An Assessment of the Impact of Innovation on Insurance Fraud Management in Zimbabwe

Dr Fainos Chinjova[1], Madeline C. Mujakaji[2]

National University of Science and Technology; Corner Gwanda Road and Cecil Avenue; Bulawayo; Zimbabwe

ABSTRACT

This study sought to assess the impact of innovation on insurance fraud management in Zimbabwe. The study used a pragmatic philosophy in carrying out the study. This is because the explanatory variables chosen by the researcher are best explained using the strengths of both qualitative and quantitative approaches with the use of statistical inferences. The population of this study consisted of all the employees of insurance companies in Zimbabwe and the population size was estimated to be around 3000. The sampling method used in this study was purposive sampling since the researcher used subjective judgment drawn from practice to come up with a sample size of 180. The sample size was considered enough to make inferences about the population. The study found out that block chain creates interlinked and independent information, its information is true, it validates transactions and the information stored in it is irreversible. Moreover, it was found out that the adoption of artificial intelligence was going to be a critical move towards the reduction of the rate of over exaggerated claims. The study also found out that insurance companies' mobile application would be highly effective because mobile technologies ensure that customers have factual and reliable information, they ensure an effective collection of customer data, they are helpful in educating customers about insurance fraud and they notify clients of their deadline. The study recommends that insurance companies take a leading role in educating its clients about insurance fraud and its implications. Moreover, insurance companies should train and develop their employees on fraud management and deploy a variety of technologies to reduce the incidence of fraud.

Keywords: Artificial intelligence; Fraud management

INTRODUCTION

In the past years, investigations on insurance fraud conducted with studies on market failures, information asymmetry and poor regulatory measures in the financial sectors of economies across the globe are increasing [1]. This is mainly because of the numerous losses that are incurred in the sector which are attributable to insurance fraud on the global insurance market. These losses run into billions of dollars and affect the growth of insurance firms and the financial well-being of both the insured and the uninsured. In-spite of such rich and extensive literature, there is scant literature and studies on measures to combat insurance fraud, thus necessitating the need for the proposed investigation. The intended study seeks to assess the impact on innovation on insurance fraud management in Zimbabwe.

Background of the study

Innovation is the application of ideas that are novel and useful. It is about staying relevant. Businesses are in a time of unprecedented change. In that case therefore companies need to adapt and evolve to meet the ever-changing needs of their constituents thus being innovative. The goal of innovation is to reinvigorate the business, create new value and boost growth and productivity. According to Leeds, [2] there are several types of technologies that are designed to provide a range of benefits to insurers and policy holders these are not limited to mobile applications, machine learning, big data, the internet, drones, telematics and the block chain ledger. The study therefore employed mobile application, machine learning, telematics and the block chain ledger as variables of innovation.

On the global landscape, insurance companies have been implementing various innovations to ensure that they deal away with insurance related fraudulent activities. For instance, AIG of the United Kingdom incorporated big data and analytics in a measure to minimize insurance criminal activity in its operations. The insurance company has been using big data to analyse consumer information, to identify the risk patterns and pricing risk as well as

Correspondence to: Dr. Fainos Chinjova National University of Science and Technology; Corner Gwanda Road and Cecil Avenue; Bulawayo; Zimbabwe Email: chinjovaf@gmail.com

to analyse information that was related to risk pooling. With big data AIG was empowered to streamline and accurately underwrite insurance products. This resulted in the decrease of exaggerated premiums as well as falsified claim [1]. From the above case, it can therefore be concluded that innovation has a positive implication on the reduction of insurance related fraud.

The American insurance sector has also been on the lead in the implementation of innovations that minimize insurance related fraud. Fidelity Life a notable example of insurance companies that have been using innovation to ensure that fraud related risks are minimized. The prominent insurance company has been using algorithms and machine learning to minimize its exposure to insurance related fraud. Computer systems are being used to perform tasks and to make premium related decision that historically required the intelligence of an employee to perform. The Chabot is being used to respond to the questions that policy holders would have as well to determine the risk profile of a prospective policy holder and their premium rate. This strategy has helped the insurance company to properly price the premium of the customers and has seen a reduction in overstated claims. This has not only reduced the fraud related costs but also enhanced the performance of the insurance company [3].

Asian countries have also embraced the usage of technological advancements in a bid to ensure that fraudulent activities are minimized. Nippon Life Insurance of Japan is a remarkable example of organizations that have embraced technologies like drones to ensure that financial criminal activity is significantly reduced. Prior to its adoption, the insurance company often had to deal with fraudulent activities relating to falsified and staged claims. With the use of drones, the organization could view the aerial footage over a disaster area to determine the amount of damage to a house or crop field. Nippon also used drones to verify information submitted by a policy holder in a claim or to help determine the risk presented by the difficult-to-reach areas of a property. The drone technology in the end enhanced the efficiency and effectiveness of the Asian insurance company as the insurance fraud rate drastically decreased [4].

In the African continent, OUTsurance of South Africa has also been on the lead in ensuring that external insurance fraud is reduced. The entity has been using both the internet and mobile applications to enhance its guard against insurance fraud. The entity has encountered losses ranging to 12 million Rands as a result of policy holders who would stage up disasters and accidents in a bid to benefit where they were not supposed to. The internet began to be used to track and reduce risk, detect problems as well as mitigate potential falsified claims. The insurance company also partnered with insures entities that provide innovative solutions and real-time monitoring. The implementation of such strategies has resulted in a drastic decrease in insurance fraud related costs and enhanced performance of the insurance organization (Ncube, 2018).

The Zimbabwean insurance industry is made up of 88 registered players and a total of 2173 intermediaries. In 2019, the sector was resilient and demonstrated enhanced performance. The total gross premiums of the insurance sector amounted to ZWL$946.01 million in 2019 in comparison to ZWL$426.05 million in 2018, thus an increase of 122%. This was on the back of increases in premiums for the whole range of insurance products mainly because of the rate driven flat. The profit after tax for sector as at December 2019 was ZWL$9.4 billion from ZWL$1.08 billion

thus a significant increase of 769%. The increase in profitability is mainly attributable to high investment returns from revaluation gains on equity investments. However, the Average Prescribed asset ratios for the funeral industries stood at 10.44%, however, this was not in compliant with the required minimum prescribed asset ratio of 15% which was stipulated in Statutory Instrument 206 of 2019. Furthermore, IPEC (2019) highlighted that the insurance industry costs increased by 158% from ZWL$301 million to ZWL$776 million in 2018 and 2019 respectively. This was mainly caused by insurance related fraud which is mainly attributed to fraudulent claims and over insurance as well as the existence of bogus insurance companies particularly funeral assurers and legal aid societies among others. In the cases and contexts above, innovation was used as means with which such a risk could be mitigated. This research therefore seeks to assess if the implementation of innovation will reduce insurance related criminal activity.

