

Factors influencing the implementation of risk-based auditing

Risk-based auditing

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Abstract

Purpose – The purpose of this paper is to examine, from the agency perspective, the influence of internal audit and audit committee attributes, as well as risk management and internal control systems, on the implementation of risk-based auditing among public-listed companies in Malaysia.

Design/methodology/approach – A questionnaire survey was distributed to the in-house internal audit function in approximately 620 public-listed companies. Consequently, data from 117 heads of the internal audit function was collected and analyzed.

Findings – The findings indicate that “audit committee review and concern” and “risk management system” are significantly and positively related to the implementation of risk-based auditing. Most importantly, the results indicate the importance of audit committee inputs and concerns in reviewing internal audit activities. Empirically, the findings also suggest that a more formalized risk environment would foster the existence of a strong risk-aware culture and hence provides a strong foundation for internal audit to implement risk-based auditing. However, internal audit experience, size of internal audit function, audit committee qualifications, and internal control system are not found to be significant predictors of the presence of risk-based auditing.

Research limitations/implications – This study examined only risk-based auditing practices in the in-house internal audit function of public-listed companies; hence, the findings cannot be generalized to all Malaysian-listed companies that outsource or co-source their internal audit activities.

Social implications – An effective internal monitoring mechanism and better quality of internal audit work will minimize potential risks that prevent the achievement of company objectives, reduce propensity to falsify financial information, and improve financial reporting quality.

Originality/value – This study contributes evidence concerning the relationship between internal monitoring mechanisms and the implementation of risk-based auditing among in-house internal audit activity.

Keywords Malaysia, Internal audit, Audit approach, Risk-based

Paper type Research paper

1. Introduction

The occurrence of business failures highlights an inability among companies to identify risks associated with their strategic initiatives (Grant and Visconti, 2006). Because risks threaten the sustainability of organizations, it is paramount to properly manage risks. Changes in the business environment, advances in technology, and developments in regulatory frameworks have largely transformed the auditing approach adopted by the internal audit function (Lemon and Tatum, 2003; KPMG, 2007). Eventually, the adoption of risk-based auditing procedures will expand the scope of internal audit activities to include the integrated monitoring of all organizational activities (Selim and McNamee, 1999a). In essence, the use of structured risk-based audit procedures will reinforce the oversight duties performed by the internal audit function and the adequacy of audit coverage of key business activities.

The shift to using risk-based auditing underscores the importance of assessing the risks inherent in strategic and operational objectives (Selim and McNamee, 1999b). The internal audit function is expected to examine risks on an integrated rather than isolated basis

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(Matyjewicz and D'Arcangelo, 2004) and to incorporate standardized risk assessment procedures into annual internal audit planning (Koutopis and Tsamis, 2009) throughout the entire individual internal audit engagement process (Selim and McNamee, 1999b; Coetzee and Lubbe, 2014). The lack of integrated monitoring and inefficient assessment of risks at the strategic and operational level leads to the imprecise coverage of exposure to strategic and operational risks in the audit universe. In addition, when risk-based auditing procedures are not implemented consistently across all internal audit processes, the internal audit function ends up assessing the state of internal control rather than the state of risk (Selim and McNamee, 1999b; Verrault and Hyland, 2005). Moreover, Sarens (2009) also suggests that the auditing technique adopted could affect the quality of the internal audit work performed. Eventually, inconsistencies and non-standardized auditing procedures can result in poor audit coverage of key risk areas and the poor-quality performance of internal audit (Koutopis and Tsamis, 2009; Coetzee and Lubbe, 2014). Furthermore, Selim and McNamee (1999b) suggest that the adoption of risk-based auditing largely depends on the influence of internal monitoring mechanisms such as the audit committee, the internal audit attributes, and the risk management and internal control systems.

The aim of this study is to identify the relationship between internal monitoring mechanisms and the implementation of risk-based auditing in the in-house internal audit function. This investigation is based on an analysis of 117 questionnaire surveys completed by the heads of the in-house internal audit function in public-listed companies in Malaysia. After controlling for organizational characteristics, the results show that there is a significant positive association between audit committee review concern and implementation of risk-based auditing. The results imply that greater involvement by a diligent audit committee would enhance the implementation of risk-based auditing. In similar vein, the influence of the risk management system on the implementation of risk-based auditing is also significant and positive. This indicates that a well-developed risk management system would enhance a risk culture and risk awareness among employees. Overall, the findings confirm the importance of internal monitoring mechanisms in promoting better-quality audit practices.

This paper extends and contributes to the prior literature in several ways. First, internal audit practices vary widely between countries; some practices are mandatory in certain countries but voluntary or recommended in others. Moreover, prior studies on internal audit have mainly focused on the European and Anglo-Saxon context. By investigating the situation in Malaysia, this study extends the scope of research to encompass the mandatory environment in emerging economies. Second, prior empirical research has predominantly examined the influence of company-specific characteristics on the implementation of risk-based auditing. In this study, the inclusion of the risk management and internal control systems, as well as the audit committee and the internal audit characteristics, allows additional empirical insights to be offered to the influence of internal monitoring mechanisms and the implementation of risk-based auditing. Third, prior studies have mainly adopted a qualitative approach to this topic. In contrast, this paper presents empirical findings to support the qualitatively-based suggestions put forward in earlier studies. Fourth, previous empirical research on the implementation of risk-based auditing was confined mainly to examining risk assessment activities in audit planning. Little attention was paid to the implementation of risk-based auditing procedures across the entire spectrum of internal audit process. This study is more extensive in that it covers all the phases of internal audit process.

