Chapter 3
Review of Literature

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3.1 What is review of literature?

Almost every primary research study begins with a review of the literature. The purpose of the literature review section of a research is to provide the reader with an overall framework for where this piece of work fits in the “big picture” of what is known about a topic from previous research. Thus, the literature review serves to explain the topic of the research and to build a rationale for the problem that is studied and the need for additional research. Boote and Beile (2005) eloquently explain the purpose of a literature review in planning primary research:

As the foundation of any research project, the literature review should accomplish several important objectives. It sets the broad context of the study, clearly demarcates what is and what is not within the scope of the investigation, and justifies those decisions. It also situates an existing literature in a broader scholarly and historical context. It should not only report the claims made in the existing literature but also examine critically the research methods used to better understand whether the claims are warranted. Such an examination of the literature enables the author to distinguish what has been learned and accomplished in the area of study and what still needs to be learned and accomplished. Moreover, this type of review allows the author not only to summarize the existing literature but also to synthesize it in a way that permits a new perspective. Thus a good literature review is the basis of both theoretical and methodological sophistication, thereby improving the quality and usefulness of subsequent research.

Shields and Rangarajan (2013) distinguish between the process of reviewing the literature and a finished work or product known as a
literature review. According to an informant website the process of reviewing the literature is often ongoing and informs many aspects of the empirical research project. All of the latest literature should inform a research project. Scholars need to be scanning the literature long after a formal literature review product appears to be completed.

3.2 Literature Review for Concept of fraud, forensic accounting and financial investigation

3.2.1 Fraud

In general language, fraud is concealment of facts resulted of which an institution or firm get financial loss of his wealth and assets. Steven L. Skalak, Manny A. Alas, Gus Sellitto (2006) have noted that fraud evokes a visceral reaction in us. It is an abuse of our expectation of fair treatment by fellow human beings. Beyond that, it is a blow to our self-image as savvy managers capable of deterring or detecting a fraudulent scheme. Whether we react because of values or because of vanity, nobody likes to be duped. Many elements of modern society are focused on maintaining an environment of fair dealing. Laws are passed; agencies are established to enforce them; police are hired; ethics and morals are taught in schools and learned in businesses; and criminals are punished by the forfeiture of their ill-gotten gains and personal liberty—all with a view to deterring, detecting, and punishing fraud. The profession of auditing grew out of society’s need to ensure fair and correct dealings in commerce and government.

According to Manny A. Alas (2006) one of the central outcomes of fraud is financial loss. Therefore, in the minds of the investing public, the accounting and auditing profession is inextricably linked with fraud deterrence, fraud detection, and fraud investigation. This is true to such
an extent that there are those whose perception of what can be realistically accomplished in an audit frequently exceeds the services that any accountant or auditor can deliver and, in terms of cost, exceeds what any business might be willing to pay.

Under common law, fraud includes four essential elements:

1. A material false statement
2. Knowledge that the statement was false when it was spoken
3. Reliance on the false statement by the victim
4. Damages resulting from the victim’s reliance on the false statement

In the broadest sense, fraud can encompass any crime for gain that uses deception as its principal technique. This deception is implemented through fraud schemes: specific methodologies used to commit and conceal the fraudulent act. There are three ways to relieve a victim of money illegally: force, trickery, or larceny. Those offenses that employ trickery are frauds. (Kranacher c01.tex V1 - February 10, 2010. Page no. 3-4).

internal control systems have been described as the basic means of preventing and detecting fraud (Beck, 1986; Hooks, Kaplan and Schultz, 1994; Bierstaker, Brody and Pacini, 2006; AICPA, 2007; Wells, 2008). However, Barra (2010) contends that what constitutes an effective internal control system is more of opinions that are not based on definite knowledge established through research. This is clear as the research efforts in internal controls have been focused on issues of the controls with reliance on implied assumptions (Simon, 1974). Moyes and Baker (2003) carried out a study on auditors’ belief about the fraud detection’s effectiveness of standard audit procedures. The results show that out of
the 218 standard audit procedures, 56 were considered more effective in fraud detection. The study further reveals that the most effective procedures were those that related to internal controls in terms of its existence and/or strength.

