

Sleuthing of Tax Fraud in Small and Medium Enterprises (SMEs) in Nigerian using an Intelligent System: Investigative Study

C. I. Akobundu¹, M. S. Julius², G. N. Nkanyi³, G. C. Abanobi⁴ and G. C. Chieme⁵

^{1, 2, 4}Evangel University, Akaeze/Computer Science Department, Ebonyi State, Nigeria
Email: chinyerekingsleyfavor@evangeluniversity.edu.ng, {Julius.michael, guzorochiabaniobi}@evangeluniversity.edu.ng
^{3, 5}Anambra State Polytechnic, Mgbakwu/ Computer Science Technology Department, Anambra State, Nigeria
Email: {diogonkanyi, gabchieme}@gmail.com

Abstract—Tax fraud has eaten deep into Nigerian's economy especially in Small and Medium Scale Enterprises (SMEs) been a subset of the industrial sector. The estimates regarding tax fraud at the international level reveals that Nigeria is one of the developing countries with a high level of tax fraud. The negative effect of this on the nation is quite evident as Nigeria as a nation had in the past depended majorly on oil giving less concern on tax as a source of revenue generation but lately, the oil sector is not booming as previous, which calls for urgent reinstatement of the tax sector which is one of her enormous sources of revenue generation. This research focuses on the detection of fraudulent activities in Small and Medium Enterprises (SMEs) in Nigeria using an intelligent data mining system. The intelligent system directly accesses the database of the SMEs tax payers and flows whistle whenever a fraudulent activity is suspected. This intelligent is built using Artificial Neural Network (ANN) for the reasoning and Supervised Learning Technique (SLT) for the learning. The investigative stage shows that it is highly exacerbating for those persons faithfully paying their taxes because it is deducted from source (like salary earners), enjoy same amenities provided by the government through the generated tax revenue and most projects are abandoned and borrowing becoming the order of the day in Nigerian government because of lack of fund which can also be alternatively generated when the tax sector is properly handled by implementing the proposed intelligent system.

Index Terms— Tax Fraud, SMEs, Intelligent System, Detection.

I. INTRODUCTION

Nigeria government, just like others countries has her sources of income because, the government needs money to fulfill her obligations to her citizens. Different countries for instance, in Africa, Ghana has cocoa, gold, and oil and gas as the major sources of its Gross Domestic Product (GDP). On the other hand, South Africa has gold; Cote d'Ivoire is known for its cocoa, gold and elephant pursk, which constitute its major sources of revenue, whereas, Cameroon is noted for its timber, oil and gas and hides and skins. Equatorial Guinea has exports mercury (often known as liquid gold) and Agricultural products. Nigeria is not left out, as she is also blessed with oil and gas, agricultural produce (groundnut, coco, cotton, hides and skin, cashew nuts. In North America, the United States relies on technology (weapons, automobiles, aircrafts, ships and trains), Agriculture, and Consulting for its revenue. In a similar vein, Canada's revenue, to a large extent, comes from its technology with war equipment, ships, trains and aircrafts ranking among the top contributors to its GDP. In Europe, Italy is noted for its gold, hides and skins (bags, belts and shoes) and finished produce of cotton (cloths). Switzerland

generates much of its revenue from gold, diamond and steel. Germany's GDP is rooted in its high technology that encompasses industrial automation and machines, electrical equipment, musical instruments, home appliances as well as medical products. England also has high content technology in automobiles, electronics, power-generating machines and consumer goods. The Asian tigers are popular and have remained forces to reckon with in the global economy. Japan in eastern Asia, is famous for its just-in-time quality technology with emphasis on automobiles, consumer electronics, and robots. China is the second-largest economy in the world and projections are there that it may assume the largest economy in the world within the next 10 years. Its GDP comes from technology spanning across almost all domains and ranging from medicals, computing, agriculture, consulting, education, consumer products, etc. India's economic growth has been consistent in the last two decades with computing, software, consumer electronics, medicals and para-medicals, constituting a major source of its GDP.

In addition to these diverse sources of income to the government, taxation is considered a veritable source of revenue for financing developmental as well as people oriented programs in virtually all countries, their socio-political status notwithstanding [1]. The continuous growth and development of every country is dynamic and requires consistent and sustainable source of revenue to enable them fulfill their constitutional mandates. Tax is a gigantic source of revenue generation but tax fraud lays as a monster to destroy its potentials. Tax is a compulsory amount of money paid to the government by her citizens, which is used to provide the social needs of the citizens. The capability of a government to generate revenue from her citizens, opens up opportunities for her to provide services and improve the economy[2].

