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Determinants of Internal Audit Maturity: Evidence from Malaysian Public-Listed Companies through the Lens of Resource-Based and Duality Theory

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Abstract

This study investigates the internal audit maturity (IAM) of public listed companies (PLCs) in Malaysia by examining the structural and functional domains of the internal audit function, conceptualised as Internal Audit Structure (IAS), Internal Audit Resources (IAR), Internal Audit Processes (IAP) and Internal Audit Relationships (IARL). The input for the internal audit maturity domains are measured by their antecedents. Drawing from Resource-Based Theory (RBT), and Duality Theory, the study applies a disjoint two-stage Partial Least Squares Structural Equation Modelling (PLS-SEM) approach, ANOVA, and Post Hoc test to explore the extent to which these domains explain IAM, as well as the differences in IAM across internal audit arrangements (in-house, co-sourced, and outsourced). Content analysis of 200 PLC annual reports from Bursa Malaysia was used to extract data. The results reveal that IAS, IAP and IARL, which are combined into IAOC constructs due to its multicollinearity in the measurement model, significantly predicts IAM, while IAR plays a supporting role. In-house models are associated with higher IAM, underscoring the strategic advantage of internal IA capabilities. The findings provide theoretical and practical implications for regulators, boards, and audit committees to strengthen governance effectiveness.

Keywords: Internal Audit Maturity, Internal Audit Function, Public Listed Companies, Partial Least Squares Structural Equation Modelling (PLS-SEM), Corporate Governance.

1. INTRODUCTION

The maturity concept originates from quality and project management (PMI, 2008), where maturity models are used to assess the degree to which processes are formally defined, managed, and optimised. These models have proven effective for diagnosing capability gaps, benchmarking progress, and guiding continuous improvement. When adapted to the internal audit context, maturity models provide a multi-level framework to evaluate the depth of integration and professionalism of internal audit (IA) practices.

Internal audit maturity (IAM) reflects how systematically and strategically the internal audit function operates within an organisation. Originating from the maturity model concept in project management (Kerzner, 1987), IAM maturity models serve as diagnostic tools for identifying organisational gaps and guiding strategic improvement (Becker et al., 2009). While IAM is acknowledged as a crucial element in enhancing organisational governance and performance, existing literature has not adequately operationalised the construct within a structured, theory-driven framework (Lenz & Sarens, 2011; Mihret et al., 2010).

The maturity of IA functions has garnered increasing attention as organizations strive to align audit practices with strategic objectives and regulatory expectations. Internal audit maturity reflects the extent to which internal audit functions (IAFs) are institutionalized, strategically integrated, and capable of contributing to organizational governance and performance. Prior frameworks, such as the one developed by Lenz, Sarens, and D'Silva (2014), highlight key antecedents—or "building blocks"—that contribute to IA maturity. These include structure,

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resources, processes, and relationships. However, empirical validation of these components remains limited, particularly in developing economies where governance contexts differ significantly from mature jurisdictions.

Although internal audit functions may be in-house, outsourced, or co-sourced, limited research has examined the relationship between internal audit framework attributes and these structural arrangements. While prior studies indicate that in-house internal audit functions in Malaysian PLCs may positively influence governance quality, financial reporting, and firm performance—unlike outsourced arrangements, which show no comparable effect (Kolsi & Al-Hiyari, 2024)—the potential impact of outsourcing on the attributes of the internal audit framework remains unclear. Existing research has primarily focused on the relationship between internal audit budgets and ESG performance within outsourced functions, rather than on core enablers such as structure and resources.

To address this gap, the present study empirically examines whether IAS, IAR, IAP and IARL-four core 'building blocks' proposed by Lenz, Sarens, and D'Silva (2014) and theoretically integrates Resource-Based Theory (RBT) (Barney, 1991), and duality theory (Farjoun, 2010), to examine IAM across varying internal audit arrangements (in-house, outsourced and co-sourced) and how different audit models' arrangements influence these dynamics. By analyzing annual report disclosures of the top 200 Malaysian PLCs by market capitalization, this research provides objective, observable evidence from an underexplored jurisdiction, aiming to resolve ambiguities surrounding how IA model shaped the development of internal audit capabilities.

Expected Contributions: This research contributes to theory by integrating RBT and duality theory, to frame IAM development. It offers methodological contributions via a robust, staged SEM approach, and practical implications for corporate governance enhancement in emerging markets.

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2. LITERATURE REVIEW

The internal audit function has evolved from a compliance-oriented mechanism to a value-adding strategic partner (IIA, 2020). Lenz et al. (2014) propose a "building blocks" framework to assess IA maturity, where four domains: structure, resources, processes, and relationships, collectively determine the audit function's developmental level. Internal audit structure refers to the organizational positioning, reporting relationships, and strategic alignment of the IAF. Key structural features include the presence of an internal audit charter, a long-term strategic audit plan, and functional reporting to the audit committee. These features are designed to ensure independence, strategic relevance, and integration within corporate governance mechanisms.

Internal audit resources encompass the competencies, training, and professional qualifications of audit staff. The existence of certified internal auditors (e.g., CIA designation), structured training programs, and clearly defined competency frameworks form the cornerstone of an effective IA resource base. Prior studies (Alzeban, 2021; Mihret & Yismaw, 2007) suggest that inadequate resourcing impairs audit quality and diminishes stakeholder confidence.

While prior research has applied maturity models to assess the evolution of internal audit functions (Arena & Azzone, 2009; Soh & Martinov-Bennie, 2011), few have examined whether the type of internal audit arrangement namely, in-house, outsourced, or co-sourced, influences the maturity attributes. This study extends the literature by empirically testing these associations using the maturity model as a theoretical anchor.

Previous studies suggest that in-house IA functions tend to be more mature due to their sustained integration with governance and strategic processes (Alzeban & Gwilliam, 2014). These arrangements often foster direct lines of communication with the audit committee, facilitate deeper organizational knowledge, and promote the continuous development of internal audit competencies. In contrast, outsourced functions while cost-efficient and potentially specialized, may prioritize compliance and financial reporting over strategic and developmental contributions (Kolsi & Al-Hiyari, 2024). Co-sourced models attempt to balance these dynamics but may face challenges in role clarity and integration.