The remainder of the paper is structured as follows: the next section reviews prior literature and outlines the development of hypotheses. This is followed by an explanation of the research method. Then the results of the analysis are presented. The paper ends with a brief discussion of the findings, some concluding remarks, and highlights the implications and limitations of the study.

2. Literature review and hypotheses development

Agency theory stipulates that separation of ownership and control between the principal (shareholders) and agent (management) heightens the occurrence of moral hazard, divergence in risk preferences, and information asymmetry (Fama and Jensen, 1986; Eisenhardt, 1989). As such, well-designed information systems, control devices, and oversight mechanisms aim to minimize agency costs and offer maximum benefit to all parties (Eisenhardt, 1989). According to the agency perspective, the role of the internal audit function is mainly to monitor management actions and decisions in executing strategies and achieving performance targets (Adams, 1994). As such, the use of structured risk-based auditing procedures by the internal audit function would ensure that risks inherent in strategies are identified and mitigated properly, and that management conduct is aligned to the interests of stakeholders.

2.1 Risk-based auditing

Risk-based auditing procedures underscore the importance of identifying the risks inherent in strategic plans, and of testing and reporting the adequacy and effectiveness of risk mitigation procedures (Selim and McNamee, 1999b; Coetzee and Lubbe, 2014). According to Selim and McNamee (1999b), the structured risk-based auditing technique should adopt risk management practices (i.e. risk identification, risk management, and risk communication) not only in annual audit planning but also in all phases of individual audit engagements (i.e. in audit planning, audit execution, and audit reporting). Ultimately, this would ensure the provision of holistic reporting on the impact mitigation of risks that may prevent the attainment of organizational objectives.

According to Selim and McNamee (1999b) and Coetzee and Lubbe (2014), structured risk-based auditing can be practised if auditable areas are aligned with overall organizational activities and objectives, if risk assessment activities are conducted in annual and individual audit planning, and if the effectiveness of risk and control processes is tested. Proper implementation of risk-based auditing would enable the internal audit function to provide assurance and information on the misalignment between the corporate and the business level in terms of action plans and achievement of results, identified risks or pertinent issues that are not being managed properly, and weaknesses in governance, risk management, and control processes. In addition, a holistic approach to risk-based auditing would enhance the effectiveness and efficiency of audit procedures, improve the allocation of valuable internal audit resources, and result in a greater focus on performing audit engagements (Coetzee and Lubbe, 2014).

Previous studies have focused mainly on the risk assessment activities conducted in the audit planning stage (Allergini and D'Onza, 2003; Koutopis and Tsamis, 2009; Castanheira *et al.*, 2010). In their study of internal auditing and risk assessment in large Italian companies, Allergini and D'Onza (2003) found that 67 percent of companies assessed strategic plans and risks, 25 percent used the traditional cyclical approach to audit, and a few implemented risk assessments for strategic and operational activities. Furthermore, Koutopis and Tsamis (2009) discovered that risk-based auditing procedures are unstructured, semi-structured, and structured. In the unstructured approach, no risk assessment activity is conducted. In the semi-structured approach, risk assessment activities are conducted mainly during annual audit planning. Meanwhile, in the structured approach, risk assessment activities are conducted in both annual and individual audit plans. Notably, for the effective implementation of risk-based auditing, there needs to be an adequate audit coverage. Thus, risk assessment activities need to be conducted during audit planning, and the effectiveness of risk management and control processes needs to be evaluated and communicated to the audit committee periodically (Selim and McNamee, 1999b; Anderson and Dahle, 2006).

Castanheira *et al.* (2010) reveal that the adoption of risk-based auditing is significantly related to international firms and listed companies. However, they noted that firm size, industry, and private or public sector are not significant predictors of the adoption of risk-based auditing in the audit planning stage. Meanwhile, other studies have found that company size, regulations, industry, and organizational culture are crucial in promoting the adoption of risk-based auditing in annual and individual audit planning (Allergini and D'Onza, 2003; Koutopis and Tsamis, 2009). In addition, Selim and McNamee (1999a) show that the implementation of risk-based auditing is determined largely by internal audit competencies, organizational culture, and top management mindsets. However, the lack of statistical evidence in prior studies inspired the present study to examine the proposed relationship.

2.2 Internal audit attributes

According to agency theory, the presence of an internal audit function as an internal monitoring mechanism is integral to corporate governance. Prior studies conclude that cumulative business knowledge and understanding of business risks are pertinent competencies for stimulating the implementation of risk-based auditing (Selim and McNamee, 1999a). Moreover, the size of the internal audit function affects the availability of internal audit resources to meet the demands of internal audit work (Mat Zain *et al.*, 2006; Arena and Azzone, 2009).

