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Case Study of Nyarugenge District

Management Control Instruments

Highlights

Rapid Impact on Savings Banks

Selling Price Across Supply Chain

Discovering Thoughts, Inventing Future

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Digitalization and its Rapid Impact on Savings Banks in Germany

By Carsten Giebe & Kevin Schulz
Szent István University

Abstract- The German banking industry is facing major challenges due to digitalization. The digital transformation is significantly influenced by technological progress, tighter regulation and low-interest phases. The market entry of fintechs and changing customer behaviour is also a reality. To meet the challenge of the digitalization and to to reduce costs, savings banks are increasingly turning to mergers, staff cuts and branch closures. The purpose of this research is to investigate the impact of digitalization on German savings banks. Through an explorative literature review, scientific sources and real KPIs of savings banks in Germany were used. The impact of digitalization on savings banks in the period 1999 – 2018 was investigated using the study situation and the analysis of key business figures. The aim is to answer whether the cost-cutting actions of savings banks are justified from an economic point of view based on the KPIs operating result, cost-income ratio and return on equity. In recent years, it has become clear that German banks lack a clear strategy. The results may be of interest to researchers dealing with the digital transformation of savings banks in Germany.

Keywords: *savings banks | digital transformation | digitalization | german banking system.*

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Digitalization and its Rapid Impact on Savings Banks in Germany

Carsten Giebe [α] & Kevin Schulz [σ]

Abstract- The German banking industry is facing major challenges due to digitalization. The digital transformation is significantly influenced by technological progress, tighter regulation and low-interest phases. The market entry of fintechs and changing customer behaviour is also a reality. To meet the challenge of the digitalization and to to reduce costs, savings banks are increasingly turning to mergers, staff cuts and branch closures. The purpose of this research is to investigate the impact of digitalization on German savings banks. Through an explorative literature review, scientific sources and real KPIs of savings banks in Germany were used. The impact of digitalization on savings banks in the period 1999 – 2018 was investigated using the study situation and the analysis of key business figures. The aim is to answer whether the cost-cutting actions of savings banks are justified from an economic point of view based on the KPIs operating result, cost-income ratio and return on equity. In recent years, it has become clear that German banks lack a clear strategy. The results may be of interest to researchers dealing with the digital transformation of savings banks in Germany.

Keywords: savings banks | digital transformation | digitalization | german banking system.

I. Introduction

Due to the current spread of the Coronavirus, economic activity around the world is significantly affected. According to Michel et al. (2020), it seems almost inevitable that the German economy will plunge into recession. However, the possible course and severity of the effects are unclear. The fact is that the uncertainty is reflected not least in the financial markets. Since the beginning of the pandemic, strong price losses and simultaneous implicit volatility have been recorded. The latter is often interpreted in the research literature to measure economic uncertainty (Michelsen et al., 2020).

Some banks that were already on shaky ground before the crisis may not survive the pandemic. The cost-income ratio, an important indicator of the efficiency of institutions, has deteriorated almost continuously over the past 15 years. This is not only due to declining earnings, but also to rising operating costs. In addition, digitalization is putting the business models of traditional banks to the test. According to Röseler, the Executive Director of Banking Supervision, German banks must cut their costs much more rigorously if they want to be competitive in the long run. The pandemic acts as an accelerator here (press release Federal Financial Supervisory Authority, 2021).

The German banking system traditionally consists of three pillars, private sector banks, savings banks and cooperative banks (see Figure 1). This structure makes the German banking system unique, only the Austrian banking system has a similar structure in Europe (Behr & Schmidt, 2015; Frank et al., 2014; Komorowski, 2020). The focus of this research paper is on the German savings banks (Pillar 02).

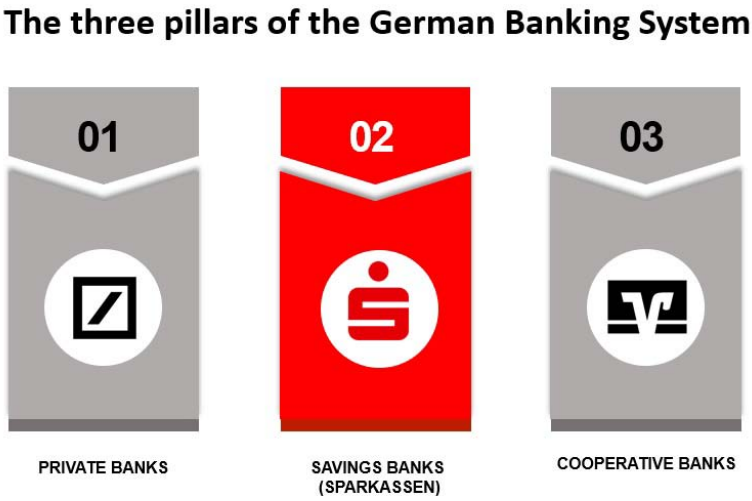


Figure 1: Own representation of the "German Banking System"

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Changing customer expectations, new competitors and a strong big technological change are influencing the banking market in Germany. We live in a working and living environment characterized by automation and digitalization. As a technical revolution, this also encompasses many areas of the savings banks. Digitalization is a priority in order to be able to ensure that we can catch up in terms of "digital skills" and not miss the boat. To realize their ambitions, savings banks are therefore well advised to create the necessary internal conditions for digital transformation. Today's banking services must be benevolently examined for feasibility, then embedded in processes and suitable technical architectures. A higher level of automation can reduce costs and open up further data sources (Damaschke & Giebe, 2020).

II. Literature Review

An exploratory literature search was conducted to find sources on the impact of digitalization on savings banks in Germany. The studies on savings banks in the age of digitalization are rudimentary.

The results of the literature search can be divided into four headings. The first heading contains the necessary data needed to study savings banks. These are data sets such as the number of savings banks, the number of branches, the number of employees as well as business management KPI's. The second section deals with the German banking market and the savings banks in Germany. Examples include the authors Behr & Schmidt (2015), Conrad et al. (2017), Damaschke & Giebe (2020) and Fischer & Arz (2016). In essence, a drastically changed situation for the savings banks, a low-interest rate level, changed competition and massive cost-cutting measures could be researched. The third category of literature deals with the digitalization of banks and savings banks. The authors Drummer et al. (2016), Giebe (2019), Henke et al. (2016), Komorowski (2020) and Sebastian et al. (2017) should be mentioned as examples. In the articles of the authors listed, it was possible to research that the digital transformation has also arrived in banks and savings banks. On the other hand, the urgent need for a strategy could be deduced. The fourth and last section of the literature research deals with other topics such as omnichannel management, brand or VR devices. Menrad (2020), Hammerström et al. (2019) and Zwerenz (2019) should be mentioned here as representatives to enable a discussion within the framework of this research.

III. Research Gap and Research Question

In their 2007 paper "The Impact of Bank Mergers on Efficiency: Empirical Evidence from the German Banking Industry", Georgiev & Burghof examine the impact of mergers on business efficiency (Georgiev & Burghof, 2007). This does imply the use of similar metrics as in this research. However, it can be noted that the research question is different from the focus on mergers. Furthermore, it can be noted that the working paper uses the time series 1991 - 2004, which allows for a research gap in terms of timeliness.

