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Fraud Detection in Savings and Credit Cooperative Societies in Tanzania: Do Red Flags Matter?

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Abstract: *The purpose of this study was to establish whether red flags matter in fraud detection by assessing their perceived influence on fraud detection in Savings and Credit Cooperative Societies (SACCOS) in Tanzania. This study employed a mixed-methods approach where quantitative data was collected from 210 SACCOS, and qualitative data was collected from 9 Key Informants. Data analysis was carried out using Partial Least Square – Structural Equation Modeling (PLS-SEM) and content analysis respectively. Findings indicate that both behavioral red flags ($\beta = 0.606$, $p < 0.001$) and operational red flags ($\beta = 0.339$, $p < 0.001$) had a significant influence on fraud detection in SACCOS. The two constructs contribute about 56% to fraud detection in SACCOS. The study concludes that red flags matter significantly in fraud detection in SACCOS, and can help as an early fraud detection mechanism. It is recommended that SACCOS Board members, managers, staff and members should be trained on how to identify and report fraud red flags to the relevant authorities.*

Keywords: red flags, fraud detection, SACCOS, Tanzania

INTRODUCTION

Fraud is a persistent and evolving threat to financial institutions, particularly Savings and Credit Cooperative Societies (SACCOS). Fraud refers to the deliberate use of deceit by members of administration, executives, employees, or third parties to gain an unfair or unlawful advantage (ISA, 2009). The Association of Chartered Fraud Examiners (ACFE) posits that fraud-related losses worldwide in 2022–2023 were USD 5 trillion (ACFE, 2024). According to the ACFE report, fraud costs the average corporation about 5% of its annual revenue, and that, compared to other organizations, financial institutions have three times as many fraud instances. (ACFE, 2024; Zainal

et al., 2022). In recent years, the financial sector has seen a sharp increase in fraud, costing businesses and consumers billions of dollars (Hillal, 2022).

In the cooperative sector, the Tanzania Cooperative Audit and Supervision Corporation (COASCO) reported fraud to be above TZS 124 billion (COASCO, 2023). Various authors including Magumola and Ndiege (2019) and Mashennene *et al.* (2019) also reported fraud as one of the main challenges facing SACCOS in Tanzania.

When fraud occurs, the most common question that people have is: Why didn't anybody notice that fraud was taking place? (Okaro, 2021; Moyes, 2007). In most cases, when fraud takes place, there are symptoms or red flags that shows fraud is taking place (DiNapoli, 2010). If only someone had recognized the red flags and addressed or reported them, the loss may not have occurred or it may have been significantly reduced. According to ACFE (2020), in 85% of fraud cases, there is at least one red flag exhibited, whereas in 50% of fraud cases, four or more red flags are displayed. Yucel (2013) and Cohen *et al*. (2010) posits that, red flagging is an important mechanism for early fraud detection, but unfortunately, it is infrequently used.

Previous debates on fraud detection and several scholarly works such as the research done by Waromi *et al.* (2024); Khaksar *et al.* (2022); Kassem and Turksen (2021); Oyerogba (2021), have focused on the influence of traditional approaches such as auditing on fraud detection. However, according to Othman *et al.* (2015) the approach in question is not sufficiently effective, arguing that fraud can only be discovered through audits months after the transactions have taken place and massive losses incurred, and sometimes the fraud will never be detected. On the other hand, other studies have focused on modern approaches such as Artificial Intelligence (AI) and fraud detection (Bao, Hillary & Ke, 2022), the use of data mining techniques (Al-Hashedi *et al*., 2021) and the utilization of machine learning (Ali *et al.*, 2022). These technologies, though relevant, are not yet practical in the SACCOS context especially in a developing country like Tanzania, where the use of ICT and its related mechanisms are in the infant stages (Moshi *et al*., 2024). In the SACCOS, fraud detection is mainly the function of auditing, monitoring and internal controls (Wangu, 2021). However, Coenen (2008) argued that the reliance on internal controls, systems and procedures is not very effective for fraud detection as these can sometimes be compromised or overridden. Such techniques could be useful for identifying errors and honest mistakes, but not for identifying actual fraud, claims Coenen (2008). Fraudulent activities are made to intentionally utilize flaws in the system of accounting and internal controls, rendering it harder for auditors to detect them - unless they make use of red flags.