2.1 Underpinning Theories

2.1.1 Resource-Based Theory

In Barney's (1991) seminal work, resources are defined as all a firm's assets, allowing it to formulate and execute strategies to improve its overall performance quality. These resources can be categorised into three distinct groups: physical capital resources, human capital resources, and organisational capital resources. In his study, Barney (1991) referenced the work of Williams (1978) to define physical capital resources as encompassing physical technology, plant and equipment, geographical region, and raw materials. Barney (1991) additionally referenced the research conducted by Becker (1975), which posited that human capital resources encompass several attributes

such as training, experience, judgement, competency, relationships, and insight possessed by individual employees.

Based on the review of the literature above, the internal audit function is increasingly recognised as a vital internal resource that contributes to an organisation's governance, risk management, and control processes. Grounded in the International Professional Practices Framework (IPPF) issued by the Institute of Internal Auditors (IIA, 2017), internal audit embodies a set of structural, resource-based, procedural, and relational characteristics that align with the conceptualisation of organisational capabilities under the Resource-Based Theory (Barney, 1991).
In sum, internal audit functions are more than compliance mechanisms; they represent a strategic resource endowed with unique attributes—independence, credibility, professional expertise, and strategic access—that can generate sustained value when leveraged effectively within the firm.

2.1.2 Gidden Duality Theory

Giddens' (1984) theory of the Duality of Structure offers a foundational perspective for resolving the longstanding tension between structure and agency. Rather than viewing these concepts as mutually exclusive, Giddens proposes that structure and agency are recursively related, structures shape human actions, yet they are also produced and reproduced through those very actions.

Earlier, Giddens (1979) had already argued that structuration processes become more salient when individuals actively engage with and influence the social systems within which they operate. This perspective provides a useful lens for understanding how internal audit functions as structured mechanisms, are simultaneously shaped by and shaping the organisational contexts in which they operate.

The integration of Resource-Based Theory (Barney, 1991) and Giddens' (1984) theory of the Duality of Structure suggests that internal auditors represent a strategic organisational resource. Their significance lies not only in their critical role within the corporate governance framework but also in their ability to fulfill dual functions both as enablers of structural assurance and as agents who actively shape and are shaped by organisational practices. This dual role underscores the value-added contributions of internal auditors, upon which both management and stakeholders increasingly depend.

2.2 Hypotheses Development

Despite growing interest in internal audit effectiveness and its contributions to governance, prior studies have often lacked integration of theoretical constructs that could explain how internal audit functions evolve and influence organisational outcomes (Lenz et al., 2014; Mihret et al., 2010; Al-Twaijry et al., 2003). Most maturity assessments remain confined to descriptive typologies or single-item measures without a cohesive framework rooted in theory. As a result, the development of internal audit maturity (IAM) and its domains—such as internal audit structure, resources, processes, and relational dimensions—remains under-theorised and empirically fragmented. Building on the conceptual limitations of earlier approaches, this study extends the literature by embedding IAM within a critical realist ontology, employing Resource-Based Theory (Barney, 1991) and duality theory (Farjoun, 2010) to explain how internal audit capabilities are developed and deployed across organisations. These theoretical perspectives offer a deeper understanding of the mechanisms and contextual conditions that underpin the evolution of internal audit functions. Accordingly, the following research questions are formulated to guide this investigation.

Question (1) : What is the extent of internal audit maturity explained by the domains of internal audit maturity?
Question (2) : How mature are internal audit functions in Malaysia?
Question (3) : Does the level of maturity vary significantly depending on the internal audit arrangement adopted (in-house, outsourced, or co-sourced)?

In answering these questions, the study aims to achieve several interrelated objectives:
Objective (1) : To identify and validate the core antecedents of IAM;
Objective (2) : To assess the current state of maturity among Malaysian public-listed companies;
Objective (3) : To examine whether internal audit maturity levels vary significantly across organizations that adopt different internal audit arrangements (in-house, outsourced, and co-sourced);

These objectives are systematically translated into testable hypotheses and an empirically grounded model that reflects the theoretical insights drawn from Resource-Based Theory, and Duality Theory. Based on the literature review and building blocks framework, the following hypotheses are proposed:

H1a: There is a significant relationship between the internal audit structure and internal audit maturity.
H1b: There is a significant relationship between internal audit resources and internal audit maturity.
H1c: There is a significant relationship between internal audit processes and internal audit maturity.
H1d: There is a significant relationship between internal audit relationships and internal audit maturity
H2: Internal audit functions in Malaysia exhibit a maturity level that is significantly higher than the "Repeatable" stage of the internal audit maturity model.
H3: There are significant differences in internal audit maturity levels across different internal audit arrangements (in-house, outsourced, and co-sourced).

Grounded in both Resource-Based Theory (RBT), and Giddens Duality Theory the conceptual framework guiding this study (Figure 1) illustrates the theorized relationship between the internal audit maturity domains-comprising Internal Audit Structure (IAS), Internal Audit Resources (IAS), Internal Audit Processes (IAP) and Internal Audit Relationships (IARL), as critical factors influencing internal audit maturity. Specifically, it posits that the extent to which internal audit maturity is influenced by differences in internal audit models arrangements.

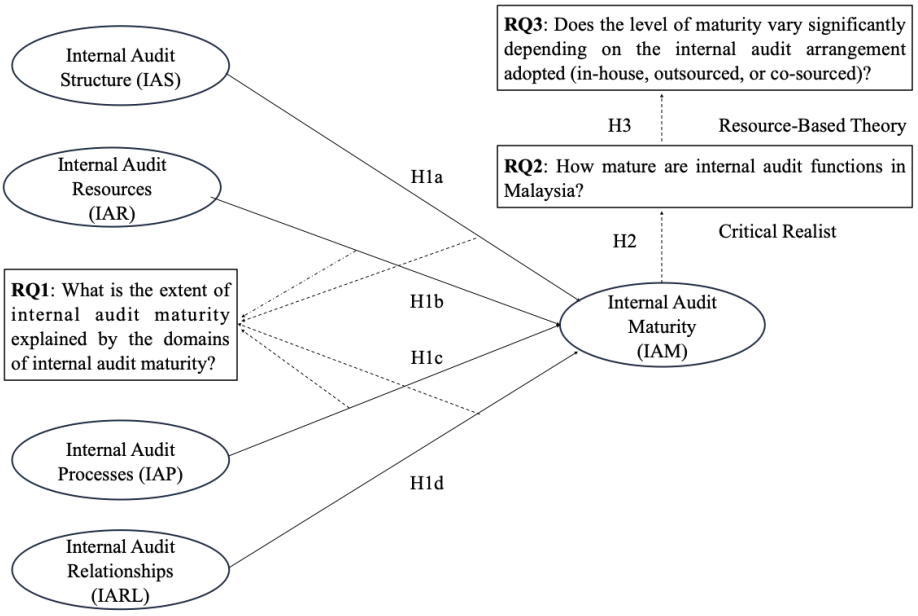

Fig 1: Conceptual Framework of Internal Audit Domains, Internal Audit Maturity and, Audit Arrangements across Different Models.