Statement of the problem

The performance of the Zimbabwean insurance industry has been highly significant as evidenced by a 122% increase in premiums and 769% increase in profitability. It should however be noted that the sector is highly challenged by fraudulent claims, over insurance and the existence of bogus insurance companies. This has seen serious increase in costs of 158% from $310 million to $776 million in 2018 to 2019 respectively. According to Porter (2012) if not properly managed, costs affect the competitiveness of the organization [5]. It is evident that the costs brought about by insurance fraud are having an implication on the competitiveness of the sector. In that case therefore, this research seeks to assess if the adoption of innovative measures will ensure that the insurance fraud is managed.

Objectives of the study

The following were the research objectives which the study intended to meet.

Main Research Objective

To assess the impact of innovation on insurance fraud management in Zimbabwe

Sub-Objectives

- To determine if block chain ledger reduces the rate of falsified claims in the insurance sector of Zimbabwe

- To ascertain if telematics has an impact on the reduction of staged claims in the insurance sector of Zimbabwe

- To evaluate if machine learning will minimize the rate of over exaggerated claims in the insurance sector of Zimbabwe

- To determine if mobile applications have an effect on the reduction of misrepresented information in the insurance sector of Zimbabwe

- To establish the measures that can be implemented to ensure that innovation is successfully implemented as a measure to curb for the insurance related fraud.

Purpose of the study

The purpose of this study is to assess the impact of innovation on insurance fraud management in Zimbabwe.

Research questions

The study was guided by the following research questions:

Main Research Question

What is the impact of innovation on insurance management in Zimbabwe?

Sub-Research Questions

- To what extent will the block chain ledger reduce the rate of falsified claims in the insurance sector of Zimbabwe?

- How will telematics reduce staged claims in the insurance sector of Zimbabwe?

- To what extent will machine learning minimize the rate of over exaggerated claims in the insurance sector of Zimbabwe?

- How will mobile applications reduce the misrepresented information in the insurance sector of Zimbabwe?

- What are the measures that can be implemented to ensure that innovation is successfully implemented as a measure to curb for the insurance related fraud?

Delimitations of the study

The following is the scope or frame of the study.

i. Theoretical – the study was only limited to innovation being used in the insurance sector and insurance related fraud.

ii. Methodological – the study employed a mixed method approach in which both the qualitative and quantitative nature of research.

iii. Geographical – the investigation was carried out in Harare Zimbabwe at the main offices of the insurance companies that were used as the sample of the study.

Conceptual framework

This study utilized a conceptual framework which describes how insurance innovation (the independent variable of the study) will be tested against insurance fraud (the dependent variable of the study). Insurance innovation has four main variables: the block chain ledger, telematics, machine learning, and mobile applications. On another note, insurance fraud has variables: falsified claims, staged claims, over exaggerated claims and misrepresentation claims. Both the sub-independent variables and the sub-dependent

variables were tested against each other respectively. Below is the diagrammatic representation of the conceptual framework of the study. (Figure 1)

Source: Author, (2020)

Figure 1 shows that a number of technological developments and innovations underpin many developments in the insurance sector. Some of the technologies are inter-related and the following subsections give a brief review of each of them in establishing a common understanding of their nature.

Block chain or distributed ledgers technology (DLT)

The OECD (2017) highlights that block chain or distributed ledger technology (DLT) is a protocol for the exchange of values or data over the internet which does not require an intermediary [6]. The protocol of block chain technology is to create a shared, encrypted database of transactions and other information. According to Iansiti and Lakhani, once the transaction is validated and recorded, the stored record is irreversible [4]. The technology has been applied to the insurance industry and is seen as one of the mechanisms through which fraudulent claims can be detected using stored data. The conceptual framework adopted in this study proposes that the use of block chain and distributed ledger technology reduced the incidences of falsified claims.

Insurance telematics

OECD (2017) asserts that insurance telematics is a branch of telematics that is concerned with the calculation of insurance premiums based not only a static measures like the drivers age, occupation or place of residence, car model and configuration, or expected mileage over the policy period, but also on dynamic measures like actual mileage, time spent on the road or the time of day when the trip is being made, location, and the driver's actual style of driving. OECD (2017) further asserts that these insurance schemes are often labelled as pay-as-you-drive (PAYD), pay-how-you drive (PHYD), manage-how-you-drive (MHYD), and the like. Accordingly, the premium is based on information gathered from car trips utilizing different pieces of information [6]. The conceptual framework adopted in this study envisages that the use of insurance telematics as an innovation is likely to reduce the incidence of fake claims as user data can correctly predict commensurate insurance claims.
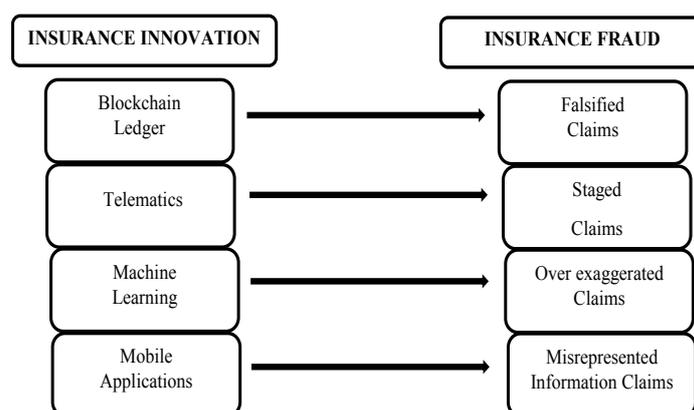

Figure 1: Conceptual framework of the study.

Machine learning and Artificial intelligence (AI)

Machine learning and artificial intelligence are increasingly being deployed in a variety of industries. OECD (2017) asserts that a machine would be considered "intelligent" when it takes into consideration its environment and takes action to maximise the possibility of achieving its given goal. Artificial Intelligence is operationalised when computer programmes are developed to have cognitive functions such as learning and problem solving. According to HM Treasury and FCA, it can cover a broad spectrum of services, but is essentially an "on-line automated advice model that has the ability to deliver advice in a more cost-efficient way" [7]. This research assumes that the employment of artificial intelligence and machine learning reduced occurrence of exaggerated claims.

