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**EFFECTIVENESS OF INTERNAL CONTROL SYSTEMS ON FRAUD PREVENTION AMONG STATE CORPORATIONS IN KENYA: A CASE OF KENYA PIPELINE COMPANY**

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**ABSTRACT**

*Effective internal control system can play a very crucial role in every organization to realize organizational goals, one of which is achieving financial performance objectives. An effective internal control system should be able to provide managers with the means to increase accountability for their programs and to obtain reasonable assurance that the programs they direct meet established goals and objectives. However, an effective system is not only restricted to a digital one but to one that is able to prevent and detect fraudulent activities. Internal control is one of the vital tools used to control use of financial resources, safeguard of assets and to checkmate incident of fraud, irregularities in every organization. The study used a descriptive design to shed more light on the effectiveness of internal control systems in government parastatals in Kenya. It was found from the findings that segregation of duties is a key internal control systems component that influence effectiveness of Kenya pipeline company and recommend that the management should emphasize and train members of staff of their significance, It was also quite interesting that few studies that had been done on internal control effectiveness had been skewed to financial performance, therefore the researcher suggested that more studies can be done in the public sector and lay emphasis on government parastatals.*

***Key Words:*** *Segregation of Duties, Kenya Pipeline Company, Internal Controls*

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## INTRODUCTION

Internal control systems are a set of guidelines and practices implemented to protect an organization's assets by reducing the likelihood of fraud cases and guaranteeing the viability of a company (Adams, 2012). Drawing from the Statements of Standard Auditing Practices No. 6 (SAP 6), defines internal control as "the plan of organization and all methods and procedures adopted by the management of an entity to assist in achieving management objectives of ensuring, to the extent practicable, the orderly and efficient conduct of its business, including adherence to management policies, the safeguarding of assets, the prevention and detection of fraud and error, the accuracy and completeness of financial reporting," internal control is defined as "the process by which an entity' Soudani (2013). Internal controls serve to improve efficiency, lower asset loss risks, and assure the accuracy of financial statements as well as adherence to rules and regulations established by the tread way Commission (COSO, 2011).

Recent scandals have revealed situations where firms engage in unethical accounting practices to omit relevant information about firms' financial data (Cohen, Holder-Webb, Nath, & Wood, 2012). Many organizations face a variety of threats when it comes to the source of the next economic crime attack. It could be internal, such as from the board of directors, management, or operations personnel; external, such as from customers, organized crime syndicates, or suppliers; or a cooperative effort involving both internal and external parties. Internally perpetrated, yet there is usually an element of collusion with external players. Internal parties are estimated to be the most common offenders of economic crime in Kenya and Africa, contrary to the global view, where external culprits are more common (Tenbele, 2019). A survey done last year found that three quarters of companies have fallen victim to a fraud incident within the past year, an increase of 14 per cent from three years before. The number of businesses suffering a financial loss as a result of fraud has also increased from 64 per cent in 2014 to 69 per cent last year (The Standard, 2022). Fraud in Kenyan corporate sector has heightened to a level that the Capital Market Authority (CMA) has formulated regulations through the CMA (whistleblower) Regulations, 2022 that aims to promote investor protection and confidence in the capital markets. The regulations as directed by the chief executive officer (CEO) outlines reward schemes for whistleblowers and witness protection to make the investment environment conducive (CMA Survey Report, 2022).

Kenya lost about Sh5.5 billion in the last two years mainly to economic crimes in public and private sectors, a survey by PwC on Economic Crimes Survey 2020 shows. The study says most perpetrators of economic crimes in the last 24 months were internal actors at 36 per cent with external actors accounting for 27 per cent of the reported cases. This indicates that majority of frauds that are committed by either employees or managers of these companies/entities. According to a report provided by the Insurance Regulatory Authority (IRA), insurance fraud in Kenya increased by 24% between 2018 and 2019. Insurance companies lost a total of Ksh 363 million, according to the authorities, with bogus fire policy claims accounting for the majority of the money lost. The trick of falsifying fire policy claims rose with 51.8 percent of the vote, and accounted for Ksh 200 million paid out to people who purposefully set fire to their cars, companies, and residences. A recent report by KPMG (Fraud Outlook Report, 2022) reveal that fraud, compliance concerns and cybercrime have become a concern to executives across multiple industries in the world and more so these three have been aggravated with the Covid-19 pandemic. The report acknowledges that fraud, cybercrime and compliance concerns have greatly increased in severity and are expected to be more frequent.