3. METHODOLOGY

3.1 Sampling and Data Collection

The sample was selected through content analysis of the top 200 Malaysian publicly listed companies (PLCs) by market capitalisation for the financial year 2023. The analysis involved reviewing the disclosures made in the annual reports of these firms. Instead of survey responses, binary indicators (1 = disclosed, 0 = not disclosed) were used to capture the presence or absence of internal audit attributes across the selected firms. This approach ensured objectivity by relying on publicly available data and eliminated potential response bias.

3.2 Measurement Development

Constructs were operationalized using reflective indicators derived from prior validated scales and aligned with the International Professional Practices Framework (IPPF) for the Internal Auditors. Internal audit structure was measured via five indicators including the presence of long-term IA strategic objectives, an IA charter and manual, risk-based internal audit plan, functional reporting to the audit committee and competency framework. Internal audit resources were assessed using five indicators related to structured training program, Chief Audit Executive's (CAE) professional qualifications, collective departmental competencies, other professional certifications eg ACCA, CPA, etc, and CIA certification was measured using a composite maturity score derived from a set of validated items capturing maturity levels. Internal audit processes were measured by comprehensiveness of internal audit scope, adoption of IPPF, advanced technologies utilization, periodic follow-up audit, used of Risk-

Based Internal Audit (RBIA), internal quality assessment, adoption of COSO framework and assurance mapping in place. Internal audit relationships were measured using five indicators relating to quarterly reporting to the audit committee, usage of IA as a management training ground, collaboration in strategic management, coordination with external auditors and private meetings with the audit committee chairman.

The measurement of maturity framework is adapted from the Internal Audit Maturity Model developed by the Institute of Internal Auditors (IIA) and supported by prior academic and professional research (Lenz, Sarens, & D'Silva, 2014; PwC, 2017). This model outlines five levels of maturity:

Level 1 – Initial: Ad hoc, unstructured internal audit activities, with minimal visibility.
Level 2 – Repeatable: Basic processes are in place, but not consistently applied or integrated.
Level 3 – Defined: Formal internal audit charter, risk-based planning, and documented processes are present.
Level 4 –Managed: Use of performance indicators and alignment with risk management and governance frameworks.
Level 5 –Optimized: IA acts as a strategic partner, contributes to decision-making, and engages in continuous improvement.

3.3 Data Analysis Techniques

The coded binary data (1 = disclosed, 0 = not disclosed) were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4. This approach was suitable given the exploratory nature of the model and the use of composite-based constructs. Reliability and validity of the measurement model were assessed through Confirmatory Composite Analysis (CCA), which included evaluations of outer loadings, composite reliability (CR), average variance extracted (AVE), and discriminant validity using the HTMT criterion. Variance Inflation Factor (VIF) values were examined to rule out multicollinearity.

The structural model was assessed using bootstrapping with 5,000 resamples to test the significance of path coefficients. R-squared (R^2), effect sizes (f^2), and predictive relevance (Q^2) were also reported. In addition, one-sample t-test, and Tukey and Games Howell post hoc tests were employed to compare internal audit maturity levels across different internal audit model types (in-house, outsourced, and co-sourced).

This study adopts a hierarchical component model (HCM) approach to examine the structural relationships among internal audit maturity dimensions and their subsequent impact on firm performance. The advantages of utilising HCM include a reduction in the number of indicators within a structural model, leading to increased parsimony. Secondly, when constructs exhibit high correlation, employing HCM is advantageous to mitigate the collinearity issue within the structural model and formative indicators. Thirdly, the management of the formative measurement model in PLS-SEM is more straightforward than that of CB-SEM. Furthermore, the comparison between both formative and reflective measurement models is also more accessible (Afthanorhan, 2014).

The model is estimated using SmartPLS 4, a variance-based SEM tool suitable for complex models and small to medium sample sizes (Hair et al., 2021; Ringle et al., 2022). Disjoint two-stage approach was utilised, where construct scores produced in the initial stage of the first-order construct served as input for model computation in the subsequent stage (Sarstedt, Jr, Cheah, & Becker, 2019). The use of Confirmatory Composite Analysis (CCA) ensures that both the measurement and structural models meet criteria for internal consistency reliability, convergent validity, discriminant validity, and multicollinearity control, particularly critical in formative specifications (Hair, Howard, & Nitzl, 2020).

The first-order measurement model evaluates the reflective latent variables of internal audit maturity with its associated antecedents (Dijkstra & Henseler, 2015; Memon, et al., 2021) before fulfilling the research objective one. Seven steps of assessment as illustrated in Table 1 must be met: 1) Estimation of loadings and determination of significance (Hair et al., 2020); 2) indicator reliability; 3) Internal consistency reliability (composite reliability); 4) convergent validity (AVE); and 5) discriminant validity (Dijkstra & Henseler, 2015; Hair, Matthews, Matthews, & Sarstedt, 2017; Jos211); 6) Nomological validity (Hair et al., 2020); and 7) Predictive validity (Hair et al., 2020).