Cumulative knowledge of business processes and operations, company-specific knowledge on risk and control matters, and work experience in areas related to accounting and auditing are important criteria for the internal auditors (Selim and McNamee, 1999a; Mat Zain *et al.*, 2006; Sarens *et al.*, 2009). Indeed, it is crucial that internal auditors are experienced and well-equipped with specific knowledge and in-depth understanding of business processes, risk management, and control activities so that they can perform their tasks effectively (Selim and McNamee, 1999a; Sarens *et al.*, 2009). Beasley *et al.* (2008) found that internal auditors with a greater understanding of business processes and related risks could play a leading role in risk-assessment-related activities. In addition, the study also found that the seniority and tenure of the chief audit executive (CAE) is more likely to influence risk-management-related activities.

The internal audit function needs to be well resourced. A larger-sized internal audit function is more likely to have the resources to meet the potential needs of an extensive audit and to offer a greater pool of staff talent. Arena and Azzone (2009) found that the size of the internal audit function influences the internal audit effectiveness. In other words, a larger-sized internal audit unit is able to meet the demands of wider audit coverage in the auditable universe. In a similar vein, Mat Zain *et al.* (2006) found that a larger-sized internal audit unit enhances the internal audit contribution to the financial statement audit. Their study indicates that a larger number of internal audit staff is able to perform more of the required audit tasks. Thus, it is hypothesized that:

- H1. There is a positive relationship between internal audit experience and the implementation of risk-based auditing.
- H2. There is a positive relationship between the size of the internal audit function and the implementation of risk-based auditing.

2.3 Audit committee attributes

From the perspective of agency theory, the aim of the audit committee is to provide a strong oversight function for monitoring management actions. In this regard, the present study examines two audit committee attributes: audit committee qualifications and audit committee review concern. The audit committee qualifications attribute represents the

competencies that the members of the audit committee of all public-listed companies should possess in order to comply with the requirements of the code of corporate governance. On the other hand, the audit committee review concern attribute refers to the proactive attitude of the audit committee in giving their opinions and views on the audit process. Thus, audit committee review concern indicates the diligent attitude of audit committee members towards good governance practices and their involvement in discharging their oversight duties with respect to internal audit activities.

Internal audit is an important source of information for the audit committee, as this information helps the committee to fulfill its oversight responsibilities. Mat Zain and Subramaniam (2007) found that a knowledgeable audit committee with broad-based expertise tends to request more information on critical issues, such as the appraisal of investment projects. In addition, a proactive and diligent audit committee demands more reliable and timely information to help it make informed decisions (Turley and Zaman, 2004). In addition, Sarens *et al.* (2009) indicate that a knowledgeable audit committee needs the assurance on risk and control matters, and, in turn, this drives audit committee members to assess the adequacy of internal audit planning.

Likewise, an audit committee that has good leadership highlights its concerns on pertinent issues and sets the tone for the whole organization in terms of good governance practices (Selim and McNamee, 1999a). Empirical studies have indicated that when an audit committee expresses concerns about strategic issues, it results in greater internal audit involvement in risk assessment activities (Selim and McNamee, 1999a; Woods, 2007; Beasley *et al.*, 2008). Moreover, a powerful audit committee is able to exert greater influence on top management and is more critical when dealing with non-routine business activities (Turley and Zaman, 2007). Based on the preceding arguments, vigilant audit committee members are greatly involved in reviewing the work and results of internal audit activities in ensuring the adequacy of audit coverage and in highlighting any concerns they have about pertinent issues. As such, it would seem that the audit committee's need for information and assurance about high-risk areas would promote the implementation of risk-based auditing. Therefore, it is postulated that:

- H3. There is a positive relationship between audit committee qualifications and the implementation of risk-based auditing.
- H4. There is a positive relationship between audit committee review concern and the implementation of risk-based auditing.

2.4 Risk management and internal control systems

According to agency theory, companies often employ organizational systems and policies as a means to align and monitor management actions and decisions. The formalization of the risk management system is a reflection of the management's commitment to proper structures and procedures for managing risks (Crawford and Stein, 2002; Goodwin-Stewart and Kent, 2006; Coetzee and Lubbe, 2014). Furthermore, the presence of a formalized risk management system enhances risk awareness within an organization (Selim and McNamee, 1999a; Page and Spira, 2004; Woods, 2007). Therefore, more highly developed risk management systems should lead to greater internal audit involvement in risk-assessment-related activities, such as risk workshops and control and risk self-assessment activities (Woods, 2007; Beasley *et al.*, 2008). In addition, as suggested by the Institute of Internal Auditors UK and Ireland (2003), the nature and extent of internal audit involvement in risk assessment activities are dependent on the stage of risk management implementation. Previous research argues that a formalized risk management system establishes a strong foundation for the implementation of risk-based auditing procedures.