Mobile technology and applications

The network effect of mobile phones and development of applications for these devices has allowed many companies to reach a bigger audience than was previously possible. Mobile technology may be working in different ways for technological innovations in the insurance industry depending on the generation of mobile networks available, and the types of handsets that are most widely used. Smartphone's and internet access enable innovations which are based on the use of apps. For this, mobile networks that allow short messages and pre-paid mobile phones, as well as large data transfers would be necessary. This is particularly relevant to emerging markets which have low insurance penetration and do not have a well-established distribution network. Mobile phones have the ability to notify individuals via short messaging service (SMS) on anything from the insurance coverage to reminding them of imminent withdrawal of airtime for premium payments. The application of mobile technologies in insurance is considered as a way of reducing misrepresented information claims.

RESEARCH METHODOLOGY

Research philosophy

The researcher used a pragmatic philosophy in the study because the explanatory variables of the study are best explained using the strengths of both qualitative and quantitative approaches with the use of statistical inferences.

Research design

This research adopted a cross sectional survey design due to the nature of variables that the researcher chose through the objectives. Thus, qualitative data was complemented with quantitative data from the survey questionnaires. The researcher used literature reviewed in identifying theories, concepts and ideas to be tested using data. Literature review guided the researcher in carrying out the process of the research and the researcher followed sequential steps in carrying out the study. Secondary literature from previous researches was used to develop the idea. Appropriate data was collected using mixed approaches and techniques. The data was analysed to determine the impact of innovations on fraud management in insurance companies; and conclusions were formulated after interpretation of the data. The researcher decided to use the qualitative design to enable better description of the impact that innovative technology can have on fraud management for insurers.

Population

The targeted population of this study consists of all the employees of insurance companies in Zimbabwe. While insurance companies (including brokers and reinsurers) number upwards of 80 in Zimbabwe, the actual population size was difficult to estimate.

Sampling

Convenience sampling was used to choose the individuals who were examined and interviewed to give data to answer the research questions. The research used convenience sampling since some employees were not available for interviewing due to the COVID 19 induced lockdown. Moreover, the actual size of the population was unknown and the researcher thus, used the data saturation technique to determine the sample size. In this study, the researcher used non-probability sampling techniques to choose the actual research participants and this does not use the probability theory but is based on some other criteria such as the researchers' judgment (Gall, Berg and Gall, 1996) [8].The sampling method used in this study was purposive sampling since the researcher used subjective judgment drawn from the theory (that is academic literature) and practice (that is past experience of the researcher) and the evolutionary nature of research process [9].

Data generation instruments

This research made use of the interview guide as the main data collection instrument. Insofar as this study is concerned, in-depth interview guides and questionnaires were used as the data collection instruments. The types of questions for interview guides were open-ended and descriptive, usually reacting to a given situation presented by the researcher.

Data analysis procedure

After obtaining the data, the researcher then transcribed all the data from interview notes and recorded audios onto Microsoft Office Word. The process of data transcription was followed by a process of data cleaning in which the researcher did thorough checks for erroneous responses or errors in entry. After finishing cleaning the data, an analysis to find out answers to the research questions was then done. Analysis for qualitative data was done through thematic and narrative analyses and this enabled the researcher to summarize large amounts of data that was gathered from employees to facilitate the drawing of conclusions. Narrations and quotations were then used to present and analyse the findings. Quantitative data was analysed through descriptive statistics with the findings presented in the form of tables and graphs.

DATA ANALYSIS AND DISCUSSION

Response Rate

Table 10.1 shows the response rate of the study in which a total of 180 questionnaires were administered to the respondents and 142 were found necessary for analysis thus a response rate of 78%. Furthermore, 15 interviews were scheduled with the management and only 10 interviews were held. In that case therefore a total response rate of 77% was attained. According to Saunders et al. [10], a response rate which is higher than 75% is acceptable and deems the responses generated valid. It is against this recommendation that the responses generated were found acceptable for analysis. (Table 1)

Reliability Test

The Cronbach's Alpha was used to determine the reliability of the research instruments. From Table10.2, a reliability coefficient of 0.823 was attained. Christen, Johnson and Turner (2011) points out that scales above 0.7 and above shows a satisfactory reliability. Based in these recommendations therefore, the statements under block chain ledger, telematics, machine learning, mobile application and effective innovation implementation measures were concluded to have adequate internal consistency thus reliable for analysis and generalization of the Zimbabwean insurance sector [11-14]. (Table 2)

Sampling Adequacy

To examine if the data collected was suitable for inferential analysis, the researcher carried out the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. Analytical findings below show a KMO static of 0.663 which was significantly higher than the critical significance level of 0.5. According to Field (2000) a succinct and suitable data sets should

Table 1: Response Rate.

Research Instrument	Sent	Returned	Percentage
Questionnaire	180	142	78%
Interviews	15	10	66%
Total	195	152	77%

Source: Survey (2020).

Table 2: Reliability Test.

Construct	Cronbach's Alpha if Item Deleted
Reliability Test for Blockchain Ledger	0.954
Reliability Test for Telematics	0.882
Reliability Test for Machine Learning	0.891
Reliability Test for Mobile Applications	0.923
Reliability for Effective Implementation Measures	0.994
Number of items	0.25
Cronbach's Alpha	0.823

Source: Survey (2020).

Table 3: Sampling Adequacy of the Study.

Test	Coefficient
Kaiser-Meyer-Olkin Measure	0.663
Bartlett's Chi-Square	546.972
Bartlett's df	18
Bartlett's Sig.	0

Source: Survey (2020).

be greater than 0.5. Adding on, the Bartlett's Test of Sphericity was highly significant (Chi-Square – 546 972 with 18 degrees of freedom, at p<0.05) [15], [16]. The findings on the sampling adequacy analysis provided an exceptional justification for further analysis to be carried out. (Table 3)

Factor Analysis

The Principal Component Method (PCM) approach was used to conduct the factor analysis of the study. Table 10.4 shows the Total Variance Analysis on the construct of the study. The table shows that the extracted factor of 44.9%. (Table 4)

Table 10.5 shows the factor loading for the insurance fraud innovation constructs. According to Rahn (2010) factor loading coefficient which is greater than 0.4 is considered highly adequate [17-19]. (Table 5)

Block chain Ledger and the Rate of Falsified Claims

Below is a presentation on the quantitative and qualitative findings on the first research construct of the study. (Table 6)

Block chain does not require an Intermediary

Table 10.6 shows that 79.8% of the respondents agreed that the block chain ledger is an effective falsified claim reduction technology because it does not require an intermediary. A mean value of 4.4 was attained which implies that the block chain's independent would be effective in reducing falsified claims to a great extent.

