Factors Influencing Internal Audit Fund Sufficiency

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العوامل المؤثرة على كفاية ميزانية التدقيق الداخلي

سالم مسفر آل فايع

قسم المحاسبة، كلية العلوم الإدارية، جامعة نجران، نجران، المملكة العربية السعودية
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ABSTRACT

This study is motivated by the lack of internal audit (IA) fund research and examines the influence that the following elements have on IA fund sufficiency: IA quality factors (experience, certification and training), the independence and objectivity of Chief Audit Executives (rotation, reporting line and appointment), IA characteristics (IA department size and age), budget changes, and IA risk assessment activities. This study identifies 2,205 Chief Audit Executives and uses logistic regression to examine the impact of internal audit quality, independence, characteristics and activity on IA fund sufficiency. The results show that IA quality variables, independence and objectivity variables, IA size, age and budget changes all contribute to predicting fund sufficiency for the model IA department. The results also demonstrate that the risk assessment variable does not contribute to the model. The value of this study is that it provides empirical evidence regarding identifying factors that influence internal audit fund sufficiency. This study's evidence has implications for policymakers and practitioners, as the actual issue of IA fund sufficiency has yet to be examined.

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الملخص

تهدف هذه الدراسة إلى فحص مدى تأثير بعض العوامل المتعلقة بجودة التدقيق الداخلي وخصائصه ونشاطه على كفاية ميزانية التدقيق الداخلي. العوامل التي تم فحصها متعلقة بجودة التدقيق الداخلي (الخبرة، الشهادة، والتدريب)، استقلالية وموضوعية الرؤساء التنفيذيين للتدقيق (التناوب، التسلسل الإداري، والتعيين)، خصائص التدقيق الداخلي (حجم وعمر إدارة التدقيق الداخلي)، وتغير ميزانية التدقيق، وأنشطة التدقيق الداخلي (نشاط تقييم المخاطر). تضمنت عينة الدراسة عدد 2205 رئيس تنفيذي للتدقيق الداخلي من حول العالم. وكانت إجاباتهم وفقاً لاستبيان تم تصميمه وتحكيمه ونشره عن طريق معهد المراجعين الداخليين الدولي. بغرض إنجاز هدف الدراسة في فحص تأثير العوامل المدروسة على كفاية ميزانية المراجعة، تم استخدام الانحدار اللوجستي. أظهرت النتائج أن متغيرات جودة التدقيق الداخلي، ومتغيرات الاستقلالية والموضوعية، وحجم وعمر إدارة التدقيق الداخلي، وتغير ميزانية التدقيق الداخلي تؤثر بشكل كبير على كفاية ميزانية التدقيق الداخلي. على عكس نشاط تقييم المخاطر الذي لم يساهم في قياس مستوى كفاية ميزانية التدقيق الداخلي. وبالتالي فإن أهمية هذه الدراسة تكمن في حقيقة أنها تقدم أدلة تجريبية حول تحديد العوامل التي تؤثر على كفاية ميزانية التدقيق الداخلي. هذه المسألة لم يتم فحصها سابقاً، والأدلة المذكورة لها آثار على صانعي السياسات وممارسي وظيفة التدقيق الداخلي..
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1. Introduction

Internal audit (IA) is an independent, objective assurance and consulting activity devised to bring value to and improve a firm's operations. IA helps organisations meet their objectives by bringing about a systematic, disciplined approach to evaluate and improve the effectiveness of risk management (Spira and Page, 2003). Originally, auditing was a financial management tool that assessed the internal financial status of organisations and evaluated their financial performance (Hass et al., 2006). Now, it is also a tool for analysing and reporting any fraudulent activities (potential or actual) within a firm. This extension has allowed internal auditing to add more value to organisations.

IA is an essential monitoring mechanism in corporate governance (Dellai and Omri, 2016). It aims to help organisations achieve their objectives. The internal audit function (IAF) provides assurance that a firm's systems of control are effective, improves risk management, monitors the internal control system, reduces fraud and does not misreport financial information (Mihret et al., 2010). It contributes to improving the productivity, the efficiency and the performance of private and public companies. However, IA cannot achieve its mission without sufficient funds. Therefore, IA funds need to be adequately allocated for it to operate effectively.

While fund sufficiency is an essential factor that enhances IA

effectiveness, there is a paucity of research on this topic. Particularly, there is no study examining the influence of IA quality, characteristics and activities on fund sufficiency. Asare et al. (2008) indicated a possible link between IA budget and risk assessment. Additionally, a study by the Institute of Internal Auditors (IIA) (2018) hinted at a connection between IA independence and objectivity with fund sufficiency. Therefore, this paper aims to investigate factors that may have an influence on internal auditing fund sufficiency.

Using data from a survey of 2,205 Chief Audit Executives (CAEs) from different regions, this study examines the influence that the following elements have on IA fund sufficiency: IA quality factors (experience, certification and training), independence and objectivity of the CAEs, IA characteristics (IA department size and age), budget changes, and IA activities related to risk assessment. The results show that IA quality variables, independence and objectivity variables, IA size, age and budget changes all contribute to predicting fund sufficiency in the model. In contrast, the risk assessment variable does not have any significant value and does not contribute to the model.