Table 1: Reflective Measurement Model Criteria of First-Order using CCA

Reflective Measurement Model	**Index Name**	**Acceptable Value**	**Reference**
Step 1: Indicator loadings and significance			
Indicator Loading and		Values below 0.4 should be deleted.	Hair et al., 2021;

Reflective Measurement Model	**Index Name**	**Acceptable Value**	**Reference**
Significance Estimate		Loading's indicators ≥ 0.7 (or 0.708 to be precise), 0.6, 0.5 are adequate; *t*-statistics > +/- 1.96 confidence intervals excluding zero are statistically significant	Ringle, Sarstedt, Sinkovics and Sinkovics, 2023
Step 2: Indicator reliability			
Indicator reliability		Square root of the individual indicator loadings; Indicator reliability > 0.50	Hair et al., 2020; Hair et al., 2021
Step 3: Internal consistency reliability			
Cronbach's alpha (α); and Composite Reliability		≥ 0.70 and < 0.95; considering reporting Cronbach's α and *pc* as lower and upper boundaries, respectively (note that these two additional metrics require that indictor correlations in a measurement model are either all positive or negative)	Hair et al., 2021; Ringle et al., 2023; Nunnally, 1975
Reliability coefficient		Recommended 0.80 to 0.90	Dijkstra-Henseler, 2015
Step 4: Convergent validity			
Average Variance Extracted (AVE)		Retained indicators should have AVE ≥ 0.50. Indicators < 0.5 should be deleted	Ringle et al., 2023; Hair et al., 2020
Step 5: Discriminant validity			
Heterotrait-monotrait	Correlation between construct items	For conceptually similar constructs, HTMT < 0.90; or For conceptually different constructs, HTMT ≤ 0.85; Test if the HTMT is significantly lower than the threshold value	Henseler et al., 2015; Hair et al., 2021; Ringle et al., 2023
Step 6: Nomological validity			
Construct validity		Analyse the variations (ANOVA) at the interest construct's mean level and determine whether the construct's mean level varies in the hypothesized direction	Kock et al., 2024; Hair et al., 2020
Step 7: Predictive validity			
Concurrent validity		Direction and significance are expected	Kock et al., 2024; Hair et al., 2020

To address Research Question 1, which investigates the extent to which internal audit antecedents reflect the domains of internal audit maturity (IAM), a second-order construct approach was employed. After establishing the reliability and validity of the twenty-three antecedents, based on established measurement criteria (e.g., indicator reliability, composite reliability, AVE, and discriminant validity), the study proceeded to evaluate how these antecedents collectively form the second-order construct of internal audit maturity. This hierarchical modelling approach enables a more integrated understanding of the interrelationships among the latent constructs and their combined effect on internal audit maturity, consistent with reflective-formative measurement logic (Sarstedt et al., 2019). The five steps listed in Table 2 are used to evaluate the second-order formative model using CCA: 1) convergent validity; 2) indicator multicollinearity; 3) size and statistical significance of the indicator weights (Hair et al., 2020; Hair et al., 2021); 4) size and significant of loadings; and 5) assess predictive validity (Hair et al., 2020).

Table 2: Formative Measurement Model Criteria of Second-Order and Third-Order using CCA

Formative Measurement Model	**Acceptable Value**	**Reference**
Step 1: Convergent Validity		
Redundancy analysis	≥ 0.708 correlation between the formative construct and a reflective (or single item) measurement of the same concept	Hair et al., 2021; Ringle et al., 2023
Step 2: Indicator Multicollinearity		
VIFs	VIFs lower than or equal to 3 - 5; or	Amora, 2023;

Formative Measurement Model	Acceptable Value	Reference
	VIFs lower than 5	Ringle et al., 2023
Step 3: Size (Relevance) and Significance of Indicator Weights		
Statistical significance of indicator weights	$p < 0.05$; t-values > 1.96 (two-tailed test) → statistically significant; $p < 0.01$; t-values > 2.576 (two-tailed test) → critical values; and $p < 0.10$; t-values > 1.645 (two-tailed test) → probability of error.	Hair et al., 2021
Effect sizes	f^2 effect size > 0.02	
Step 4: Absolute contribution		
Relevance of indicators with significant weights	Larger significant indicator weights indicate a higher relative contribution of the indicator to the construct	Hair et al., 2021; Hair et al., 2020
Relevance of indicators with nonsignificant weights	Loading's indicators ≥ 0.5: keep the indicator although not significant; Loading's indicators < 0.5: Not significant → delete indicator; Significant → remove indicator	Hair et al., 2021; Hair et al., 2020
Step 5: Predictive Validity		
Concurrent validity	Direction and significance are expected	Kock et al., 2024; Hair et al., 2020

Upon measurement of the reliability and validity of the second-order construct. The composite score for IAM was calculated by summing the total multiplication of the LVS for IAS, IAR, IAP and IARL, and its corresponding outer weight using the following formula, to address Research Question 2;

> IAM composite score = IAS Composite Score + IAR Composite Score + IAP Composite + IARL Composite Score

The composite score was subsequently scaled to a maturity scale ranging from 1 to 5 through a linear transformation. The scaling ensures that scores correspond to maturity levels on a standardised scale, with 1 indicating the lowest maturity level (Initial) and 5 denoting the highest maturity level (Optimised).

> Scaled Score = ((IAM Composite Score – Min IAM Score)/(Max IAM Score – Min IAM Score)) * (Targeted Max – Targeted Min) + (Targeted Min)

Where, Targeted min scale = 1; Targeted max scale = 5

The IAM composite scores were analyzed by IA model—in-house, outsourced, and co-sourced—to evaluate potential group differences as outlined in Hypotheses H3, through a one-way analysis of variance (ANOVA). The independent variable was the type of internal audit model, categorised as in-house, outsourced, or co-sourced. To further investigate, the ANOVA result corroborating Hypothesis H3, post hoc comparisons were performed utilizing both Tukey HSD and Games-Howell methods. The experiments evaluated pairwise variations in the Internal Audit Maturity Composite Score (IAMCS) among the three internal audit model types: in-house, outsourced, and co-sourced together with boxplot to determine the distribution of IAM composite score among the three models.

4. RESULTS AND DISCUSSION

4.1 Measurement Model Evaluation

After removing all indicators that showed weak outer loadings of less than 0.708 (Hair et al, 2022), the indicators' Composite Reliability (CR) and Average Variance Extracted (AVE) using 5,000 sampled bootstrapping analysis were evaluated. Table 3 illustrates that all constructs exhibited satisfactory convergent validity. The AVE values varied between 0.600 and 0.835, exceeding the suggested minimum threshold of 0.50. The IA Structure demonstrated the highest AVE value (0.835, $t = 21.834$, $p < .001$), suggesting that a significant amount of the variance in its indicators is accounted for by the underlying construct. In a similar vein, IA Processes demonstrated an AVE of 0.765 with a t-value of 22.379 and a p-value less than .001. IA Resources showed an AVE of 0.600, a t-value of 21.592, and a p-value below .001. Additionally, IA Relations achieved an AVE of 0.684, a t-value of 22.441, and a p-value under .001, all of which satisfied the necessary criteria.

