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DETERMINATION OF FINANCIAL RESOURCE LEAKAGE AND ITS IMPACT ON VALUE DELIVERY IN SECONDARY SCHOOLS: A CASE STUDY OF NAKURU COUNTY, KENYA

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Abstract

This study investigated financial resource leakage and its repercussions on value delivery in secondary schools within Nakuru County. Specific objectives include determining the extent of resource leakage and its relationship with value delivery. The study was informed by parents, in different Counties, complaining of being fleeced by school administration. It intended to address the problem of whether there is any relationship between financial resources leakage and value delivery in secondary schools in Nakuru County. The null hypothesis posits no resource leakage and no relationship between resource leakage and value delivery in Nakuru County's secondary schools. It employed a survey-based methodology where both quantitative and qualitative surveys were conducted to scrutinize governance, accounting controls, and resource leakage. The study targeted all 326 registered secondary schools in the County. Stratified sampling selected 33 schools proportionally across ownership and district, with a 20% buffer to address anticipated non-response. Various stakeholders, including head teachers, department heads, accountants, teachers, students, and suppliers, participated through structured questionnaires. Statistical analysis using Spearman's coefficient of correlation revealed notable findings. Price leakage analysis demonstrated a non-significant negative correlation with improvement index (Spearman's rho, correlation coefficient = -0.390, p = 0.059), indicating higher price leakage associated with lower performance improvement. Perceived leakage displayed a significant negative correlation with improvement index (Spearman's rho, correlation coefficient = -0.418, p = 0.059), indicating higher perceived leakage associated with lower value delivery. Recommendations emphasize the implementation of effective financial controls and accountability measures to optimize resource utilization and enhance educational outcomes.

Keywords: *budgetary variance, financial resource leakage, value delivery*

Introduction

Education is one of the unique avenues through which social, economic and political enablement can be achieved in an equitable way (Omondi, 2021). The main purpose of the education system is to equip the learners with skills and knowledge that would help them face the challenges of life and provide skilled manpower that would provide the engine and the fuel required to meet economic, social and political needs of Kenya (G. D. I. Musungu et al., 2023). Educational institutions are established to meet these challenges. Factors like family, school, classroom conditions, teaching methodology and the learners circumstances have, through research, been shown to be major determinants of value delivery as measured by academic scores (Atieno et al., 2019a; Atieno & Kiganda, 2020).

However, while resources are required to start, run, maintain and provide learning and teaching materials, their contribution towards academic scores has not yet been fully captured by research. In an attempt to establish a link between resources and academic scores through use of multiple linear regression analysis, researchers found no significant relationship. Other

studies though, have contended that financial resources are important and do influence academic performance (Maharjan et al., 2019; Ofem et al., 2021). The current study was designed to find out the reasons that may be attributed to this discrepancy in research by finding out whether factors like leakage, governance structures, accounting and audit control systems, if included in such studies, would account for the difference.

The relationship between school inputs and educational outcomes is critical for educational (Abana, 2022; Atieno & Kiganda, 2020). Ofem et al., (2021) found that house-hold educational expenditure and school inputs are technical substitutes in the production function of cognitive achievements. They also found that the impact of un-anticipated inputs was higher than the impact of anticipated inputs. By establishing the links between resources availability and leakage, allocation criteria, governance structures, accounting control systems, value for money delivery of services and by adjusting for these factors, it is expected that the link between resource availability and academic performance can be established (Aliyi, 2023; Robert et al., 2021).

Research has identified the following as factors that affect value delivery in learning institutions: teacher training, teacher experience, teacher's abilities, the pupil's abilities, teacher's salaries, teacher pupil ratio, instructional spending and expenditure per pupil (Aliyi, 2023; Lalima, 2019). According to, primary resources are not consistently related to student's performance. A good teacher was found to surpass a bad teacher by more than a full grade level of a student's performance over a single academic year, the students' family characteristics and the students' entry behaviour held constant (Obi & Osorobi, 2022). Ugwu et al., (2020) reckons that these differences could not have been caused by training, salaries, number of students or overall level of spending and recognized that incentives affect student's performance. He was of the opinion that pupils from schools endowed with resources will have come from families that are also endowed with resources. Parents in such families are ready to spend more time with their children leading to better performance. He also found that school's effectiveness is independent of resources. By observation, he found out that there are schools which perform at very different levels despite having similar inputs. Value added analysis also indicate that institutions with moderate levels of achievements may enhance learning at least as much as high scoring and well-resourced schools (Sahlan & Hidayatulloh, 2020; Udoh-Uwah et al., 2018). However, in all these, the question of accountability, leakage of resources and a consideration of what went directly to the provision of learning resources, were not incorporated in the analysis.