The legal definition of fraud is the same whether the offense is criminal or civil; the difference is that criminal cases must meet a higher burden of proof. For example, let’s assume an employee who worked in the warehouse of a computer manufacturer stole valuable computer chips when no one was looking and resold them to a competitor. This conduct is certainly illegal, but what law has the employee broken? Has he committed fraud? The answer, of course, is that it depends. Let us briefly review the legal ramifications of the theft. The legal term for stealing is larceny, which is defined as “felonious stealing, taking and carrying, leading, riding, or driving away with another’s personal property, with the intent to convert it or to deprive the owner thereof.” In order to prove that a person has committed larceny, we would need to prove the following four elements:

1. There was a taking or carrying away
2. of the money or property of another
3. Without the consent of the owner and
4. with the intent to deprive the owner of its use or possession. (Kranacher c01.tex V1 - February 10, 2010. Page no. 5).

Tommie. W. Sigleton defined the fraud in the way of fraud cycle. The fraud cycle essentially begins with the plans of the fraudster leading up to the committing of the fraud act. Once committed, the fraudster converts the asset to cash, if necessary, and conceals the fraud.
According to Aaron J. Singleton (August 2010) fraud means different things to different people under different situations. Fraud can be perceived deception or fraud can be perceived as the opposite of truth, justice, fairness, and equity.

The U.S. Supreme Court in 1888 provided a definition of civil fraud as:

First: That the defendant has made a representation in regard to a material fact;

Second: That such a representation is false;

Third: That such representation was not actually believed by the defendant, on reasonable grounds, to be true;

Fourth: That it was made with intent that it should be acted on;

Fifth: That it was acted on by complainant to his damage; and

Sixth: That in so acting on it the complainant was ignorant of its falsity, and reasonably believed it to be true. The first of the foregoing requisites excludes such statements as consist merely in an expression of opinion of judgment, honestly Forensic Accounting and Fraud Investigation for Non-Experts entertained; and again excepting in peculiar cases, it excludes statements by the owner and vendor of property in respect of its value.

The U.S. Securities and Exchange Commission (SEC) has presented its view towards fraud that fraud is a activity which contains following reactions:-

It shall be unlawful for any person, directly or indirectly, by the use of any means or instrumentality of interstate commerce, or the mails, or of any facility of any national securities exchange,
(a) To employ any device, scheme, or artifice to defraud,

(b) To make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading, or Fraud in Society

(c) To engage in any act, practice, or course of business this operates or would operate as a fraud or deceit upon any person, in connection with the purchase or sale of any security.

Howard Silverstone, Michael Sheetz (2007) classified the fraud in following category:-

1. Sales and Collections

2. Purchases and Payments

3. Payroll and Personnel

4. Inventory and Warehousing

5. Capital Acquisition and Repayment
Fraud Deterrence Cycle

Thomas W. Golden, Steven L. Skalak, and Mona m. Clayton (2006) have been propounded above fraud deterrence cycle according to which fraud should be detected in pre-settled steps.

3.2.2. Forensic Accounting

Many of literature are available for the forensic accounting. Many scholars have been propounded the concept of forensic accounting. Tommie W. Singleton (2010) has defined forensic accounting as the term forensic accounting refers to the comprehensive view of fraud investigation. It includes preventing frauds and analyzing antifraud controls. Forensic accounting would include the audit of accounting records in search for evidence of fraud; a fraud audit. A fraud investigation to prove or disprove a fraud would be part of forensic accounting. It also includes the gathering of nonfinancial information,
such as interviews of all related parties to a fraud, when applicable. Forensic accounting includes writing a report to management or court. Serving as an expert witness and litigation support are part of forensic accounting.

Forensic accounting has also been defined, in the words of Aaron J. Singleton (2010), as a general term used to describe any financial investigation that can result in a legal consequence. Fraud auditing is a specialized discipline within forensic accounting, which investigates a particular criminal activity, namely fraud. Investigative auditing involves reviewing financial documentation for a specific purpose, which could relate to litigation support and insurance claims as well as criminal matters.

Stephen Pedneault (2007) opined that “ask any two practicing forensic accountants to define what forensic accounting is, and you are likely to get two different answers. Both may be accurate, and there likely will be some similarities within the responses, but still there is no one consistent answer recited by everyone who practices in this specialized area of accounting. The responses provided will depend largely on the background, experience, and areas of practice of each individual forensic accountant.”