The findings validate that all first-order constructs exhibit convergent validity, thereby reinforcing the suitability of the measurement model for the following structural analysis.

Table 3: Average Variance Extracted (AVE) using CCA for FOCs Based on Bootstrapping (5,000 Resamples, One-Tailed)

Constructs	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
IA Processes	0.765	0.764	0.034	22.379	0.000
IA Relations	0.684	0.683	0.030	22.441	0.000
IA Resources	0.600	0.599	0.028	21.592	0.000
IA Structure	0.835	0.833	0.038	21.834	0.000

Heterotrait-Monotrait Ratio (HTMT) was then evaluated through bootstrapping, utilizing 5,000 resamples and a one-tailed test at a 90% confidence interval. According to Henseler et al. (2015), HTMT values below 0.85 signify good discriminant validity, whereas values ranging from 0.85 to 0.90 may be acceptable depending on the specific context. For confidence intervals, 1.00 should not be included. Three construct pairs exhibited HTMT values exceeding 0.90, with their 95% confidence intervals encompassing the threshold of 1.00 (e.g., IAS – IAP) reported an HTMT value of 1.021 (95% CI: 0.987 to 1.069), and IA Resources <-> IA Processes had an HTMT of 0.952 (95% CI: 0.861 to 1.073), suggesting potential discriminant validity concerns. The results indicate potential overlap in construct content or measurement redundancy (Franke & Sarstedt, 2019) as shown in Table 4.

Table 4: HTMT Results Using Confirmatory Composite Analysis (Bootstrapping, 5,000 Resamples, One-Tailed)

	Original sample (O)	Sample mean (M)	5.0%	95.0%
IARL <-> IAP	0.942	0.943	0.867	1.012
IAR <-> IAP	0.534	0.534	0.462	0.604
IAR <-> IARL	0.574	0.574	0.498	0.651
IAS <-> IAP	1.021	1.024	0.987	1.069
IAS <-> IARL	0.984	0.987	0.923	1.045
IAS <-> IAR	0.583	0.584	0.510	0.659

A model re-specification strategy was implemented to address this issue, grounded in the theoretical coherence and empirical intercorrelation of the constructs. The three first-order constructs (IA Structure, IA Processes, and IA Relations), which exhibit high correlation, with values surpassing the 0.85 threshold, thereby indicating possible concerns regarding discriminant validity, were reconceptualized as dimensions of a unified second-order construct termed IA Organizational Capability (IAOC). The higher-order construct was modeled reflectively using a disjoint two-stage approach, with latent variable scores from the first-stage model serving as indicators in the second-stage composite model.

In stage 2, the measurement of the second-order IAOC construct was developed by integrating first-order components with significant discriminant validity. The IAOC is characterized as a higher-order construct that includes the LVS Internal Audit Processes (IAP), Internal Audit Relations (IARL), and Internal Audit Structure (IAS), along with another construct in the path model, which is Internal Audit Resources (IAR). IAR construct is assessed using standard multi-item measures.

The outer loadings indicate that all first-order constructs demonstrate robust associations with the IAOC construct (IAS=0.955; IARL=0.938 and IAP=0.925). Additionally, the IAR sub-dimensions (IAR2, IAR3, IAR4, and IAR5) exhibit moderate to high loadings, with values ranging from 0.798 to 0.898. The findings from this phase provide additional evidence of the internal consistency and relevance of the chosen first-order constructs, thereby strengthening the reliability of the IAOC model for evaluating internal audit maturity within organizational contexts. The bootstrapping results provide robust evidence for the validity of the second-order IAOC construct. All outer weights with t-values exceeded 1.96 and p-values fall below 0.05 indicating significant and substantial evidence that the first-order constructs (IAP, IAR, IARL, IAS) contribute meaningfully to the formation of IAOC.

The findings from the assessment of Variance Inflation Factor (VIF) values to check for multicollinearity among the first-order constructs indicated that the first-order constructs (IAP, IARL, IAS) can be combined to create the second-order IAOC construct. Accordingly, the initial hypotheses suggesting that four internal audit constructs: structure, resources, processes, and relationships, would each demonstrate a significant relationship with internal

audit maturity (IAM) were subsequently revised. Theoretical and empirical integration of these constructs led to the development of a second-order formative construct known as Internal Audit Organisational Capability (IAOC), aimed at more effectively encapsulating their collective impact on IAM while maintaining the IA Resources as a reflective construct. The updated hypotheses are as follows:

Original Hypotheses	Revised Hypotheses
H1a: There is a significant relationship between the internal audit structure and internal audit maturity	H1a (Revised): There is a significant relationship between internal audit organizational capability (IAOC) and internal audit maturity
H1c: There is a significant relationship between internal audit processes and internal audit maturity	
H1d: There is a significant relationship between internal audit relationships and internal audit maturity	
H1b: There is a significant relationship between internal audit resources and internal audit maturity.	H1b: There is a significant relationship between internal audit resources (IAR) and internal audit maturity

4.2 Structural Model Results

In order to test the hypotheses H2, the IAM construct is characterized as a higher-order formative construct, originating from multiple first-order constructs as depicted in Fig 2.

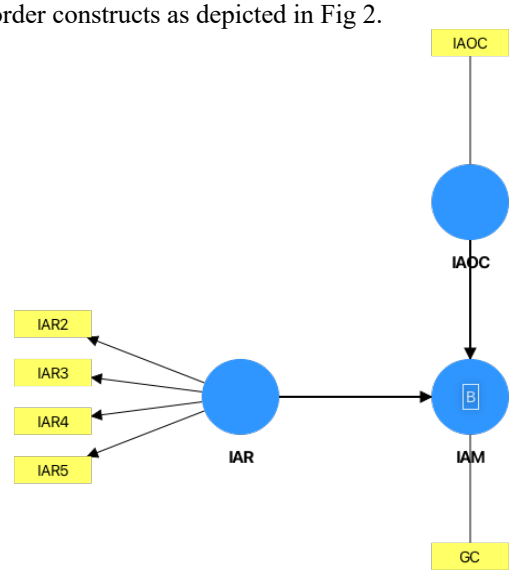

Fig 2: Structural Model of Internal Audit Maturity (Higher-Order Construct)

Through Confirmatory Composite Analysis (CCA) employing bootstrapping procedures with 5,000 subsamples in SmartPLS 4, within the Internal Audit Resources (IAR) construct, all four indicators exhibited outer loadings surpassing the recommended threshold of 0.70, thereby affirming the reliability of the indicators (Hair et al., 2021).