This study is premised on the basis that financial resources availed to schools are not necessarily used for teaching and learning purposes. Only financial resources used directly to provide learning resources are likely to influence cognitive displacement. This implies that leakage should be treated as a diversion of financial resources from the main stream academic purpose. The main task in this study was to find out whether educational institutions with good governance, low leakage of resources, effective accounting and auditing control systems had a causal relationship between availability of financial resources and value delivery.

The government of Kenya is currently in the process of starting centres of excellence which are expected to yield high results after providing optimum resources to these centres. This is based on the premise that resources enhance academic performance (Mutula, 2021; Othoo et al., 2019). If this is true, why is there this disparity between expectation and research results? Despite this premise, there is no systematic study that has been conducted to establish the

effects of financial resources on performance in secondary schools when leakage of resources, misallocation of the resources, accounting for the resources and governance structures are taken into account. It is thus in this context that this study sought to establish the effects of financial resource accountability on value delivery in secondary schools in Nakuru County in Kenya.

Research Objective

To determine the extent of leakage of financial resources and the subsisting relationship between leakage of financial resources and value delivery in secondary schools in Nakuru County.

Empirical Literature

The question of leakage of resources though indirectly, has been recognized as a contributor to academic performance challenges (Michael, 2022). A public expenditure tracking survey (PETS) to gauge the extent to which public resources actually filtered down to educational institutions showed that in the mid-1990s in Uganda, the average schools received only around 20% of the allocations from central government. Most schools received nothing and the bulk of the allocation was captured by local government officials (and politicians) in charge of disbursing the allocations to schools. In this case unlike the conditional approach where senior officers are mandated to monitor, that is, a top bottom approach, a bottom top approach was employed where information concerning the usage of the funds was published in the newspapers. The findings were that, schools nearest to the newspaper outlets registered a marked increase in resources that filtered to the school and also test scores in the same schools improved.

Leakage of resources in the context of this study means diversion of resources from their main purpose to other purposes. Other terms that are used to refer to leakage include theft of resources, corruption, misappropriation, misallocation, mismanagement of resources and so on. According to Rasdi et al., (2021) measuring corruption is an exercise in futility and any attempt to objectively measure it is doomed to fail due to its very nature. They argue that corruption is inherently un-measurable.

Methodology

The study adopted a survey design, which includes a quantitative and a qualitative survey. The aim was to establish the prevailing governance status, accounting and auditing controls in place and resource leakage. The population of this study was all registered secondary schools both public and private in Nakuru County. There are 326 secondary schools; 199 being public and 127 private. In each institution, the head teacher, Heads of department (HODs), class teachers, Bursar/accounts clerk/finance officer, students, store keepers and suppliers were sampled to get those who were subjected to interviews and answering of questionnaires.

The register of schools in the respective district education office was used to form the sampling frame. The secondary schools were stratified according to ownership structure, that is, private and public schools. A sample of 33 secondary schools was taken out of the 326 secondary schools in the Nakuru County. The sample size was picked in proportion to the number of private and public schools in each district. The districts in Nakuru County are; Nakuru town, Nakuru North, Naivasha, Rongai, Njoro, Molo and Kuresoi. From the sampled schools, the

Head teacher, bursar, Heads of departments, store keeper, class teachers, students and suppliers were interviewed. Due to expected non-response, which was estimated at 20% because of the sensitivity of the mater under investigation, a spare sample of 20% was taken. This sample proved adequate and was used to replace the schools that either out rightly refused to fill the questionnaires or despite their initial acceptance failed to fill the questionnaires.

The researcher prepared questionnaires for the Head teacher, Deputy Head teacher, Heads of departments, accountant, teachers, students and Suppliers. With the help of two trained assistants, the researcher administered the questionnaires to the sampled schools.