Block chain technology allows insurance companies to create, share and encrypt databases

It was further agreed by 85.8% of the respondents that the block chain ledger is of paramount important in false claim reduction because Zimbabwean insurance companies get to create a shared, encrypted database of insurance transactions and other insurance related information. A mean value of 4.6 was obtained from the analysis which implies that the ability of the insurance companies to create, share and encrypt information would reduce falsified claims to a great extent.

Block Chain creates Interlinked & Independent Information

From the investigation, 93.3% of the respondents agreed that the block chain technology is advantageous in reducing falsified claims because it creates an ever-lengthening chain of blocks of insurance information which is interlinked and very independent. In the same vein a mean value of 4.7 was attained which means that the interlink and independent information characteristic of the block chain would effectively reduce falsified claims to a great extent.

Table 4: Insurance Fraud Total Variance Explained.

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.801	44.921	44.92	4.801	68.59	44.92
2	1.033	24.762	69.68			
3	0.597	15.951	85.63			
4	0.264	10.254	95.89			
5	0.143	4.11	100			

Source: Survey (2020).

Item	Factor Loading
Block chain Ledger and Falsified Claims	0.959
Telematics and Staged Claims	0.937
Machine Learning and Over Exaggerated Claims	0.934
Mobile Application and Misrepresented Information	0.912
Effective Implementation Measures and Insurance Fraud Combustion	0.934

Source: Survey (2020).

Table 6: Block chain Ledger and the Rate of Falsified Claims Descriptive.

Statement	SA	A	N	D	S.D	Likert Mean	Std. Dev
The blockchain ledger is an effective falsified claim reduction technology because it does not require an intermediary	12.9%	66.9%	6.8%	7.9%	5.5%	4.4	1.074
The blockchain ledger is of paramount important in false claim reduction because insurance companies get to create a shared, encrypted database of insurance transactions and other insurance related information	27.7%	58.1%	26.7%	4.4%	11.1%	4.6	1.072
The block chain technology is advantageous in reducing falsified claims because it creates an ever-lengthening chain of blocks of insurance information which is interlinked and very independent	29.6%	63.7%	0.5%	6.2%	0.0%	4.7	0.925
Falsified claims will likely reduce with the use of the blockchain ledger because each block will be having validated transactions by insurance companies in the blockchain and the premise of the blockchain is that information in each block would be true.	34.2%	58.9%	1.3%	2.8%	2.8%	4.7	1.12
The blockchain ledger can be applied to ensure falsified claims are significantly reduced because once the transaction is validated and recorded, the stored insurance information is irreversible.	24.9%	67.9%	1.54%	2.75%	2.91%	4.7	1.05

Source: Survey (2020).

Block chain Information is True

Table 10.6 shows that 93.1% of the respondents agreed that falsified claims will likely reduce with the use of the block chain ledger because each block will be having validated transactions by insurance companies in the block chain and the premise of the block chain is that information in each block would be true. Adding on, a mean value of 4.7 was attained which shows that honest information that will be provided by the block chain will ensure that falsified claims are minimized to a greater extent.

Block chain Validates Transactions & Its Information is Irreversible

From that survey, 92.8% of the respondents agreed that the block chain ledger can be applied to ensure falsified claims are significantly reduced because once the transaction is validated and recorded; the stored insurance information is irreversible. A mean value of 4.7 was attained which means that the block chains' ability to validate transactions has the potential to reduce falsified claims to a great extent.

In course of the interviews, the management hinted that the block chain technology would be effectively used in their organizations. Below are some of the descriptions that were given in relation to how block chain technology will be used:

"The block chain technology will be useful and highly critical in managing insurance fraud because we will share information with other insurance companies. This data will be pivotal as we will know our clients better, serve them better and be mindful of fraudulent individuals."

"Block chain ledger is an innovation that will change the dynamics in the organization as it will highly assist in managing risks we are posed with as well as showing the loopholes that clients use to swindle funds and services from the insurance companies"

Telematics and the Reduction of Staged Claims

Below is a presentation of the quantitative and qualitative findings on the second research construct of the study. (Table 7)

Telematics Offers an Electronic Data Exchange

Table 4.7 shows that 72.9% of the respondents agreed that telematics is an innovation that can be used to reduce stages claims as it offers an electric data exchange between connected vehicles. A mean value of 3.7 was obtained and this denotes that the electronic data exchange quality offered by telematics would reduce staged claims to a greater extent.

Telematics Calculates Insurance Premiums Based on Static and Dynamic Measures

Furthermore, 60.9% of the respondents agreed that the telematics innovation will be highly useful because it will calculate the insurance premiums based on the static and dynamic measures thus significantly mitigating staged claims. A mean value of 3.5 was obtained from the analysis and this means that the calculation of insurance premiums based on static dynamic measures would mitigate staged claims to a great extent.

Telematics' Uses Static Demographics

In the same vein, 90.2% of the respondents agreed that, telematics

Telematics and the Reduction of Staged Claims.

Statement	SA	A	N	D	S.D	Likert Mean	Std. Dev
Telematics is an innovation that can be used to reduce stages claims as it offers an electric data exchange between connected vehicles.	15.7%	57.2%	6.8%	5.9%	14.4%	3.7	0.915
The telematics innovation will be highly useful because it will calculate the insurance premiums based on the static and dynamic measures thus significantly mitigating staged claims	16.2%	44.7%	21.4%	9.2%	8.4%	3.5	0.924
Telematics will reduce the risk of stages claim because it will determine the insurance premium to be paid with the use of metrics like the age of the driver, place of residence and expected mileage over a given policy period	28.3%	61.9%	0.0%	3.8%	6.0%	4.6	0.925
Telematics will be highly efficient in reducing staged claims because it will determine the premium that a customer has to pay with the use of factors like time spent on the road, the time of the day when the trip was made, the location and the driving style of the driver.	23.8%	61.9%	1.3%	2.8%	2.8%	4.2	0.998
Insurance telematics should be incorporated to ensure a reduction in staged claims because if supports the use of the pay-as-you-drive, pay-how-you-drive and manage-how-you-drive schemes	32.9%	48.6%	1.9%	5.9%	10.7%	4.0	1.13

Source: Survey (2020).