The relationships GC → IAM and IAOC ← IAOC exhibited weights of 1.000. The IAM construct necessitates a minimum of one indicator, as SmartPLS 4 regards this formative construct as an endogenous variable within the IAOC second-order formative construct (Shin & Kim, 2011; Hair, Howard, & Nitzl, 2020). The structural design of higher-order constructs (reflective-formative and formative-formative specifications) within the disjoint two-stage approach resulted in the absence of t-statistics or p-values (Table 5).

Table 5: Outer Loadings Using Bootstrapping for IAM Formative Construct

	Original sample (O)	T statistics (|O/STDEV|)	P values
GC -> IAM	1.000	n/a	n/a
IAOC <- IAOC	1.000	n/a	n/a
IAR2 <- IAR	0.792	25.269	0.000
IAR3 <- IAR	0.831	34.452	0.000
IAR4 <- IAR	0.897	53.697	0.000

	Original sample (O)	T statistics (|O/STDEV|)	P values
IAR5 <- IAR	0.851	41.624	0.000

The outer weights for the Internal Audit Maturity (IAM) formative construct in Table 6 were determined through bootstrapping, utilising 5,000 resamples and revealed that the first-order IAR constructs have a significant contribution to the third-order IAM construct, as evidenced by all P-values being below the conventional significance threshold of 0.05. The T-values for all paths surpass the critical threshold of 1.96, thereby confirming the robustness and statistical significance of the relationships. Whilst the IOAC's outer weights showed 1.000, both IAOC and IAR constructs have a direct impact on the IAM construct. The findings indicate that the first-order constructs of IAR play a significant role in the development of IAOC, which subsequently acts as a crucial factor influencing IAM, hence hypotheses H1a (revised) and H1b are supported.

The findings support the conceptualisation of IAM as a formative construct, with IAOC functioning as a second-order construct that serves as a critical latent variable impacting IAM. The findings indicate that IAM represents a multifaceted aspect of internal audit maturity, with IAOC serving as a key factor influenced by processes, structure, and relationships, together with IAR.

Table 6: Outer Weights Using Bootstrapping for Third-Order IAM Formative Construct

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GC -> IAM	1.000	1.000	0.000	n/a	n/a
IAOC <- IAOC	1.000	1.000	0.000	n/a	n/a
IAR2 <- IAR	0.215	0.215	0.008	25.647	0.000
IAR3 <- IAR	0.334	0.335	0.016	21.245	0.000
IAR4 <- IAR	0.282	0.282	0.009	30.473	0.000
IAR5 <- IAR	0.351	0.352	0.017	21.052	0.000

The R-square value of 0.870 indicates that 87% indicates the model has a strong explanatory power in assessing internal audit maturity. Further, the R-square adjusted value of 0.868, which is slightly lower than the R-square value, adjusts for the number of predictors and is still indicative of a strong model fit. The minor difference between the R-square and R-square adjusted values indicates that the model is not overly complex and that the included constructs contribute meaningfully to explaining IAM (Table 7).

Table 7: R-Square and R-Square Adjusted for IAM

	R-square	R-square adjusted
IAM	0.870	0.868

Table 7 illustrates the structural model as derived from SmartPLS analysis. Path coefficients, shown alongside directional arrows, demonstrate statistically significant relationships between IAOC and IAR with IAM.
IAOC → Internal audit maturity: $\beta = 0.330$, $t = 11.672$, $p < .001$
IAR → Internal audit maturity: $\beta = -0.045$, $t = 2.652$, $p < .001$

Table 8: Structural Model Path Coefficients

Path	β	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
IAOC -> IAM	0.330	0.327	0.028	11.672	0.000
IAR -> IAM	-0.045	-0.046	0.017	2.652	0.004

Table 8 shows that IAOC exerts a significant positive influence on IAM ($\beta = 0.330$, $t = 11.672$, $p < .001$), demonstrating robust concurrent validity. This finding supports the theoretical premise that organisational capability, which includes internal processes, systems, and relational structures, is crucial in determining the overall maturity of the internal audit function.

Interestingly, IAR exhibited a significant negative effect on IAM ($\beta = -0.045$, $t = 2.652$, $p = .004$). The small negative coefficient, although statistically significant, indicates a more complex relationship. This suggests that

resources, when evaluated in isolation from capability and integration, may not necessarily enhance the perceived maturity of the internal audit function and could, in certain situations, impede it (e.g., resource overload lacking strategic alignment).

4.3 Level of Internal Audit Maturity in Malaysia

The study found that complex government regulations (Mean = 4.22, SD = 0.984) and lack of compliance guidance (Mean = 4.22, SD = 0.960) are major barriers to e-invoicing adoption. The lack of training from regulatory authorities (Mean = 4.38, SD = 0.926) was identified as the most significant regulatory issue. Additionally, SMEs reported that integrating e-invoicing with tax compliance (Mean = 4.24, SD = 0.897) was particularly challenging.

These findings support prior research suggesting that unclear tax policies and compliance burdens hinder technology adoption (Ahmad et al., 2021). SMEs struggle with understanding and implementing new digital regulations, which increases the risk of non-compliance. While regulatory complexity was a challenge, regression analysis indicated that it was not a statistically significant predictor of adoption. This suggests that while SMEs perceive compliance as difficult, it may not directly determine their decision to adopt e-invoicing. Governments must simplify compliance processes, provide structured training, and offer clearer guidelines to ease adoption.

4.4 Technological Readiness and Adoption Rates

H2 operates as a diagnostic hypothesis, intended to assess whether internal audit functions in Malaysia have attained a level at which performance contribution is feasible and sustainable. The average IAM composite score that was a sum of the latent variable scores (LVS) for IAOC and IAR across all 200 samples was 2.47. The established maturity scale denotes that a composite score of 2.47 corresponds to a maturity level between Level 2 (Repeatable) and Level 3 (Defined), indicating that the internal audit functions are partially developed but lack consistent application or integration across the organization.

The hypothesis H2 posits that the internal audit functions in Malaysia demonstrate a maturity level that is significantly above the "Repeatable" stage (Level 2) of the internal audit maturity model.