### Statement of the Problem

Fraud prevention has proved to be a major challenge to most corporate entities in Kenya despite the existence of internal controls, regulatory policies and laws (Njeri, 2017). Fraud in this study is defined as an act of deceit through deliberate misrepresentation by the other party engaging in fraud to the victim. Corporate institutions, including banks and non-bank organizations, through which criminals get rewarded with sufficient financial capital, are the key victims of fraud (Cavaliere et al.,2021).

Studies done of fraud prevention and control focus majorly on internal control systems but fail to address the strengths of other fraud prevention measures for instance; Musila (2018) carried a study on impact of internal controls in fraud detection and prevention in the Kenya's public sector. The study aimed at determining how and the extent to which internal controls impact on fraud detection. Similarly, Mutonyi (2018) on tackling the problem of corporate fraud in the Kenyan corporations through the lens of corporate governance. The study focused on the role of corporate governance and its attributes to preventing corporate fraud in Kenya. Murimi (2017) looked at the internal audit functions and level of financial fraud in the banking sector. The study emphasized on the effects of internal audit function and the level of financial fraud. Consequently, another study by Omukaga (2020) on the influence of elements of fraud diamond theory in detecting financial statement fraud among non-financial firms in Kenya. Abdalla and al Mamun (2022) on their study on overview of corporate fraud and its preventive approach, aimed at finding suitable approaches that could be used to prevent corporate fraud. Based on the studies that have carried out, it can be noted that none has addressed any aspect of effectiveness of fraud prevention techniques applied by various firms/entities in combating corporate fraud. Therefore, this study will aim at analyzing the effectiveness of internal control systems in fraud prevention at Kenya Pipeline Company.

From the studies, it is strongly evident that none of these researches addressed the effectiveness of internal controls and in particular government parastatals. In addition to this there are not as many studies carried out to stipulate the effectiveness of internal controls on enhancing fraud prevention despite many studies undertaken on internal control systems and fraud detection and prevention. Therefore, very little evidence does exist on the effectiveness of internal controls in state parastatals in Kenya. This study aimed to feel this gap by answering the question "How effective is the Internal Controls on Fraud Prevention at the Kenya Pipeline Company?

**Objectives of the study**

**General Objective**

The general objective of the study was to analyze the effectiveness of internal control systems on fraud prevention at the Kenya Pipeline Company. The study was guided by the following specific objective;

- To analyze the effectiveness of segregation of duties on fraud prevention at Kenya Pipeline Company

## LITERATURE REVIEW

### Theoretical Review

**Fraud Diamond Theory**

The fraud diamond theory is an extension of fraud triangle theory, which was established in 2004 by Wolfe and Herman (2004). According to Wolfe and Hermanson (2004), the fourth component of capability, which is what makes up the fraud diamond hypothesis, is necessary for the fraud triangle to be complete. This is because one might not be able to commit fraud and cover it up without the capacity to take advantage of control flaws (Dorminey et al., 2012). As a result, by including the fourth aspect of competence, the fraud diamond improves upon the fraud triangle (Wolfe and Herman, 2004). Additionally, in the Fraud Triangle, capability alters the concept of opportunity by limiting access to those who possess the required capability (Dorminey et al., 2012).

As a result, Wolfe and Herman (2004) explain that four components—incentive, opportunity, rationalization, and individual capability—must all be present for fraud to occur. The fraud diamond was employed in this thesis as a tool for fraud detection and prevention. The following Figure 1 illustrated this;