Tax fraud refers to tax evasion, avoidance and other forms of tax sabotages. In Nigeria, the people that fulfill their tax obligations are majorly government workers and some company workers because their tax is been deducted at source before they receive their net pay [3], while the social amenities that are dig up from the revenue generated are been enjoyed by all. The challenge is what can be done to harness the huge amount of money lost to tax fraud especially to the SMEs. An intelligent system is an unaffordable clarion call towards this sturdy objective.

II. REVIEW OF RELATED LITERATURE

Dilip having seen the unarguable importance of tax to bursting and sustaining a country's revenue generation stated in his article incentive reforms in developing country that some countries have effective tax administrations and elements of these systems can be replicated elsewhere[4]. The system of tax administration in Nigeria can also be improved to burst the country's revenue generation for meeting the basic governmental responsibilities for the citizens. Nigeria has depended majorly on the oil sector for her revenue generation over the years, neglecting the tax activities but the situation of things has changed as her oil sector is not as booming as years back and her overlook of tax revenue generation has made her lose substantial amount of her revenue due to fraudulent activities in the tax sector. This is alarming as individuals have gained deception devise such as unethical and illegal representations in tax sector leading to tax evasion and tax avoidance.

In the year 2017, Nigerian government having realized the importance of tax in bursting the country's revenue generation and millions she loses annually because of tax fraud, set up a minimum of 3,700 tax force under its policies of the economic, employment and social development arenas employed volunteers known as Npower tax who will work as a community tax liaison officers to work in their states of residence with the state's tax authorities. The Npower community tax liaison officers have the following key responsibilities which include: answering online inquiries, customer management, creating awareness of tax compliance[5]. Despite the stringent actions most individuals they try in some cases to avoid payment of taxes and in other extreme cases, evade taxes [6,7].

The SMEs are more prone to this bug described as tax fraud as despite the widespread of SMEs all over the country, there is a big challenge with their compliance on tax payment as study as shown that it is at that subset of industrial sector, that to find more tax evasion and tax avoidance. It is a well known fact that the revenue generated from the taxation of individuals and businesses commonly known as small and medium scale enterprise (SME) in Nigeria is an important stream of income for the government but tax compliance among SMEs is poor[8].

The America's government agency responsible for tax collection and tax law enforcement indicates that it is often defined as an International wrong doing on the part of a Taxpayer with the specific purpose of evading tax known or believed to be owing [9], or omits from a return any sum which should have been included, making any false statement or entry in a return and also making false statement in connection with a claim for any deduction or allowance [10].

Fraud detection is becoming a central application area for knowledge discovery in databases, as it poses challenging technical and methodological problems, many of which are still open. A major task in fraud detection is that of constructing models, or profiles, of fraudulent behavior, which may serve in decision support systems for preventing frauds [11]. Data mining is a technique widely used in fraud detection because it has served as an effective tool in identifying frauds. Data mining is defined as a sophisticated data search capability that uses statistical algorithms to discover patterns and correlations in data [12].

III. METHODOLOGY

A. The structure of the present SMEs tax payment system in Nigeria

Figure 1. The structure of the current tax system in SMEs in Nigeria

This system is highly prone to tax fraud in the following notable ways: in the side of the taxpayer: failure to make returns of income to relevant tax authority, false/incorrect statement of return of income, failure to keep records as directed by the law, failure to comply with the requirements of the notice of assessment sent to the tax payer, failure to pay the assessed sum of money unlawfully, and Assist (aid abed) in tax aviation. On the side of tax administrator, fraudulent acts such as collecting of tax and withholding it, demand excess of the amount assessed, make a false return after collecting money and embezzlement of the money in custody is also found.

The proposed system comprises of three (3) components (modules) namely:

These different modules are interlinked for sole purpose of registering a tax payer, generating of unique number for each payer and spawn the tax payable by the tax payer and validating any payment made. While the intelligent module relates with the database directly, thereby scouting on the transactions in order to detect fraud in tax payment which can be as a result of tax squashing or diversion.