Table 8: Mobile Application and the Reduction of Misrepresented Information.

ANOVA					
Mobile Application and the Reduction of Misrepresented Information					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	295.349	4	45.192	41.024	.002
Within Groups	393.671	265	1.419		
Total	492.105	292			

will reduce the risk of stages claim because it will determine the insurance premium to be paid with the use of metrics like the age of the driver, place of residence and expected mileage over a given policy period. A mean value of 4.6 was attained which shows that the static demography of telematics had the potential to reduce staged claims to a very great extent.

Telematics' Uses Dynamic Measures

Another, 85.7% of the respondents agreed that, telematics will be highly efficient in reducing staged claims. A mean value of 4.2 was gathered and this shows that telematics' usage of dynamics would enhance the reduction of staged claims to a great extent.

Telematics Supports Innovative Insurance Schemes

From the survey, 81.5% of the respondents agreed that, insurance telematics should be incorporated to ensure a reduction in staged claims because if supports the use of the pay-as-you-drive, pay-how-you-drive and manage-how-you-drive schemes. In that case therefore, a mean value of 4.0 was attained which shows that telematics support of innovation insurance schemes would reduce staged claims in the Zimbabwean insurance sector to a great extent.

The management strongly agreed that some insurance companies were in the process of and considering the adoption of telematics in fraud management. Below are some of the notable issues that were pointed out in relations to the adoption of telematics in the Zimbabwean insurance sector.

"Telematics will obviously be adopted in the organization as it will help minimize the risk of staged claims that we are highly prone to and in some instances suffer from."

"Telematics is a highly technical innovation which we will adopt only after we have either up skilled the employees or rigorously trained them to be able to us it." (Table 8)

Machine Learning and the Rate of Over Exaggerated Claims

Below is a presentation of the quantitative and qualitative findings on the research construct. (Table 9)

Machine Learning Considers Insurance Business Environment

Table 10.9 shows that 87.6% of the respondents agreed that machine learning would be highly effective in the Zimbabwean context because it considers the insurance fraud prone business environment and takes action to reduce over exaggerated claims. A mean value of 4.2 was attained which denotes that machine learning's characteristics will reduce over exaggerated claims to a greater extent.

Artificial Intelligence has problem-solving capacity

Another, 76.6% of the respondents of the study agreed that artificial intelligence would be an effective over exaggerated claim reduced because it has the problem-solving capability. In the same vein, a mean value of 3.8 was attained which implies that artificial intelligences' ability to solve problem will reduce over exaggerated claims to a greater extent.

Machine learning ensures that computers are programmed

In the like manner, 84.7% of the respondents of the study agreed that, machine learning will also be useful in reducing insurance

Table 9: Machine Learning and Rate of Over exaggerated Claims.

Statement	SA	A	N	D	S.D	Likert Mean	Std. Dev
Machine learning would be highly effective in the Zimbabwean context because it considers the insurance fraud prone business environment and takes action to reduce over exaggerated claims	27.8%	59.9%	4.4%	8.0%	0.0%	4.2	1.074
Artificial intelligence would be an effective over exaggeratedclaim reduced because it has the problem-solving capability.	13.8%	62.8%	5.9%	10.6%	9.9%	3.8	1.072
Machine learning will also be useful in reducing insurance fraud as insurance companies will program their computers to monitor exaggerated claims under specific conditions	32.8%	51.9%	0.0%	9.2%	6.1%	4.4	0.925
Machine learning insurance fraud detector will have to operate under conditional instructions for placing a trade order, speed and frequency that is not possible for insurance personnel	32.9%	48.6%	3.9%	7.5%	6.8%	4.1	1.12
The robo-advice or automated advice provided by the usage of artificial intelligence and machine learning will be very helpful in ensuring that overexaggerated claims are reduced	39.6%	48.7%	9.1%	2.6%	0.0%	4.2	0.976

Source: Survey (2020).

fraud as insurance companies will program their computers to monitor exaggerated claims under specific conditions. Furthermore, a mean value of 4.4 shows that the ability of machine learning to ensure that computers are programmed would reduce the risk of over-exaggerated claims to a greater extent.

Machine Learning Operates Under Conditional Instructions

From the investigation, 81.8% of the respondents agreed that, machine learning insurance fraud detector will have to operate under conditional instructions for placing a trade order, speed and frequency that is not possible for insurance personnel. A 4.1 mean value was attained from the analysis and this shows that machine learning's ability to operate under conditional instructions would reduce the risk of over exaggerated claims to a greater extent.

Artificial Intelligence Provides Robo-Advice

Adding on, 88.3% of the respondents the robo-advice or automated advice provided by the usage of artificial intelligence and machine learning will be very helpful in ensuring that over exaggerated claims are reduced. A mean value of 4.2 was obtained. This means that artificial intelligence capability to provide robo-advice would reduce the risks of over exaggerated claims to a greater extent.

A majority of the participants indicated that their entities had not embraced machine learning as yet but were conducting technical appraisals which would determine their adoption of the strategy. Below are the notable issues that were pointed out by the management:

"Machine learning has not been embraced as yet, but the organizations are conducting technical appraisals on the strategy"

"The organization is in the process of acquiring and incorporating machine learning technology. Training is being conducted with the dedicated personnel that will be programming, monitoring and managing the system"

The extent to which machine learning minimize the rate of over exaggerated claims in the insurance sector

From the findings obtained from this question, it is apparent that machine learning will significantly reduce the risk of over exaggerated claims in the insurance sector. Some of the manager had the following to say:

"The adoption of machine learning in the insurance sector means the system will master the premium payment strategy, premium due data, most preferred and used services. Furthermore, the machine will also learn of the fraudulent activities that the insurance sector is highly prone to encounter. Machine learning will show the insurance companies the loopholes in the systems that are manipulated by insurance fraudsters. In that case therefore, the incorporation of machine learning will be highly helpful in reducing over exaggerated claims."