According to DiNapoli (2010), red flags are indicators that something is out of the ordinary and might need further investigation. In addition to helping to identify certain common personal traits, circumstances, opportunities, and activities that support fraud, red flags offer potential warning indications of fraud. Sandhu (2019) argues that examining the signs and symptoms that fraudsters often exhibit is a very efficient and affordable method of detecting fraud. In this context, there is a need for further investigation on whether red flags matter in detecting the potential for fraud to take place in SACCOS.

This study is, therefore, aimed at assessing the influence of red flags on fraud detection, by focusing on SACCOS operating in Tanzania. Most of the previous studies on fraud red flags have only identified the red flags (ACFE, 2024, Ngosa and Mwanza, 2021), but this study goes a step further by linking the red flags to fraud detection.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Underpinning

The Fraud Pentagon Theory

The Fraud Pentagon Theory (FPT) was advanced by Howarth Crowe in 2011 as an enhancement of the previously popular Fraud Triangle Theory by Cressey (1953). The Fraud Pentagon Theory contains five elements which drive people to commit fraud, namely; opportunity, pressure, rationalization, arrogance and competence. In the FPT, pressure is regarded as the financial or social need that pushes someone to perpetrate fraud; competence refers to personal attribute or capacity to commit fraud; opportunity is an internal control system flaw that gives someone the chance to engage in fraud; rationalization implies the validation for the wrongful action; and arrogance denotes the mentality needed to outsmart a system and ignore internal controls (Fitriyah and Novita, 2021).

The FPT has been used in this study as it is relevant for explaining the fraud red flags. Each of the five components of the FPT can be associated to a certain behavioral or operational red flag. For instance, pressure is linked to living beyond means and financial distress, opportunity is linked to weak internal controls and audits, competence is linked to the knowledge and skills to exploit loopholes in the organization, arrogance is linked to resistance to audits or supervision and rationalization is linked to rule-breaking (Fitriyah and Novita, 2021; Fernandhytia and Muslichah, 2020). Other studies that have used this theory includes Situngkir and Triyanto (2020), Hidayah and Sapatrini (2019), Apriliana and Augustina (2017).

Hypotheses Development

Red Flags and Fraud Detection

Red flags refer to warning indicators that point to possible wrongdoing, fraud, or suspicious activities. Fraud red flags are certain peculiarities or symptoms that indicates a high fraud risk (Sandhu, 2021). DiNapoli (2010) asserts that red flags indicate circumstances that are abnormal or deviate from the norm. Red flags only serve as potential indicators of fraud and assist in identifying certain common psychological traits, opportunities, external pressures, and internal structural systems that support white-collar crime, but they do not prove guilt or innocence. Although there are several methods for identifying and discouraging fraud, experts consider behavioral red flagging to be a low-cost and efficient fraud detection technique (Sandhu, 2016). Additionally, Padgett (2014) argued that, reducing the frequency of fraud may be possible by observing changes in employee behavior to identify behavioral red flags. According to Agubata (2021) fraud red flags

can be behavioral, operational, structural, and financial. This study focuses on establishing the influence of operational red flags and behavioral red flags on fraud detection.

Influence of Behavioral Red Flags on Fraud Detection

Behavioral red flags refer to actions, attitudes, or personality traits that indicate fraudulent behavior. They are warning signs portrayed in the lives of Board, employees or management indicating that fraud may be taking place (Agubata, 2021; DiNapoli, 2010). Fraudsters typically exhibit certain behavioral characteristics that indicate their involvement in fraud. Understanding these characteristics or warning signs is essential since it enables leaders, management and auditors to enhance chances of fraud detection (Sandhu, 2021). According to ACFE (2024) some of the notable behavioral red flags includes changes in behavior of individuals, abrupt changes in lifestyle, unusual touchiness and suspicion, isolation, substance abuse, unusual closeness to customers etc. In his study, Agubata (2021) found a negative but significant influence of behavioral red flags on fraud detection. In the SACCOS context, it is unclear whether similar red flags have been observed in fraud situations, and whether the red flags significantly influence fraud detection. The aim of this study was to establish the influence of behavioral red flags on fraud detection in the SACCOS context, thus the hypothesis developed is;

