Research Paper 2

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**Data Collection**

**Research Instruments**

In this research study, a questionnaire will be used to collect data. The questionnaire will be divided into two sections. The first section will consist of demographic information of the respondents such as age, gender, education level, position held in a company and work experience. The second section will comprise of determinants of the effectiveness of internal audits. The third section will consist of information that will establish the auditor's authority and independence. Section 4 of the questionnaire will consist of questions that establish the technical competence of internal auditors, the 5th section will comprise of questions to find the factors related to the detection of fraud. The questionnaire will be made of easy and simple questions for the respondents. The questionnaire will be distributed directly to the respondents which will be collected after one day or via email. A clear explanation will be provided at the start of the questionnaire regarding how the respondents will be benefited by this research. Clear instructions on how to fill this questionnaire will also be provided on the first page of the questionnaire. The dependent variable in this research study is the effectiveness of the internal audit. The effectiveness of the internal audit is measured in terms of the ability of the internal auditor to identify the noncompliance activity with policies and procedures. The factors that will be measured will involve internal auditor independence, the competence of internal audit, approved internal audit charter and relationship between the external auditor and internal auditor. Likert scale is usually a psychometric scale that is used commonly for survey-based questions. The Likert scale questionnaire will be used in which the scale ranges from 1 to 5. The scale 1 will denote ‘strongly disagree’ and 5 will represent ‘strongly agree’ (Bryman, 2017).

**Target population**

In statistics, the target population is defined as a specific population about whom information is required. The population is defined as a well-defined set of elements, services, people, and events that are being studied. The target population in this study are internal auditors in the government-linked organizations and the public sector.

**Sample Size**

Hair, et.al (2006) in his study stated that an adequate sample size for the research study is the one that lies within a range of 110 to 140. In this study, the list of the public sector and government-linked companies present in United States capital, will be found. After that, they will be classified into different strata and substrata. By using the above-mentioned Hair, et.al (2006) rule, the total sample for this study should be present between the ranges of 110 to 140. The questionnaires will be distributed to internal auditors of public and government-linked companies. The sample size will be determined by using the following equation, where N is population size and e is the confidence interval i.e. 95%.



**Research Design**

The main aim of this study is to determine the factors that influence the effectiveness of the internal audits in the public sector and the factors that influence the internal auditor’s probability to detect fraud. A descriptive research design will be adopted for this study as it will provide well-stated and clear investigation that sought to determine who, when and what type questions. The descriptive research design will help to determine the effectiveness of the independence of the auditor, working environment and internal auditor’s technical competency on the internal audit performance in the public and government-linked organizations. Survey research will attempt to gather data from a population sample and will describe the respondent's opinions, concerns, and thoughts. Primary data will be used in this study which will be collected by distributing questionnaires to internal auditors in the public companies.

**Data analysis**

To determine the different factors that affect the internal auditor’s probability to detect fraud, a binary logistic regression model will be used. The binary logistic model will be used because the dependent variable in this study is fraud detection and it is binary. In this study, the size of the firm, auditor’s experience, auditor’s position tenure and probability of fraud detection will be independent variables.

**Sampling Frame**

The sampling frame of this study consists of internal auditors. A list of members of senior internal auditors and audit committees will be collected that will make the sampling frame. The sampling frame is defined as an objective population list from which the sample is selected by the researchers (Drogalas, Pazarskis, Anagnostopoulou, & Papachristou, 2017).

**Sampling Technique**

Random sampling is probability sampling. So, in this sampling technique all the participants have an equal chance of being selected. This sampling is also appropriate when the sampling frame is not large and each unit is accessible easily. This sampling method is also used to compute easily, the sampling errors present in the research. The amount of bias present in the study can also be eliminated by using random sampling. As mentioned earlier, in this study, only members from senior internal auditors and audit committees will be selected from the public and government-linked companies. This will allow for greater accuracy of results, population elements availability, lower research cost, and greater data collection speed. Stratified random sampling will be used to select the respondents. Random sampling ensures that each member of the population has an equal chance to be included in the study, hence it eliminates biases.

**Data Collection Procedure**

Research instruments provide different ways of data collection. These different ways of data collection boost the reliability and validity of data. Different methods are used to collect data from different sources. Data collection can be primary as well as secondary. Primary data is collected by using both unstructured and structured interviews such as a self-administered questionnaire. Primary data will be collected in this research study. Data will be collected by using a structured questionnaire for both qualitative and quantitative information. The questionnaire will be developed after reviewing the literature on internal audit effectiveness and factors which influence the detection of fraud.

**Pilot testing**

 Pilot testing is a preliminary study that is conducted to determine the statistical variability. The reason for conducting a pilot study is to determine the weaknesses in the design of the instrumentation which improves study design before final data collection. Pretesting of the questionnaire will be done by distributing the questionnaire to a small sample of respondents who will not include in the actual study. Constructive feedback will be taken throughout this process and changes will be made to the questionnaires.