Rasey (2009) opined very differently from his scholars friends. According to him “Forensic accounting relies on the fraud triangle to identify weak points in the business systems and find possible suspects in cases of fraud. It consists of three core concepts which together create a situation ripe for fraud: incentive, opportunity, and rationalization. People must have the incentive and opportunity to commit financial fraud, as well as the ability to justify it. Recent analysis has suggested adding a fourth
concept to make a diamond—capability. Just because someone has the opportunity or incentive to steal does not necessarily mean that they have the capability to do so. For example, if someone does not understand how to make journal or ledger entries in the books of accounts, they would not know how to manipulate numbers no matter what the incentive or opportunity is.”

Njanke, Dube and Mashayanye (2009) in their study on the effectiveness of forensic auditing in detecting, investigating, and preventing bank frauds, sought to find out level to which the forensic auditors are able to fulfill this mandate and investigate problems that hinder forensic auditors to make progress in their operations in developing countries.

Generally, forensic accounting approaches include the proactive and the reactive ones. The use of any of these approaches depends very much on the existing circumstances. The proactive approach is asserted to be a universally tactical approach as it aggressively targets types of fraud, searches for indicators, symptoms, or red flags (Levanti, 2001). The Bendford’s digital analysis (Nigrini, 1999); the breakpoint technique (Hassibi, 2000); the strategic fraud detection technique (Albrecht and Albrecht, 2004); fraud hypothesis testing technique (Albrecht et al. 2004) and the five-step detection technique (Ernst and Young, 2006) are generally proactive forensic accounting techniques because they comply with the detective philosophy which aims at catching fraud before it occurs.

Darren J. Tapp, W. McKay (Mac) Henderson (2006) discussed the many differences between the work of the forensic accounting investigator and the work of the financial statement auditor. They focused on a key question that in any audit that identifies indicia of possible fraud is:
When should the auditor, external or internal, consider reaching out for the forensic accounting investigator? Darren J. Tapp, W. McKay (Mac) Henderson opined that many forensic accounting investigators would take the position that the typical financial statement auditor may wait too long before calling in the forensic accounting investigator. The thoughtful and efficient use of forensic accounting investigators often offers the right balance between conducting routine audits and investigating for possible fraud.

The integration of accounting, auditing and investigative skills yields the specialty known as Forensic Accounting. "Forensic", according to the Webster's Dictionary means, "Belonging to, used in or suitable to courts of judicature or to public discussion and debate." "Forensic accounting", provides an accounting analysis that is suitable to the court which will form the basis for discussion, debate and ultimately dispute resolution.

Forensic Accounting encompasses both Litigation Support and Investigative Accounting. As Forensic Accountants, we utilize accounting, auditing and investigative skills when conducting an investigation. Equally critical is our ability to respond immediately and to communicate financial information clearly and concisely in a courtroom setting. Forensic Accountants are trained to look beyond the numbers and deal with the business reality of the situation.

Tommie w. singleton, Aaron j. singleton (2010) also support the concept of forensic accounting. They have introduced fraud detection models in their book. If a number of auditors are involved in an audit, it is conceivable that each of them observed one or two red flags but dismissed them. Their reasons would be quite valid on an individual basis. But a number of anomalies larger than any one person’s could be
dismissed. The question that begs to be answered, therefore, is these anomalies, these red flags, significant in the aggregate? There is no way to know without some formal process in the audit to accumulate anomalies.

Howard Silverstone, Michael Sheetz (2007), have detailed the “Five Accounting Cycles” to understand how fraud occurs within businesses is to understand how the cycles work within an accounting system. Specifically, the cycles are defined as:

1. Sales and Accounts Receivable
2. Payments/Expenses and Accounts Payable
3. Human Resources and Payroll
4. Inventory and Storage/Warehousing
5. Capital Expenditures

Harry Cendrowski, Cames P. Martin, Louis W. Petro (2007) have defined forensic accounting as a comprehensive form of fraud deterrence. According to them, “Fraud deterrence is the proactive identification and removal of the causal and enabling factors of fraud. Fraud deterrence is based on the premise that fraud is not a random occurrence; fraud occurs where the conditions are right for it to occur. Fraud deterrence attacks the root causes and enablers of fraud; this analysis could reveal potential fraud opportunities in the process, but is performed on the premise that improving organizational procedures to reduce or eliminate the causal factors of fraud is the single best defense against fraud. Fraud deterrence involves both short-term (procedural) and long-term (cultural) initiatives.”