The sample size was fixed using the coefficient of variation (CV), which is defined as, ratio of population standard deviation to Population mean. Since the CV tends to remain stable over time and with increasing population size, it is a reliable measure for use in sample size determination (Gathii et al., 2019). In most experiments or surveys, a coefficient of about 30% is usually acceptable for sample survey work. The sample size was then obtained using the formula; $n = \frac{NC^2}{C^2 + (N-1)e^2}$, where C is the coefficient of variation, e is the error margin we wished to tolerate in the measurements and N is the population size. An error of 5% was considered acceptable since the results are for policy purposes and not for sensitive decisions where a small error would be detrimental that is where very high levels of assurances are required. The sample was determined as follows; Where n is the sample size, N=population size (336), C= coefficient of variation (0.30) and e= error margin we wish to tolerate (0.05) thus, n = 326*0.3*0.3/[0.3*0.3 + (326-1)*0.05*0.05] = 32.5 aprox. 33. This is about 10% of the whole population. Gay (1992) suggests that a sample of 10% should be considered minimum for a large population and 20% for a small population. One shortcoming of this method is its luck of statistical justification which applies to many other suggested methods of fixing sample size. It should also be noted that 33 is considered a large sample in statistics. The distribution of the schools in the county were as shown in Table 1.

Table 1: Distribution of Secondary Schools in Nakuru County According to Districts

Ownership	Number of schools per District							total
	Nakuru town	Naivasha	Nakuru North	Njoro	Molo	Rongai	Kuresoi	
Public	21	42	30	21	18	28	39	199
Private	25	34	39	3	8	14	4	127
Total	46	76	69	24	26	42	43	326

Thus using the formula, $n_h = \frac{NC^2}{C^2 + (N-1)e^2}$. The samples were distributed as illustrated in Table 2

Table 2: The Proportional Allocation of Sampled Respondents According to Districts

Ownership	Number of selected samples per category of schools per District							
	Nakuru Town	Naivasha	Nakuru North	Njoro	Molo	Rongai	Kuresoi	Total
Public	4	5	2	2	2	3	4	22
private	2	3	3	1	1	1	1	12
Total	6	8	5	3	3	4	5	34

The number of heads, bursars, laboratory assistants and store keepers were equivalent to the number of schools sampled as each school has one respectively. There are 7 heads of department in each school thus there were 2282 heads of department and the number of heads of department to be interviewed was determined using the sample size formula sited above were 36. In every school visited, a head of department was chosen at random. The exception was only in three schools were two heads of department sampled in the whole of Nakuru County and the same was done for class teachers. Since there were 77053 students divided into 40943 boys and 36110 girls, applying the sample size formula, 225 boys and 225 girls were sampled. For every school sampled, 2 Form II, 2 Form III and 3 Form IV students from each school sampled, were randomly sampled and requested to fill the questionnaire.

Results and Discussion

Leakage of Resources in Secondary Schools Using Prices

The objective of this study was to establish the extent of resources leakage in secondary schools in Nakuru County and its relation to value delivery. To accomplish this objective, leakage was approached from two perspectives, price leakage, and perceived leakage by stakeholders. To establish price leakage, the study identified some commonly used items (maize, beans, rice, cooking fat, salt, kales, cabbages, printing papers, fool's caps and fire wood) to form a basket of goods. The prices that the schools paid for a given quantity of the commodity were established and the total cost of the basket of goods for each school were determined. The mean of the price was determined and the variability of the prices (inflated prices) from the mean used to measure the extent of leakage of resources. The deviations from the mean that were subjected to the analysis including budgetary leakages and perceived leakage were as given by table 3.

The respondents were also asked questions touching on matters to do with cash management. On how often petty cash and cash were balanced, there was no clear policy as to when or how often cash needs to be balanced or even who to ensure that the balancing takes place. Everything was left to the head teacher to oversee. Asked on who has authority to raise a check and who oversees the use of that authority, it turned out that the head teacher was the authority carrier and also the overseer which was contradictory. On matters to do with frequency of bank reconciliation there was no outright policy on how it should be done. When the respondents were asked whether they handle cash in the school other than petty cash, there appeared to be very clear policies but they were poorly implemented. One bursar said, "We only pay or receive cash so long as it is five thousand shillings or less". The school accepts and pays by cash from students and suppliers yet they know very well that if anything happens to the money they would be liable. There was no clear policy as to how much cash each school should maintain at any given time. The same school maintains a petty cash of 100 thousand shillings. Although the school was categorical on the policy of school fees been paid through the bank, the concern of the research was many transactions of five thousand shillings and the petty cash could result to a huge amount which can be tempting. On the question of accountability, the respondents

were not very sure on to who the head teacher is accountable to, whether the board or the ministry of education or the parents or local political leaders.