Based on the described research gap, the authors formulate the following research question:

Are the cost-cutting activities such as branch closures and staff reductions due to the rapid impact of digitalization of savings banks in Germany economically justified about the present operating result, cost-income ratio and return on equity?

IV. Hypotheses and Methodology

To answer the research question quantitatively, the following data on Statista (https://de.statista.com/) was used for our research and was narrowed down to the common period 1999-2018. In addition to the number of individual savings banks, branches and employees, real KPIs were used in this research. Specifically, we looked at operating profit, cost-income ratio and return on equity. The operating result usually describes the result from ordinary business activities. The cost-income ratio describes the cost-income ratio in the operational business of the savings banks and provides information on efficiency. The lower the cost-income ratio, the more efficiently the savings banks operate. The return on equity describes the result (net income after taxes) about the equity capital employed.

- Number of savings banks in Germany
- Number of branches of savings banks in Germany
- Number of employees of savings banks in Germany
- Operating income of savings banks in Germany
- Return on equity after taxes of the savings banks in Germany
- Development of the cost-income ratio of savings banks in Germany

The software R was used to evaluate the data. The vizualisations were generated in Python.

The following hypotheses were made:

1st hypothesis:

H_1: The operating profit of savings banks in Germany has changed statistically significantly in the years 1999-2018 due to digitalization.

2nd hypothesis:

H_1: The cost-income ratio of savings banks in Germany has changed statistically significantly in the years 1999 - 2018 due to digitalization.

3rd hypothesis:

H_1: The return on equity of the savings banks in Germany has changed statistically significantly in the years 1999 - 2018 due to digitalization.

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Descriptive analyses

The number of institutes has decreased by about 34% over the entire period under consideration, from 587 in 1999 to 386 in 2018 (see Figure 2). The monotonic decrease is significant with a rank correlation coefficient of -1 and unbroken up to and including 2018. This reflects a long-lasting phase of consolidation.

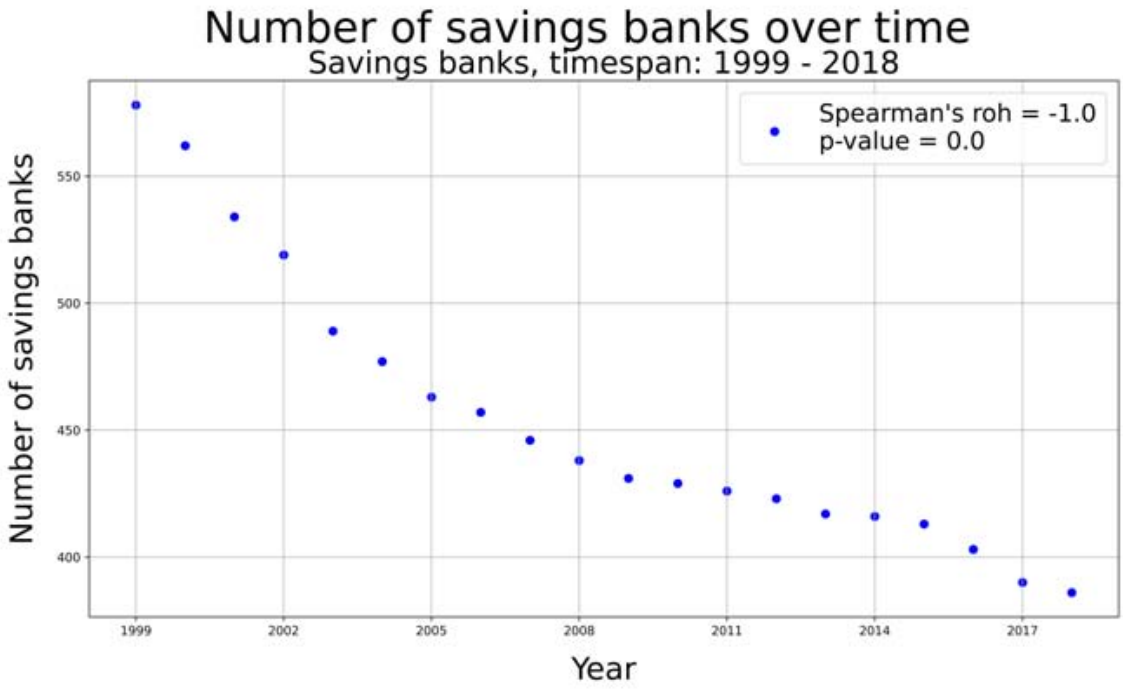


Figure 2: Own representation of the "Number of savings banks"

The consolidation of the savings banks is accompanied by a consolidation of the bank branches (see Figure 3).

Over the entire period under review, the branches were reduced to a similar extent as the institutions. With shrinkage of approx. 46%, this development is even more pronounced and affects the institutions that were still active on the market until 2018.

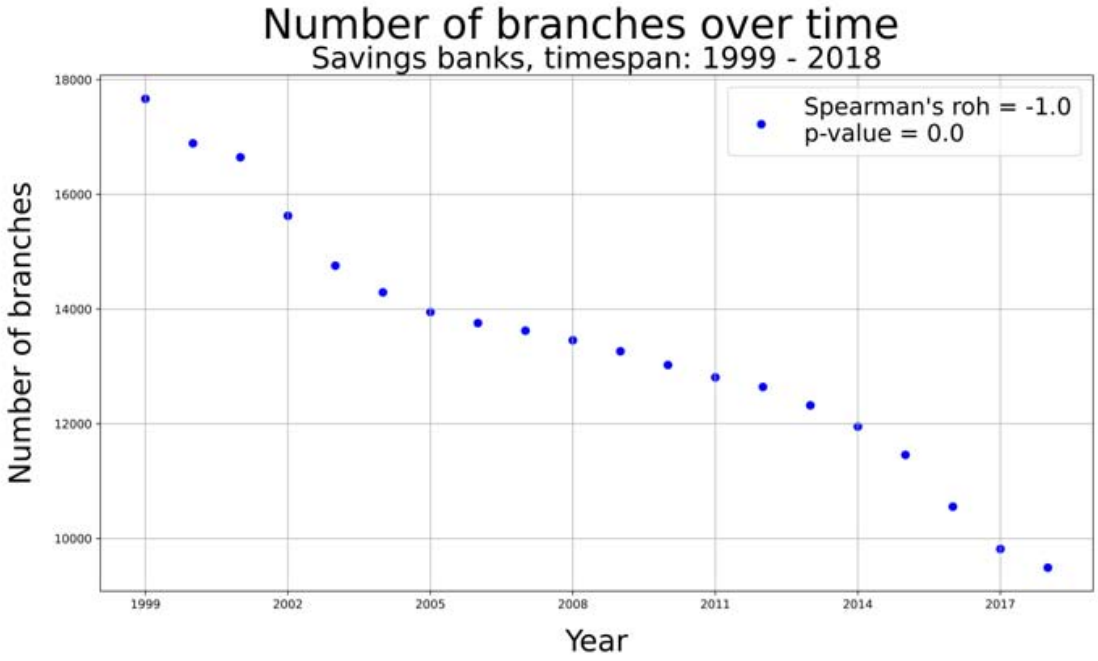


Figure 3: Own representation of the "Number of branches"

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The number of employees has developed quite analogously (see Figure 4). Here, too, there is a very clear monotonous decline, which continued at an accelerated pace from 2015 onwards.

