assurance.

7.0 Operational Definitions

Term	Definition
Robotic Process Automation (RPA)	A software application that interacts with other software systems at the user interface level to automate structured, rule-based business processes (Cohen et al., 2019). Referred to as “bots” or “software robots” in this study.
Automated Environment / RPA Environment	An organizational setting where core operational, financial, or administrative processes are conducted using RPA technology.
Robotic Process Automation Developer	A technical professional responsible for designing, building, and deploying bots using RPA tools. This role requires proficiency in programming, process mapping, data structure, and exception handling (Carr, 2020).
Robotic Process Automation Consultant	A professional who identifies RPA opportunities, evaluates business needs, and designs RPA implementation strategies. Acts as a liaison between business users and developers (Carr, 2020).

8.0 Literature Review

This section reviews and synthesizes relevant literature on Robotic Process Automation and its intersection with internal audit practices. The review begins with the conceptual underpinnings of RPA, followed by an exploration of internal audit functions, RPA-associated risks, evolving audit processes, and the skill transformation required for auditors. The literature also identifies gaps that justify this study, particularly the limited empirical evidence on how RPA affects internal audit structures in emerging economies such as Malaysia.

9.0 Conceptual Framework

The conceptual framework proposed in this study (see Figure 2) is based on the *Three Lines of Defense* model (Institute of Internal Auditors, 2020) and reflects the interaction between RPA implementation and internal audit transformation. The framework examines the relationships among three core variables:

1. **Key Risk Areas** in RPA implementation
2. **Process Changes** within the Internal Audit Function
3. **Skill Requirements** for internal auditors

This model provides a structured approach to analyzing how RPA affects internal audit performance and governance. It also serves as a guide for empirical inquiry and future theoretical development in the auditing domain.

9.0 Literature Review

This section reviews existing scholarly and professional literature on Robotic Process Automation (RPA) and its impact on internal audit, including theoretical foundations such as the Three Lines of Defense (3LOD), developments in internal and IT auditing, and emerging technologies influencing audit practices.

9.1 The Three Lines of Defense (3LOD) Model

The 3LOD model organizes the essential roles and responsibilities in risk governance into three distinct layers to enhance clarity and effectiveness in managing risks and controls. The **first line** consists of operational management, which owns and manages risk. The **second line** comprises functions responsible for risk oversight and compliance monitoring. The **third line** is the Internal Audit Function (IAF), which provides independent and objective assurance over governance, risk management, and internal controls (IIA, 2013).

The 3LOD framework is widely adopted in corporate risk management and has proven especially relevant in the context of technological transformation. According to Kovanen (2020), each line plays a critical role in strengthening the organization's risk posture. The IIA (2018) further notes that the 3LOD model must adapt to evolving market conditions and digital disruption. In the age of RPA, the first and second lines—where most automation initiatives are implemented—are undergoing significant transformation. Therefore, the third line must also evolve, developing the necessary capabilities to provide oversight and assurance in an increasingly automated environment (ICAEW, 2019).

In this study, the IAF functions as the third line of defense in overseeing RPA implementation. It must address associated risks, understand process-level changes, and acquire the necessary digital competencies. The study's conceptual framework integrates these challenges, reflected in the research questions that explore (i) the risk areas of RPA deployment, (ii) the impact on audit processes, and (iii) the skills required by internal auditors.

9.2 Internal Audit and IT Internal Audit

Internal auditing is defined by the IIA (2004) as an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It employs a systematic and disciplined approach to evaluate the effectiveness of risk management, control, and governance processes. Internal auditors are governed by the *International Professional Practices Framework (IPPF)* and the *Code of Ethics* issued by the IIA.

Recent developments have reshaped internal auditing from a control-centric to a risk-based and advisory approach (Hass et al., 2006). Lois et al. (2020) highlighted how the digital age has introduced both opportunities and challenges for internal auditors, requiring new technical knowledge and the ability to support continuous auditing initiatives. Ramamoorti and Weidenmier (2004) observed that IT now affects virtually all dimensions of the IAF, including scope, strategies, reporting lines, and methodologies.

As enterprise IT systems become more complex, internal auditors must offer greater assurance over IT controls. According to Hass et al. (2006), assurance is only meaningful when controls are properly designed and monitored continuously for performance and reliability. Moeller (2010) emphasized the importance of specialized IT audit functions or, at minimum, internal audit teams equipped with technical expertise in cybersecurity, automation, and systems design.

In response to ongoing digital disruption, *Technology Internal Audit (ITIA)* has emerged as a specialized domain that helps organizations assess, implement, and govern technological innovations like RPA (PwC, 2017b). With organizations increasingly reliant on IT for critical business processes and data security, the IAF plays an essential role in evaluating system reliability and information integrity (Gray, 2016).

Given the strategic importance of RPA, internal auditors must evaluate its effectiveness, efficiency, compliance, and risk implications. The IIA (2012) emphasized that IAFs must assess whether IT governance structures support the organization's objectives (Standard 2110). Tools such as COBIT and the *IT Assurance Guide* (ITGI, 2007) provide structured frameworks for aligning audit practices with evolving IT environments (Héroux & Fortin, 2013).