Njanke, Dube and Mashayanye (2009) in their study on the effectiveness of forensic auditing in detecting, investigating, and preventing bank
frauds, sought to find out level to which the forensic auditors are able to fulfill this mandate and investigate problems that hinder forensic auditors to make progress in their operations in developing countries. Their study made use of questionnaires, personal interviews, and document review as the instruments for data collection. Using a sample of thirty forensic auditors from thirteen commercial banks, four building societies and four audit firms in Zimbabwe, it was found that the forensic auditing departments suffer from multiple challenges. Amongst these challenges were lack of material resources, lack of technical know-how, interference from management, and unclear recognition of the profession.

### 3.2.3 Financial Investigation

Financial investigation refers to activity that uses financial investigation techniques and includes:

- The use of financial information in criminal investigations;
- The use of financial information in intelligence products (Information in Intelligence Products);
- Seizing cash;
- The use of anti-money laundering powers;
- Restraining assets;
- Undertaking confiscation investigations;
- Working with other agencies to reduce crime. *(Practice Advice on Financial Investigation)*

**Techniques of Financial Investigation**
Physical Surveillance: This is a useful technique to gain general background and intelligence and information on individuals/businesses, habits and relationships of suspects. Surveillance can be especially useful in financial investigations in cases involving the movement of bulk currency and by identifying “gatekeepers” involved in the development and implementation of ML or TF schemes. Surveillance of targets can often identify where financial and related records might be stored and lead to the discovery of assets. In addition, surveillance can help corroborate financial data and identify other targets and associates.

Trash runs: (i.e., searching the suspect’s discarded trash for evidence): This technique can be an effective way of obtaining leads where assets are maintained, as well as help develop probable cause for more coercive measures and evidence for use at trial. Suspects frequently discard evidence, including financial records and correspondence that may be valuable to a financial investigation.

3.3 Use and effectiveness of fraud prevention and detection mechanisms

Forensic accounting investigations involve situations where there is a possibility that (1) fraudulent accounting and reporting has occurred, and (2) there is a misappropriation of assets (Ranallo 2006, p. 110). Forensic accounting is trying to identify fraudulent transactions and typically involves reviewing transactions using document reviews, interviews, and examination of electronic media.6 Forensic accounting techniques are often time consuming and since the results may be used in government adjudication processes or in court reviews, there is a very high evidence standard that must be maintained when forensic accounting evaluations are made.
Forensic accounting evaluations often use interview techniques designed to obtain an admission of guilt by the person(s) involved with the fraud scheme (Golden and Dyer 2006). The investigations also involve detailed document reviews (Clayton 2006, pp. 306-311). Data mining of entries in data bases is another important forensic accounting technique (Clayton et al. 2006).

There are many of the techniques introduced for fraud prevention and detection. Each and every technique has its own usefulness. However, internal control systems have been described as the basic means of preventing and detecting fraud (Beck, 1986; Hooks, Kaplan and Schultz, 1994; Bierstaker, Brody and Pacini, 2006; AICPA, 2007; Wells, 2008). However, Barra (2010) contends that what constitutes an effective internal control system is more of opinions that are not based on definite knowledge established through research. This is clear as the research efforts in internal controls have been focused on issues of the controls with reliance on implied assumptions (Simon, 1974). Moyes and Baker (2003) carried out a study on auditors’ belief about the fraud detection’s effectiveness of standard audit procedures. The study further reveals that the most effective procedures were those that related to internal controls in terms of its existence and/or strength.