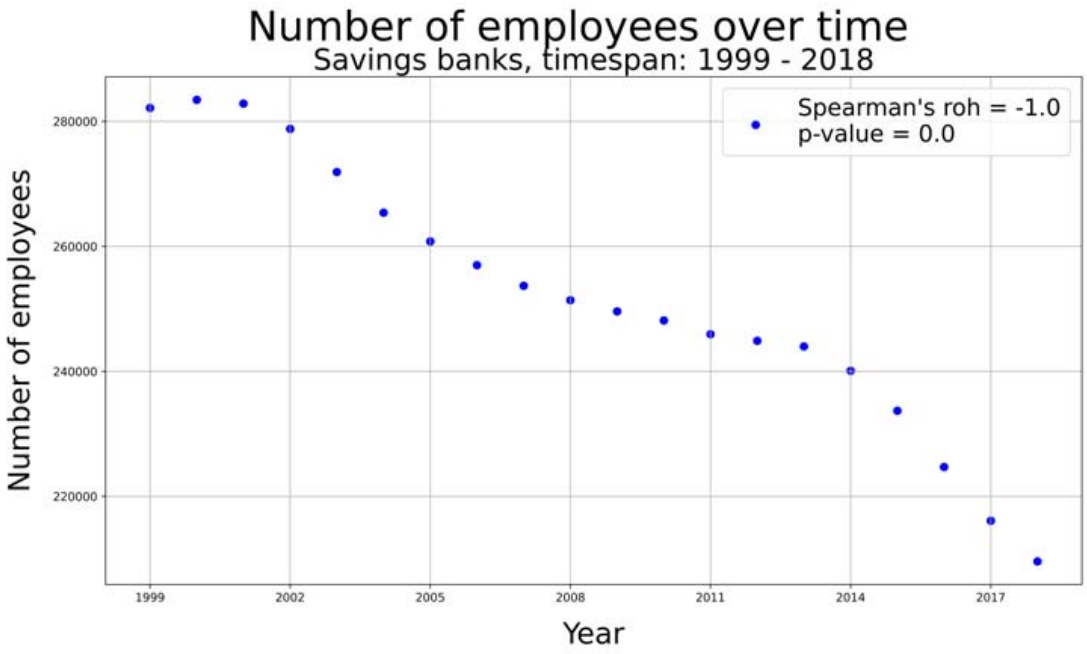


Figure 4: Own representation of the "Number of employees"

The similar trends in the number of institutions, branches and employees in the period under review from 1999 to 2018 are reflected in a high correlation between them.

	Number_of_institutes	Number_of_branches	Number_of_employees
Number_of_institutes	1.0000000	0.9623245	0.9312817
Number_of_branches	0.9623245	1.0000000	0.9842132
Number_of_employees	0.9312817	0.9842132	1.0000000

They express cost reduction measures in the savings banks finance group and are henceforth combined into one factor "cost reduction measures".

For this purpose, three factors are formed by linear combinations with the help of a Principal Component Analysis (PCA).

Importance of components:

	PC1	PC2	PC3
Standard deviation	1.7037	0.29264	0.10858
Proportion of Variance	0.9675	0.02855	0.00393
Cumulative Proportion	0.9675	0.99607	1.00000

The first factor PC1 already explains more than 95% of the variance and combines the statistics "number of institutions", "number of branches" and "number of employees". Consequently, we interpret this factor as a global measure of the cost reduction measures.

Inductive analyses

Methodology

A linear regression model is used to examine the operating ratio, cost-income ratio and return on equity to see whether they changed significantly during the period under review. If this is the case, a second linear regression is used to determine the influence of the cost-cutting measures on these KPIs to determine if a significant influence can be said to exist. The significance level is set to alpha = 0.05.

To take the time series character of the data into account, the tests are carried out with a HAC estimator (heteroskedasticity and autocorrelation consistent). The analysis of the residual plots justifies this methodological approach, since heteroskedasticity and autocorrelation of the residuals are present.

Statistical tests

The operating result of the savings banks fluctuated strongly between 1999 and 2018. For example in 2008 – during the global economic crisis –

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the operating income fall back to the level of the year 2000. However, the operating result grew with a clear upward trend until 2018 (see Figure 5).

To distort the results of this analysis by an outlier, the operating result from 2011 was excluded from the analysis of the significance of this trend.

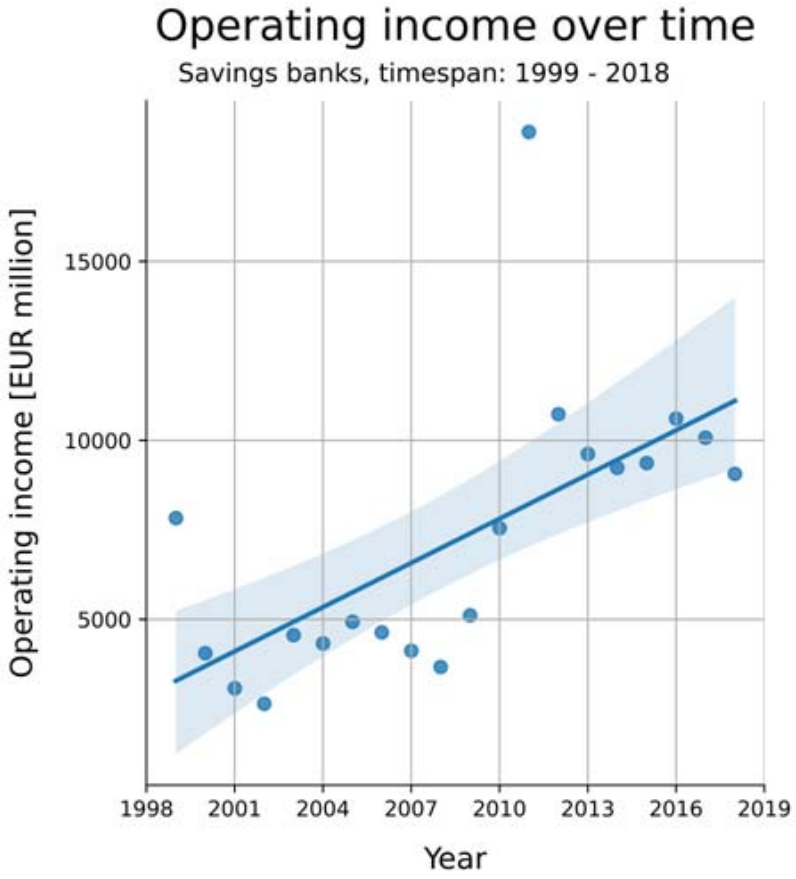


Figure 5: Own representation of the "Operating income"