9.3 Robotic Process Automation (RPA)

Overview and Evolution

Initially developed for repetitive, rule-based tasks, RPA has evolved significantly in recent years. Modern RPA tools no longer require deep programming knowledge, as workflows can now be designed through user-friendly interfaces (Gadre et al., 2017). The *IEEE Industry Advisory Group* (2017) defines RPA as “a preconfigured software instance that uses business logic and structured workflows to execute autonomous transactions and tasks across unrelated software systems.”

According to UiPath (2017), RPA software interacts with existing applications via their user interfaces to perform tasks traditionally carried out by humans. It is particularly useful for high-volume, repeatable activities that require accuracy and efficiency. Unlike traditional IT solutions, RPA is cost-effective, easy to deploy, and minimally invasive to existing IT architecture.

RPA platforms replicate human actions using software “robots,” with each robot operating independently using its own virtual environment. Leading vendors in the RPA market include UiPath Inc., Blue Prism Group PLC, and Automation Anywhere Inc. (Kokina & Blanchette, 2019).

9.4 RPA and Internal Audit: The Rationale for Oversight

Given RPA's growing adoption across industries, internal auditors are increasingly required to assess the risks and controls associated with automation. The IAF is uniquely positioned to ensure that RPA implementations are aligned with governance objectives and do not introduce operational vulnerabilities. Key audit concerns include process reliability, access control, exception handling, and business continuity.

As part of governance assurance, internal auditors must evaluate whether organizations have appropriately defined RPA governance frameworks, documented controls, and designed monitoring mechanisms. RPA impacts not only the way audits are performed, but also the type of skills required by audit professionals—including process mapping, control validation, and data analytics.

5.3.3 Effect of Tax Rate Level on Tax Evasion

H1A: There is a significant relationship between the tax rate level and tax evasion. (*Rejected*)

Based on theoretical and empirical expectations, this study hypothesized a positive relationship between tax rate levels and tax evasion. However, the statistical findings indicated a significant **negative** correlation between the two variables. With a p-value of 0.0549 (> 0.05), the effect of tax rates on evasion in Sum Area, Malaysia, is not statistically significant. Therefore, this hypothesis is rejected, and it is concluded that an **increase in tax rates corresponds with a reduction in tax evasion** in this context.

5.3.4 Effect of Inflation Rate on Tax Evasion

H1A: There is a significant relationship between the inflation rate and tax evasion. (*Accepted*)

This study hypothesized that inflation has a positive effect on tax evasion. The empirical analysis confirmed this, as the regression coefficient for inflation was positive and statistically significant ($p < 0.05$). Therefore, the hypothesis is accepted. The findings imply that **higher inflation rates increase the likelihood of tax evasion** in Sum Area, Malaysia, possibly due to the erosion of real income and increased financial pressure on taxpayers.

5.3.5 Effect of Tax System Complexity on Tax Evasion

H1A: There is a significant relationship between the complexity of the tax system and tax evasion. (*Accepted*)

This hypothesis proposed that a more complex tax system would lead to higher levels of tax evasion. The results validated this assumption. The coefficient was positive and statistically significant ($p < 0.05$). Hence, the hypothesis is accepted. The data suggest that **increased tax complexity correlates with greater instances of tax evasion**, likely due to difficulties in understanding tax obligations or exploiting system loopholes.

6.0 Conclusion

This study aimed to examine the impact of various factors—namely income level, education, tax rate, inflation, and tax system complexity—on tax evasion among taxpayers in Sum Area, Malaysia.

The findings revealed that:

- **Income Level:** There is a positive and statistically significant relationship between income and tax evasion. While higher income provides the capacity to pay taxes, it also offers greater opportunities and incentives for evasion. However, it was found to have the lowest standardized coefficient among all variables.
- **Education Level:** There exists a significant negative correlation with tax evasion. Contrary to common assumptions, higher education may lead to greater noncompliance, possibly due to improved understanding of the system and the ability to manipulate it.
- **Tax Rate Level:** Surprisingly, the relationship was **negative and statistically insignificant**. This contradicts traditional theories that higher tax rates encourage evasion, and instead suggests that increased penalties or enforcement may outweigh the incentive to evade.
- **Inflation Rate:** The inflation rate showed a strong and significant **positive** relationship with tax evasion. As inflation rises, taxpayers are more likely to evade taxes in order to preserve their purchasing power.
- **Tax System Complexity:** The complexity of the tax system is positively correlated with tax evasion. Complex procedures may discourage compliance and provide avenues for avoidance or evasion.

In summary, inflation and system complexity are the most influential factors, while education and income play moderate roles. Tax rate, although traditionally important, showed a weaker and inverse association in this context.

6.2 Suggestions for Future Research

While this study contributes to the understanding of tax evasion behavior in Malaysia, it is limited in scope and generalizability. The following are recommended for future studies:

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