By Bierstaker, Burnaby and Hass (2004), effectiveness of internal control had been investigated and measurement of extent was decided by the usefulness of internal control on the basis of frequency of using internal control by practitioners. The outcome of the study suggest that internal control review and improvement, operational audits and reference checks on employees were the commonly used mechanisms of fraud prevention and detection, yet software and digital analysis with generally high ratings of effectiveness were the least often used. While the results of the
study also perceived that small firms, with less than 250 million USA Dollars in revenue, were most reluctant to invest in fraud prevention and detection technology, the use of anti-fraud software by larger firms was insignificant.

*Harry Cendrowski, James P. Martin, Louis W. Petro (2007)* debated about the “Generation X Enterprises Technologies” which was about DBMS (Data Base Management System). Data management systems have been at the core of enterprise software infrastructure for over three decades. The introduction of the relational data model and the concept of data independence revolutionized the data management industry and quickly overtook network and hierarchical systems for large-scale data management. Over the next two decades, the relational database is expected to be transformed into a high-performance, high-volume query processing engine, mainly through innovations in storage and retrieval techniques, concurrency control and recovery, and query processing technology, such as cost-based optimization.

Generally, forensic accounting approaches include the proactive and the reactive ones. The use of any of these approaches depends very much on the existing circumstances. The proactive approach is asserted to be a universally tactical approach as it aggressively targets types of fraud, searches for indicators, symptoms, or red flags (Levanti, 2001). The Bendford’s digital analysis (Nigrini, 1999); the breakpoint technique (Hassibi, 2000); the strategic fraud detection technique (Albrecht and Albrecht, 2004); fraud hypothesis testing technique (Albrecht et al. 2004) and the five-step detection technique (Ernst and Young, 2006) are generally proactive forensic accounting techniques because they comply with the detective philosophy which aims at catching fraud before it occurs. On the other hand, the reactive approach, favours the philosophy
of waiting to see the fraud taking place first and then arrest it. This may involve the use of electronic equipment, such as the closed circuit television (CCTV) or digital and mobile cameras (Njanike, Dube and Mashayanye 2009).

*Debreceny et al (2005)* used the internal and external auditors to examine which of the group uses CATTs and more often. It was discovered that the internal auditors tend to use CATTs for special investigation but it was not the regularly used technique in the normal day to day activity, while the external auditors did not use CATTs at all. According to *Sayana (2003)*, it is not possible to perform an audit in the present dispensation without using information technology. Generalized audit software (GAS) is the most common computer audit assisted tool (CATT) used in the recent years (*Singleton 2006*). Information technology auditors use GAS because of its product motivation and could be used as proactive antifraud tool.

Literature on the use of CATTs in fraud prevention and detection are very few. Academics should research into these areas so as to provide better understanding of the motivations for, and constraint on the use of CATTs in internal audit departments (*Rezaee, 2002* and *Vasarhelyi 2002*). *Debreceny (2005)* also supported that GAS can only be used in limited instances to assist in gathering the audit evidence with regards to each audit objective. This implies that the purpose for the audit has to be clearly known before GAS can be of any beneficial importance to the audit.

*Cullinan and Sutton (2002)* have recognised the need for self-development which the auditors need to employ during the audit. The auditors may use the analytical technique. An analytical technique allows
for the estimation of the account balances without examining the relevant account balances. Moreover, Fraser, Hatherly and Lin (1997) classified analytical technique as non-quantitative, simple quantitative and advance quantitative. Advance quantitative techniques include sophisticated methods derived from statistics and artificial intelligence, like neural networks and regression analysis.

Lalit Wadhwa and Dr. Virender Pal are advocating the “Ratio Analysis” as an effective technique of forensic accounting. A useful fraud detection technique is the calculation of data analysis ratios for key numeric fields. Like financial ratios that give indications of the financial health of a company, data analysis ratios report on the fraud health by identifying possible symptoms of fraud. Three commonly employed ratios are:

1. The ratio of the highest value to the lowest value (max/min);
2. The ratio of the highest value to the second highest value (max/max2);
and
3. The ratio of the current year to the previous year

Using ratio analysis, financial expert studies relationships between specified costs and some measure of labor hours. For example, to arrive at overhead costs per direct labor hour – Total overhead costs might be divided by total direct labor hours. Ratio analysis may help a forensic accountant to estimate expenses.