On average, the operating result of the entire savings banks finance group grew by approximately 370 million euros per year between 1999 and 2018. The significance of the increase can be seen in the p-value $0.003341 < 0.05$ of the explanatory variable Year.

```
t test of coefficients:

              Estimate  Std. Error t value  Pr(>|t|)
(Intercept) -736760.089  166327.055 -4.4296 0.0003671 ***
Year            370.127      82.735  4.4736 0.0003341 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

The influence of the cost reduction measures on this increase is later analyzed.

When looking at the residual plot, the autocorrelation of the residuals in the form of a periodic curve is striking (see Figure 6). The HAC estimator takes this anomaly into account.

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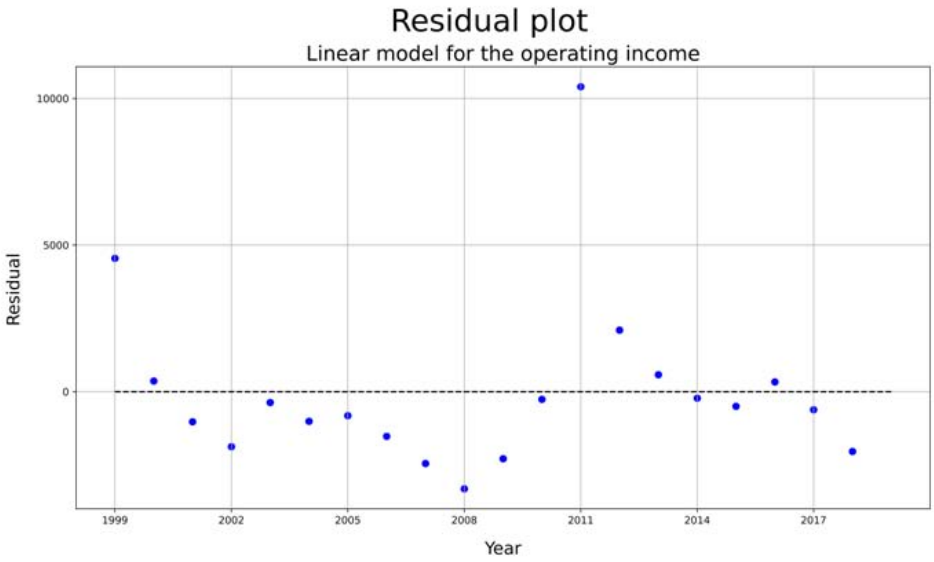


Figure 6: Own representation of the "Operating income" (Residual plot)

The return on equity also fluctuated strongly during the period under review. It reached a temporary minimum in 2008, then recovered again until 2010 and oscillated until 2018 (see Figure 7).

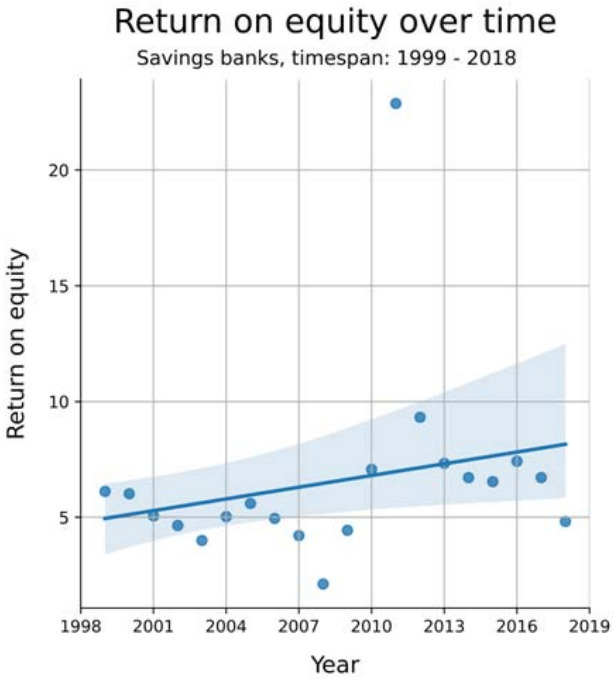


Figure 7: Own representation of the "Return on equity"

Again, the year 2011 is treated as an outlier and thus removed from the analysis.

The return on equity did not change significantly during the period under review, as shown by the p-value 0.07677 > 0.05. Consequently, this KPI is excluded from further analysis.

```
t test of coefficients:

              Estimate  Std. Error t value Pr(>|t|)
(Intercept) -205.445576  112.019049 -1.8340  0.08422 .
Year           0.105129    0.055798  1.8841  0.07677 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```


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The residual plot shows an autocorrelation of the residuals and also a weak form of heteroskedasticity (see Figure 8). The heteroskedasticity shows up as an increasing dispersion of the residuals, which leads to a funnel-shaped residual distribution. This anomaly is also taken into account by the HAC estimator.

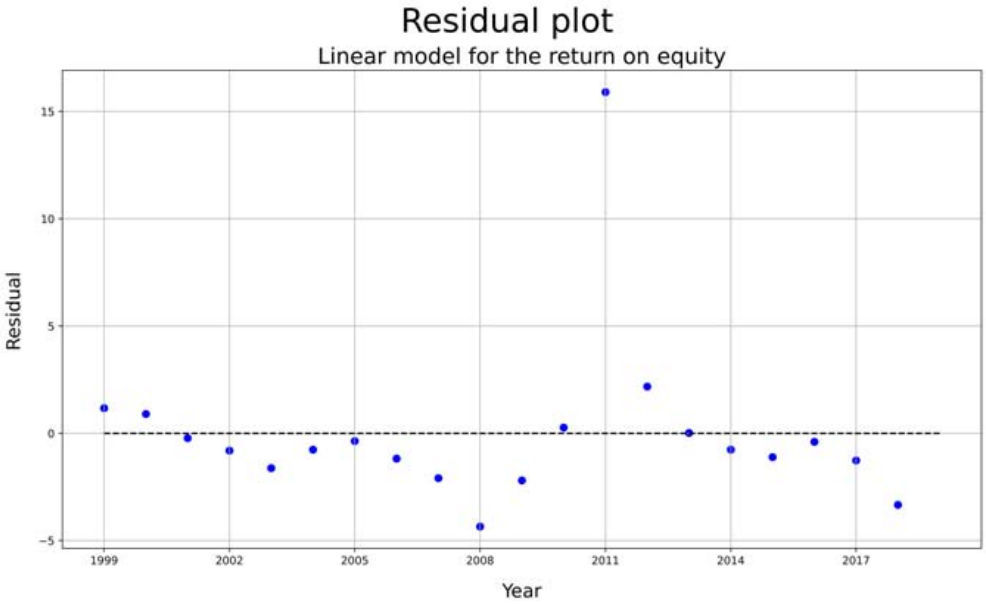


Figure 8: Own representation of the "Return on equity" (Residual plot)

The cost-income ratio also fluctuated strongly throughout the entire period under review (see Figure 9).

A clear trend, whether positive or negative, is not discernible. Here, The year 2008 is not considered an outlier in this time series, since it appears inconspicuous. Instead, a sharp drop in the cost-income ratio occurred with a time lag of two years in 2010, where it fell to the lowest level in the period under review.