A one-sample t-test was performed using SPSS version 40 to evaluate the hypothesis, comparing the sample mean maturity score to the benchmark value of 2.0. The dependent variable was the internal audit maturity composite score (IAMCS). The analysis indicated a statistically significant difference: $t(199) = 5.086$, $p < .001$ (one-tailed). The calculated sample mean was 2.47, indicating a mean difference of 0.474. The 95% confidence interval was established to range from 0.290 to 0.658. The findings in Table 9 demonstrate that the average internal audit maturity level within the sample exceeds the "Repeatable" stage significantly.

Consequently, H2 is statistically supported; however, the practical implication indicates that the majority of internal audit functions are still in a transitional phase, progressing but not yet fully matured.

Table 9: Internal audit maturity level one-sample test

One-Sample Test

Test Value = 2

	t	df	Significance		Mean Difference	95% Confidence Interval of the Difference	
			One-Sided p	Two-Sided p		Lower	Upper
IAMCS	5.086	199	<.001	<.001	.47380	.2901	.6575

4.5 Comparative Analysis of Internal Audit (IA) Models

While H2 establishes this baseline level of maturity, it does not account for variability in maturity across different internal audit arrangements, nor does it reveal how internal audit antecedents are differentially adopted depending on audit model type. To investigate these dimensions, the analysis progressed to evaluate Hypotheses H3 to address Research Question 3, which collectively examined whether internal audit model types (in-house, outsourced, co-sourced) are associated with significant differences in internal audit maturity levels.

To assess differences in IA maturity across IA model arrangements (in-house, outsourced, co-sourced), a one-way analysis of variance (ANOVA) was conducted. Table 10 indicated a statistically significant difference in internal audit maturity scores among the three types of IA models, $F(2, 197) = 8.079$, $p < .001$. Generally, this finding

supports the Hypothesis H3, demonstrating that the type of the internal audit arrangement has a significant impact on maturity levels.

Table 10: One-way ANOVA

ANOVA

IAMCS	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26.192	2	13.096	8.079	<.001
Within Groups	319.330	197	1.621		
Total	345.522	199			

The outcomes of the Games-Howell test that further corroborating ANOVA, which accommodates different variances and sample sizes, revealed the variations in the Internal Audit Maturity Composite Score (IAMCS) among the three internal audit model types, indicating the following:

- In-house vs Outsourced: In-house models reported significantly higher IAMCS than outsourced models (*Mean Difference = 0.63*, *p = .001*).
- In-house vs Co-sourced: In-house models also scored significantly higher than co-sourced models (*Mean Difference = 1.22*, *p < .001*).
- Outsourced vs Co-sourced: Outsourced models reported significantly higher IAMCS than co-sourced models (*Mean Difference = 0.59*, *p = .047*).

The Hypothesis H3 is further reinforced by the boxplot in Fig 3 that depicts the distribution of IAM composite score among three internal audit models. Collectively, these post hoc and boxplot findings offer strong evidence for H3, suggesting that in-house audit functions correlate with significantly higher levels of maturity.

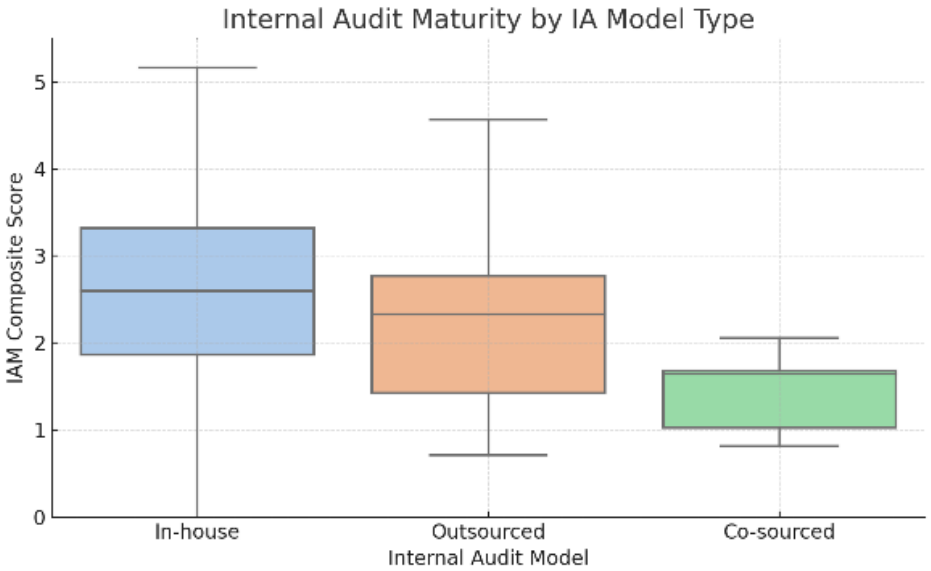

Fig 3: Boxplot distribution of Internal Audit Maturity Composite Scores (IAMCS) by Internal Audit Model Type

Based on the hypotheses tested, below are the summary of this study:

Table 11: Summary of hypotheses testing

Hypothesis	**Statement**	**Path Coefficient/Test Statistic**	**Result**
H1a (revised)	There is a significant relationship between the internal audit organisational capacity and internal audit maturity.	β = 0.330, t = 11.672, p < .001	Supported Strong, significant positive effect

Hypothesis	Statement	Path Coefficient/Test Statistic	Result
H1b	There is a significant relationship between internal audit resources and internal audit maturity	$\beta = -0.045$, $t = 2.652$, $p < .001$	Supported Significant negative effect
H2	Internal audit functions in Malaysia demonstrate a maturity level that is significantly higher than the "Repeatable" stage on the internal audit maturity scale.	$T = 5.086$, $p < .001$	Not fully supported
H3	There are significant differences in internal audit maturity across IA arrangements (in-house, outsourced, co-sourced).	$F(2,197) = 8.079$, $p < .001$ (ANOVA); Games-Howell: all pairwise differences $p < .001$	Supported

Based on Table 11 above, all four hypotheses were empirically supported by the data. H1a(revised) and H1b demonstrate that both internal audit organizational capacity comprises of internal audit structure, internal audit process and internal audit relationships, and latent variable of internal audit resources significantly contribute to internal audit maturity, with strong path coefficients and high statistical significance. H2 only shows a slight support though it is hypothesized to be higher than “Repeatable”. H3 is also supported, with significant ANOVA and post hoc test results indicating meaningful differences in maturity levels across internal audit model types. Specifically, in-house models demonstrated the highest levels of maturity, followed by outsourced and co-sourced models.