"Machine learning software is very advantageous in reducing insurance risks relating to over exaggerated claims. However, the company will have to incorporate it in a gradual process, in phases so that the employees do not feel replace then eventually sabotage manual investigations on insurance frauds. It should nevertheless, not be ruled out that machine learning will be highly beneficial in mitigating insurance fraud mainly the risk of over exaggerated claims"

Inferential analysis was again conducted to ascertain whether there was an association between machine learning and the reduction of over exaggerated claims in the Zimbabwean insurance sector. Below is a presented on the third research assumption of the study:

H^3 - There is an association between machine learning and the reduction of over exaggerated claims

H^0 - There is no association between machine learning and the reduction of over exaggerated claims. (Table 10)

According to Table 4.10 which presents a one-way ANOVA analysis which sought to determine the existence of relationship machine learning and over exaggerated claims. The comparison between the two conditions resulted in a significant effect of condition 32.9 and a significant value of 0.003 which was lower than the critical value of 0.005. The findings obtained shows that there is an association between machine learning and the reduction of over exaggerated claims in the Zimbabwean insurance sector. In that case, the successful adoption of machine learning will reduce the risk of over exaggerated claims in Zimbabwe.

Mobile Applications and the Reduction of Misrepresented Information

This section presents the qualitative and quantitative findings

Table 10: Machine Learning and Over Exaggerated Claims.

ANOVA					
Mobile Application and the Reduction of Misrepresented Information					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	121.943	4	31.063	32.971	.003
Within Groups	394.871	396	1.823		
Total	409.491	423			

Source: Survey (2020).

Table 11: Mobile applications and the reduction of misrepresented information.

Statement	SA	A	N	D	S.D	Likert Mean	Std. Dev
The mobile applications of insurance companies work effectively to ensure that misrepresented information is significantly reduced	29.8%	64.8%	1.8%	2.6%	1.0%	4.8	0.915
Mobile applications notify insurance companies and their clients of the premium deadlines and information which would not have been provided by the client.	27.9%	52.8%	18.6%	0.7%	0.0%	4.0	0.963
Mobile technologies are helpful in sending direct messages to customers in the process of educating them about insurance fraud.	39.7%	42.1%	0.0%	9.6%	8.6%	4.0	0.995
Mobile applications foster the collection of data on customer premiums, preferred services and how they can service better whilst providing substantial information.	27.9%	54.9%	1.3%	2.8%	2.8%	4.1	0.915
Smart phones and the access to internet has also been highly critical in ensuring that information provided by customers is factual and true.	44.9%	38.6%	0.0%	7.9%	8.6%	4.2	0.984

Source: Survey (2020).

gathered in aspect of the mobile applications and the reduction of misrepresented information. (Table 11)

Insurance Companies Mobile Applications Effective in Misrepresented Information Reduction

Table 10.11 shows that 94.6% of the respondents agreed that the mobile applications of insurance companies work effectively to ensure that misrepresented information is significantly reduced. A mean value of 4.8 was attained which shows that the effectiveness of Zimbabwean insurance companies mobile applications ensures the reduction of misrepresented information to a greater extent.

Mobile Applications Notify Clients of Deadlines

From the survey, 80.7% of the respondents agreed that mobile applications notify insurance companies and their clients of the premium deadlines and information which would not have been provided by the client. In the same vein, a mean value of 4.0 was attained which shows that the notification strength posed by Zimbabwean insurance companies' mobile application would ensure a reduction of misrepresented information in the insurance companies to a greater extent.

Mobile Technologies Helpful in Educating Customers about Insurance Fraud

In the same vein, 81.8% of the respondents agreed that, mobile technologies would be helpful in sending direct messages to customers in the process of educating them about insurance fraud. A mean value of 4.0 was attained this shows that mobile technologies advantage of educating customers would ensure the risk of misrepresented information is mitigated to a greater extent.

Mobile Applications Ensure the Effective Collection of Customer Data

Adding on, 82.8% of the respondents of the study agreed that, mobile applications foster the collection of data on customer premiums, preferred services and how they can service better whilst providing substantial information. The analysis obtained a mean value 4.1 which shows that effective data collection with the use of the mobile application would reduce misrepresented information in the Zimbabwean insurance sector to a great extent.

Mobile Technologies Ensures Customers Have Factual and Honest Information

The study also revealed that, smart phones and the access to internet has also been highly critical in ensuring that information provided by customers is factual and true as agreed upon by 83.5% of the respondents of the study. A mean value of 4.2 was gathered from the analysis and this means customer's provision of factual and honest information has the potential to reduce the risk of misrepresented information a greater extent.

Mobile applications as a tool for fraud management

From the above questions, the management pointed out those mobile applications have been effective in ensuring that fraud was management. However, it was found that the usefulness of mobile applications and their perceived ease of use were deterring the effective management of fraud. Below are some of the quotes derived from the interviews:

"Mobile applications are highly effective; however, some clients fail to navigate through the interface of the mobile application. This is giving customers a negative perception about the application and

thus reducing its usage and increasing the prevalence of insurance fraud."

"Some clients do not find mobile applications useful and would rather report to the physical branch. In that case, gathering customer information and monitoring any fraudulent activities with the use of the mobile application becomes. It is imperative for insurance companies to educate their customers about the importance of mobile applications."

The management hinted that misrepresented information in Zimbabwean insurance sector could only be reduced by initially educating customers about the relative advantage of mobile applications, collecting substantial customer data with the use of the mobile applications and ensuring that customers use the application frequently. Below are a few of the statement derived from the interviews?

"Customers do not appreciate mobile applications. For mobile applications to be highly effective in ensuring that misrepresented information is eliminated customers should be concertized. Insurance companies should educate and encourage customers to use mobile applications. The user interface should be simple to navigate and beneficial to the customers. When the aforementioned factors are considered, there would be high traffic to the mobile applications"

"Mobile applications will be very effective in ensuring that the misrepresented information risk is minimized. With increased usage of mobile applications, customers will input critical information on their details, prepayments and other insurance service and usage related information. This data will be critical for insurance companies as they will use it to determine the usage and performance of individuals' insurance products and services. It will also result in easier monitoring of insurance services and mitigation of the misrepresented information."

ANOVA analysis was conducted to determine whether the alternate or null assumption of the fourth hypothesis of the study held true. The section below presents findings obtained from the fourth research hypothesis of the study.

H^4 - There is a significant relationship mobile application and the reduction of misrepresented information.

H^0 - There is no significant relationship between mobile application and the reduction of misrepresented information. (Table 12)

Table 10.12 gives findings obtained from the one-way analysis of variance when the relationship between mobile application and the reduction of misrepresented information was analysed. Findings from the comparison between mobile applications and misrepresented information brought a significant effect of condition 41.02 and a significant value of 0.002. These findings mean there is a significant relationship between mobile application and the reduction of misrepresented information.