In addition, agency theory supports the view that the purpose of an effective internal control system is to ensure the integrity of financial information and effectiveness of business operations. The establishment of an effective internal control system aligns management actions and decisions in accord with the best interests of stakeholders, and provides a supportive environment for the assessment of control and risk and the performance of monitoring. Past studies have found that the existence of an effective internal control and performance measurement system intensifies control awareness within an organization (Selim and McNamee, 1999a; Woods, 2007). For instance, Woods (2007) illustrates that the presence of strong control awareness can help the internal audit function to educate management about the importance of risk ownership (risk identification), to use control procedures as part of risk mitigation procedures, and to achieve performance targets. In addition, Selim and McNamee (1999a) reveal that the tone at the top (control environment), and a better appreciation of control awareness, triggers greater internal audit involvement in risk assessment activities. Thus, the establishment of an effective control system would heighten the implementation of risk-based auditing.

In short, the formalization of risk management and internal control systems establishes a strong infrastructure that enhances risk and control awareness within a company. Based on the foregoing arguments, the following hypotheses are proposed:

- H5. There is a positive relationship between the risk management system and the implementation of risk-based auditing.
- H6. There is a positive relationship between the internal control system and the implementation of risk-based auditing.

3. Research method

3.1 Data collection procedure

A questionnaire was developed based on a review of the literature and internal auditing standards. Despite of the revisions made to the internal auditing standards, requirement on risk-based audit plan remains unchanged, i.e. Performance Standards 2010 consistently states that CAE must establish a risk-based plan to determine the priorities of the internal audit activity, consistent with the organization's goals (Institute of Internal Auditors Research Foundation (IIARF), 2009; Institute of Internal Auditors (IIA), 2013, 2017). The questionnaire was pre-tested by four heads of internal audit function in public-listed companies in Malaysia.

Internal audit activity was made mandatory to Malaysian public-listed companies in January 2008. They are given option either to have it in-house or outsource. The target population of the present study consisted of the in-house internal audit function in public-listed companies at Bursa Malaysia (Malaysian Stock Exchange). The researcher has personally called all 837 companies (as of October 2010) and found that 620 companies have established an in-house internal audit unit. Questionnaire surveys were mailed to 620 in-house internal audit departments between November 2010 and January 2011. Either the Chief Internal Auditor or the Head of Internal Audit Function answered the questionnaire. These respondents were identified as the most appropriate because of their considerable exposure, detailed understanding of, and involvement in, designing internal audit planning, and performing audit work.

Intensive follow-up by e-mail and phone resulted in the return of 123 questionnaires; an overall response rate of 19.8 percent. Out of these questionnaires, six were excluded due to incomplete responses about the internal audit experience, resulting in an effective response rate of 18.9 percent (117 useable questionnaires).

3.2 Measurement

3.2.1 *Dependent variable.* The dependent variable was defined as the implementation of risk-based auditing procedures in all internal audit processes (i.e. audit planning,

audit execution, and audit reporting). The dependent variable was measured by 16 items that were adapted from the validated model in Selim and McNamee (1999a). In the questionnaire, the items were presented in the form of statements to which the head of the internal audit function responded by using a five-point Likert-type scale (ranging from 1 = not at all, to 5 = very extensively). The dependent variable is to measure the implementation rather than the stage of implementation of risk-based auditing. Given that this study employed a continuous dependent variable, multiple regression analysis was used to examine the simultaneous effect of multiple independent variables on the dependent variable.

To confirm the validity of the scale, the construct of the implementation of risk-based auditing was subjected to the confirmatory factor analysis. Items were forced into one factor and all items converged on a single component. One item (i.e. performs quarterly review on annual audit plan) had a factor loading lower than 0.5, hence it was omitted from the subsequent analysis. This omission improved the total variance explained from 53.39 to 56.16 percent. The Kaiser-Meyer-Olkin measure of sampling was 0.87, which is considered to be an excellent score. Bartlett's test of sphericity was significant at $p < 0.01$. To measure internal consistency, a reliability test using Cronbach's α was performed. The reliability coefficient of the extent of the implementation of risk-based auditing was 0.942, which is highly acceptable (Hair *et al.*, 2010). Table I presents the results of the factor and reliability analyses for the items related to the dependent variable.

3.2.2 Independent variables. The independent variables investigated were internal audit attributes, audit committee attributes, risk management system, and internal control system. The internal audit attributes consisted of two constructs: internal audit experience and size of internal audit function. Internal audit experience refers to the proportion of internal audit staff in the company with work experience in a related industry (Mat Zain *et al.*, 2006). It was calculated as a percentage (the number of experienced staff divided by the total number of internal audit staff). The size of the internal audit function was measured by the total number of internal audit staff within the company (Mat Zain *et al.*, 2006). The number of internal auditors has been used in previous research studies to indicate the resources potentially available to the internal audit department (Goodwin-Stewart and Kent, 2006; Mat Zain *et al.*, 2006; Arena and Azzone, 2009). To improve the reliability measure and reduce collinearity when performing the regression analysis, a logarithmic transformation was applied to the size of the internal audit function.