Data mining techniques are also advocated by same scholars. It is a set of assisted techniques designed to automatically mine large volumes of data for new, hidden or unexpected information or patterns. Data mining techniques are categorized in three ways: Discovery, Predictive modeling and Deviation and Link analysis. It discovers the usual knowledge or
patterns in data, without a predefined idea or hypothesis about what the pattern may be, i.e. without any prior knowledge of fraud. It explains various affinities, association, trends and variations in the form of conditional logic. In predictive modeling, patterns discovered from the database are used to predict the outcome and to guess data for new value items. In Deviation analysis the norm is found first, and then those items are detected that deviate from the usual within a given threshold (to find anomalies by extracted patterns). Link discovery has emerged recently for detecting a suspicious pattern. It mostly uses deterministic graphical techniques, Bayesian probabilistic casual networks. This method involves “pattern matching” algorithm to ‘extract’ any rare or suspicious cases.

Mohammed Shanikat, Abdelrazaq Al-Farah, Tariq Hani Dorgham (2014) revealed in their study that 16 fraud prevention mechanisms were ranked from the most effective mechanism used to the least based on the mean and standard deviation (SD) scores of effectiveness in the respective organizations. Generally, it was found that management review of internal control, independent audit committee, management of certification control of financial statements, anti-fraud policy, internal audit or fraud examination department, job rotation/mandatory vacation, code of conduct, external audit of financial statements, surprise audits, formal fraud risk assessments which can be conducted by specialist professional firms, fraud training and prevention program for managers and employees, employee support programs, rewards for whistle blowers and fraud hotlines have a mean score ranging from 3.2341 to 4.3571 (effective).

According to views of KPMG, “with the oversight and guidance of senior management, organization provide employees with multiple channels for reporting concerns about fraud or misconduct. Many typically request
that employees follow a process that would bring with alerting their own managers, if possible, or a designated human resources or compliance officers.” Telephone hotlines are often made available and can be used at any time, although they are usually intended for use when the normal channels are impractical or ineffective. A hotline typically provides a viable method whereby employees, and other third parties if applicable, are encouraged to:

- Communicate concern about potential fraud and misconduct, including questionable accounting and auditing matters.
- Seek advice before making decisions when an appropriate course of action is unclear.

According to (CAQ, 2010), organizations typically employ two strategies to mitigate the fraud risks, firstly by deterring potential fraud by having a strong ethical tone at the top and a proactive fraud management program and secondly by detecting fraudulent activities that have occurred. Meanwhile, some controls like whistleblower program may be used to deter fraud by their presence and at the same time may help detect incidents of fraud.

Rashidah Abdul Rahmana, Irdi Syahira Khair Anwar (2014) described about many techniques for fraud detection and detection mechanisms. Ethics training, fraud hotline, password protection, continuous auditing, audit committee and reference check on employees are some of the techniques which are suggested by the above mentioned scholars.

3.4 Research Methodology

The process used to collect information and data for the purpose of making business decisions. The methodology may include publication
research, interviews, surveys and other research techniques, and could include both present and historical information.

In general terms, research methodology is the steps going to be executed in a research. Steps in Research Process:

1. Formulating the Research Problem
2. Extensive Literature Review
3. Developing the objectives
4. Preparing the Research Design including Sample Design
5. Collecting the Data
6. Analysis of Data
7. Generalization and Interpretation
8. Preparation of the Report or Presentation of Results-Formal writes ups of conclusions reached.

According to *C.R. Kothari (2004)*, research methodology is a way to systematically solve the problem. It may be understood as a science of studying how research is done scientifically. In it, we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods but also methodology. Researcher not only needs to know how to develop certain indices or tests, how to calculate the mean, the mode, the median or the standard deviation or chi-square how to apply particular research techniques, but they also need to know which of these techniques or methods, are relevant and which are not, and what would they mean and indicate.
A very important decision in research is “selecting the sample”. In the words of Richard Branson – (highest-ranking business person)

“Samples are used all around us. We read a newspaper article and the reporter states that she or he talked to a group of employees; advertisements inform us that, in tests, eight out of ten owners said their pet preferred a particular brand of pet food. Less obviously, television programs offer us the top 100 best pop songs or the top 100 most scary cinema film moments. Implicit in these is the understanding that, as it is impossible to ask every person these questions, data would have to have been collected from individuals in some form of sample who were willing and able to respond.”