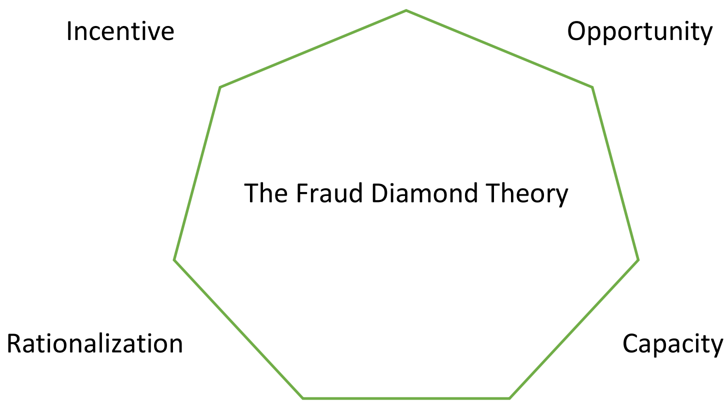
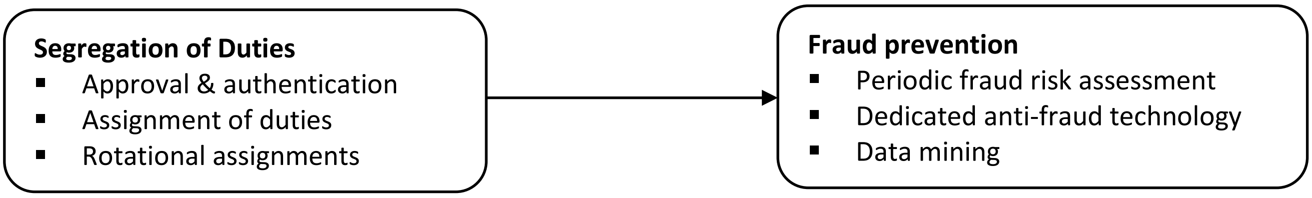



***Figure 1: Fraud diamond theory***

**Source:** Wolfe and Hermanson (2004)

Therefore, Wolfe and Herman (2004) emphasize that the presence of weak internal controls or oversight may provide the opportunity for fraud in an organization. But fraud might never happen if the correct person doesn't have the skills to see the opportunity, the person must be able to take advantage of it, and have the right justification. Wolfe and Herman (2004) lists the following characteristics as observable traits for committing fraud: (1) The person's position in the organization may provide the ability to create or exploit the opportunity to commit fraud; (2) The person must be intelligent enough to understand and exploit the internal control weaknesses; (3) The right person has a strong ego and great confidence; (4) the person can coerce others to commit or conceal the fraud; (5) the person can lie effectively and consistently and deal with the stress.

**Conceptual Framework**




Independent Variable

Dependent Variable

***Figure 2: Conceptual Framework***

**Segregation of Duties**

Separating the responsibilities or tasks that, when combined, would allow one person to record and conduct an entire transaction is a key control measure. Separating duties decreases the possibility of intentional fraud or error and enhances the aspect of verification. Functions including authorization, execution, valuation, reconciliation, custody, and recording should be segregated. Wherever possible, the functions of establishing the charges to the receivables accounts, recording cash receipts and preparing deposits, and approving any adjustments or write-offs to any receivable accounts should be kept apart from the maintenance of the receivable accounts and related subsidiary ledgers (Zakaria et al.,2016).

The first key control area in most organization is that of organizational controls achieved through a division of duties which if combined will enable an individual to record and process a complete transaction. No one person should therefore be responsible for the recording and processing of a complete transaction. The involvement of several people reduces the risk of error and mistakes in recording and processing of transaction (Anthony and Govindavajan, 2014). Individuals acting collectively can alter financial data or other management information in a manner that cannot be identified by control systems (Hughes, 2002). The effectiveness of segregation of duties lies in individuals' performing only their assigned tasks or in the performance of one person being checked by another. There is always a risk that collusion between individuals will destroy the effectiveness of segregation of duties (Williams 2009).

Owusu-Ansah (2019) argued that separation of responsibilities lowers the possibility of internal manipulations and unintended mistakes while raising the checking component. The following roles in financial management of an organization should be separated: initiation (officer or person who decides to grant a loan), execution (person who holds the money to be loaned out), and recordkeeping (the person who records the whole process in the book). To fully protect against fraud, the internal control system must take into account system development and daily operations. Wangombe (2017) points that every transaction ought to be subject to approval by a responsible person. It is suitable for funds used for various transactions to be authorized by a trusted and responsible person because this is highly significant in the financial system of an organization where huge amounts of money are handled.

**Empirical Review**

ICS was created to make it easier for the company to meet its missions and goals, but it does not provide management with a 100% assurance that those goals can be achieved (Agbenyo, Jiang & Cobblah, 2018). According to Bangsa (2018), ICS is crucial in the identification and prevention of fraud since it is used to evaluate an organization's resources, track how they are used, and determine how they should be used. According to Agbenyo, Jiang, and Cobblah (2018), the primary uses of the ICS are to enhance organizational performance and financial successes.