The audit committee attributes also consisted of two constructs: audit committee qualifications and audit committee review concern. Audit committee qualifications represent the overall breadth of audit committee knowledge and experience in accounting, finance, auditing, and industries related to the company (Mat Zain *et al.*, 2006). The construct was given a score by the head of the internal audit function using a five-point Likert-type scale (ranging from 1 = very poor, to 5 = excellent). The second construct, audit committee review concern, was designed to evaluate two items. First, it measures the extent of audit committee involvement in reviewing internal audit activities (Arena and Azzone, 2009). Second, it measures the interest of audit committee members in discussing strategic issues and their attitude towards being diligent in making sure that good governance practices are followed (Selim and McNamee, 1999a; Woods, 2007; Sarens *et al.*, 2009). The scale was adapted from Selim and McNamee (1999a) and Arena and Azzone (2009), based on which ten items were formulated to evaluate the state of agreement of the head of the internal audit function regarding audit committee review concern and commitment to good governance practices. These items were measured based on a five-point Likert-type scale (ranging from 1 = strongly disagree, to 5 = strongly agree).

The level of risk and control awareness within an organization is influenced largely by the extent to which the risk management and internal control systems have been formalized

Items	Factor loading	Cronbach's α
<i>Implementation of Risk-based Auditing</i>		0.942
Internal audit in our organization		
Obtains understanding of organizational strategic objectives	0.598	
Assesses risks inherent in organizational strategic objectives	0.720	
Determines audit universe based on strategic plans and organizational activities	0.670	
Determines audit universe based on enterprise risk management	0.707	
Integrates inputs from risk register (prepared by management) and own risk assessment activities (prepared by internal audit) in developing annual audit plan	0.632	
Obtains understanding of the objectives of key business processes	0.733	
Assesses risks inherent in the objectives of key business processes	0.777	
Tests the adequacy of risk management system in key business processes	0.840	
Tests the effectiveness of risk management system in key business processes	0.835	
Tests the adequacy of internal control system in key business processes	0.787	
Tests the effectiveness of internal control system in key business processes	0.770	
Reports on how risks identified earlier are managed by the management	0.747	
Reports on the effectiveness of risk management system in key business processes	0.816	
Reports on the effectiveness of internal control system in key business processes	0.766	
Communicates relevant risk information in a timely manner to the audit committee	0.797	
<i>Audit committee qualifications</i>		0.898
AC experience and knowledge in accounting-related areas	0.833	
AC experience and knowledge in finance-related areas	0.830	
AC experience and knowledge in auditing-related areas	0.772	
AC experience in senior managerial positions	0.781	
AC experience and knowledge in industry related to the company	0.753	
AC expertise in other fields (e.g., law, engineering, environment, etc.)	0.665	
<i>Audit committee review concern</i>		0.933
AC reviews internal audit plans	0.854	
AC approves internal audit plans	0.845	
AC monitors internal audit activities on a periodic basis	0.818	
AC reviews internal audit reports	0.827	
AC brings issues highlighted in internal audit reports to the board of directors	0.782	
AC is highly committed to good governance (i.e. ethical corporate environment)	0.633	
AC considers information pertaining to business risks	0.670	
AC considers control-related issues	0.661	
A formal risk management system is used within our company	0.822	
<i>Risk management system</i>		0.858
Risk management procedures are clearly defined within our company	0.882	
Responsibilities related to risk management are clearly defined within our company	0.888	
There exists a separate or standalone risk manager or risk management function within our company	0.626	
There exists a separate risk management committee at board level	0.731	
<i>Internal Control System</i>		0.720
Control environment provides an atmosphere that enables the employees to conduct their activities and discharge their responsibilities effectively	0.819	
Management assesses risks that would have a negative impact on the achievement of organizational objectives	0.697	
There is an effective control procedure established by management to ensure the company's overall risks are considered and mitigated	0.518	
Internal control system is monitored on a continuous basis	0.546	

Table I.
Factor and reliability
analyses

(Sarens *et al.*, 2009). Formalization of risk management system is indicated by the presence of risk management procedures, structures, and responsibilities (Crawford and Stein, 2002; Goodwin-Stewart and Kent, 2006). Meanwhile, the internal control system refers to the condition of internal control processes, such as the control environment, risk assessment,

control activities, information and communication, and monitoring (Sarens and DeBeelde, 2006). The items of both of these constructs (risk management system and internal control system) were measured based on a five-point Likert-type scale (ranging from 1 = strongly disagree, to 5 = strongly agree).

Principal component analysis with varimax rotation analysis was used to identify the number of components for the three independent variables: audit committee attributes (audit committee qualifications, audit committee review concern), risk management system, and internal control system. After running the first factor analysis, three items were eliminated because they had factor loadings lower than 0.5. The final results of the principal component analysis showed a four-factor solution with eigenvalues greater than 1.0. The total variance explained was 68.33 percent. The Kaiser-Meyer-Olkin measure of sampling indicated a value of 0.822. Bartlett's test of sphericity was significant at $p < 0.01$. Meanwhile, Cronbach α values for the tested variables were 0.898 for audit committee qualifications, 0.933 for audit committee review concern, 0.858 for risk management system, and 0.720 for internal control system. In general, all the reliability coefficients were above the minimum acceptable requirement of 0.60 (Hair *et al.*, 2010). Table I presents the results of the final factor and reliability analyses for audit committee qualifications and audit committee review concern, risk management system, and internal control system.