Table 3: Summary of Data on Leakage of Financial Resources Used for Analysis.

School Id	1	2	3	4	5	6
Total price for the basket	30,725	26,320	29,352	66,428	20,140	31,036
perceived leakage	30	30	30	40	30	40
price leakage	3,054	-1,351	1,681	38,757	-7,531	3,365
Budgetary leakage	57,000	47,880	-1,014,626	-365,000	-196,194	16,000,000
KCSE av. Performance	8.41	5.4	6.45	3.6	8.208	8.78
improvement index	0.356	0.5	-0.232	0.13	-0.067	0.155

Table 3: Continued

School ID	7	8	9	10	11	12
Total price for the basket	17,660	18,855	25,284	37,502	26,364	22,545
perceived leakage/extent of corruption	30	20	70	40	50	80
price leakage	-10,010	-8,815	-2,386	9,832	-1,305	-5,125
Budgetary leakage	-100,000	-14,749	-330,000	-22,000	-1,346,503	-72,512
KCSE av. Performance	-	4.55	6.036	4.2	5.947	-
improvement index	-	1.275	0.041	-0.045	-0.174	-

Table 3: Continued

School ID	13	14	15	16	17	18
Total price for the basket	24,590	27,747	29,052	26,943	20,765	15,568
perceived leakage	60	40	20	50	40	10
price leakage	-3,080.58	76.92	1,381	**-727.7**	-6,905.6	-12,102.6
Budgetary leakage	-,1299,041	244,225		-804,530	58,306	-49,400
KCSE av. Performance	-	9.111	4.522	7.6	5.102	3.7
improvement index	-	0.0123	0.256	-0.156	-0.150	-0.075

Table 3: Continued

School ID	19	20	21	22	23	24
Total price for the basket	32,893	21,365	33,370	24,552	-	-
perceived leakage	10	30	30	10	10	20
price leakage	5,222.70	-6,306	5,699	-3,119	-	-
Budgetary leakage	-12,173	-	-931,198	-	-	-
KCSE av. Performance	5.186	2.597	4.724	4.36	-	-
improvement index	-0.259	0.855	-0.156	0.453	-	-

Table 3: Continued

School ID	25	26	27	28	29	30
Total price for the basket	25,435	0	0	39,818	0	0
perceived leakage	50	50	50	-	30	10
price leakage	-2,236	-	-	12,147	-	-
Budgetary leakage	-	-	-	-1,360,256	-	-
KCSE av. Performance	4.6	2.8	-	4.354	3.1	8.88
improvement index	0.278	-0.462	-	-0.972	-0.981	0.11

Table 3: Continued

School ID	31	32	33	34
Total price for the basket	15,850	0	27,035	29,910
perceived leakage	20	40	50	45
price leakage	-11,821	-	-635.58	2,239.42
Budgetary leakage	-75,000	-	10,193	-
KCSE av. performance	4.72	-	4.42	5.15
improvement index	1.36	-	-0.26	0.43

The school ID has not been disclosed due to ethical issue as the respondents were promised that, that would not happen. The reader is also advised to maintain discretion in identifying the schools. Table 3 is a summary of the data that was used to generate table 4.

When the data in table 4 were subjected to analysis through SPSS the following summary of the results was relevant to this section.

Table 4: Hypothesis Test Summary

Null hypothesis	Test statistics	Sign. Pr>z	Decision criteria
The distribution of price leakage is normal with mean 0.000 and standard deviation of 8,713.38	One sample Kolmogolov Smirnov test	0.123	Retain the H_o
The distribution of perceived resource availability is normal with mean 66.97and standard deviation of 19,55	One sample Kolmogolov Smirnov test	0.031	Reject the H_o
The category of perceived leakage/extent of corruption occur with equal probability	One sample chi-square test	0.126	Retain the H_o
The category of accountability occur with equal probability	One sample chi-square test	0.519	Retain the H_o
The category of criteria used to select suppliers occur with equal probability	One sample chi-square test	0.012	Reject the H_o
Category of criteria used to prioritize purchase occur with equal probability	One sample chi-square test	0.000	Reject the H_o

Under these circumstances, when a one sample Kolmogolov Smirnov test was carried out on the results with the null hypothesis $H_0 : \mu = \mu_0$, the test statistics was $Z_0 = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}}$ the probability that this could not have occurred by chance are presented in Table 4 results are reported below.