The next section reviews prior literature and formulates the conceptual framework of this study. The research methodology is described next, followed by variables and measurements. Data analysis and discussion of the main findings are then presented. The final section contains the conclusion.

2. Literature and Hypothesis Development

Prior studies have investigated the factors that contribute to the creation of added value for IA. These factors include fund sufficiency (MacRae and van Gils, 2014; Mihret et al., 2014), independence (Ahmad et al., 2009; Mutchler, 2003), the competence of the IA staff (Ahmad et al., 2009; Mihret and Yismaw, 2007), outsourcing (Salameh et al., 2011) and management support (Ahmad et al., 2009; Dellai and Omri, 2016). Abbot et al. (2010) examined IA attributes without looking at resource allocation. The present study enriches the findings of previous studies by investigating the influence that IA quality, characteristics and activities have on IA fund sufficiency. This study bears some similarities with the existing works of Barua et al. (2010) and Al-Dhamari et al. (2018), both of which linked audit committee characteristics to IA budget (investment). However, in the current paper, other factors such as IA quality, IA characteristics and IA activity are discussed. In addition, the current paper examines the adequacy of IA fund sufficiency rather than the amount of budget required.

The following section reviews the existing research literature on factors that influence IA fund sufficiency. Specifically, it discusses fund sufficiency as well as the extent to which IA fund sufficiency is influenced by IA quality factors (experience, certification and training), the independence of the CAEs, IA characteristics (IA department size and age), budget changes and IA activities related to risk assessment.

2.1. Fund Sufficiency:

Any activity or programme requires adequate funding in order to succeed. Insufficient funding creates a considerable barrier to fulfilling the roles and responsibilities of IA activities. However, a professionally staffed and sufficiently funded IAF will easily and timely uncover problems and recommend improvements to internal controls to prevent the problems detected. Therefore, that same organisation will not need intensive IA activity in the future to avoid similar problems, as the root cause of those problems will have been solved.

A well-controlled organisation with exceptional policies, practices and oversight systems may need a smaller audit budget than an organisation at substantial risk of fraud, waste and abuse. Previous IA budgets and plans must be put taken into account when considering the budget for the next audit. In addition to paying close attention to organisational risks, benchmarks regarding other IA sections are helpful. According to Tang et al. (2017), settling on an investment in IA is like making a decision on an insurance policy; an organisation must have adequate coverage against risks. Potential audits are developed based on the evaluations of specific risks within organisations. This finding shows, without a doubt, that fund sufficiency in IA is critical in eliminating organisational risks. In government programmes, cutting IA budgets can be very detrimental to the public (Mihret et al., 2014). Since the budget affects the capacity of IA to perform its responsibilities, funding should not be left under the control of the organisation being audited (MacRae and van Gils, 2014).

2.2. Internal Audit Quality Characteristics:

Johl et al. (2013) examine the relationship between internal audit quality components and abnormal accruals. They considered approving an annual budget for IA as a factor of IA quality. Therefore, it can be proposed that there is a relationship between IA quality and fund sufficiency. According to the Statement on Auditing Standards No. 65, the quality of internal auditing is measured by the competence and objectivity of internal auditors. The competence of internal auditors is affected by experience, certification and training. Experience refers to the number of years in the field of internal auditing. The certification of internal auditors refers to the professional certifications (e.g., CIA, CPA...etc.) of the CAEs. Training is measured by the formal training of the CAEs (Schneider, 2010). The following subsections discuss the four factors of IA quality.

2.2.1. Experience

The audit team is created by considering the finance and accounting educational background of its members. The qualifications and experiences of the auditors influence the IA quality (Ahmad et al., 2009; Alzeban and Gwilliam, 2012; Gramling and Hermanson, 2009). Research on the link between audit committees and the operations of IA in the US, New Zealand and Australia confirms a positive correlation between accounting and financial knowledge and the results of the IAF (Raghunandan et al., 2001). The findings also show that experience in accounting and finance may influence the examination or review of suggestions regarding the IAF. These suggestions may include the IA budget. This implies that the experience of the CAEs could be important in the funding of IA, especially during the decision-making stages. If the experience of the CAEs is associated with the extent to which they review the IA work, then it is possible that their experience can also influence budgetary allocations. Based on this, it can be concluded that the experience of the CAEs will affect IA fund sufficiency. Therefore, the following hypothesis is put forward:

H1: the experience of the CAEs is positively related to IA fund sufficiency.

2.2.2. Certification

The certification of internal auditors is an essential predictor of competent and professional leadership (Tarr, 2002). In addition, it has been argued that effective auditing requires professionally qualified, preferably certified and competent staff to oversee and manage audit activities (MacRae and van Gils, 2014). Al-Twaijry et al. (2003) studied professional qualifications and found a positive relationship between the professional qualifications and the effectiveness of the IAF. In addition, Alzeban (2017) noted that internal auditors must have all the requisite skills to carry out the duties associated with the International Standards for the Professional Practice of Internal Auditing. Qualified CAEs have greater power to plan their work and identify their needs. Schneider (2010) argued that certified CAEs should give users more comfort about IA integrity and quality. With this in mind, it can be proposed that professionally certified internal auditors are more sufficient at achieving audit objectives. Therefore, the following hypothesis is proposed:

H2: the professional certifications of the CAEs are positively related to IA fund sufficiency.