Le et al. (2020) on the other hand, examined the use of internal control system and code of conduct as a more specific element of internal control, in the reduction of fraud (corruption) to the public officials of Vietnamese firms. This study was based on an argument that the use of internal control and code of conduct helps to mitigate motivation, opportunity, and rationalization. The findings from the study revealed that internal control elements such as clear structure and authorities as well as clear mechanisms for risk assessment, monitoring and reporting would reduce fraud incentive.

Ozigbo (2015) performed a study on the Internal controls and accounting record keeping in Nigerian commercial organizations. The study focused on a few chosen companies to examine the necessity for internal control systems and the extent to which they safeguard the assets of today’s companies by preventing fraud. The researcher used both primary and secondary sources and a survey methodology in order to analyze the data for the study. The study discovered a significant connection between internal controls and accounting record keeping. It was determined that internal controls are essential to protect and ensure that business owners' funds are used effectively.

Idogei, Josiah, and Onomuhara (2017) focused on the influence of internal control quality on financial fraud detection in Nigerian banks. The research evaluated the internal controls as the foundation for prevention, detection, and eradication of fraud in banks in Nigeria. The researcher used a survey design and used Ordinary Least Squares (OLS) regression analysis to analyze the data. Moreover, Ayagre et al. (2014) studied the effectiveness of banks' internal control systems targeting banks in Ghana. Using COSO's principles and criteria for evaluating the efficacy of internal control systems, this study assessed the control environment and monitoring activities components of the internal control systems of Ghanaian banks. The study discovered that the monitoring activities and control environment components of the internal control systems of Ghanaian banks have robust controls. The report advised Ghanaian bank boards to take the findings seriously and work hard to maintain continuing, separate internal control monitoring to make sure that measures are actually in place and are operating as intended.

Furthermore, Peltier-Rivest and Lanoue (2015) analysed the effect of various internal controls in the form of hotlines, regular ethics (fraud) training, surprise audits, internal and external audits, and background checks on reducing occupational fraud losses, by victim banking organizations of Société Générale. Findings from the study revealed that implementing internal control in the form of hotlines and surprise audits significantly reduce the incentive to commit fraud. This was supported by the recommendation of Othman et al. (2015) from their findings which explains that hotlines provide secure and discrete ways for a whistle-blower to give out 27 information in an anonymous way and hence reducing fraud incentive. Moreover, Nawawi and Salin (2018) also made findings that there is a need for managers to monitor staff's claim submission to keep employees alert and reduce the incentive to commit fraud.

Yakubu, Alhassan, and Sumaila (2017) carried a study on the effectiveness of ICS in safeguarding assets in the Ghanaian banking industry. The study focused on the major causes of fraud in the banking industry in Ghana, the extent of implementation of ICS, and effectiveness of fraud prevention, detection techniques that were being implemented by banks and ascertained the effect of fraud on the bank performance in relation to liquidity, profitability and operational efficiency. Findings showed that employees perceived that insufficient internal control systems, the presence of unqualified staff, insufficient staffing, bad record-keeping procedures, inadequate training and retraining of staff, among other factors, were the main causes of fraud experienced by banks in Ghana. The study further noted that banks vigorously established and utilized all facets of the internal control systems and the bank's internal control system was effective in preventing fraud of all kinds. It was further revealed that fraud had a negative and insignificant impact on the bank's performance. The research recommended that bank should maintain their internal control systems in order to ensure that fraud of any kind is kept to a minimal.

Maulidi and Shonhadji (2020) made an investigation examining the efficacy of COSO internal control in governmental organizations in reducing opportunities to commit fraud. And made finding that control systems can support managers to align employee capabilities, activities and performance with the organization's goals and missions. Hence, risk assessment and monitoring should be performed continuously if organizations want to prevent fraud capability. The prior studies described above shows the impact of internal control design and use on fraud prevention and detection. Some of the studies (Maulidi and Shonhadji, 2020; Le et al., 2020; Othman et al., 2015; Peltier-Rwest & Lanoue 2015) revealed that internal control played an important role in reducing fraud. While contrary to these, other studies (Nawawi and Salin, 2018; Baker et al., 2017; Zakaria et al. 2016) revealed that weak or non-existing internal control procedures increased the chances of fraud occurrence.