H_1: Behavioral red flags significantly influence fraud detection in SACCOS

Influence of Operational Red Flags on Fraud Detection

Albrecht (2012), define operational red flags as inconsistencies in the procedures or inefficiencies of internal controls. They are warning signs that suggest potential issues or risks in an organization's operations. Singleton and Singleton (2010) postulated that operational red flags include issues like inadequate flow of information, abnormalities in organizational procedures, unexplained transactions, abnormalities in approval processes, attempts to prevent independent audit process etc. According to Agubata (2021), operational red flags significantly and favorably impacted fraud detection. Since very few studies have linked operational red flags to fraud detection in SACCOS, this research sought to determine how operational red flags affect fraud detection in the SACCOS context, by focusing on common SACCOS operations and procedures. The following hypothesis was developed to accomplish the same;

H_2: Operational red flags significantly influence fraud detection in SACCOS

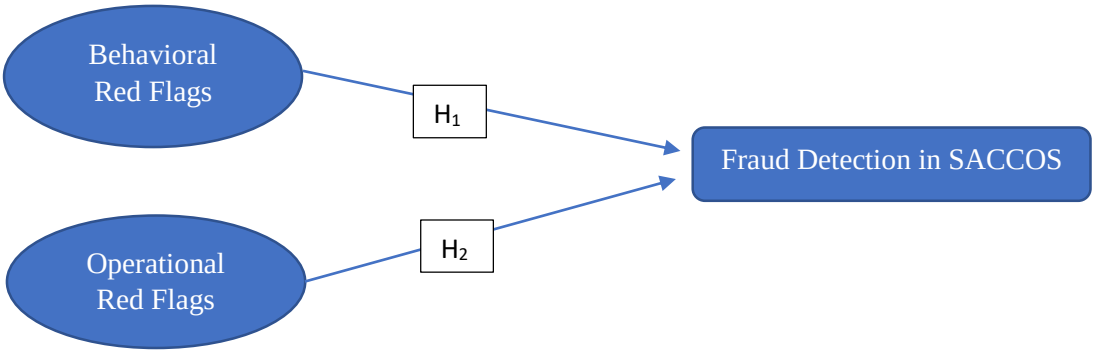


Figure 1: Conceptual Framework

METHODOLOGY

Research design, sampling and data collection

This study implemented a cross-sectional design where data was gathered once. An integrated mixed methods design was judged appropriate to accomplish triangulation of findings, with the qualitative data enhancing and offering contextual clarifications for a better comprehension of the data while the quantitative data made it easier to compare variables (Saunders *et al*., 2016). Since Kilimanjaro, Tanga, and Arusha are among Tanzania's top five regions with the most SACCOS (COASCO, 2023), they were selected as representatives of the other regions. The study involved 210 out of 443 by means of the.

$$n = \frac{N}{1+N(e)^2}$$

Where: N is the population size,

e is the margin of error required = 5%

Therefore: $n = \frac{443}{1+443(0.05)^2} = 210$

The sample for each of the three areas was projected using the Fisher *et al*. (1991) formula as follows.:

Sample size per region = $\frac{Estimated\ sample\ size}{Total\ population}$ x number of SACCOS per region

from Kilimanjaro = $\frac{210}{443}\ x\ 120$ =57, Arusha = $\frac{210}{443}\ x\ 162$ = 77, and Tanga = $\frac{210}{443}\ x\ 161$ = 76 SACCOS

A list of SACCOS provided by District Cooperative Offices (DCOs) was used to conduct a systematic random selection method (using an n^{th} term) to gather the necessary SACCOS from each district in the area. The respondents of this study included either. Previous studies on fraud

in Cooperatives (Sebhatu *et al.,* 2020) and fraud in SACCOS (Koskei, 2019) have all used either Board Chairperson or Manager as the unit of analysis. The reason for this is that given the covert nature of fraud, these are in a better position to provide evidence for the fraud (Cohen *et al.*, 2010). Even in situations where they did not personally investigate or observe the fraud, they still have access to files, reports and information about the fraud. In addition, 9 Key Informants (KI) were approached from COASCO (3), Tanzania Cooperative Development Commission (TCDC) (3),