2.2.3. Technical Training

Sufficient funds cater to training and administration as well as emergency or unanticipated audits. Enough resources must be allocated for training and administration. A well-equipped audit team is likely to enhance the effectiveness of IA (Alzeban and Gwilliam, 2014). Competent audit staff are critical for supporting fund sufficiency. The role of an audit is to offer an opinion regarding the efficiency, effectiveness, health, safety and legal compliance of organisations (Mihret et al., 2014). As such, a more professional auditing team is in a better position to provide an accurate picture of an organisation or programme. Internal auditors need to have the skills and competencies necessary to achieve individual duties, including professional care and proficiency. The only way they can

obtain these skills is by undertaking proper training and development programmes (Endaya and Hanefah, 2016). Therefore, offering training programmes for the auditing team is extremely important, and this requires adequate funding.

Endaya and Hanefah (2016) evaluated the moderating effect of senior management on the effectiveness of IA. In the process, they stated that the training and computer programmes provided by senior management need sufficient budget allocation. Senior management reviews and approves the annual budget allocation for IA department training programmes. Therefore, assuming that senior management supports the IAF, the funds allocated for training should be directly proportioned to the level of training that the function requires. In prior literature, no study has been carried out to examine the impact of training on budget allocation. As a result, the current study expects that IA staff training needs are related to IA budget allocation. This leads to the following hypothesis:

H3: the technical training of the CAEs is positively related to IA fund sufficiency.

2.2.4. Independence and Objectivity

Mutchler (2003) described independence as freedom from conflict of interest. Management's involvement in the IAF is likely to negatively impact its independence (Sarens, 2009). Therefore, independent audit activity is facilitated by the establishment of an audit committee (AC) (MacRae and van Gils, 2014). A survey conducted by Christopher et al. (2009) included a sample of 34 Australian companies. The survey's goal was to analyse the independence of the IAF through the relationship between AC and management. The researchers found that there were threats from management when the CAE report directly to the AC. They identified a combination of indirect threats from management, such as approving the IA budget, involvement in the IAF plan and using IA as a steppingstone to move to other positions (Christopher et al., 2009).

Rose et al. (2013) put forth the belief that the objectivity of internal auditors is impaired when the IAF is used as a training ground for future senior managers, as it is assumed that the internal auditors will be more willing to accept the wishes of management. This is due to management's role in appointing and evaluating internal auditors (Rose et al., 2013). Hence, internal auditors with an interest in moving to higher positions are associated with lower financial reporting quality (Christ et al., 2015). Therefore, independence is positively linked to IA effectiveness (Alzeban and Gwillian, 2014; Dellai and Omri, 2016; Pizzini et al., 2015). It is also concluded that audit independence is associated with audit budget sufficiency.

Mihret et al. (2014) revealed that management and ACs regard the IAF as a faultfinder rather than a value-adding service provider. As such, the involvement of these parties not only affects the independence of the activity (Sarens, 2009) but also affects resource and funds allocation. MacRae and van Gils (2014) warned against leaving the responsibility of audit planning and budgeting to management and the auditees. Those being audited are likely to allocate insufficient funds and other resources to the IAF, as they often have a negative view of the activity (Ahmad et al., 2009). Based on this background, the present study anticipates that the independence of the IA will influence the sufficiency of the budget allocated for the IAF. Therefore, the following hypothesis is proposed:

H4: the independence of the CAEs (rotation, reporting relationships and appointment of the CAEs) is positively related to IA fund sufficiency.

2.3. Characteristics of Internal Audit:

2.3.1. Internal Audit Size

According to MacRae and van Gils (2014), audit activities should have sufficient funding relative to the size of audit responsibilities. Each organisation defines its audit depending on the size and scope (IIA, 2018). In 2017, Shamki and Alhajri provided evidence of a significantly positive relationship between the size of the IA department and certain other factors related to the size of the audit committee, the firm's affiliation with the finance sector, and the presence of a separate risk management committee. In addition, it has been found that the IAF size is positively associated with better governance, the use of technologies, and larger organisations and activities (Anderson et al., 2012). Therefore, larger IA departments need bigger budgets and sufficient funds. Based on this, the present paper proposes the following hypothesis:

H5: the size of the IA department is positively related to IA fund sufficiency.

2.3.2. Internal Audit Age

According to Kor and Mahoney (2000), an audit department and committee with longer tenure ensures that there is more knowledge about an organisation and the ability to manage its risks effectively. This enables the IA department to understand the operations, internal controls, accounting systems and characteristics of the company's industry (Boone et al., 2008). From this observation, it is concluded that the longer the audit department operates in an organisation, the better its audit plans are. This implies that increased knowledge about the organisation can help secure sufficient funding for the audit function. However, Rickling (2014) reported that a longer tenure may lead to less vigilant or less independent auditors. In other words, audit members may no longer exercise independent judgement, thus influencing the IA budget negatively. As such, this study states the following hypothesis:

H6: the age of the IA department is positively related to IA fund sufficiency.

2.4. Budget Changes:

The IA budget amount is based on the tasks that must be performed. Each organisation has its needs. For example, organisations with a strong internal control system may not need a huge budget. Organisations with too small a budget require a robust audit plan for future budgets. In short, adequately funded IAs lessen the budgets for subsequent IAs. However, this only occurs when the risks identified in previous audits are adequately prevented.