## METHODOLOGY

The study used a descriptive design to shed more light on the effectiveness of internal control systems in government parastatals in Kenya. The study considered all the employees of Kenya Pipeline Company in the national headquarters in Nairobi. According to the human resource department statistics, Kenya Pipeline Company, have 792 employees (KPC, 2020). The unit of observation was all the management employees at KPC drawn across the 9 departments and only employees who had worked for the company for more than one year were considered in the study. To achieve the objective of this study, the research adopted stratified random sampling technique to select the sample for the study together with purposive sampling, which permitted only individuals with desired information to be selected to form part of the sample. Stratified random sampling was used because of the heterogeneity of the target population. The sample size for the study was determined by Yamane's formula, (1967) and constituted 88 respondents who were selected from the nine directorates of the Kenya Pipeline Company as outlined in the Table 1, below;

**Table 1: Sample Distribution**

| Directorates | Number of employees | Sample size |
|---|---|---|
| Operations & maintenance | 246 | 27 |
| Infrastructure & development | 211 | 23 |
| Human resource & administration | 63 | 7 |
| Finance | 45 | 5 |
| Strategy and Compliance | 73 | 8 |
| Company Secretary & legal services | 21 | 2 |
| Morendar institute of oil and gas | 42 | 5 |
| Supply chain | 59 | 7 |
| Internal Audit | 32 | 4 |
| **TOTAL** | **792** | **88** |

The study used both primary and secondary data. Primary data were obtained using a questionnaire and secondary data obtained from reports and published audit reports. Data analysis involved qualitative analysis for qualitative data and quantitative analysis for quantitative data. For qualitative analysis, data was systematically organized in order to come to some useful conclusions and recommendations (Mugenda, 2003). Whereas quantitative analysis involved grouping of the data to meaningfully describe the distribution of score using few indices or statistics. The researcher also employed descriptive statistics to analyze the quantitative data for this study. Inferential statistics was also employed to establish the associations between the study variables, and involved Pearson correlation coefficient and regression models.

## RESULTS AND DISCUSSION

The study achieved a response rate of 80.7% from a total of 88 questionnaires administered to the employees selected from KPC headquarters, though 19.3% questionnaires were not returned.

### Descriptive analysis

### Segregation of duties

This objective sought to analyze the effectiveness of segregation of duties on fraud prevention in KPC. This part required the respondents to give their opinion based on the statements provided relating to segregation of duties. The results were displayed in table 2 below;

**Table 2: Segregation of Duties**

| Statement | Mean | STD DEV. |
|---|---|---|
| The company does not allow person writing cheques to approve them | 3.81 | 0.708 |
| Different people are assigned responsibility of maintaining custody of company assets | 3.89 | 0.894 |
| Person writing purchase orders are not supposed to approve payments | 3.97 | 1.090 |
| The company regularly have brainstorming meetings about fraud risks | 4.01 | 1.093 |
| Different persons have been allocated responsibility for authorization of company transactions | 3.90 | 1.064 |
| Recording of company transactions are performed by different people who have been given the responsibility | 3.76 | 0.647 |
| The company has a policy that allows employees to assume rotational job functions to reduce autonomy | 3.84 | 0.754 |
| Composite mean and standard deviation | 3.882 | 0.893 |

Descriptive statistics results shown in table 2 above show a composite mean of 3.882 and a standard deviation of 0.893. The composite mean computed and small standard deviation obtained implies that respondents strongly agree that the parameters used to measure segregation of duties are effective in fraud prevention. The responses were not deviant as per the small composite standard deviation. Findings for specific parameters show that the company does not allow person writing cheques to approve payment relating to them as represented by a mean of 3.81 and standard deviation of 0.708. Consequently, on whether different are assigned responsibility of maintaining custody of company assets, majority of the respondents agreed that the company had assigned responsibility to different people to oversee safe custody of company assets as indicated by a mean of 3.89 and standard deviation of 0.894. Owusu-Ansah (2019) also argued that separation of responsibilities lowers the possibility of internal manipulations and unintended mistakes while raising the checking component.