A questionnaire was used to collect quantitative data concerning the perceived red flags exhibited by SACCOS fraudsters, whereas qualitative data from the Key Informants was collected using an interview guide. Respondents had to use a five-point Likert scale, with "Strongly Agree" to "Strongly Disagree," to answer questions about the typical operational and behavioral red flags seen in financial institution frauds. Due to its appropriateness for people who are not familiar to Likert scale assessments and enables them to pick up on small details, a five-point rating system was employed, which increases the possibility that information would be acquired. (Krosnick and Presser, 2010).

Analysis of Data

Quantitative information was analyzed using the Partial Least Square – Structural Equation Modeling technique (PLS-SEM). PLS-SEM is a variant-based structural equation analysis that is used to assess both the measurement model and the structural model simultaneously, according to Hair *et al.* (2017). While the structural model checks causality (hypothesis testing), the measurement model evaluates validity and reliability (Sabrida and Bukit, 2021).
Qualitative data was analyzed by content analysis which involved exploring meanings, themes and patterns in the responses. The measured items are shown in Table 1.

Table 1: Measured Items

Construct	Measured Item	Source
Behavior Red Flags (BRF)		
BRF1	Living beyond ones means	Sandhu (2021)
BRF2	Substance abuse/alcoholism	ACFE (2024)
BRF3	Refusal to take leave/change office	DiNapoli (2010)
BRF4	Rationalizing dishonest behavior	Feess and Timofeyev (2020)
BRF5	Social isolation	
BRF6	Hiding members ledgers/passbooks	
BRF7	Unusual closeness to members	
Fraud Detection (FD)		
FD 1	Detection of accounting fraud in SACCOS	Mangala and Kumari (2015)
FD 2	Detection of SACCOS employee fraud cases	
FD 3	Detection of theft of SACCOS' money or properties	Koskei (2019)
FD 4	Detection of collusion fraud	
Operational Red Flags (ORF)		
ORF1	Meetings not conducted timely	Agubata (2021)
ORF2	Auditing not conducted/avoided	Singleton and Singleton (2010)
ORF3	Unexplained cash in/outflows	
ORF4	Unexplained increase in loans in/out	
ORF5	Lack of transparency in financial reports	
ORF6	Delaying/postponing elections	

3.1.3 Structural Equation Model Evaluation

i) Outer Model

The relationships between the constructs and their observed indicators are depicted in the outer model. First, the entire sample was evaluated, and items with factor loadings less than 0.50 were eliminated. (Kline, 2018). The reliability analysis was tested using Composite Reliability (CR) which is the initial part of the measurement model using the recommended threshold of 0.70 (Ringle *et al*., 2018) as indicated in Table 2. Second, as indicated in Table 2, convergent validity was assessed using Average Variance Extracted (AVE) with a cut-off criteria value of 0.50 (Ringle *et al.,* 2018). Additionally, the Variance Inflation Factor (VIF) was used to assess multicollinearity (Hair *et al.,* 2017). When an indicator's VIF score is less than 5, it suggests that there may not be any potential collinearity between the indicators as shown in Table 2.

Table 2: Factor loadings, Validity, Reliability, and Collinearity

Construct	Loadings	Cronbach alpha	CR	AVE	VIF
Behavior Red Flags		0.901	0.917	0.628	
BRF1	0.855				2.704
BRF2	0.836				2.376
BRF3	0.822				2.557
BRF4	0.724				1.744
BRF5	0.758				1.849
BRF6	0.805				2.213
BRF7	0.737				1.855
Fraud Detection		0.907	0.91	0.783	
FD 1	0.878				2.545
FD 2	0.905				3.26
FD 3	0.89				2.902
FD 4	0.865				2.591
Operational Red Flags		0.869	0.894	0.603	
ORF1	0.828				2.213
ORF2	0.860				2.481
ORF3	0.708				1.714
ORF4	0.812				2.265
ORF5	0.742				1.86
ORF6	0.693				1.657

Using the Heterotrait Monotrait (HTMT) Ratio technique, discriminant validity was assessed. All of the HTMT values in Table 3 fall below the 0.90 threshold, indicating that discriminant validity was attained. According to Henseler *et al.* (2015), discriminant validity is confirmed when the HTMT ratio is less than or equal to 0.90. All of the HTMT values in Table 3 fall below the 0.90 threshold, indicating that discriminant validity was attained.