**Reliability test**

A reliability test is used to determine the reliability of the questionnaire. Cronbach alpha is one of the most reliable methods to determine the reliability of a questionnaire. The greater the alpha value the higher the reliability. In this study, the reliability of the questionnaire will be tested by a Cronbach alpha value of 0.7 that is important to prove the questionnaire reliable (Leung, 2015).

**Normality Test**

In literature review, statistical errors are very common and more than half of the research articles that are published online have some errors in it. It is important to determine the normality for different parametric tests. The prime test for normality includes the Shapiro-Wilk test and the Kolmogorov-Smirnov test.

**Validity**

Validity is defined as the quality of an instrument and procedure used in research being true, right, accurate and meaningful. A measurement is considered valid when it measures what is supposed to be measured. In this study, both content and construct validity will be measured. Content validity refers to the extent to which different items in the questionnaire are adequately measured whereas construct validity is a level of degree to which a test measured, what it purports and claims(Leung, 2015).

Data analysing involves ordering, categorizing, summarizing and manipulating data and then representing it in a meaningful term. Data analysis will be conducted using descriptive statistics. The descriptive analysis is described as an analysis of percentages and frequency (Li, Dai, Gershberg, & Vasarhelyi, 2018). The descriptive analysis will be carried out for the demographic variables such as gender and age. Both graphical and numerical approaches will be used. Correlation analysis will be used to determine the different factors that contribute to the effectiveness of internal audit in the public and government-linked organizations. Correlation analysis will help to determine whether the different variables are related and will also help to find the correlation strength. The correlation coefficient is known as “r” and ranges from -1.0 to +1.0. If the value of r is '0' then it means that there is no relationship between variables. The +1 value indicates the positive relationship and -1 indicates inverse or negative relationship. A p-value of fewer than 0.05 means that significant association is present between the independent and dependent variables.

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| --- | --- |
| Correlation Coefficient (r ) |  Relationship Strength |
| 0.2 and below | Negligible |
| 0.2-0.4 | Low correlation |
| 0.4-0.7 | Moderate Correlation |
| 0.7-0.9 | High correlation |
| 0.9-above | Very high  |

**Multiple regression Analysis**

Regression analysis will be used for this study. Some assumptions will be made and tests such as reliability test, linearity test, and homoscedasticity and normality will be run. These assumptions are known as ordinary least square and if all these tests are passed then the multiple regression analysis will take place. The normality test will be carried out when variables have a normal distribution. The reliability test will be carried out when questions that are constructed are reliable. The linearity test will be used to test the linear relationship between dependent and independent variables. The Statistical Package for Social Sciences (SPSS) will be used for data analysis. After the data is collected, it will be entered into the SPSS and checked for completeness. Coding will be done and both descriptive and inferential statistics will be carried out.

**Ethical consideration**

It is the responsibility of every researcher to protect the rights of research participants. It is an ethical responsibility of a researcher to respect the dignity, rights, sensitivity and privacy of research participants and also the organization's integrity in which research is being carried out. Informed consent is a basic component of any research study. Informed consent involves procedures by which individuals have free choice to decide whether to participate in a particular study or not. It is the responsibility of a researcher to ensure that the participants of the study have a complete understanding of the methods and purpose of the study, the risks present and the responsibility that is placed on them as a participant. The research participant must also be provided with the information that they have full rights to withdraw from the study at any time. Informed consents are of two types: Direct and Indirect(Roberts & Allen, 2015). Direct consent is preferred mostly because the consent agreement is directly obtained from the individual present in the study. On the other hand, substitute, informed consent is usually obtained when the individual cannot make decisions and are dependent on others such as children under 18 years of age, people with disability, etc. Data from both direct and indirect informed consent must meet the criteria of informed consent (Hammersley & Traianou, 2017). Informed consent must consist of three elements such as information, capacity, and voluntariness to be effective. The data that will be collected from public and government-linked companies will be used solely for this research. Permission will be obtained from the university’s ethical committee before starting the study. Data that will be collected will not be shared with anyone except the study leader. Before collecting data, informed consent will be obtained from all participants (Li et al., 2018). The purpose of informed consent will be to make respondents understand the purpose of the research study, possible research outcomes, methods that will be used in the study, and the associated discomfort, risks, demand and inconvenience that the participants can face (Hammersley & Traianou, 2017). Protecting the respondent’s confidentiality and anonymity is another basic component of research ethics. In this study confidentiality of all respondents will be made and their identities will not be revealed in any case.