Further analysis reveal that there was a strong agreement that the company had put measures in place that do not permit the person writing purchase orders to approve their payments in order to strengthen the controls on fictitious payments as reflected by a mean of 3.97 and a standard deviation of 1.090. The results reflect the opinion of Anthony and Govindavajan, (2014) that no one person should therefore be responsible for the recording and processing of a complete transaction. The involvement of several people reduces the risk of error and mistakes in recording and processing of transaction.

The respondents also strongly agreed that company hold regularly brainstorming meetings to address concerns about fraud risks as indicated by a mean 4.01 and standard deviation of 1.093. Moreover, there was a strong agreement that the company ensures that different persons are allocated responsibility for authorization of company transactions to enable them be more responsible of their roles and actions as reflected by a mean of 3.90 and a standard deviation of 1.064.

Consequently, the study found that recording of company transactions were performed by different people who have been given the responsibility by the company management as indicated by a mean of 3.76 and a standard deviation of 0.647. The company was also found to have policies that allow employees to assume rotational job functions as a means of preventing fraud as indicated by a mean of 3.84 and standard deviation of 0.754. These findings also concur with the fact that functions of establishing the charges to the receivables accounts, recording cash receipts and preparing deposits, and approving any adjustments or write-offs to any receivable accounts should be kept apart from the maintenance of the receivable accounts and related subsidiary ledgers and be performed by authorized personnel (Zakaria et al., 2016).

**Fraud prevention**

The general objective of the study was to analyze the effectiveness of internal control systems components on fraud prevention in KPC. The respondents were required to indicate their level of agreement with the statements provided. The results are shown in Table 3 below.

**Table 3: Statements on fraud prevention**

| Statement | Mean | Std Dev |
|---|---|---|
| Company has effective internal audit that supports internal control environment of the organization | 2.345 | .9849 |
| Elaborate structure for regulatory compliance strategies to strengthen internal controls | 2.587 | .9970 |
| Performance of periodic fraud risk assessment to assess effectiveness of ICS | 2.226 | .9875 |
| Company has a collaborative approach that permits fraud reporting with reward schemes | 2.288 | 1.086 |
| Adoption of dedicated anti-fraud technology to enable detection | 2.405 | .9434 |
| Data mining allows easy information audit through advanced Technology | 2.217 | .9834 |
| Cumulative mean and standard deviation | 2.344 | .8341 |

Descriptive statistics results in Table 3 above shows that the respondents agreed that internal control systems were moderate in preventing fraud in KPC (composite mean=2.344, standard deviation=.0.8341). The composite mean computed and small standard deviation obtained implies that respondents moderately agreed that the parameters used to measure effectiveness of internal control systems on fraud prevention. The standard deviation was small which implied that the responses did not differ much.

Findings from specific elements indicate that moderate number of respondents agreed that KPC had effective internal audit that supports their internal control environment in enhancing fraud prevention as represented by a mean of 2.345 and standard deviation of 0.9849. Further the results show that the company has put in place elaborate structure for regulatory compliance that aid the company to strengthen its capacity in handling fraud with a mean of 2.587 and a standard deviation of 0.9970. This confirms the fact that fraud prevention can only be effective if the organization maintains ethical practices, maintains organizational honesty culture, assess the possibilities and eliminate risks, reduce the fraudulent activities and implement internal control mechanism (Kabue and Aduda 2017).

Consequently, there was an agreement with the statement that company conducts periodic fraud risk assessment to evaluate their internal control systems effectiveness towards reducing occurrence of fraud and other forms of misappropriations on company assets, this was represented by a mean of 2.226 and a standard deviation of 0.9875. The study also found that moderate number of respondents had a feeling the company's collaborative approach to handling fraud played a significant role in enhancing their resolve to reduce fraud prevalence as was represented with a mean of 2.288 and a standard deviation of 1.086. The results corroborate the views of Nyakarimi et al., (2020). Fraud prevention involves the integration of all efforts that may be used to reduce or limit the opportunities to commit fraud, ensure employees are able to meet their needs in order to reduce pressure on them that would lead to commit fraud and lastly ensure that there is no justification by employees to commit fraud.

Adoption of dedicated antifraud technology has enhanced the company's capacity to prevent systemic fraud committed by organization insiders with a mean of 2.405 and standard deviation of

0.9434. To conclude, the study found that a consider majority agreed that since the adoption of data mining allows easy information audit through advanced technology, a lot has been achieved in relation to enhancing effectiveness of internal controls towards reducing recurrent fraud as reflected by a mean of 2.217 and standard deviation of 0.9834. Cumulatively, on examining the results the researcher observed that all the attributes had a mean between 2 and 3, which is an indication that KPC internal control measures had a moderate effect in preventing fraud.