A well-founded IA budget is an important tool for decision-making (Asare et al., 2008). It can help ensure that auditors, executive management and the AC agree on the organisation's risk profile, audit objectives and audit goals. Therefore, to guarantee fund sufficiency and effective deployment of resources in internal auditing, organisational risks need to be evaluated. The IA activity needs must determine the budget. Despite the fact that audit activities may be almost identical in size, function and location, their different needs require different budgets (Shanszadeh and Zolfaghari, 2015). This ensures their needs are met. A well-controlled organisation with exceptional policies, practices and oversight systems may need a smaller audit budget than a similar organisation at substantial risk of fraud, waste and abuse. Previous IA budgets and plans must be taken into account when considering the budget for the next audit. Therefore, the following hypothesis is proposed:

H7: the budget changes of the IA department are positively related to IA fund sufficiency.

2.5. Risk Assessment Activity:

According to Asare et al., (2008), an organisation-wide risk

assessment is the most effective way to establish the sufficiency of the IA budget. According to the Public Company Accounting Oversight Board (PCAOB), the auditor should perform sufficient risk assessment procedures to give a reasonable foundation for recognising and assessing risks that emanate from fraud or error in order to devise further audit procedures (PCAOB, 2010). A company-wide risk assessment includes an understanding of the company and its environment since risks of material misstatements arise from external factors (industry and environment) and company-specific factors.

A major element of risk assessment is the identification of those factors that influence the riskiness of an audit unit (Shanszadeh and Zolfaghari, 2015). This involves consideration of information from past audits, audit-planning activities and other company engagements (PCAOB, 2010). This assessment can help determine the budgetary allocations required for an effective audit. Abbott et al. (2010) reported a positive association between risk management activities and the amount of the budget devoted to internal control-based activities. In addition, successful risk assessment requires skilled workers in the IA staff. Therefore, adequate funds are needed for the training of audit staff on risk assessment. Based on this information, the present study anticipates that risk assessment activities will have an impact on budget allocation for the IAF. Thus, it is proposed that:

H8: risk assessment activity is positively related to IA fund sufficiency.

3. Variables and Measurements

Figure 1 summarises the key aspects of this study. The survey questions in Exhibit 1 measure the IA quality in terms of CAE experience, training and professional certification. In addition, some other independent variables related to IA independence, characteristics and activities have been included. Exhibit 2 comprises the dependent variable question of fund sufficiency.
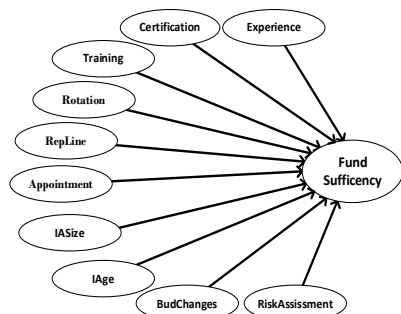
Figure 1: The Study Framework

Exhibit 1: Independent variables:

Construct	Variable	Question
IA Quality	Experience	Total years of experience
	Certification	Has an IA Certification (any type)
	Training	In addition to performing general IA activities, do you have an area of technical specialisation for which you have had formal training AND in which you spend a majority of your time working?
Independence and Objectivity	Rotation	Organisation uses IA as a training ground for future executive positions
	RepLine	What is the primary functional reporting line for the CAE or equivalent in your organisation? (CAEs only)
	Appointment	Who makes the final decision for the appointment of the CAE or equivalent? (CAEs only)
IA Characteristics	IA Size	Approximately how many full-time equivalent employees make up your IA department?
	IA Age	Approximately how many years has the IA department been in place at your organisation? (CAEs only)
Budget Change	BudChange	From last year to this year, how did your IA department budget change? (CAEs only)
Activity	Risk Assessment	How frequently does IA conduct a risk assessment? (CAEs only)

Exhibit 2: Dependent Variable

Variable	Question	Coding
Fund Sufficiency	In your opinion, how sufficient is the funding for your IA department relative to the extent of its	1 = Not Sufficient 2 = Sufficient

4. Research Design

4.1. Sample Selection Process:

In order to achieve the goals of this study, secondary data was used [the Common Body of Knowledge (CBOK) 2015 practitioner survey]. The Institute of Internal Auditors Research Foundation (IIARF) is the global leader in IA. Its mission is to sponsor and promote IA professional research. The CBOK survey was developed and validated by the IIARF for the benefit of internal auditors, the IA profession and the general public. For ethical consideration, a data access request form was submitted to the IIARF that contained information about the research proposal and the researcher. Following the approval from the CBOK committee members, the use of the CBOK 2015 Global Practitioner Survey was authorized under a confidentiality agreement.

The questionnaire consisted of several components and topics related to the respondent's background, IA activities and characteristics. The CBOK 2015 Practitioner Survey was conducted in March 2015 and was offered in 23 languages, with participation from 166 countries/territories. It included responses from 14,518 practitioners representing different levels of internal auditors from more than 150 chapters and 106 institutes. For the purpose of this research, only responses from 2,205 CAEs or their equivalents from six regions were included for statistical analysis (IIARF, 2015).