Effective measures that can curb Insurance Fraud

Below is a presentation of the qualitative and quantitative findings obtained from the data collection on the last construct of the study. (Table 13)

Client Awareness

As seen in Table 4.10, 81.4% of the respondents agreed that clients should be educated on the insurance fraud, its implication on service delivery and customer relationship management. A mean value of 4.0 was attained which shows that client awareness would ensure the combustion of insurance fraud in the Zimbabwean insurance sector to a greater extent.

Employee Training

It was further agreed by 79.8% of the respondents that insurance

Table 12: Mobile Application and the Reduction of Misrepresented Information.

ANOVA					
Mobile Application and the Reduction of Misrepresented Information					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	295.349	4	45.192	41.024	.002
Within Groups	393.671	265	1.419		
Total	492.105	292			

Source: Survey (2020).

Table 13: Success Measures and Insurance Fraud Reduction.

Statement	SA	A	N	D	S.D	Likert Mean	Std. Dev
Clients should be educated on the insurance fraud, its implication on service delivery and customer relationship management.	9.7%	71.7%	4.4%	5.9%	8.3%	4.0	1.074
Insurance personnel should constantly be trained and developed on insurance fraud, its implications and means to combat it.	34.7%	45.1%	6.7%	4.9%	8.6%	3.8	1.072
Insurance companies should invest in sophisticated technologies that not only safeguard client information but combat insurance fraud.	39.8%	43.9%	3.3%	7.1%	5.9%	4.2	0.925
There is need for insurance companies to assign personnel or a department that investigates and monitors insurance related fraud.	43.9%	38.6%	2.9%	11.1%	3.5%	4.2	1.12
The financial services regulator should come up with a legislature on insurance fraud mitigation.	19.4%	66.8%	8.6%	5.2%	0.0%	4.3	1.05

Source: Survey (2020).

personnel should constantly be trained and developed on insurance fraud, its implications and means to combat it. A mean value of 3.8 was attained from the analysis of the statement; this shows that employee training would ensure that financial fraud is combusted to a great extent.

Investment in Sophisticated Technologies

It was further agreed upon by 83.7% of the respondents that insurance companies should invest in sophisticated technologies that not only safeguard client information but combat insurance fraud. A mean value of 4.2 was attained which shows that investments in sophisticated technologies would ensure that reduction of insurance fraud in the Zimbabwe to a greater extent.

Fraud Investigation Personnel or Department

In the same vein, 82.5% of the respondents of the study agreed that there is need for insurance companies to assign personnel or a department that investigates and monitors insurance related fraud. This was further evidenced by a mean value of 4.2 which was attained and implies that the instatement of fraud investigation departments in Zimbabwean insurance companies would reduce insurance fraud to a greater extent.

Regulative Legislature on Insurance Fraud

It was also agreed upon by 82.6%, of the respondents that financial services regulator should come up with a legislature on insurance fraud mitigation. A mean value of 4.3 was attained which shows that the enactment of a regulative legislature on insurance is predicted to reduce insurance related fraud to a greater extent.

Measures to enhance deployment of innovations in insurance management

From the interview, the management hinted on a few measures that can be taken to ensure innovations are fully incorporated in the insurance. These include training and development, effective communication, mentoring and coaching, workshops with the management, change management, monitoring and evaluation of technology. Below are some of the quotes extracted from the interviews.

"Employees need to be trained and developed. Training will ensure employees know the importance of innovation in the insurance industry. Development assures the organizations that employees are capable of fully utilizing innovation."

"Effective organizational communication is highly critical for the deployment of innovation in insurance organization. The organization will have to adopt a flatter organizational structure that fosters an open-door policy where employees are updated every step of the way."

"Incorporation of innovation means change. Employees are often resistant to change if they feel they are not a part of it. The management should put an effective change management mechanism in place. Employees should be communicated to, understand the need for and desire organizational change. This is highly critical as minimal resistance to change implies that innovations will be successfully adopted in insurance entities."

Inferential analysis was conducted to determine which of the fifth objective either the alternate or null hypothesis held true. The section below presents the findings on the fifth research objective of the study:

H^5 - There is an association between the measures to ensure innovation adoption and the reduction of insurance related fraud

H^0 - There is no association between the measures to ensure innovation adoption and the reduction of insurance related fraud (Table 14)

Table 10.14 presents findings obtained from the one-way analysis of variance (ANOVA) which was used to analyse the relationship between the measures for the innovation implementation and the reduction of insurance fraud. The findings obtained from comparison between conditions showed a significant effect of condition 34.8 and a significance value of 0.000. It is against these findings that the researcher concluded that there is a relationship between the effective innovation implementation measures and the reduction of insurance fraud. This is because an ANOVA coefficient of 0.000 which is lower than the critical value of 0.05 was attained thus denoting the existence of a relationship between variables.

RESEARCH FINDINGS

Below are the summaries of the findings obtained on each research objective of the study.

Block chain Ledger and the Rate of Falsified Claims

Quantitatively, it was found that the block chain creates interlinked and independent information, its information is true, it validates transactions and the information stored in it is irreversible. Block chain was agreed not to require an intermediary when using it, thus highly compatible in ensuring that falsified claims are minimized. Qualitatively, it was found that the block chain technology would be highly useful and highly critical in managing insurance fraud mainly because of information exchange. The inferential analysis also found a statistically significant relationship between the adoption of the block chain ledger and a decrease in the rate of falsified claims as was evidenced by a significance value of 0.000 which was lower than the critical value.

Telematicsand the Reduction of Staged Claims

From the survey, it was gathered that telematics should be

Table 14: Measures for Technology Implementation and Reduction of Insurance Fraud

ANOVA					
Mobile Application and the Reduction of Misrepresented Information					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	239.455	4	34.873	21.935	.000
Within Groups	468.014	326	1.276		
Total	591.832	396			

Source: Researcher (2020).

incorporated in the insurance companies because it uses static demographics, it uses dynamic measures, supports innovative insurance schemes, offers an electronic data exchange and calculates premiums based on static and dynamic measures. Though the management pointed out that telematics would be best adopted after employees are unskilled and rigorously trained, its adoption was also stated to help minimize the risk of staged claims that the sector was highly prone to. This was further evidenced by the confirmation of a relationship between the adoption of telematics and reduction of misrepresented information from the p value of 0.002 that was obtained.