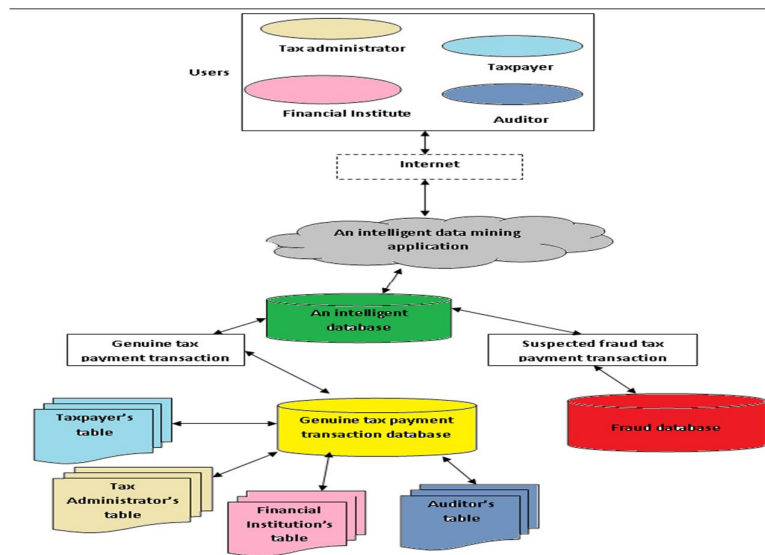


Figure 2. The Structure of the Intelligent System

C. The Description of the Intelligence

The intelligent aspect of the proposed system stands as a secret agent, which sits secretly within the system, relating directly with the database for the purpose of spying on the transaction activities in the system in order to ascertain and blow a whistle when there is an act of fraud. As an intelligent system, it is trained using a data mining model and for every transaction, a unique transaction reference code is generated with the detailed information of the tax payer attached.

D. Data Mining Tool Depiction

The system is proposed to adopt the Artificial Neural Network (ANN) for the reasoning aspect of the intelligence and the Supervised Learning Technique for the training of the engine (i.e. profiling of known data to the knowledge base).

IV. FINDINGS

A. Types of Tax Frauds

There are different types of tax frauds detectable which are prevalent in Nigerian tax system which includes both the tax payer and the tax administrator. The types of tax fraud include but not limited to the following:

- i. Under declaration of tax payer's Income thereby leading a reduced income tax payable.
- ii. Stick: this is a case where the tax administrator underreports tax evasion in exchange for a bribe.
- iii. Carrot: the tax collector retains a certain fraction of additional revenue generated within a specific period.
- iv. Making an exaggerated amount of deductions
- v. Asserting personal expenses as part of the business expenses.
- vi. Obstinate failure to pay income tax also known as tax avoidance
- vii. Another kind of Tax Fraud is using fudged tax number (i. e. fake number) to claim payment of tax.

All there aforementioned Tax Frauds rub the government huge amount of money incessantly and indirectly contributes to the bankruptcy of a government, so any form of tax fraud is punishable by law because it is seen as a criminal act.

B. General Tax Fraud Equations

To get the general equation of tax fraud, let us consider a tax payer with factual gross income of g with a tax rate t which is constant, tax payable will be tg , therefore for a true report, the net income N is as seen in equation 1.

$$N = g - tg \dots \dots \dots 1$$

TABLE I. TAX FRAUD TABLE

S/N	CODE	NAME OF TAX FRAUD	DESCRIPTION
1.	001	Under reporting	The tax payer declares less of the gross income.
2.	002	Stick	Tax administrator underreports tax evasion in exchange for a bribe
3.	003	Carrot	Tax administrator retains a fraction of additional revenue generated within a given period.
4.	004	Exaggerated Deduction	The taxpayer makes high claims of tax deductions.
5.	005	Asserting Personal Expenses	The taxpayer influences personal expenses as part of business expenses
6.	006	Tax avoidance	Obstinate failure to pay income tax
7.	007	Use of fake tax number	Using someone's tax number or fudging a tax number.

Suppose the tax payer underreports his/her gross income by amount e , and both the taxpayer and tax collector responsible for return seek to maximize their expected net incomes (meaning that they are risk neutral), then taxpayer voluntary pays a tax of $t(g - e)$ instead of tg bring his/her net income to see equation 2

$$N = g - t(g-e) \dots\dots\dots 2$$

There is a probability p that the tax collector will detect the evasion through an audit. When an evasion is discovered, the tax administrator reports the underreported amount of d . This assesses the taxpayers true gross income as $(g-e)+d$, and the tax payable as $t(g - e) + td$.

Penalty at a constant rate f on the amount of income concealed is eventually imposed on the taxpayer, hence the taxpayer pays back taxes and penalty totaling the expected present value of $td + df$.