Table 1 shows the descriptive statistics for both the independent and dependent variables confirming that there are 2,205 valid respondents (CAEs) without missing values for some variables and less than 4% missing values for other variables. Therefore, there is no need for further action regarding the missing values.

Table 1. Descriptive Statistics

	N Valid	Missing	Mean	Std. Deviation	Skewness	Kurtosis	Minimum	Maximum
Experience	2202	3	1.6335	.48195	−0.555	−1.694	1.00	2.00
Certification	2205	0	1.54	0.498	−0.163	−1.975	1.00	2.00
TechTraining	2205	0	1.72	0.451	−0.957	−1.086	1.00	2.00
Rotation	2205	0	1.23	0.421	1.278	−0.366	1.00	2.00
RepLine	2205	0	1.71	0.452	−0.952	−1.095	1.00	2.00
Appointment	2190	15	1.65	0.477	−0.630	−1.604	1.00	2.00
IA size	2168	37	1.84	0.806	0.301	−1.400	1.00	3.00
IA age	2205	0	1.4073	0.49143	0.378	−1.859	1.00	2.00
BudChange	2128	77	1.7364	0.67080	0.366	−0.808	1.00	3.00
RiskAssess	2136	69	1.91	0.282	−2.931	6.597	1.00	2.00
SuffFund	2141	64	1.8561	0.35103	−2.031	2.127	1.00	2.00

The current study employed the commonly used cut-off of ±3.5 (p < 0.001, two-tailed test) in order to identify any extreme response (outliers) (Tabachnick and Fidell, 2014). Table 2 shows that there are no outliers.

Table 2. Z-score Descriptive Statistics

	N	Minimum	Maximum
Z-score: Experience	2202	−1.31447	.76042
Z-score: Certification	2205	−1.08451	.92165
Z-score: TechTraining	2205	−1.58607	.63020
Z-score: Rotation	2205	−0.54771	1.82497
Z-score: RepLine	2205	−1.58254	0.63161
Z-score: Appointment	2190	−1.36314	0.73326
Z-score: IA size	2168	−1.04050	1.44113
Z-score: IA age	2205	−0.82871	1.20615
Z-score: BudChange	2128	−1.09774	1.88375
Z-score: Risk Assessment	2136	−3.23712	0.30877
Z-score: SuffFund	2141	−2.43896	0.40982
Valid N (listwise)	1996		

Intercorrelations among predictor variables can produce unreliable results. Therefore, multicollinearity should be checked. Table 3 confirms that there is no multicollinearity problem as the tolerance values for predictive variables are not less than .10 (i.e., tolerance value > 0.71). This is also supported by the variance inflation factor (VIF) value (1.32 and lower for all variables and well below the cut-off of 10). Therefore, there is no violation of the multicollinearity assumption. These results are not surprising, given that the Pearson's correlation coefficient shows no high correlations among the three independent variables (above .9) (see Correlations Table 4).

Table 3. Multicollinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Experience	0.915	1.092
	Certification	0.942	1.061
	TechTraining	0.978	1.022
	Rotation	0.913	1.095
	RepLine	0.754	1.327
	Appointment	0.771	1.297
	IA size	0.793	1.261
	IA age	0.827	1.210
	BudChange	0.966	1.035
	RiskAssess	0.967	1.034

Table 4: Pearson Correlations

	SuffFund	Experience	Certification	TechTraining	Rotation	RepLine	Appointment	IA size	IA age	BudChange	RiskAssess
SuffFund	1.000										
Experience	0.009	1.000									
Certification	0.061	0.214	1.000								
TechTraining	−0.032	0.005	0.030	1.000							
Rotation	0.079	0.016	0.019	0.109	1.000						
RepLine	0.102	0.126	0.071	0.036	0.060	1.000					
Appointment	0.099	0.045	−0.016	0.024	0.029	0.472	1.000				
IA size	0.117	0.128	0.054	−0.006	0.257	0.077	0.056	1.000			
IA age	0.076	0.148	0.001	−0.048	0.109	0.092	0.099	0.376	1.000		
BudChange	−0.170	−0.054	0.006	−0.031	−0.087	−0.081	−0.055	−0.118	0.034	1.000	
RiskAssess	0.047	0.063	0.072	0.069	0.084	0.111	0.071	0.060	0.092	0.010	1.000
	**. Correlation is significant at the 0.01 level (two-tailed).										
	*. Correlation is significant at the 0.05 level (two-tailed).										

The multivariate normality assumption is met when 'each variable and all linear combinations of the variables are normally distributed' (Tabachnick and Fidell, 2014: 112). However, with a large sample (as is the case in this study), it is preferable to look at the data distributions through histograms, P–P plots or Q–Q plots (see Figures 2, 3 and 4).