3.2.3 Control variables. The study sample encompasses public-listed companies in Malaysia. Listed companies are greatly influenced by corporate governance guidelines and it is mandatory to have an internal audit function. Other control variables were included in the model to verify the relevance of any contextual factors that might influence the results. These control variables were firm size and leverage. Firm size was measured by the total assets of the company (Lemon and Tatum, 2003; Mat Zain *et al.*, 2006; Arena and Azzone, 2009). Larger firms tend to have more diversified and decentralized activities, increasing the need for more effective internal monitoring mechanism (Goodwin-Stewart and Kent, 2006; Arena and Azzone, 2009). In addition, past studies have also adopted leverage as the control variable (Carcello *et al.*, 2005; Sarens and Abdolmohammadi, 2011). Those studies argued that when the company is high risk due to a higher proportion of debt, it will increase the risk exposure of a firm, which requires extensive investigation and audit procedures by the internal audit function. To improve the reliability measure and to reduce collinearity when performing the regression analysis, a logarithmic transformation was applied to firm size and leverage.

4. Results

4.1 Descriptive statistics

Table II presents the descriptive statistics of the variables used in the model.

As shown in Table II, risk-based auditing procedures are being implemented extensively by the internal audit function, with an average score of 3.95 out of 5 (SD 0.59).

Variables	Min	Max	Mean	SD
Risk-based auditing (RBA)	1.87	5.00	3.95	0.59
IA experience (IAE)	0.00	1.00	0.59	0.38
IA size (IA_sz)	1	215	12.03	40.31
AC qualifications (ACQ)	2.67	5.00	3.94	0.63
AC review concern (ACRC)	3.00	5.00	4.46	0.52
Risk management system (RMS)	1.00	5.00	3.81	0.84
Internal control system (ICS)	2.25	5.00	4.15	0.47
Firm size (in thousands) (Firm_sz)	MYR61	MYR239984	MYR5507.69	MYR24157.12
Leverage (Lev)	1.07	13.19	3.15	2.28

Table II.
Descriptive statistics
for variables

The proportion of internal audit staff with experience in an industry related to the company ranges from 0 to 100 percent with a mean of 59 percent (SD 0.38). The size of the internal audit function has a mean value of 12.0 with a minimum of 1 and a maximum of 215. On average, the audit committee qualifications construct has a mean of 3.94 out of 5 (SD 0.63). According to the scores given by the respondents (heads of the internal audit function), the audit committee is involved proactively in reviewing internal audit work and showing concern about risk-related audit issues (mean of 4.46 out of 5 (SD 0.52)). In respect of the two organizational systems, the risk management system score ranges from 1.00 to 5.00, with a mean of 3.81 (SD 0.84), and the internal control system score ranges from 2.25 to 5.00, with a mean of 4.15 (SD 0.47). As for the control variables, firm size ranges widely from MYR 61,000 to MYR 239,984,000, with a mean of MYR 5,507,000; and the leverage ratio ranges from 1 to 13 percent, with a mean of 3.06 percent (SD 2.28). The logarithmic transformation of the size of the internal audit function, firm size, and leverage was applied to improve the reliability measure and to reduce collinearity when performing the regression analysis.

Table III presents the correlation matrix for the dependent and independent variables.

As indicated in Table III, the implementation of risk-based auditing is significantly positively correlated with audit committee qualifications, audit committee review concern, risk management system, internal control system, and firm size, which is significant at 1 percent level. According to Hair *et al.* (2010), a coefficient correlation between two independent variables greater than 0.60 is evidence of potential problems with multicollinearity. However, the result of diagnostic tests to ascertain the tolerance value and the variance inflation score suggests that multicollinearity is not a problem.

Table IV illustrates the results of the regression analyses. The regression model is statistically significant ($F = 8.334$; $p < 0.000$; $R^2 = 0.342$).

There is no evidence in the results to show that the implementation of risk-based auditing is influenced by internal audit experience, size of internal audit function, audit committee qualifications, and internal control system. Table IV indicates that internal audit experience ($H1$) and size of internal audit function ($H2$) are not significantly related to the implementation of risk-based auditing. As such, $H1$ and $H2$ are not supported. This result contradicts the study by Selim and McNamee (1999b), which suggested that internal audit competencies play an important role in the adoption of risk-based auditing procedures. In addition, the results do not support $H3$ on audit committee qualifications, as the coefficient is not significant. Audit committee qualifications or competencies do not have a direct effect on the implementation of risk-based auditing procedures. Hence, based on the results, it seems that the personal attributes of the internal auditors and the members of the audit committee are not significant predictors of the implementation of risk-based auditing.