**Inferential Statistics**

**Pearson Correlation Coefficient**

The Pearson correlation test results were summarized in Table 4 below, showing the correlation test analysis between the dependent variable (fraud prevention) and independent variables (control environment, segregation of duties, risk assessment, and monitoring controls). The correlation results showed that fraud prevention was positively correlated with segregation of duties recording the highest coefficient of 0.398 with a p-value of 0.001, control environment indicated a positive correlation with fraud prevention, recording a coefficient of 0.395, with a p-vale of 0.001. Consequently, taxpayer perception about tax showed a positive correlation recording a coefficient of 0.390 with a p=value of 0.001, whereas tax rates had the lowest positive correlation with fraud prevention and the coefficient recorded was 0.214, with a p-value of 0.074. In conclusion, the results were significant at α=5% and any positive change in level of any independent variable would lead to improved fraud prevention in Kenya Pipeline Company.

**Table 4: Correlations coefficients**

| | | Fraud Prevention | Control Environment | Segregation of Duties | Risk Assessment | Monitoring Controls |
|---|---|---|---|---|---|---|
| | Pearson Correlation | 1 | .395** | .398** | .214 | .390** |
| FP | Sig. (2-tailed) | | .001 | .001 | .074 | .001 |
| | N | 71 | 71 | 71 | 71 | 71 |
| | Pearson Correlation | .395** | 1 | .323** | .278* | .290* |
| CE | Sig. (2-tailed) | .001 | | .006 | .019 | .014 |
| | N | 71 | 71 | 71 | 71 | 71 |
| | Pearson Correlation | .398** | .323** | 1 | .543** | .558** |
| SG | Sig. (2-tailed) | .001 | .006 | | .000 | .000 |
| | N | 71 | 71 | 71 | 71 | 71 |
| | Pearson Correlation | .214 | .278* | .543** | 1 | .329** |
| RA | Sig. (2-tailed) | .074 | .019 | .000 | | .005 |
| | N | 71 | 71 | 71 | 71 | 71 |
| | Pearson Correlation | .390** | .290* | .558** | .329** | 1 |
| MC | Sig. (2-tailed) | .001 | .014 | .000 | .005 | |
| | N | 71 | 71 | 71 | 71 | 71 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

**Regression analysis**

The study conducted regression analysis to analyze the effectiveness of internal control systems components on fraud prevention in KPC. Regression analysis was an important tool: in making predictive analysis to estimate, on decision making to eliminate guesswork, to pick the right variables to make the most informed decisions, correcting errors and avoid making costly mistakes and finally looking at the data that can provide new and fresh insights (Kothari & Gaurav, 2014).

**Model Summary**

**Table 5: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .516[a] | .467 | .422 | .551 |

a. Predictors: (Constant), CE, SG, RA, MC

The study found that the independent variables in the study explained a significant proportion of variance in analyzing the effectiveness of ICS components on fraud prevention in Kenya Pipeline company, $R^2$= .467 which implies that 46.7% of the proportion can be explained by the independent variables while other variables not covered by this study contributes to 53.3% of the variance as indicated in table 6.

**Analysis of Variance (ANOVA)**

Table 6 shows the results of the Analysis of Variance (ANOVA). The F-Statistics for the model was 5.997 at a significant level of 0.00<0.05, as the results show. This implied that effectiveness of internal control systems components plays a significant role on fraud prevention in Kenya Pipeline company.

**Table 6: ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.284 | 4 | 1.821 | 5.997 | .000[b] |
| | Residual | 20.040 | 66 | .304 | | |
| | Total | 27.324 | 70 | | | |

a. Dependent Variable: FP

b. Predictors: (Constant), MC, CE, RA, SG

**Beta Coefficients**

Beta coefficient is the size of the coefficient for each independent variable that gives the size of the effect that variable is having on the dependent variable. The direction of the influence is indicated by the sign of the coefficient (positive or negative). In a regression with a single independent variable, the coefficient shows how much the dependent variable is anticipated to change when the independent variable increases by one, depending on whether it is positive or negative.