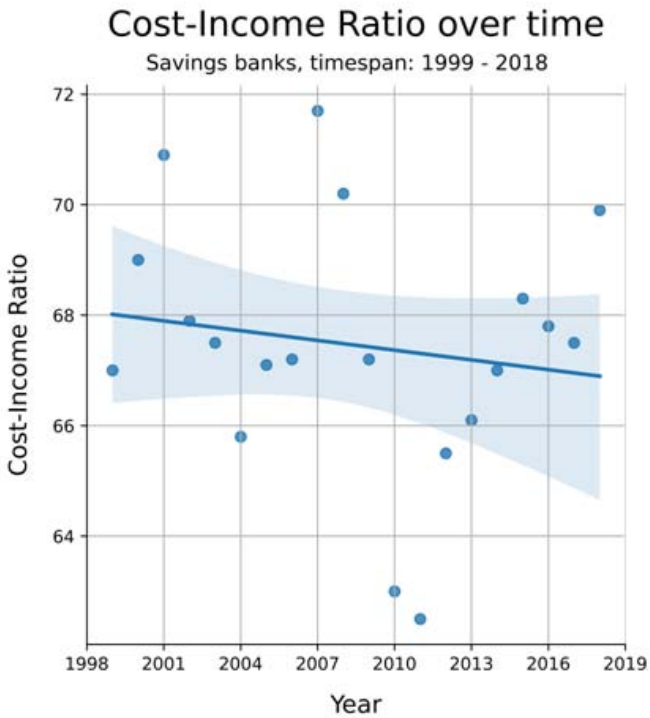


Figure 9: Own representation of the "Cost-income ratio"

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The cost-income ratio did not change significantly during the period under review.

The p-value 0.5085 is greater than alpha = 0.05. Consequently, no further analysis is carried out for this KPI either.

```
t test of coefficients:

             Estimate Std. Error t value Pr(>|t|)
(Intercept) 185.699774 174.862382  1.0620   0.3023
Year         -0.058872   0.087269 -0.6746   0.5085
```

The residual plot reveals the autocorrelation of the residuals and again confirms the use of the HAC estimator (see Figure 10).

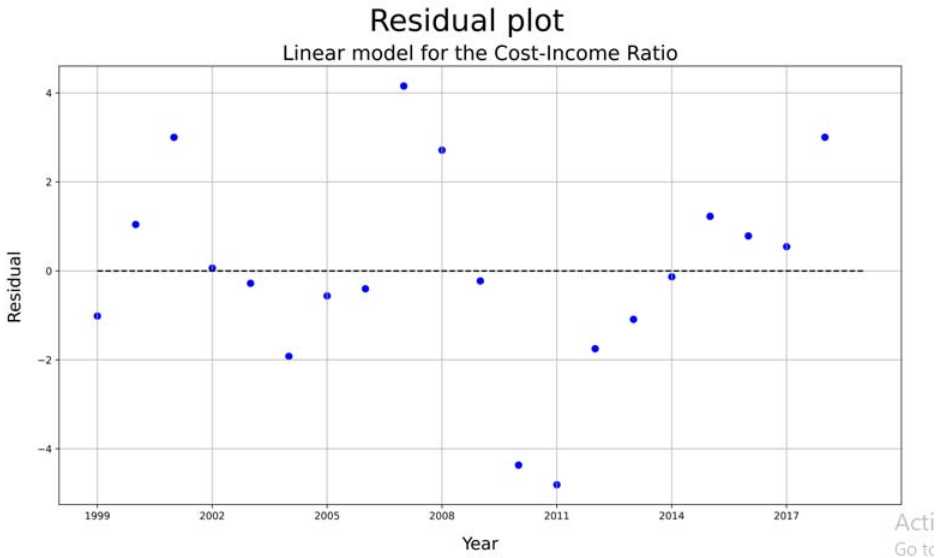


Figure 10: Own representation of the "Cost-income ratio" (Residual plot)

Only the operating result has changed significantly from 1999 to 2018. It is analyzed whether the cost reduction activities are significantly related to the increase in operating profit. The factor cost reduction measures (PC1) from the Principal Component Analysis is used as the explanatory variable.