Variables	RBA	IAE	IA_sz	ACQ	ACRC	RMS	ICS	Firm_sz	Lev
RBA	1	0.026	0.120	0.314**	0.524**	0.442**	0.428**	0.238**	0.017
IAE		1	-0.168	-0.121	0.057	0.137	0.055	-0.022	-0.129
IA_sz			1	0.088	0.056	0.292**	0.160	0.707**	-0.250**
ACQ				1	0.515**	0.282**	0.266**	0.006	0.048
ACRC					1	0.340**	0.526**	0.134	-0.040
RMS						1	0.383**	0.409**	-0.177
ICS							1	0.234*	-0.106
Firm_sz								1	-0.322**
Lev									1

Table III.
Pearson correlation
for variables

Notes: **Significant at 0.05, 0.01 levels, respectively (two tailed)

Variables	Dependent variable: implementation of risk-based auditing	
	Hypotheses	
	Panel 1	Panel 2
Constant	3.141 (10.655)***	0.359 (0.693)
<i>Control variables</i>		
Firm size	0.235 (2.832)***	0.121 (1.199)
Leverage	0.028 (1.086)	0.029 (1.366)
<i>Hypotheses variables</i>		
IAE	<i>H1</i>	-0.055 (-0.433)
IA_sz	<i>H2</i>	-0.096 (-0.625)
ACQ	<i>H3</i>	0.019 (0.212)
ACRC	<i>H4</i>	0.408 (3.449)***
RMS	<i>H5</i>	0.184 (2.754)***
ICS	<i>H6</i>	0.152 (1.255)
R ²	0.068	0.388
Adjusted R ²	0.051	0.342
F-value	4.028	8.334
Significance	0.020	0.000
Durbin-Watson		1.584
n	114	114

Notes: RBA: average score (ranging from 1 to 5) on 15 items measuring the implementation of risk-based auditing (1 = not at all, 2 = scarcely, 3 = moderately, 4 = extensively, 5 = very extensively); Firm_sz: Logarithm of total assets; Leverage: Leverage measured by the proportion of long-term debt compared to total assets; IAE: number of experienced internal audit staff divided by total number of internal audit staff; IA_sz: Logarithm of total number of internal audit staff; ACQ: average score for items measuring the audit committee members' experience and knowledge in accounting, finance, auditing, and related industries (1 = very poor, 2 = poor, 3 = good, 4 = very good, 5 = excellent); ACRC: average score for items measuring the audit committee review of and interest in internal audit work and results (1 = strongly disagree to 5 = strong agree); RMS: average score for items measuring formalization of risk management procedures, structure and responsibilities (1 = strongly disagree to 5 = strong agree); ICS: average score for items measuring status of internal control activities (1 = strongly disagree to 5 = strong agree). Statistics shown: Coefficients (*t*-statistics in parenthesis). ****p* < 0.01

Table IV.
The results of multiple regression analysis

The results in Table IV show that there is a significant positive relationship between two independent variables, namely, audit committee review concern and risk management system, and the implementation of risk-based auditing. As such, *H4* and *H5* are supported. The significant positive coefficient strongly explains that audit committee review concern would recommend the implementation of risk-based auditing. This result is consistent with Selim and McNamee (1999a) and Mat Zain and Subramaniam (2007), and implies that a more interactive and proactive audit committee would require relevant information pertaining to business risks in order to make decisions on any future strategic direction (Selim and McNamee, 1999a). As such, an audit committee that needs information on pertinent issues would likely promote the implementation of risk-based auditing.

Table IV also shows that there is a highly significant positive coefficient for the formalization of risk management system (*H5*) and that this independent variable is a significant predictor of the implementation of risk-based auditing. A similar finding is reported by Selim and McNamee (1999a) and Sarens *et al.* (2009). Formalization of risk management would heighten the presence of risk awareness and a risk-focused culture. In line with the establishment of a proper structure for risk management responsibilities and procedures, management would assume responsibility and accountability for more effective risk management practices (Goodwin-Stewart and Kent, 2006). Such an environment would enable the internal audit function to perform risk-based auditing procedures.

However, the coefficient in *H6* for the internal control system is not significant. The results suggest that the presence of strong control awareness would not heighten the implementation of risk-based auditing procedures. As such, the data do not support previous studies' suggestion that the presence of strong control awareness has a positive effect on the implementation of risk-based auditing (Selim and McNamee, 1999b; Woods, 2007).

In addition, the data analysis shows that most of the control variables are not related to the implementation of risk-based auditing. The findings reported herein do not support those in Castanheira *et al.* (2010) and Coetzee and Lubbe (2014). In particular, firm characteristics, such as firm size and leverage, were found to be non-significant predictors of the implementation of risk-based auditing.