**Table 7: Beta Coefficients[a]**

| Model | | Unstandardized Coefficients B | Unstandardized Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 1.869 | .575 | | 3.247 | .000 |
| | MC | .283 | .112 | .279 | 2.462 | .016 |
| | RA | .280 | .127 | .223 | 1.552 | .125 |
| | SG | -.046 | .113 | -.051 | -.406 | .686 |
| | CE | .180 | .113 | .201 | 1.566 | .122 |

a. Dependent Variable: FP

b. Independent Variables, CE, SG, RA, MC

The results of multiple linear regressions model showed that there was a collective significant effect of F (4, 70) =5.997, p > 0.05 with $R^2$ of .467 in the model for effectiveness of internal control systems on fraud prevention using predictors control environment, segregation of duties, risk assessment, and monitoring controls.

When individual predictors were examined further it was found that monitoring controls had (Beta = 0.279, t = 2.462, p = 0.016), risk assessment had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(Beta = 0.223, t = 1.552, p = 0.125), Segregation of duties had (Beta = -0.051, t = -0.406, p = 0.686) and control environment had (Beta = 0.201, t = 1.566, p = 0.122). All factors were found to have effect on fraud prevention in Kenya Pipeline Company.

**CONCLUSION AND RECOMMENDATION**

The study analyzed the effectiveness of internal control system components on of fraud prevention in KPC. The researcher observed that it was imperative for state owned corporations in Kenya to put up strong internal control systems to deter occurrence of fraudulent cases and to safeguard public resources. From the study it can be observed that strong emphasis was laid on strengthening the internal controls components of control environment, risk assessment, segregation of responsibilities to allow easy trace of organization transactions and to bestow authority and responsibility.

On control environment, the study found a strong relationship on fraud prevention which can be attributed to strong controls that have been established. The ratings could also be due to the responsibilities bestowed upon the respondents, since the respondents bear the burden of safeguarding the assets, they may have introduced proper and strong control mechanisms to protect the resources of their organizations. Though, some respondents harbored different opinion, which could be as a result that still control activities have insignificant effect on fraud prevention in hence the reported cases. It is therefore concluded that although there is agreement among the respondents that the mechanisms put in place are capable of preventing fraud, these mechanisms are not fool proof enough to prevent fraud completely and fraudsters find weak points to perpetrate fraud. Therefore, it would be prudent to reinforce these parameters or introduce new and more effective mechanism

This high rating of the risk assessment parameters could be due to proper and strong mechanisms that have been put in place for identification of potential risk, analysis, estimation and mitigation of risks. This could also be attributed to the fact that the respondents, who bear the burden to safeguard the company's resources to assure stakeholders and investors that their investments are protected against risk in order increase their confidence and attract more customers and investors.

On segregation of duties, it was noted that it played a significant role in ensuring that proper command of activities and other transactional roles in the company are streamlined to avoid cases where any person performing the role of authorization of payments falls to be the same offering the services of drawing the invoices, purchase orders etc.

Employee conduct, permission levels, access log reports should be the basis of enhancing the control environment and ensure that all processes of the company transactions follow laid regulations and policies as per internal standards of reporting guidelines and the international accounting standards in order to improve on the effectiveness of internal controls.

The company should ensure that all employees perform their duties as their assigned roles and regularly allow for rotational assignments to reduce cases of perceived opportunity and rationalization that prompt a person to engage in fraudulent activities.

Risk assessment has been found to have significant effect on fraud prevention, therefore mechanisms put in place to identify, analyze, estimate and mitigate risks should be tightened and enhanced so that they can completely seal off loopholes both in laws and organization policies. It is recommended that the organizations should engage risk analysts on regular bases and pinpoint any sign of fraud early enough for it to be stopped before the actual fraud takes place. The organizations should regularly train employees on the ways that can improve their capabilities in detecting and handling any risk.

The study recommends that the monitoring activities to be evaluated and revised regularly to


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improve on capability of addressing sophisticated nature of current fraud perpetration. The organizations should engage well trained and experienced personnel in ensuring that monitoring is done well.

**Suggestions for Further Studies**

It is also quite interesting that few studies that have been done on internal control effectiveness have been skewed to financial performance, therefore the researcher suggests that more studies can be done in the public sector and lay emphasis on government parastatals.

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