Table 3: Discriminant Validity using HTMT

	BRF	Fraud Detection	ORF
BRF			
Fraud Detection	0.894		
ORF	0.881	0.826	

ii) Coefficient of Determination (R-square)

The R-Square statistic, which illustrates how much the changes in the endogenous latent variable are explained by the exogenous latent variables taken together, is one of the most significant indicators of the model's predictive power. A reasonable level of prediction about the combined effects of exogenous components on endogenous constructs is indicated by R-Square values ranging from 0.50 to 0.75 (Hair *et al*., 2011; Henseler *et al.*, 2015). The operational and behavioral red flag constructs have a moderately positive impact on SACCO fraud detection, as indicated by the R-squared value of 0.559.

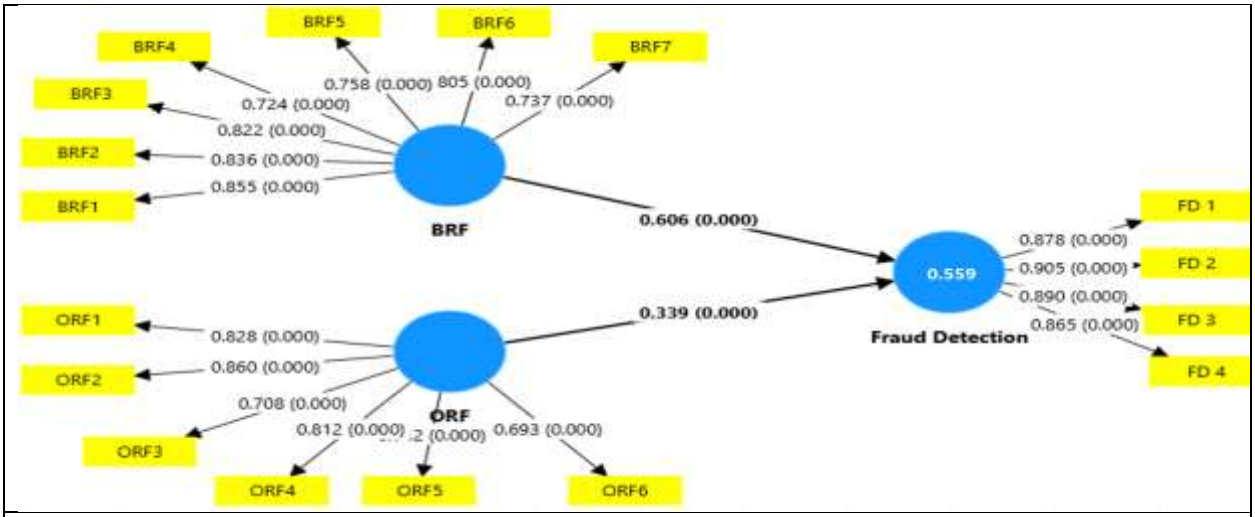
Table 4: Coefficient of Determination (R-square)

	R-square	R-square adjusted
Fraud Detection (FD)	0.559	0.556

FINDINGS AND DISCUSSION

Structural Model Relationships (path analysis)

The relationships (paths) between the constructs in the suggested research model are depicted by the structural model (Figure 2). Path analysis based on the postulated relationship between latent exogenous and endogenous components was part of the inner model evaluation. The variance explained by the model (R2) shows that the independent variables have a moderate explanatory power; R2 = 0.559 suggests that operational and behavioral red flags account for 55.9% of fraud detection, with other factors explaining the remaining 44.1%.