According to the histogram, the normal probability plot (P–P) of the regression standardised residual and the scatterplot of the sample are not normally distributed. In the normal P–P plot, sample points do not lie in a straight diagonal line from bottom left to top right. The same situation applies with the histogram and the scatterplot, as they show major deviations from normality, suggesting a violation of the normality assumptions.
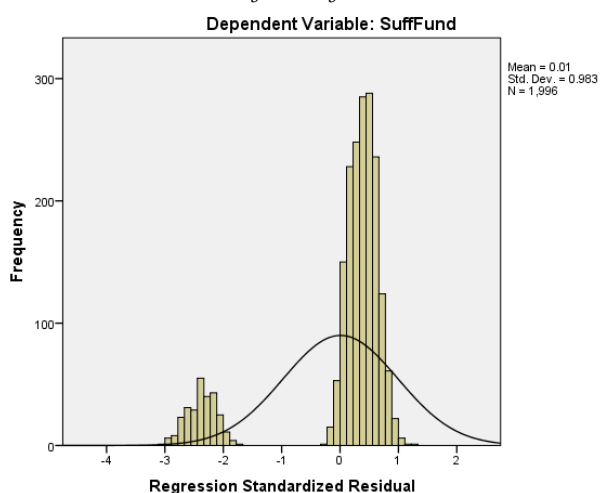
Figure 2: Histogram
Dependent Variable: SuffFund

Mean = 0.01
Std. Dev. = 0.983
N = 1,996

Figure 3: Normal P–P Plot
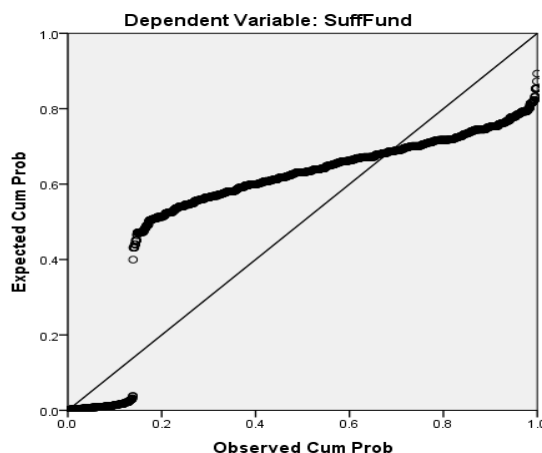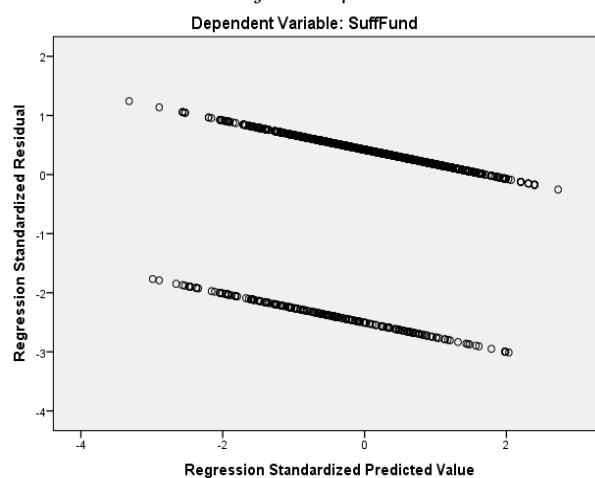Dependent Variable: SuffFund

Figure 4: Scatterplot
Dependent Variable: SuffFund

5. Statistical Techniques Selection

The dependent variable is categorical (dichotomous). In addition, the normality assumption is not met, and this contributes to other assumption violations. However, a transformation may cause bias in the data, so multiple regression is not suitable for scores not normally distributed nor with categorically dependent variables. Therefore, binary logistic regression is the best option to achieve this study's objectives. This is a statistical technique that allows the researcher to assess how well independent variables predict or explain the categorical (dichotomous) dependent variable. It assesses the adequacy of the model's 'goodness of fit' and provides an indication of the relative importance of each independent (predictor) variable (Pallant, 2013).

5.1. Logistic Regression Assumptions:

Logistic regression does not need normally distributed data concerning the scores for the predictor variables. However, it is highly sensitive to (1) small samples, (2) multicollinearity and (3) the problem of outliers. Per the aforementioned discussion of the data assumptions (sample selection process), the sample is large enough to run logistic regression. In addition, there are no high correlations among the predictor variables (multicollinearity), and there is no outliers problem. The results of the logistic regression are presented in the following section.

5.2. Logistic Regression:

This section discusses the results of the binary logistic regression. The model is summarised as follows:

SuffFund = b0 + b1EXP. + b2 CERTIFCAT. + b3 TRAIN. + b4 ROTATION + b5 REPORLINE + b6 APPOINT + b7 IASIZE + b8 IAAGE+ b9 BUDCHANGE + b10 RISKASSESS + ε_u

According to the logistic regression formula, the model contains ten independent variables that predict how sufficient the funding for the IA department is relative to the extent of its audit responsibilities (SuffFund). The full model containing all predictors was statistically significant, x^2 (12, N = 2,205) = 133.288, p < .001, indicating that the model was able to distinguish between the CAEs who reported whether their fund was sufficient or insufficient.

Classification results show how well the model can predict the correct category (sufficient fund/insufficient fund) for each case. In order to compare the model with and without predictor variables, Block 0 illustrates the results of the analysis without independent variables, and Block 1 illustrates the results of the analysis with independent variables. In the classification results, the overall percentage of correctly classified cases was 86.1%. In this case, SPSS classified that all cases (CAEs) would report sufficient funds for their IA department because there was a higher percentage of people answering 'sufficient fund' to the question. Step 1 showed minor improvement in the model after including predictive variables (86.3%).