For some research questions it is possible to collect data from an entire population as it is of a manageable size. However, you should not assume that a census would necessarily provide more useful results than collecting data from a sample which represents the entire population. Sampling provides a valid alternative to a census when:

- It would be impracticable for you to survey the entire population;
- Your budget constraints prevent you from surveying the entire population;
- Your time constraints prevent you from surveying the entire population;
- You have collected all the data but need the results quickly.

According to Mark Saunders, Philip Lewis, Adrian Thornhill (2009) and other authors the sampling techniques available to a researcher can be divided into two types:
- Probability or representative sampling;
- Non-probability or judgmental sampling.

This research is mainly based on primary data which have been collected through structured and semi structured interview of respondents. According to *Saunders, Lewis and Thornhill* interviews can be divided in following categories:

- Structured interviews;
- Semi-structured interviews;
- Unstructured or in-depth interviews.

Another typology (Healey 1991; Healey and Rawlinson 1993, 1994) differentiates between:

- Standardized interviews;
- Non-standardized interviews.

Robson (2002), based on the work of *Powney and Watts (1987)*, refers to a different typology:

- Respondent (participant) interviews;
- Informant interviews.

In the questionnaire, responses have been recorded in the ratio scale. Questions have been setting up in such a way that responses will answer in rating scale. According to *Saunders, Lewis and Thornhill (2009)* rating scales are best magnitude in five levels of Likert scales.

### 3.5 Data analysis

In this research data analysis was made on the basis of research questions and objectives of the study. As described in the “Research Methodology” chapter, there were Student’s t Test, Factor Analysis Test, Karl Pearson’s
Bivariate Correlation, Two Sampled Z test, and simple arithmetic mean used. The entire tests have been regulated in the Microsoft SPSS 20.0. For foundation of knowledge of SPSS 20.0 books of renowned authors has been used by the researcher.

3.5.1 Student’s t Test in SPSS 20.0

Essentially the t test compares two results. The first is the difference between the mean scores of the two samples. The second is an estimate of what it would expect the difference in means to be when the null hypothesis is true. If the difference in means is not bigger than the expected difference then we cannot reject the null hypothesis: we have not found evidence that our experimental manipulation is having an effect. If the difference in means is larger than the expected difference then we can see whether it is large enough to reject the null hypothesis and claim that our experimental manipulation is having a statistically significant effect. (Perry R. Hinton, Charlotte, Brownlow, Isabella, McMurray & Bob Cozens, 2004)

**Independent samples t test**

The independent samples t test is undertaken when the samples are unrelated, with different participants in each sample, such as the daytime and night-time driving asks discussed below. This test is also called the unrelated t test or the independent measures t test. (Perry R. Hinton, Charlotte, Brownlow, Isabella, McMurray & Bob Cozens, 2004)

**The paired samples t test**

The paired samples t test is undertaken when the samples are related, usually with the same participants in each sample. This test is also called the related t test or the repeated measures t test. In this research to know
the difference between perceived effectiveness of forensic accounting techniques and their actual use, paired sample t test has been used. (Perry R. Hinton, Charlotte, Brownlow, Isabella, McMurray & Bob Cozens, 2004)

3.5.2 Factor Analysis Test

What is the factor analysis?

The Factor Analysis is an explorative analysis. Much like the cluster analysis grouping similar cases, the factor analysis group similar variables into dimensions. This process is also called identifying latent variables. Since factor analysis is an explorative analysis it does not distinguish between independent and dependent variables.

Factor Analysis reduces the information in a model by reducing the dimensions of the observations. This procedure has multiple purposes. It can be used to simplify the data, for example reducing the number of variables in predictive regression models. If factor analysis is used for these purposes, most often factors are rotated after extraction. Factor analysis has several different rotation methods; some of them ensure that the factors are orthogonal. Then the correlation coefficient between two factors is zero, which eliminates problems of multicollinearity in regression analysis. Factor analysis is also used in theory testing to verify scale construction and operationalization. In such a case, the scale is specified upfront and we know that a certain subset of the scale represents an independent dimension within this scale.