The total tax payable by tax fraud is therefore given as

$$t(g-e+d)+fd \dots\dots\dots 3$$

And the net income taxpayer with tax fraud will amount to:

$$N = g - (t(g-e+d)+fd) \dots\dots\dots 4$$

V. CONCLUSION

The incessant tax fraud found in SMEs subset of the industrial sector of Nigeria calls for an urgent solution. This research carried out an investigative study on using an intelligent system in the form of data mining to apprehend this high challenge. The prevalent tax payment method in this subset of the industrial sector as found in the research shows that it promotes the fraudulent act, but the proposed intelligent data mining model if implemented would monitor the payment system and blow whistle where fraud is suspected. Then the auditor follows up from there for the next line of action. All is geared towards harnessing the money lost to fraud in Nigeria for improved economic development.

In no doubt the impact of this system would be felt highly because it would help the government improve the fiscal control efficiency with the new approach developed using data mining process, improve the revenue generated by government which will in-turn improve the social amenities provided by the government, support growth and development in Nigeria thereby attracting foreign investors to Nigeria, promote the integrity of private companies and also an added advantage when seeking contracts from government, bring to the consciousness of tax payers (individuals) the need to abstain from tax fraud and expose fairly the conduct of tax payers for easy auditing by the auditors.

It would interest us to know that this is part of a big work on tax fraud detection using an intelligent system which is on development process, the researchers are currently working tirelessly to the full development and implementation of this intelligent system to save our country from unnecessary money lose.

REFERENCES

- [1] Cornelius, M. O., Ogar, A., and Oka F. A., The Impact of the Tax Revenue on Economic Growth: Evidence from Nigeria. *International Organisation of Scientific Research – Journal of Economics and Finance (IOSR-JEF)*, Vol. 7, Issue1, pp 32 – 38. Jan-Feb, 2016.
- [2] Oxfordbusinessgroup.com
- [3] Kennedy Prince Modugu and Alade Sule Omoye “An Appraisal of personal income tax evasion in Nigeria” *Asian Economic and Financial Review*, 2014, 4(1): 33-40.)
- [4] Mookherjee, Dilip. “Incentive Reforms in Developing Country Bureaucracies Lessons from Tax Administration.” (1997)
- [5] www.npower.gov.ng
- [6] Bukar, K (2004). Are Nigerians ready to pay tax? *BBC News*, <http://newsvote.bbc.co.uk/mpapps/pagetools/print/news.bbc.co.uk/1/hi/world/africa/461412>, assessed on 6th September, 2004.
- [7] Omoigui, I. (2004). Are Nigerians ready to pay tax? *BBC News*, <http://newsvote.bbc.co.uk/mpapps/pagetools/print/news.bbc.co.uk/1/hi/world/Africa/461412>, assessed on 6th September, 2004.
- [8] Ojochogwu, W. A., and Stephen, A. O., Factors That Affect Tax Compliance Among Small and Medium Enterprises (SMEs) in North Central Nigeria. *International Journal of Business and Management*, Vol. 7, issue 12, June, 2012.
- [9] IRS, [irm_25-001-001.html](http://www.irs.gov/irm/part25/irm_25-001-001.html) (IRS Fraud Handbook), 23 January, 2014. https://www.irs.gov/irm/part25/irm_25-001-001.html. retrieved 26th May, 2020
- [10] Chu, Y. Combating Tax Fraud, 1st February, 2012. <https://www.imf.org/external/np/seminars/eng/2012/asiatax/pdf/chu.pdf>. retrieved 26th May, 2020.
- [11] Bonchi F., Giannotti F., Mainetto G. and Pedreschi D., Using Data Mining Techniques in Fiscal Fraud Detection. 369 - 376. 10.1007/3-540-48298-9-35
- [12] Harry Newton, *Newton’s Telecom Dictionary*. CMP Books, <http://www.cmpbooks.com>
- [13] Cesar, P. L., Maria, J. D. R. and Sonia deLucas S., Tax Fraud Detection through Neural Networks: An Application Using a Sample of Personal Income Taxpayers. [MDPI], *Future Internet*, 2019, 11, 86. www.mdpi.com/journal/futureinternet.
- [14] Okoro F. M., Oshoiribhor E. O. and John-Otumu M., A Framework for Detecting Fraudulent Activities in Edo State Tax Collection System Using Investigative Data Mining. *International Journal of Artificial Intelligence and Applications (IJAIA)* vol. 7, issue 3, May, 2016.
- [15] Pamela C. G. and Juan D. V., Characterisation and Detection of Taxpayers with False Invoice Using Data Mining Techniques. *Expert System with Applications* 40(2013), 1427 – 1436. www.elsevier.com/locate/eswa