The cost reduction measures had a significant impact on the operating profit. The p-value of 0.006756 is less than 0.05.

```
t test of coefficients:

            Estimate Std. Error t value  Pr(>|t|)
(Intercept)  6590.68     640.73 10.2862 1.022e-08 ***
PC1          1147.95     372.44  3.0823  0.006756 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

V. Discussion of The Results

To survive, savings banks are increasingly turning to mergers, staff cuts and branch closures to reduce costs. The President of the Federal Association of German Banks, Hans-Walter Peters, expects that up to a quarter of the branches of all banks and savings banks in Germany will be closed in the next few years (Peters, 2018).

As has been pointed out, savings banks have significantly reduced the number of institutions, branches and employees. There are various reasons for this, e.g. a historically unprecedented environment of lowest and negative interest rates in the euro area and Germany (Wolgast, 2016). Based on the available key figures, the reduction of savings banks, branches and employees can be described as a rapid impact due to digitalization.

It was found during the research that only the operating profit changed significantly in the years 1999-2018. For this KPI, a relationship can be established with the cost reduction measures that have taken place due to increasing digitalization. The KPIs cost-income ratio and return on equity, on the other hand, did not change significantly during the period under review. The following research question had to be answered: Are the

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cost-cutting measures through branch closures and staff reductions due to the rapid impact of digitalization at savings banks in Germany economically justified about the present operating result, the cost-income ratio and the return on equity? Since two (cost-income ratio and return on equity) of the three ratios to be examined do not show any significant change, it can be stated that the cost-cutting measures are not economically justified.

The role of the branches is under discussion from an omnichannel perspective. Branch closures are without alternatives due to the ever-increasing cost pressure (Waschbusch et al., 2016). Banks and savings banks are also lagging behind other sectors in this context. Omni-channel management in German bank distribution will change significantly and is without alternative (Menrad, 2020).

In recent years, it has become clear that banks in Germany lack a concrete strategy. It would be desirable to find strategies that do not exclusively focus on cost reductions, e.g. through branch closures (Henke et al., 2016). However, the digital strategy of a savings bank only has added value if it promotes investments and bundles resources at the same time. The top management of many companies is hesitant to define a digital strategy. The best digital strategies guide both strategic and operational decisions (Sebastian et al., 2017).

VI. Conclusions

Many banks and savings banks in Germany could miss the boat in the age of digital transformation. On the one hand, external influences such as customer behaviour, customer expectations, technological change, willingness to pay and product life cycles are gaining importance. On the other hand, the internal expectations of employees, e.g. the acceptance of new technological solutions and processes, are rather sluggish. According to a study by the consulting firm McKinsey, traditional banks and savings banks could lose a third of their turnover through competition with FinTech companies (Drummer et al., 2016).

For other reasons, too, there is a need for action. The banking industry is facing an environment in which rapid environmental changes are linked to strict IT governance requirements. Banks have to face ever-stricter regulatory and more complex requirements to be able to limit business risks. To achieve this, robust governance and complex IT infrastructures must also be ensured (Gregory et al., 2018).

Unfortunately, German banks are increasingly neglecting proactive action and serving customer interests. The danger is that banks may no longer be optimally positioned for the future. The more entrenched a banks structures and organiszation are, the more passive it is. The focus will increasingly be on improving profitability alone (Fischer & Arz, 2016).

The banking sector would benefit from the development of different competencies. Commercial banks need to develop their own competencies for each activity in the value chain. This is the only way to make the most of the various technological innovations (Mavlutova & Volkova, 2019).

Examples of opportunities and competencies in the age of digitalization for German savings banks are Big Data & Analytics for forecasting closing probabilities or Virtual Reality Devices for innovative customer advice (Giebe et al., 2019; Hammerström et al., 2019).

In summary, it can be stated that digital transformation is a highly complex matter that affects the entire company. The formulation of a digital transformation strategy remains a crucial success factor (Hess et al., 2016). Digitalization is a process that will accompany banks from now on. Digitalization will continue to be a natural part of daily work and organiszation. From the cleaning lady to the CEO, every employee must develop and demonstrate digital skills (Giebe, 2019).

VII. Limitations and Directions for Further Research

One of the limitations of this research is the set of key performance indicators (KPIs). Only a selection of KPIs could be used. This could be the starting point for further research that examines other KPIs. Another methodological criticism is the selection of the time series. The time window investigated will be outdated and allows for an analogous investigation in the future. The results of this research may be useful as a benchmark paper in this regard.

The COVID-19 pandemic hit Europe at the beginning of 2020, whereas the time series studied ends in 2018. Research regarding the impact of the COVID-19 pandemic can be a value-added endeavour.

A study by Conrad et al. showed that inhabitants of sparsely populated rural regions in particular have comparatively poor digital access. It must be questioned to what extent the savings banks succeed in digitally mapping basic financial services promptly and across the board (Conrad et al., 2017). This means that a part of bank customers cannot be reached digitally by savings banks. The authors suggest taking the clientele of savings banks in Germany into account in further studies. Due to the different regional orientation of German savings banks, the age, gender and place of residence of bank customers, for example, lend themselves as study factors. Another aspect for further research could be the influence of the savings bank brand on possible KPIs. If the enthusiasm of employees for the savings banks (aka Sparkassen) brand grows, employee identification and performance will increase. This performance can in turn positively influence KPIs (Zwerenz, 2019).

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Understanding Tax Compliance in the Informal Sector in a Developing or Emergent Economya Case Study of Nyarugenge District Rwanda

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Introduction- Background of the study: Existence of governments and the social and political contracts between the governed and those who govern them is a central feature of modern society. The governed entrust those who govern them with the responsibility to provide security as well as physical and social infrastructure, among others, to live and enjoy quality life. They owe the mutual responsibility, to pay taxes.or other levy to the governers. (Edame & Okoi, 2014).

The first known system of taxation was in Ancient Egypt around 3000–2800 BC in the first dynasty of the Old Kingdom. The earliest and most widespread form of taxation were the corvée and tithe. In an organised society, tax is the price paid for civilisation. Such society needs a well-financed administrative structure. Therefore, taxation in its different forms has existed as long as society had the minimum elements of government (Taxation Handbook, 2015).

Keywords: Informal sector, tax compliance, developing countries, principles.

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I. Introduction

a) Background of the study

Existence of governments and the social and political contracts between the governed and those who govern them is a central feature of modern society. The governed entrust those who govern them with the responsibility to provide security as well as physical and social infrastructure, among others, to live and enjoy quality life. They owe the mutual responsibility, to pay taxes. or other levy to the governers. (Edame & Okoi, 2014).

The first known system of taxation was in Ancient Egypt around 3000–2800 BC in the first dynasty of the Old Kingdom. The earliest and most widespread form of taxation were the corvée and tithe. In an organised society, tax is the price paid for civilisation. Such society needs a well-financed administrative structure. Therefore, taxation in its different forms has existed as long as society had the minimum elements of government (Taxation Handbook, 2015).

b) Benefits of taxation

Taxes are often resisisted. However without taxes or some other form of levy, society would ground ton a halt. It provides the means of expenditure by those in authority to provide quality of life commensurate with the value the governed extend. Secondly, it is a means to distribute wealth. The rich would exploit the resources wihout those with similar aceess benfitinng. It would be exploitative and most likely there would be social and political uprising. Finally, it provide a means of social and economic recognition, with those paying higher taxes earning bigger recognition.

II. Objectives of The Study

The research was carried out with the following objectives:

1. To identify the challenges faced by tax collectors in Nyarugenge District, Rwanda
2. To show the challenges which prevent informal traders form paying taxes in Nyarugenge District, Rwanda
3. To analyze the relationship between informal trade and tax compliance in Nyarugenge District, Rwanda

III. Justification and Significance of the Study

Tax compliance is a matter of great concern to governments and tax payers, in both developed and developing countries. By answering the question of the study, we believe findings of this research would assist the government of Rwanda and other countries to formulate appropriate policies that motivate tax payers to comp In addition, other researchers will benefit from the findings and pursue more research in this and other related areas.