The Omnibus Tests of Model Coefficients assessment (Table 5) provides an overall indication of how well the model performs, over and above the results obtained for Block 0, with none of the predictors entered into the model. This is referred to as a 'goodness of fit' test. The significance value is the probability of obtaining the chi-square statistic (133.288) if there is no effect of the covariate on the dependent variable. The degree of freedom is 12 (including the number of independent variables). In this case, the significance value is very high at .000 (p < 0.0005). Therefore, the model with predictor variables is better than the original SPSS CAEs model shown in Block 0 that assumed everyone would report sufficient funds for their IA department.

The model summary shows that the addition of all the covariates improves the model from 1,474.443 to 1,607.731 (e.g., 1,474.443 + 133.288). Logistic regression does not have an equivalent to the R-squared value provided in multiple regression outputs, and what is seen in Cox and Snell's R^2 and Nagelkerke's R^2 are pseudo-R-squares. The pseudo-R-square values provide an indication of the amount of variation in the dependent variable explained by the model (from a minimum value of 0 to a maximum value of approximately 1). In this case, the two values are .065 and .117, suggesting that the values between 6.5 and 11.7 of the variability are explained by this set of variables.

The results shown in Table 5 support this study's model as being worthwhile. The Hosmer–Lemeshow goodness of fit test is the most reliable test of model fit available in SPSS. It is interpreted quite differently when compared to the Omnibus Tests of Model Coefficients tool. For the Hosmer–Lemeshow goodness of fit test, a good fit is indicated by a significance value higher than .05. In this case, the chi-square value for the Hosmer–Lemeshow goodness of fit test is 3.836, with a significance level of .87 (>0.05). Therefore, these results indicate support for the model.

Table 5. Hosmer–Lemeshow Test

Step	Chi-square	Df	Sig.
1	3.836	8	0.872

A significance value lower than .05 indicates that variables contribute significantly to the predictive ability of the model. Table 6 demonstrates that IA quality variables (experience, certifications and technical training), independence and objectivity variables (rotation, reporting line and appointment), IA size and budget changes contribute to predicting fund sufficiency for the IA department in the model (significant value p < 0.05) (H1, H2, H3, H4, H5, H7). In addition, IA age records significant value with a 0.07 (p < 0.1) value (H6). However, the risk assessment variable does not reveal any significant value (.123, p > 0.1) and does not contribute to the model (H8). The importance of each of these variables is presented in the Wald test. Table 6 shows the significant variables through the theoretical framework.

Table 6. Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1a	Experience(1)	−0.309	0.146	4.483	1	0.034	0.734	0.551	0.977
	Certification(1)	0.339	0.139	5.996	1	0.014	1.404	1.070	1.842
	TechTraining(1)	−0.330	0.157	4.413	1	0.036	0.719	0.528	0.978
	Rotation(1)	0.364	0.185	3.875	1	0.049	1.439	1.002	2.067
	RepLine(1)	0.389	0.162	5.754	1	0.016	1.476	1.074	2.029
	Appointment(1)	0.326	0.158	4.277	1	0.039	1.385	1.017	1.887
	IA size			18.252	2	0.000			
	IA size(1)	0.714	0.170	17.661	1	0.000	2.041	1.463	2.847
	IA size(2)	0.430	0.191	5.090	1	0.024	1.538	1.058	2.234
	IA age(1)	0.276	0.157	3.107	1	0.078	1.318	0.970	1.793
	BudChange			59.775	2	0.000			
	BudChange(1)	−0.362	0.165	4.826	1	0.028	0.696	0.504	0.962
	BudChange(2)	−1.458	0.196	55.203	1	0.000	0.233	0.158	0.342
	RiskAssess(1)	0.346	0.224	2.383	1	0.123	1.413	0.911	2.192
	Constant	1.262	0.295	18.355	1	0.000	3.533		

- Variable(s) entered on step 1: Experience, Certification, TechTraining, Rotation, RepLine, Appointment, IA size, IA age, BudChange and RiskAssess.

Figure 5: The Significance Pathways
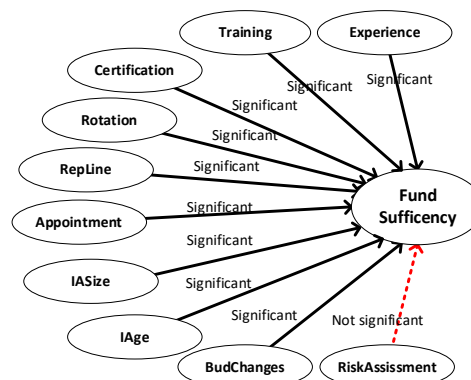
Positive B values indicate that an increase in the independent variable score will result in an increased probability of the case recording a score of one in the dependent variable. In this case, the increases in the total years of experience and in technical training are more likely to be associated with non-sufficient funds (H1 and H3 are not supported). In contrast, CAEs who have any type of IA certification are more likely to be associated with sufficient funds (H2). The odds ratios for each of the predictor variables are presented in the Exp(B) column. The odds ratio represents 'the change in odds of being in one of the categories of the outcome when the value of a predictor increases by one unit' (Tabachnick and Fidell, 2014).