The distribution of price leakage is normal with mean 0.000 and standard deviation of 8,713.38 with p=123. This implies that we cannot reject H_0 on one sample Kolmogolov Smirnov test which means that price leakage was normally distributed and not specific in certain schools. This being a non-parametric test implies that the buyers could be buying genuinely without hidden motives. However the variability is rather high and this could mean that there is a lot of latitude for the buyers to exercise which may need to be addressed, according to these findings, schools do not use prices to leak resources and the variability could be as a result of differences in market conditions.

The test results of 3 and the following interpretation of the results all point to the fact that schools do not use prices as a means of diverting resources from schools or in other words there was no sufficient evidence to support the hypothesis that schools use prices to leak financial resources. This point to the fact that the prices paid by the schools are normal prices and are not exaggerated prices. This was a surprise finding as one would expect that those in a position to exploit the freedom to buy would grab the opportunity to freeze the public given the general perception of corruption. This is in contrast to the Ugandan case where out of the allocations to schools, local government officials captured the allocations with only 0 to 20% of the allocations filtered to the schools and the campaigns on the newspapers increased the amount filtering to the schools to over 80% especially for schools near newspaper stands (Robert et al.,

2021). This could also be attributed to the stringent procurement law which every public institution has to adhere to.

When the board members were asked about the hierarchical position of the board, they appeared to be aware that the board's position was in management but they were not aware of their responsibility. One of the respondents when asked this question answered, "BOG members are the managers of the school." This was a common answer which shows potential of conflict especially if the board chooses to micro-manage the school.

Use of Perception as a Measure of Leakage

The extent of leakage was also measured using the perception of school community members, who were asked questions relating to their perception of the extent of leakage or corruption in their schools. The resulting scores for each school were then added to obtain an overall score for the school. The distribution of these scores was tested using the one sample chi-square test under the null hypothesis that, the category of perceived leakage/perceived extent of corruption occurs with equal probability. The probability value was 0.126 which is greater than the critical value of 0.025 for a two tail test which means that there is no sufficient evidence to reject the null hypothesis and thus the hypothesis is accepted.

It must also be noted that when the question of accountability was analyzed on the assumption of the hypothesis that the perception of accountability occur with equal probability under the one sample chi-square test, it was found that the probability that the measured parameter could not have occurred by chance was 0.519 which was greater than the critical value of 0.05. This led to the acceptance of the hypothesis that the perception of accountability in schools by the school community occurs with equal probability.

When a similar test was carried out on the criteria used to select suppliers under the assumption that the criteria occurred with equal probability, the probability that the observed occurrence could not have occurred by chance was 0.012 which was below the critical value of 0.05 and thus the hypothesis had to be rejected in favor of the hypothesis that schools use different criteria to select their suppliers.

When a one sample chi-square test was carried out on the criteria used to prioritize purchases under the hypothesis that the criteria occurred with equal probability, it was observed that the probability that the observed score did not occur by chance was 0.000 and this led to the rejection of the null hypothesis and acceptance of the alternate hypothesis that the criteria used to prioritize purchases is different in different schools. On the same note when the availability of resources in schools was subjected to one sample kolmogolove smirnov test under the hypothesis that perceived resource availability is normally distributed with a mean of 66.97 and a standard deviation of 19,555, the p score was 0.000 that is the probability that the observed occurrence could not have occurred by chance. The implication being that the null hypothesis has to be rejected in favour of the alternate hypothesis that the distribution of resources is not normal. This reflects the disparity of the distribution of resources in our secondary schools. The implication of this is that are unequally funded and there is need to harmonize the funding of schools.