IV. Literature Review

Tax compliance refers to fulfilling all tax obligations as specified by the law, freely and completely, and it includes submitting a tax return within the stipulated period, correctly stating income and deductions and paying assessed taxes by due date (Atawodi & Ojeka, 2012). Tax compliance has also been defined as the ability of taxpayers to meet their statutory obligations under the tax laws that require them to file tax returns and pay taxes promptly (Abdul-Jabbar & Pope, 2008).

Factors which contribute to compliance and non-compliance

Various factors contribute to either tax compliance or its antithesis, non-compliance. Governmental policy effectiveness, transparency of the tax system as well as voice and accountability are perceived to be key grounds for tax compliance or non-compliance. As aspects of tax administration, they significantly influence variances in tax compliance (Nkundabanyanga et al, 2017).

Justice, actual or perceived, inherent in a tax administration system affects the level of compliance by the taxpayers. There are three types of justice in taxation systems, namely, distributive justice (viewed as the

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exchange of resources, that is, benefit and cost); procedural justice (viewed as the process of resource distribution) and retributive justice (viewed as the appropriateness of sanctions when norm-breaking occurs).Tax compliance behavior of the taxpayer will be in response to whether the procedure is just or not. Retributive justice is a theory of punishment that when an offender breaks the law, justice requires that they suffer in return, and that the response is proportional to the offence (Sellywati et al, 2017). Modern tax systems rely heavily on voluntary compliance for revenue collection. Very clear understanding of why taxpayers meet their obligation s or fail to do so or of how much tax liability is uncollected is critical for measuring administrative performance and for targeting compliance strategies (John & Liucija, 2007).

Tax compliance continues to be a critical problem in developing and emergent countries. Goverments have to ever widen the tax net through concerted combination of more enforcement and moral suasion, as well as technology-based improvements (Anirudh, 2019).Deterrence models generally predict compliance patterns based solely on the subjective probability and utility of outcomes associated with alternative actions. Yet recent work in behavioral decision theory suggests that compliance decisions may also be affected by how the risks of noncompliance are described and how the decision-maker's preferences are expressed. Cognitive heuristics evoked by these descriptive and procedural variables affect tax compliance. It was found in a study that taxpayer preferences are significantly influenced by descriptive and procedural variables that traditional expected utility models ignore. Using tax decision problems involving how to choose a tax professional, whether to take a questionable deduction, and how to approach an impending tax audit is crucial for a taxpayer. (Casey & Scholz, 1991).

Non-compliance tax models in the 1970's assume that tax payers are rational actors aiming for benefits. They compare the cost of compliance with the utility of tax non-compliance. As such, they will be non-compliant when the expected penalty and probability of being caught are rather small compared to the utility gained by non-compliance (Michael & Agnar, 1972).

Following the classical economic model of tax non-compliance, governments and tax authorities should seek to ensure that the utility of non-compliance is outweighed by the cost of non-compliance. To achieve this the main tools used are increased penalties and the perceived probability of detection of the non-compliant tax payers. In practice it has been noted that reducing tax non-compliance is not just a matter of applying higher penalties or alternatively increasing the probability of detection as the model suggest or both. This has necessitated the search for alternative models which take into account the non-pecuniary aspects of the tax compliance decision (Horodnic, 2018). Recent approaches to tax compliance studies have been based on social and psychological theories with argument that the human element plays a vital role in individual taxpayer compliance decisions. Tax compliance literature indicates that there are still many research gaps that need to be filled with respect to issues concerning tax morals, tax fairness and deterrence measures, for the likely improvement in overall taxpayer compliance (Devos, 2014).

That taxpayers' decisions on paying taxes or not paying taxes cannot be explained only by expected economic gains and costs alone. There are many psychological, sociological and demographic variables affecting taxpayer decisions. It will be possible for tax administration to increase tax compliance and tax collection to a degree with conventional tools and practices. Beyond legal obligations, it is necessary to analyze the ethical-cultural norms of the individuals and the society and the behavior of taxpayers and to produce the requisite policy accordingly, so as to increase the voluntary tax compliance and motivate the taxpayer (Serdar, 2019).

The potential for behavioural research to contribute to better tax collection and administration has been quite limited. Effective tackling of the task requires a better understanding of attitudes and behavioural motivations of taxpayers against taxation so as to improve both voluntary compliance and tax administration efficiency. Some of the important factors influencing fiscal behaviour are discouragement; personal and social norms; fairness and trust in the tax administration; complexity of the tax system; the role of government and the broader economic environment. A contemporary healthy tax system does not mean exclusively a series of norms and the increase or decrease of the amount of taxes, duties and contributions. Rather it also entails a long history in which it was created and stratified, mindful of a certain behavioural culture of taxpayers which has been shaped in a manner that facilitates the proper operation and compliance with the norms and the consolidation of good practices in the field (Mitu, 2016)

Behavioral economics and economic psychology are other disciplines that have been leveraged to explain tax compliance and non-compliance. They cover areas such as rational and irrational decision-making; social representations about taxes, as well as the interaction between tax authorities and taxpayers. From behavioral finance in particular rational choice and tax payments have been addressed from the point of view of prospect theory, mental accounting and framing effects to explain social representations and provide knowledge and understanding of taxation, attitudes and beliefs, personal and social norms, as well as distributional and procedural justice (Olsen & Kirchler, 2018).

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The theory of planned behavior (TPB) has also been used to investigate the issue of tax compliance. It is based on the notion that there are three components to behavior: attitude, subjective norms, and perceived behavioral control. Seven determinants have been developed to study tax compliance intention, namely, tax morale, tax fairness, trust in government, perceived power of authority, tax complexity, tax information, and tax awareness. Findings are that tax morale, tax fairness and tax complexity have a statistically significant influence on the tax compliance intention of the citizens. It has been further proven that the power of authority, trust in government, tax information, and tax awareness do not show a statistically significant relation to tax compliance intention (Heang &Yongjin, 2020).

A study was carried out on factors that determine tax compliance attitude and perception in Kenya, Tanzania, Uganda and South Africa. Findings were that in Kenya and South Africa, citizens who perceive that it is difficult to avoid taxes are more likely to have a tax compliant attitude than citizens who think avoidance is relatively easier. Evidence was also found that individuals who are more satisfied with public service provision are more likely to have a tax compliant attitude in all the four countries. On the other hand, frequent payment to non-state actors, for instance criminal gangs, in exchange for protection, reduces likelihood to have tax compliant attitude. In addition, in Tanzania and South Africa it was established that individuals who perceive that their ethnic group is treated unfairly by the government are less likely to have a tax compliant attitude. The degree to which respondents perceive that it is difficult to know what taxes to pay is also negatively correlated with tax compliant attitude in these two countries. Tax compliance attitude in Uganda is low, mainly because of the low perception about the quality of public services provided among tax payers (Ali, 2013).A study by the World Bank of a cross-section of Ugandan firms shows that an adverse business environment characterised by inadequate Government provision of public capital, bureaucratic bribery and an inefficient legal and regulatory environment could potentially induce a firm's behaviour towards tax evasion (World Bank Group, 2017).

V. The Informal Sector

The definition of what the informal sector is has most times been characterised by negative connotations such as activities that are unrecognized, unrecorded, unprotected or unregulated by public authorities, although it is not confined to marginal activities but also included profitable enterprises. The sector has also been referred to as the shadow, hidden, black, underground, gray, clandestine, illegal, unreported, non-cash and parallel economy (Thomas, 2002).

Researchers have defined the informal sector or economy variously according to what best fits with the object of their own analysis. For example, one school of thought discriminates between registered or unregistered economic activity (Joshi et al., 2013),

The term "informal sector" was first used in a study of informal income opportunities in urban Ghana, involving the Frafras, one Northern Ghanaian group, as migrants to the urban areas of Southern Ghana. In this study the economic activities of the low-income section of the labour force in Accra, the urban sub-proletariat into which the unskilled and illiterate majority of Frafra migrants are drawn were described. As a result of Price inflation, inadequate wages, and an increasing surplus to the requirements of the urban labour market, there was a high degree of informality in the income-generating activities of the sub-proletariat. Given the uncertainty related to the economic activities of the members of the communities studied, income and expenditure patterns were more complex than is normally allowed for in the economic analysis of poor countries. This made evaluation of economic activities difficult as was determination of tax payable (Harth, 1973).