Machine Learning and the Rate of Over Exaggerated Claims

From the quantitative analysis, it was found that, the adoption of artificial intelligence was going to be a critical move towards the reduction of the rate of over exaggerated claims. This is because machine will learn of the fraudulent activities that the insurance sector is highly prone to encounter. Machine learning will show the insurance companies the loopholes in the system that is manipulated by insurance fraudsters. In that case therefore, the incorporation of machine learning will be highly helpful in reducing over exaggerated claims. Inferential analysis revealed the existence of a relationship between the adoption of machine learning and over exaggerated claims as was evidenced by a significance value of 0.003 which was lower than the critical value of 0.05.

Mobile Applications and the Reduction of Misrepresented Information

The respondents of the study agreed that the usage of mobile applications would reduce the risk of misrepresented information. The survey revealed that insurance companies' mobile application would be highly effective because mobile technologies ensure that customers have factual and reliable information. With increased usage of mobile applications, customers will input critical information on their details, prepayments and other insurance service and usage related information. This data will be critical for insurance companies as they will use it to determine the usage and performance of individuals' insurance products and services. Hypothetical testing also revealed that mobile applications would be helpful in reducing misrepresented information as a significance value of 0.002 was attained from analysis.

Effective innovation implementation measures to curb for insurance fraud

The respondents of the study pointed out that insurance companies had to invest in sophisticated technologies, train their employees and educate customers, have a regulative legislature on insurance fraud and instate a insurance fraud unit. The management should put an effective change management mechanism in place. This is highly critical as minimal resistance to change implies that innovations will be successfully adopted in insurance entities. Inferential analysis revealed that the implementation of the critical success factors would curb insurance related fraud as evidenced by significance value of 0.000 obtained.

RECOMMENDATIONS

The following are the recommendations that the study has to proffer in aspect of the main findings of the study.

Client awareness schemes

Insurance companies would have to implement the following:

- Use press releases to educate customers about the types of insurance fraud.

- Have posters and fliers pasted in customer service points of the insurance companies.

- Give customers leaflets and brochures that inform them about the high prevalence of insurance fraud and penalty involved should one engage in such.

- Front line personnel should have direct infomercial with clients where they educate them about insurance fraud.

Training and Development of Employees

The study recommends that insurance companies should embark on the following:

- Continuous training of employees as means of making them understand the need for adopting innovations that combat insurance fraud.

- Employees should also be trained on how to use the innovations that will not necessarily be replacing them but the used as augmentation purpose.

- Employees should be empowered to up skill themselves so they match up to the skills required for the effective incorporation of technology in insurance companies.

- Insurance companies should hold continuous workshops with the management to ensure that the management is in support of the insurance innovations that mitigate the risks of fraud.

Investment in sophisticated technologies

Insurance companies should look into investing in sophisticated technologies with the following features:

- Chat bots: insurance companies should have chat bots on their websites and social media platforms that would be on a 24/7 standby to attend to client queries and complaints. The chatbot should also be programmed to provide information on insurance fraud, its types and ways to minimize it.

- Big Data and Analytics: insurance companies should incorporate big data software in their operations. This will provide information on client behaviour and preferred services. With the use of big data insurance companies would be empowered on how to serve clients better and to create exceptional relationships which lead to loyalty. Usage of the software will also highlight the operational loopholes leading to increased insurance fraud.

Instatement of an insurance fraud unit in insurance companies

Insurance companies should create robust insurance fraud mitigation factors with the implementation of the following:

- Instatement of an Insurance Fraud Unit: insurance companies should have fraud detection units that investigate and detect how insurance fraud transpires. Companies should exchange information on the fraud patterns and its mitigation strategies

- Fraud Reporting Officers: insurance companies should have an individual who is responsible for insurance fraud related matters despite having a unit for that. The individual would have to keep an audit trail of all fraud relating to insurance, information exchanged and progress being made in the elimination of such a risk

REFERENCES

1. Greggs P. Fraud in the Markets: Why It Happens and How to Fight It. Hoboken, NJ: Wiley 2019.

2. Leeds D. Application of machine learning techniques for supply chain demand forecasting. Eur. J. Oper. Res 2018; 184:1140-54.

3. Roberts A.Fraud and the insurance industry: Why don't they do something about it, then? International Journal of Risk Security and Crime Prevention 2019.

4. Iansiti A, Lakhani I. Insurance fraud. J Risk Insur 2017; 69:271-87.

5. Michael E. Porter. National Competitive Advantage in Services. The Competitive Advantage of Nations 2012:239-273.

6. OECD. Distributed ledger technology for the financial industry. OECD Science 2017.

7. FCA. Insurance fraud 2016.

8. Farrar Donald E, Robert R, Glauber. Multicollinearity in regression analysis: the problem revisited. Rev Econ Stat 1967; 49: 92-107.

9. Donald R Cressey. Other Peoples' Money: A Study in the Social Psychology of Embezzlement. Am Sociol Rev 1971; 19:362.

10. Saunders Mark, Philip Lewis, Adrian Thornhill. Research methods for business students 2009.

11. Keith J Crocker, Sharon Tennyson. Insurance fraud and optimal claims settlement strategies. J. Law Econ. 2002; 45:469-507.

12. Abderahman Rejeb, John G Keogh, Horst Treiblmaier.How Block chain Technology Can Benefit Marketing: Six Pending Research Areas. Frontiers in Block chain 2020.

13. Dwane Hal Dean. Perceptions of the ethicality of consumer insurance claim fraud. J. Bus. Ethics 2004; 54:67-79.

14. Georges Dionne, Robert Gagné. Replacement cost endorsement and opportunistic fraud in automobile insurance. J. Risk Uncertain 2002; 24:213-30.

15. Denzin S, Lincoln P. Qualitative and evaluation methods 2000.

16. Dixit A, Nalebuff B. Game Theory 1960.

17. Strain differential association and coercion: insights or the criminology literature on causes of accountant's misconduct. Accounting and the Public Interest 2008; 8:1-20.

18. Kahina Khacef, Guy Pujolle. Secure Peer-to-Peer communication based on Block chain. Adv. Intell. Syst. Comput. 2019:662-72.

19. Petraşcu Daniela, Tamaş Attila. Internal audit versus internal control and coaching. Procedia Economics and Finance 2013; 6:694-702.