In this case, CAEs with IA certifications, higher independence and objectivity (H4) and bigger IA size (H5) are more likely to record sufficient funds. If 30% of the CAEs have IA certifications and higher independence and objectivity, the odds of sufficient funds are more than one times those of the CAEs who do not have these variables. The same applies to IA size. An IA department that is 70% larger is more likely to have funds that are two times more sufficient. Finally, the odds of CAEs with sufficient funds are reduced by approximately 30% when the IA department budget changes (H7 is not supported). However, the risk assessment activities variables have no significant influence on fund sufficiency (p = 1.2) (H8 is not supported).

6. Discussion and Conclusion

This study examined certain factors that have an influence on IA fund sufficiency. This study is motivated by the lack of internal audit fund research as fund sufficiency is an essential factor that enhances internal audit effectiveness. Using the binary logistic regression approach and a sample of 2,205 CAEs, the model contains ten independent variables to predict how sufficient the funding for the IA department is relative to the extent of its audit responsibilities. The analysis results reveal that IA fund sufficiency is associated with IA quality, IA independence and objectivity, IA characteristics and budget changes. Risk assessment did not reveal a significant relationship with internal audit fund sufficiency.

Previous literature has proven the important influence that IA quality has on the effectiveness of internal auditing. For instance, Mihret and Hismaw (2007) argued that the effectiveness of the IAF is influenced by the IA quality, independence and objectivity. In addition, Dellai and Omri (2016) suggested that the effectiveness of internal auditing is influenced by the independence and objectivity of internal auditors. Following their study, Pizzini et al. (2015) indicated that financial statement audit delay is influenced by IAF quality. The present work advances the literature by studying the link between IA fund sufficiency and IAF quality. A lack of resources also has an influence on IA effectiveness.

The negative relationship between internal audit fund sufficiency and CAEs with higher experience or technical training may be due to the smaller amount of time they spend on achieving their tasks. Rodgers and Al Fayi (2019) suggested that CAEs with higher knowledge rely more on their perception and experience to make a decision. Thus, they need less time. However, CAEs with professional certifications rely more on regulations and standards. They consider available information in the analysis stage prior to making a decision (they need more time to weigh various options before making a decision).

It is not surprising to find a strong relationship between internal audit independence and sufficient funds. Previous studies have proven that low independence and objectivity have a negative influence on the quality of internal audit work (Al-Twaijry et al., 2004; Christopher et al., 2009; Alzeban and Gwiliam, 2014; Christ et al., 2015; Rodgers and Al Fayi, 2019). The results of this study match those of Anderson et al. (2012), who found a positive relationship between internal audit size and internal audit budget.

Management support is linked to hiring qualified staff, providing sufficient resources, and having an independent IAF (Alzeban and Gwilliam, 2014). Leung et al. (2011) examined the accountability structures and relationships between IA staff and management support. They concluded that a close relationship between the CAE and management can lead to career risks for or management pressure on the CAE. Such relationships should be clearly defined to create efficient corporate governance and avoid negative consequences (Leung et al., 2011).

It has been argued that the longer the audit department is in an organisation, the better the plan to manage risk is (Kor and Mahoney 2000), and the better the knowledge is regarding operations, control systems and accounting systems (Boone et al., 2008). This implies that knowledge about the organisation can help secure sufficient funding for the IAF. However, Rickling (2014) reported that a longer tenure may lead to less vigilant and less independent auditors. Audit members may no longer exercise independent judgement, thus negatively influencing the IA budget. Due to the disagreement among previous studies, the present work did not reveal a strong relationship between IA age and fund sufficiency, as the determinants were not fixed. For example, internal auditors with increased knowledge about the company system may need a smaller amount of time and a lower budget. At the same time, they may have a better plan for risks, requiring sufficient funds.

The amount of the IA budget is based on the tasks that must be performed. Each organisation has its own needs. A well-controlled organisation with exceptional policies, practices and oversight systems may need a smaller audit budget than a similar organisation with a substantial risk for fraud, waste and abuse. As a result of this argument, a negative relationship has been found between budget changes from the previous year and fund sufficiency. Abbott et al. (2010) reported a positive association between risk management activities and the amount of the budget devoted to internal control-based activities. However, this study did not find any significant relationship between internal audit fund sufficiency and risk assessment activities.

This study is subject to several limitations. Most notably, the CBOK survey is a worldwide survey, and the CAEs are from different regions. Organisations around the world have different regulations, culture and characteristics that may limit the ability to generalise the findings. For instance, the CAEs in the US spend up to 10% of their time and budget on risk management activities. This is in contrast with Belgian, Italian and Australian firms that give a greater contribution to the risk management process (Alzeban and Sawan, 2013). Along the same lines, Al-Qadasi et al. (2019) argued that family companies rely more upon external auditing than an IAF, leading to a lower budget compared to other companies. Despite these limitations, the current study predicts how sufficient the funding for the IA department is relative to the extent of its audit responsibilities. Future research should focus on the difference between developing and developed countries as this could reveal significant implications (Alzeban and Gwilliam, 2014; Parker, 2011). Finally, additional studies could use different approaches such as experimental and case studies (Christ et al., 2015).

Biography

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Acknowledgements

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