Key: BRF = Behavior Red Flags; ORF = Operational Red Flags

Figure 2: Hypothesized Path Relationships

Hypothesis testing

The first hypothesis (H_1) examines whether or not behavioral red flags significantly impact SACCO fraud detection. The study discovered that behavioral red flags Further analysis of the indicators of behavioral red flags in SACCOS reveals that BRF 1 (Living beyond ones means), BRF 2 (Substance abuse/alcoholism) and BRF 3 (Refusal to take leave or change office) were perceived to be the most dominant red flags exhibited by SACCOS fraudsters. On the other hand, BRF 4 (Rationalizing dishonest behavior) and BRF 7 (Unusual closeness to members) were perceived to be the least displayed red flags. This implies that in the SACCOS, when any or some of these behaviors are seen from either Board members, manager or other employees, this should signal that fraud may be taking place and swift action should be taken to investigate the situation (Sandhu,2020). According to DiNapoli (2010) red flags are always present in fraud situations, but they are either not recognized, or they are recognized but not acted upon by anyone. with the Fraud Pentagon Theory, living beyond means is an indication of pressure whereas substance abuse may result from both pressure and unethical behavior resulting from rationalization.

In addition to the behavioral red flags tested in this study, several key informants interviewed mentioned "betting" as a behavioral red flag exhibited by SACCOS fraudsters. This is a new behavioral red flag which has not been observed in previous studies. Some of the studies such as ACFE (2024) and Feess and Timofeyev (2020) do mention "addiction problems" but are not specific. One interviewed COASCO official in Tanga reported that;

> *"…. a growing number of SACCOS employees and even Board members are now engaging in betting especially the sports betting and other online betting platforms currently introduced in our country. We have witnessed a few cases where some employees have stolen money from the SACCOS and used it to bet in anticipation that if they win, they will repay back the money. When they lose, they steal more money and bet again and this becomes a habit. In the long run if the SACCOS are not careful, we are going to have many cases of that nature" (Interview, Tanga, 9th November, 2022)*

The second hypothesis (H_2) examines whether operational red flags significantly influence fraud detection in SACCOS. The findings reveal that operational red flags. Further analysis revealed that ORF 2 (Auditing not conducted/avoided) and ORF 1 (Meetings not timely conducted) as well as ORF 4 (Unexplained increase in loans in/out) are perceived to be the top operational red flags to watch out for. The results designate that more attention to operational red flags will precipitate an increase in fraud detection in SACCOS. However, the COASCO report of 2023 indicated that, even in cases where operational red flags have been identified, there is a challenge of many SACCOS not addressing the red flags identified in previous audits. In the fraud pentagon theory, rationalization may occur when no measures are taken to previous fraudsters (Crowe, 2011). This implies that the issue is not only identifying the red flags, but also taking swift measures to address them whenever they are identified. These findings are similar to those of Agubata (2021) who also established that operational red flags have a positive influence on fraud detection. A summary of the results is given in Table 6

Table 6: Hypothesis testing

Hypothesis	β	Standard deviation	T statistics	P-values	Remarks
Behavioral Red Flags -> Fraud Detection	0.606	0.068	8.962	0.000	Supported
Operational Red Flags -> Fraud Detection	0.339	0.068	4.991	0.000	Supported

CONCLUSION, RECOMMENDATIONS AND PRACTICAL IMPLICATIONS

The study sought to establish whether red flags matter in detecting SACCOS frauds. Contrary to previous studies which only identified the red flags, this study has established a link between red flags and fraud detection in SACCOS. From the findings it can be concluded that red flags do matter a lot in fraud detection and they are useful as an early fraud detection mechanism.

Considering the results of this study, it is recommended that individual SACCOS, regulators and the support institutions (TCDC, COASCO, Moshi Cooperative University etc.) should strengthen education and training to the SACCOS leaders, managers, employees and members on the red flags exhibited by fraudsters so that when they see such red flags, they can report to the relevant authorities for further measures. The reporting channels should also be made clear so that once red flags are noticed, people know where to report. To this end, it is also necessary for SACCOS to have a system that those who report frauds are confident that their identities will be protected, especially if they report frauds conducted by their leaders/managers.

Practically, this paper contributes to the current practice of fraud detection by cementing the use of red flags as supplementary approach to current fraud detection approaches. Thus far, auditing has been the sole approach used to identify fraud in SACCOS. The problem with auditing is that much time may have passed since the fraud was conducted until when it is detected. But this study has shown that red flagging can be an effective method of detecting fraud before or immediately as it occurs. This can help to stop the fraud or at least to reduce the severity of impacts.

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