4.6 Discussions

These findings empirically support the theoretical model proposed by Lenz et al. (2014). Internal audit structure, internal audit processes and internal audit relationships which are combined into internal audit organizational capacity due to their multicollinearity and internal audit resources are critical enablers of IA maturity, contributing to independence, competence, and integration. The structural dimension ensures that the IAF has authority and strategic positioning, while the resource dimension ensures technical capability. The significant differences in maturity scores across IA models suggest that organizational arrangements matter. In-house models, often equipped with dedicated staff and direct reporting to the audit committee, exhibit higher maturity levels. Outsourced and co-sourced models, though cost-efficient, may lack strategic alignment and institutional continuity, limiting maturity development. These results echo prior studies (Kolsi & Al-Hiyari, 2024; Christopher et al., 2009) indicating that outsourcing can constrain audit depth and autonomy.

The findings, viewed through a critical realist perspective, support the idea that IAM emerges from underlying generative mechanisms. The difficulty in distinguishing internal audit structure, internal audit processes and internal audit relationships empirically underscores their co-embedding in practice, illustrating the duality of structure and agency as articulated by Giddens (1984). In internal audit contexts, processes are influenced by structural conditions such as reporting lines and formal mandates, which are perpetually reinforced through engagement with audit committee and senior management, and operational routines.

The study also revealed that the average internal audit maturity (IAM) score for the 200 sampled Malaysian PLCs was 2.47, positioning it between the “Repeatable” and “Defined” stages of the internal audit maturity model. This level indicates that although certain formal internal audit practices have been put in place, they have not yet been completely integrated throughout the organisation. Processes might be applied inconsistently and may not exhibit strategic integration or mechanisms for continuous improvement. Collectively, these insights highlight that the maturity of internal audit in Malaysian PLCs, although advancing, is still primarily focused on operational and compliance functions instead of evolving into integrated and strategic roles. The disparity between existing maturity levels and the expectations set by regulatory or professional bodies highlights the necessity for enhanced audit governance, investment in auditor skills, and alignment with internationally recognised internal audit standards.

The underlying theoretical rationale based on the findings of hypothesis H3, stems from prior literature indicating that the organisational placement and resourcing of the internal audit function can critically influence its development and maturity trajectory (Lenz & Sarens, 2011; Alzeban, 2020). The findings indicate that in-house models exhibit significantly higher maturity levels compared to outsourced and co-sourced arrangements. The findings suggest that organizational control, continuity, and the embeddedness of internal audit functions are significant enablers of maturity. This aligns with the Resource-Based Theory, which posits that the ownership and strategic alignment of internal resources enhance institutional capabilities.

Further, this finding is consistent with prior research indicating that the arrangement of internal audit models (in-house, outsourced or co-sourced) influence the execution of audit practices and the conditions that facilitate them

(Christopher, Sarens, & Leung, 2009; Mihret & Yismaw, 2007). Kolsi and Al-Hiyari (2024) found that in-house internal auditing in Malaysian PLCs has a more significant impact on governance and performance outcomes compared to outsourced models, which tend to emphasise compliance due to their operational nature.

In summary, the empirical evidence from H7a, specifically, closely correlates with recent research by Kolsi and Al-Hiyari (2024) and transcends the methodological constraints noted by Cooper et al. (1996), offering substantial proof of the significance of structurally internalising internal audit functions for attaining enhanced maturity and governance results.

5. CONCLUSION AND IMPLICATIONS

These findings indicate a necessity for increased decision making in the selection of internal audit models. Organizations must assess the effectiveness of their existing arrangements, whether outsourced or co-sourced, in achieving the strategic alignment required to fully leverage the value of internal audit maturity. Firms with moderate maturity can enhance the benefits of internal audit maturity through targeted interventions, including the reinforcement of internal audit oversight, the improvement of auditor competencies, and fostering an environment of organizational commitment.

From a Critical Realist perspective, the IA model functions as a causal mechanism that influences the development of audit maturity over time. Bursa Malaysia requires PLCs to establish internal audit functions; however, this external regulation does not consistently result in matured internal audit practices, nor does it ensure uniform high levels of internal audit maturity. The results presented in H2 indicate that the average maturity score (2.47) is only slightly above the “Repeatable” level, implying that mere compliance with listing requirements does not ensure effective internalisation of audit quality or the institutionalisation of capability

These notions are most comprehensively understood through the combined perspectives of Duality Theory and Resource-Based Theory (RBT), highlighting both structural limitations and the strategic agency inherent in organizational activities.

The duality theory, emphasizing the relationship between structure and agency, offers a significant perspective for analyzing the diverse maturity levels of internal audit arrangements. The results indicated that internal audit maturity in Malaysian PLCs is moderate, slightly beyond the "Repeatable" stage (H2). This moderate maturity is substantially affected by internal audit models (H3), with in-house arrangements demonstrating higher maturity than outsourced and co-sourced solutions.

Together, the duality and resource-based perspectives explain why certain internal audit models outperform others in maturity development, as indicated by hypotheses H7–H8. The maturity of internal audit is fundamentally influenced by structural opportunities and organizational agency. Organizations that integrate structured governance frameworks with proactive agency—by strategically internalizing resources and thoroughly embedding audit practices within their operations—are optimally positioned to attain high maturity and, in theory, favorable performance outcomes. In conclusion, the unexpected result in H9 challenges conventional assumptions regarding internal audit maturity and performance outcomes. This highlights a critical practical implication: maturity alone is insufficient without active strategic alignment and internal governance support.

This study extends the internal audit literature by providing empirical evidence on the role of internal audit structure, resources, processes and relationships, the ‘building blocks’ in shaping maturity. Findings support the view that maturity is contingent upon both formal governance mechanisms and human capital investment. Practitioners should assess their IA function’s positioning and resourcing relative to best practices to benchmark maturity. Regulators may consider integrating IA maturity indicators into corporate governance disclosures, especially for sectors with systemic risk. Policymakers should encourage organizations to strengthen internal audit frameworks by mandating minimum resourcing and structural standards aligned with the IPPF.

5.1 Limitations and Future Research

This study is cross-sectional and limited to Malaysian PLCs. Future research may employ longitudinal data to track maturity progression and explore additional antecedents such as technology adoption, audit culture, or industry effects. Comparative studies across ASEAN economies may offer insights into contextual determinants of audit capability.

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