There have 12 variable been inputted in factor analysis test. A correlation matrix has been prepared, on the basis of which decisions are extracted. Communalities, Scree Plots and total variance tables are also used for interpretation of result.
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test has been performed to check adequacy of data used for the factor analysis purpose.

Above literatures are reviewed from the “SPSS Manual”.

3.5.3 Z test: - Two Sample for Means

\[
z = \frac{\bar{x}_1 - \bar{x}_2 - \Delta}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}
\]

According to David C. LeBlanc (2003) a hypothesis test that is used to compare two sample groups to determine if they have originated from the same population. The two sample z-test requires the standard deviation to be known or the original size of the sample taken to be larger than 30, with a population that falls within a system of normal distribution.

Three conditions must be satisfied to perform this z-test.

- The samples must be independent.
- The samples must be large enough to use a normal sampling distribution.
- The samples must be randomly selected.

In this research z test has been performed through MS excel.

3.5.4. Karl Pearson’s Bivariate Correlation Coefficient

The degree of relationship between the variables under consideration is measure through the correlation analysis. The measure of correlation called the correlation coefficient. The degree of relationship is expressed by coefficient which range from correlation \((-1 \leq r \leq +1\)). The direction of change is indicated by a sign. The correlation analysis enables us to have
an idea about the degree & direction of the relationship between the two variables under study. (Geoffrey R. Norman, David L. Streiner, 2008)

Amount of information that two variables measure jointly, compared with the average amount of information measured individually by each of the two variables. Information in statistical terminology is variance (variability) in the test scores. The conceptual definition of correlation is, in fact, a fairly rigorous statistical definition: A correlation is the ratio of the variance shared (the covariance) to the average variance. Thus, correlations can range from ±1.00 to 0; ±1.00 means that all information measured by the two variables is shared, and a correlation of 0 means that no information is shared by the two variables (Robert G Malgady and David E Krebs, 1986).

A correlation equal to zero indicates that no relationship exists between the variables; the two scores vary independent of one another. Thus, a change in one variable does not imply a change in the other variable. A correlation of +1.00 or -1.00 indicates that the variables are perfectly related; when one variable changes, the other variable always changes proportionately. Perfect correlations, however, rarely occur in real research. Figure 1 depicts an almost perfect relationship. A correlation of .80 is generally described as a fairly strong relationship; a correlation of .60 denotes a moderate relationship between variables, and a correlation of .20 means that the test scores are associated only weakly.

Confidence that some relationship exists between the variables being analyzed is reflected by the probability (p) value associated with the correlation. The p value indicates how often a correlation as large as or larger than the one calculated would be expected to occur by chance alone, if no real relationship exists between the variables. If p is small
(conventionally, $p < .05$), then you can be at least 95% confident that some relationship exists in the study sample. In this case, the correlation is said to be "significant." Larger $p$ values, those greater than the conventional .05 (5%) level, mean less confidence may be placed in the correlation. Such correlations are said to be "non-significant." The $p$ value only indicates the degree of certainty that some relationship exists between the variables in the sample being measured; when $p = .05$, the reported correlation could occur by chance alone in 5 of 100 repetitions of the study, if in fact no relationship exists (Robert G Malgady and David E Krebs, 1986).

A correlation coefficient can express association, predictive accuracy, or the percentage of information measured by both variables. Valid interpretations of a correlation, however, depend on the nature of the investigation and the assumptions imposed by the study design and data.

Hypotheses 3 to 7 have been tested on the basis of Correlation coefficient. For the testing of relation various correlation matrixes has been formed up and on the basis of that conclusion are made in the chapter of findings and suggestions.

**3.6 Conclusion**

This chapter has looked at critical issues in relation to the objectives of the research which were stated in chapter one. It was a further extension on the review of previous studies. Different mechanisms of fraud prevention and detection were reviewed.

Review on the state of forensic accounting education, which is a critical factor in the use of forensic accounting, reveals that forensic accounting is United States centric and it is not clear whether any university in Asia, including India is offering any courses related to it. Also, the intentions of
the practitioners to use forensic accounting methods or its personnel in fraud prevention and detection in India are lacking in literature.

In view of the review that has been presented in this chapter, the next chapter examines the theories that underpin the present study and the development of the various propositions in support of the constructs.