**Hypothesis Testing**

Internal audit is considered as one of the most important factors to detect the external auditor's errors. It is also important to protect the organizations from internal criminal attitudes and behaviour. Previous literature has shown an internal audit as one of the most important tools for the detection of fraud. Therefore, it can be predicted that the organizations that have an internal audit system have more ability to detect fraud (Li et al., 2018).

To test this hypothesis, the following model will be used. Most of the independent variables that are present in this study have been tested in previous studies. It is found in different studies that internal audit is associated with increased propensity to report and detect fraud. The following hypothesis is presented for this

**Hypothesis 1**

Public and government-linked organizations, having internal audit functions, are more likely to report and detect fraud than those which do not.

**Hypothesis Testing**

Prior studies have also addressed the organization's internal auditor's relation to fraud detection. It is found that when internal audit function is outsourced then organizations have fewer opportunities to detect fraud.

**Hypothesis #1:**

Internal auditors described as relevant will be perceived to possess more ability to detect fraud.

**Hypothesis Testing**

Hypothesis 1 suggests that the level of described conscientiousness will show a positive impact on the internal auditor's perceived ability to detect fraud. Variation analysis will be carried out using conscientiousness as an independent variable (low or high) and fraud detection ability perception as the dependent variable. ANOVA model will be used to find the effect of conscientiousness perception in the internal auditor’s perceived ability to detect fraud. The results from the previous study show the significant relationship between the ability of fraud detection and conscientiousness (p <0.001). This shows that individuals that have conscientiousness have a greater ability to detect fraud. The result supports the above hypothesis (Power & Gendron, 2015). This hypothesis’ testing results are a reflection of how risk impact differentiates the perception of detection of risk across different conscientiousness levels.

The regression analysis model is also used in which the level of fraud, perceived ability to detect fraud is a dependent variable and risk auditor class and portrayed conscientiousness are known as independent variables. A regression model that is used is as follows: -

Perceived skills to Detect Fraud= β0 + β1 (Fraud Risk) + β2 (Conscientiousness) + β3 (Audit Class) + β4 (Perceived Risk) + ε

The conscientiousness positive coefficient (p<0.001) with the results of univariate analysis, provides strong support for the above-mentioned hypothesis.

**Hypothesis 3**

There is a significant association between the internal and external auditors and the effectiveness of the internal audit.

**Hypothesis testing**

There is a need to determine the relationship between the external auditor and internal auditor and the effectiveness of the internal audit. The following model will be used to test this hypothesis: -

IAE= **α+** **β1 A1+β2** AC+ **β3** 1AC+ **β4** E1+ **β5** AF+ei

Where IAE: Internal auditor’s effectiveness to the public and government-linked organizations

A1= Independence of internal auditor

AC: Competence of internal auditor

IAC: Approved internal auditor charter

**α:** constant which represents internal audit effectiveness when all independent variables is equal to 0.

**Analysis and Forecasting of Time series**

The main idea behind the time series forecasting model is to determine a mathematical formula that can generate a historical pattern in the form of time series. Time series is described as a sequence of observations (collected at a constant interval of time) of a chosen phenomenon that changes over time. In this study time series, the analysis will be used to determine the time-based pattern that exists in the data to find a good model that helps to forecast the future trend of business metrics (Zhang et al., 2017). It will also help to identify the timely characteristics/pattern in data and also to analyse the trends in the effectiveness of internal auditors with time. There are different types of time series methods such as seasonal, stationary, univariate, linear, nonlinear and non-stationary. In this study, univariate time series will be used. Univariate time series is a method on which forecast is based on only one variable that changes over time. In this study time series, data will be obtained from the analysis of different primary studies that have been published in the last 10 years, from 2009 to 2019 (Ma’Ayan & Carmeli, 2016). The data obtained from findings will depend on the analysis method, publication type, organization sector, research participant, and measurement analysis used in previously published studies. The list of sources that will be used to obtain the time series data includes Australian Accounting Review, Managerial Auditing Journal, BMJ- Health Services Research and Annals of Faculty of Economics and International Journal of Auditing, etc. Historical data on the effectiveness of internal auditing will be used to predict future values. Among the 29 publications that report empirical studies, about half of them used regression analysis to investigate the factors that influence IA effectiveness. As mentioned above, in addition to these empirical studies, there are also secondary studies that discuss the influence of various factors that are considered to influence the audit’s effectiveness based on literature reviews. In this study, forecasting will be done by using regression analysis. Regression analysis is used to find the relationship among different variables. The main purpose of this is to estimate and predict the value of one variable from assumed or known values of other variables. For forecasting, we will first identify the effective predictors and then estimate by using the univariate method time series method. A stationary series is the one in which variance, mean and covariance do not change with time-series data. For data to be classified as stationary, it should not follow a trend. In this study, there will be no stationary time series because a proper trend has been shown in previous studies regarding the internal auditor and its relationship with the organization's effectiveness (Zhang et al., 2017).

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