From the above findings, it is apparent that the perception of corruption in different schools is not markedly different and either the people were too conservative with the truth or the perceived leakage of resources may not be useful in measuring extent of leakage in secondary

schools and this in itself may be perpetuating leakage in schools by failing to recognize its existence (Musungu et al., 2023). This is in agreement with challenges identified by the ministry of education, joint review of the education sector (JRES) which identified; partial withdrawal of communities from supporting education hence reducing community participation and ownership, poor work attitude and weak supervision of staff in the education sector and culpability of communities in corruption as is evident in non reporting of corruption cases to management for action to be taken as among eleven challenges facing the implementation of the Kenya Education Sector Support Program (KESSP) (Atieno et al., 2019b)

What this finding implies is that school communities' perception of leakage of resources in their schools is not different from that of any other school. Looked at closely it is realized that the scores were more on the lower side than on the higher side meaning that the individual school community was conservative when it came to rating their schools in terms of corruption and this could easily perpetuate corrupt practices. It is also important to note that people have kind of owned the schools and are protective to the schools thus playing down on the negative things and highlighting anything that is likely to bring benefits to the schools and that is an important sign of ownership.

The Relationship between Leakage of Resources and Value Delivery

Leakage of resources is a difficult parameter to capture. This is because of the nature of leakage, the social stigma associated with those considered corrupt and the environment of secrecy associated with corruption (Abana, 2022). Every person involved in pilferage of public funds cover their trucks very carefully and the involvement of the very people who are expected and supposed to safeguard the resources make it even more difficult to capture the variable (Musungu Inganga Daniel et al., 2023). This makes it imperative that an indirect way must be used to establish the variable.

In this study, value delivery was measured in terms of performance at KCSE examinations and improvement index. These variables were taken to be the main purpose for which educational institutions are established. Value delivery was measured by ascertaining the cognitive displacement of the learners during the period of exposure to the leaning process. The practical way, considering the prevailing circumstances, to ascertain this was taken to be the performance at KCSE and the improvement index. However it is recognized that the best way to measure value delivery in terms of cognitive displacement would be to measure the absolute cognitive displacement which should manifest itself in a comparative way. Thus comparing what the person would have done without the training and what he is capable of after the training would be a more accurate measure of value delivery. This would entail a longitudinal study to extract the displacement. The measure used in this study is a relative one and prone to the shortcomings of relative measures. To establish the relationship between leakage of resources and value delivery, Spearman's rho correlation coefficient was calculated as per table 5. From the table it can be observed that correlation coefficients can be observed between; price leakage and improvement index which is -0.390 with a p-value of 0.059 which is above the critical value of p at 0.05 that is that the probability that the correlation could have occurred by chance. This means that the correlation is not significant at 95% confidence level. It must not be lost that the correlation is significant at 94% level of confidence and is negative, thus the higher the leakage the lower the improvement index.

The fact that the correlation is negative means that as the value of one increases, the value of the other decreases. Although the correlation is not significant at 95% level of confidence and as such for our case, the fact that it is negative is important and also that it is significant at 94% level of confidence.

Table 5: Spearman's Correlation Coefficients on Leakage and Value Delivery

		KCSE av. performance	improvement index
price leakage	Correlation Coefficient	.039	-.390
	Sig. (2-tailed)	.856	.059
	N	24	24
perceived leakage/extent of corruption	Correlation Coefficient	.001	-.418
	Sig. (2-tailed)	.998	.059
	N	21	21

Perceived leakage has no significant correlation with any of the variables at 95% level of confidence. However it cannot escape notice that the perceived leakage is significantly negatively correlated to improvement index at 94% level of confidence. The correlation coefficient of perceived leakage and the improvement index was -0.418 and p-score of 0.059 this is as expected since as the leakage of resources increases, the value delivery decreases.

Recommendations

The study found that pricing is not a major course of leakage. People's perception about leakage is that, there is no significant leakage. However, budgetary variance is a major source of resource leakage. It is also recommended that stake holders in secondary schools both private and public view budgeting more seriously as it can and is used to leak resources. Once budgets are established deviations should be keenly scrutinized to establish causes. Also, budget making process should be viewed more seriously and be participatory.

It is recommended that a further study can be done to establish the reasons as to why people do not want to acknowledge leakage of resources in their own institutions and also why variability of prices is very high.

There is a need to carry out a study on why performance tends to increase with leakage of financial resources in Kenya which goes against expectation. What would be expected would be performance to decrease with increase in leakage of financial resources.

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