5. Discussion

The shift in focus from regulations and compliance to performance and planning (strategic planning) has increased the recognition that corporate governance mechanisms need to focus more strategically on pertinent issues. From an agency perspective, the need for effective monitoring of the extent of exposure to the risks inherent in business strategy has promoted recognition of the importance of the internal audit function and risk-based auditing procedures. The role of the internal audit function is to fulfill the need to monitor management conduct and the effectiveness of organizational systems. To this end, recently, the audit methodology being predominantly adopted by the internal audit function is the risk-based internal audit approach. As such, the implementation of a systematic and disciplined internal audit approach should eventually facilitate more effective performance of internal audit activities. Previous studies have mainly been concerned with the critical success factors of risk assessment activities in the audit planning stage (Allergini and D'Onza, 2003; Koutopis and Tsamis, 2009; Castanheira *et al.*, 2010). In contrast, as suggested by Selim and McNamee (1999b) and Coetzee and Lubbe (2014), the present study highlights the extent of risk-based auditing procedures in all internal audit activities including planning, execution, and reporting. Furthermore, this study provides empirical evidence on the causality and direction of the significant predictors of the implementation of risk-based auditing. In short, the results of the present study highlight the importance of proactive audit committee members and the presence of a strong risk culture in reducing agency problems.

The results provide some support pending to a relationship between the independent variables: audit committee review concern and risk management system, and the dependent variable "implementation of risk-based auditing". It seems a proactive audit committee that needs more information on pertinent issues is more likely to influence the implementation of risk-based auditing. The results further suggest that a more diligent audit committee would become involved in reviewing internal audit activities. As such, the committee would provide inputs for internal audit planning and ensure adequate audit coverage of important areas. Indeed, an audit committee that has a proactive attitude and good-quality leadership would enhance and promote internal audit activities as part of good governance. The audit committee's greater involvement in reviewing internal audit work would enable it to express concerns regarding risk and control issues. A diligent audit committee would actively interact with the internal audit function and would be more likely to be involved in determining the relevant audit approach. The above findings support those of Selim and McNamee (1999b) and Turley and Zaman (2007).

Another important finding is that the risk management system has a significant effect on the implementation of risk-based auditing. A formalized risk management system is characterized by having proper risk management structure, responsibilities, and procedures. Such an environment reflects a high level of risk awareness and the proper implementation of risk management practices. This means that a stronger risk culture encourages management to take into account exposure to risk in all business actions

and decisions. Similar to Coetzee and Lubbe (2014), the results support the view that the presence of a mature risk management system fosters a resilient risk environment and provides a strong foundation for the implementation of risk-based auditing procedures.

As for the other independent variables (internal audit experience, size of internal audit function, audit committee qualifications, and internal control system), these are not found to be significant predictors of the implementation of risk-based auditing. In particular, a higher proportion of internal audit experience in an industry related to the company does not lead to the implementation of risk-based auditing. Likewise, audit committee qualifications are not a major factor in determining the implementation of risk-based auditing. It would seem that the broad-based knowledge and background of the audit committee alone would not encourage the implementation of risk-based auditing. This suggests that mere compliance with the qualifications requirements, as stipulated in the Malaysian code on corporate governance, is insufficient to promote the implementation of risk-based auditing. Indeed, the capability of the audit committee to communicate or interact comfortably on business matters is more relevant. A powerful audit committee with a good-quality leadership could set the tone of governance practices, earn respect, and be more critical in dealing with non-routine activities (Turley and Zaman, 2007).

Furthermore, the direct impact of the internal control system on the implementation of risk-based auditing seems to be insignificant. A possible reason for this result could be the nature of the measurements used to examine the influence of the internal control system. The measurement covers broad aspects of the control structure and procedures that are probably too weak to gauge the supportive role of an internal control system as part of risk mitigation procedures. Finally, the control variables, firm size and leverage, were predicted to influence the implementation of risk-based auditing and were found not to do so.

6. Implications, limitations, suggestions for future research, and conclusion

In short, the findings support the expectation from the agency theory. There is significant relationship between the audit committee (as an oversight mechanism), risk management system (as a control device), and risk-based auditing. More importantly, audit committee members that desire to discharge effective oversight duties and make an informed decision would exercise their active role in reviewing and approving internal audit risk-based plan. A proactive and diligent audit committee recognizes the potential of internal audit function as an information provider in fulfilling the gap of information asymmetry, while formalized risk management system provides an effective infrastructure in heightening management awareness on risk management.

The findings also have some implications for the regulators and internal audit profession. The findings provide useful guidelines on comprehensive approach of structured risk-based audit adopted by the internal audit function. The implementation of more structured risk-based auditing would enhance the ability of internal audit in ensuring that identified risks inherent to strategic initiatives are mitigated properly. This would reflect an improvement in the work quality of an internal audit in fostering effective monitoring function. From a practical and social perspective, an effective internal monitoring mechanism and better quality of internal audit work will minimize potential risks that prevent the achievement of company objectives, reduce propensity to falsify financial information, and improve financial reporting quality.

The present study has several limitations. First, a questionnaire survey method limits the possibility of explaining and giving details about the questions to respondents. Thus, the researcher is unable to control how respondents interpret the questions. Second, the questionnaire was addressed personally to the chief internal audit or the head of internal auditor. However, the researcher never knows who responded even when it is indicated who should respond. Third, the sample consists of the in-house internal audit departments

of listed companies. Therefore, generalization of the findings to other listed companies may be inappropriate. Further research needs to be carried out to gather evidence on the internal audit practices of external providers to obtain a more robust result. Future research on other regulatory frameworks and cultures should provide deeper insights on the determinants of the implementation of risk-based auditing practices that are being adopted globally.

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