The phrases informal sector and informal economy have been interchangeably used in much of economics literature. It constitutes an important component of most economies. It contributes between 25 and 65 percent of GDP and between 30 and 90 percent of total non-agricultural employment in most economies. The trend is likely to continue with the informal economy in sub-Saharan Africa likely to remain large for many years to come. This should not be cause for worries, because the informal sector presents both opportunities and challenges for policymakers. During the five years period between 2010-14, Sub-Saharan Africa unweighted average share of informality reached almost 38 percent of GDP. It was only surpassed by Latin America and the Caribbean, which registered a higher rate at 40 percent of GDP. The comparative figures for South Asia and Europe are 34 percent and 23 percent of GDP in South Asia and Europe respectively. For the Organisation for Economic Co-operation and Development (OECD) member countries, the informal sector is estimated to account for 17 percent of GDP. With limited opportunities in the formal sector, informal activity avails an essential social and economic safety net by providing employment and income to a large number of otherwise vulnerable people. It also offers means to poverty reduction. Between 30 to 90 percent of employment in the non-agricultural sector occurs in the informal sector in some sub-Saharan African countries (IMF, 2017)

Other studies have also confirmed the findings above. The importance of the informal sector is equally important in other parts of the world. Estimated average size of informal economy on tax revenue as a

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percentage of GDP was 37.4 % in Peru, in Latin America it was 34 % while in OECD countries it was 19.89 % (Guillermo & Deyv, 2019).

In cities worldwide the informal sector offers a high proportion of employment ranging between 80% on average in Abidjan, Bamako, Cotonou, Dakar, Lomé, Niamey and Ouagadougou, 59% in Lima, Peru, 53% in Ho Chi Minh City, Vietnam and 45% in Buenos Aires, Argentina(Herrera et al 2012).

VI. Taxation of the Informal Sector

The issue of taxation of the 'informal economy' in developing and emergent economies has received increasing attention in recent years as has been that of whether indeed taxation of the informal economy is justified. Questions have been raised regarding the issue with critics arguing that the potential revenue yields are low, administrative costs are high, tax incidence is likely to be regressive, and tax enforcement risks exposing vulnerable tax payers to harassment (Keen, 2012).

Failure to pay taxes is not an issue of formality or informality. Thus, reducing informality cannot form the basis of tax policy, because the reasons for not paying taxes vary across both informal and formal sectors. For example, believing that tax rates are unjustifiably high or that there is no evidence of benefits arising from taxes paid are reasons pertinent to firms in both formal and informal sectors. Accordingly, in designing tax policy, the reasons for not paying taxes matter as much as or more than the fact that a firm pays no taxes. (Kanbur & Keen 2015).

Taxes from the informal sector have a significant effect on capital development. In a study carried out in the Lagos Metropolis, among the conclusions made was for government not only to create an enabling environment for the informal sector but also give all necessary support for its survival because the sector has contributed immensely to the capital development of the state. It was recommended that the government should continue with its capital development programs by constructing more roads, building hospitals, schools and markets in order to gain the trust of the citizenry (Andy et al 2019).

In a study on informal sector tax compliance issues and the casualties between taxation and economic growth in Ghana, empirical evidence findings revealed that attitudes, subjective norms, and perceived behavioural control were the main determinants of the informal sector compliance factor, and it was recommended that efforts should be geared towards improving tax systems to augment the GDP of the country (Ameyaw et al, 2016). In neighbouring Nigeria, a study carried out in River State findings were that taxing the informal sector boosted revenue generation and positively affected the economic development of developing states in Nigeria (Obara & Nangih 2017).

Tax non-complince is more pronounced in developing and emerging countries. There is no single theory that can explain the phenomenon of tax noncompliance behaviour, however perception and attitude of taxpayers are among the factors contributing towards compliance behaviour. Empirical evidence indicates that taxpayers act according to their belief and attitudes. A framework focusing on tax service and public governance indicates that quality as well as tax system structure are factors relevant to developing and least developing countries, in as far as promoting tax compliance is concerned (Lutfi et al ,2015). There should be greater reliance on locally grounded binding constraints analysis. This must be coupled with careful attention to understanding politics and the drivers of trust in particular contexts, to guide analysis of how best different investments may be combined, prioritized, or sequenced (Wilson et al 2019).

Recent interest in the matter of taxing the informal sector has been catalyzed by growing attention to the potential benefits of informal sector taxation in terms of revenue, growth, and governance. With respect to revenue, the informal sector forms a large and, in many countries, growing share of GDP, and thus represents a potentially significant source of tax revenue for cash-strapped governments (Schneider & Montenegro, 2010).

a) The informal Sector in Rwanda

In Rwanda, the informal sector refers to establishments that are not registered with the revenue authority body (RRA) to pay local or national taxes and do not maintain regular operational accounts:(NISR, 2014).Over time Rwanda has recorded significant growth in the formal sector, and the percentage level of the formal private sector and the government of Rwanda's Vision 2020 explicitly promotes private sector development and recognises the informal sector as a key part of the economy. Nevertheless, there is need for concerted effort to expand the formal sector because it enables business enterprises to effectively plan for their future investments and expand their business activities. The expansion would increase domestic revenues (Rukundo, 2015).

In Rwanda the informal sector is an enterprise that employs one to nine people. It covers a wide sector and it includes manufacturing, trading, and services. The sector includes market traders, artisans (mechanics, technicians), cottage industrialists, petty hawkers, transport workers, small shops, and micro businesses. Built on experience, a progressive tax system is capable of reducing the chances of evading taxes because it eliminates the onus of self-assessment from the informal sector, such that the duty of evaluating taxable income rests on the tax authority (Adesoji &

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Chike, 2016) There is growing evidence that taxing the informal sector encourages them to be more organised and practice better management by way of keeping proper financial and accounting records (Oduwole & Sanni, 2014). When considering the merits of committing scarce resources to taxing small informal sector firms, debate has frequently focused on limited revenue potential, high costs of collection and potentially perverse impacts on small firms. By contrast, recent arguments have increasingly emphasised more indirect benefits of informal sector taxation in relation to economic growth, tax compliance and governance. These potentially broader benefits are increasingly finding support in recent research, but they are contingent on government support and consequently demand further attention. Encouraging tax compliance demands not only lowering costs but also strengthening the potential benefits of formalisation, from increased security to new economic opportunities. Successful reform needs political support from political leaders, tax administrators and taxpayers alike. It also requires institutional reform (Anuradha et al, 2013).

The issue of paying tax is a primary nexus between the individual (taxpayer) and the state. Tax laws are examples of purposive administrative law. Compliance is as problematic as non-compliance and tax payers, be they individuals or bodies corporate, have different opportunities for both compliance and noncompliance, and paying tax does not necessarily involve deliberate decisions. Four clusters of factors affecting the content of compliance decisions are material consequences, normative expectations, sociolegal attitudes and beliefs as well as expressive factors (Kent & Kinsey, 1987).

VII. Resistance to Registration for Tax Purposes

In previous studies efforts have been made to find out reasons for not registering for taxes, and self-reported expected tax obligations. One such study was carried out by the World Bank involving small enterprises in Katwe area of Kampala, Uganda in 2011.

Despite the numerous benefits of taxation to the economies of various countries there are various reasons as to why potential tax payers do not register for purposes of taxation, as table 1 below indicates (Dekoya et al, 2020).

Table 1: Reasons for not registering for taxes, and self-reported expected tax obligations

Reason for not registering for taxes	*Share (%)*		*Expectation of annual tax obligations*	*Actual annual tax obligations*		*Monthly turnover*
		Median	Mean	Median	Mean	Mean
High registrationcost	1.5	86,000	224,125	100,000	158,333	950,000
Too small to pay taxes	53.0	50,000	111,645	100,000	1,026,803	550,000
Taxes are too high	12.0	95,000	254,943	100,000	1,440,034	1,075,000
No action will be taken	1.0	40,000	60,167	200,000	200,000	750,000
Too complicated process	0.7	235,000	380,000	100,000	180,000	1,140,000
No time to register	3.2	50,000	195,263	216,000	210,571	1,000,000
Do not know what the TIN is	11.5	50,000	941,045	100,000	1,001,687	800,000
Business is just not registered	9.3	60,000	138,058	100,000	1,455,412	500,000
Do not know where to register	3.4	100,000	276,158	100,000	608,000	650,000
Other Specify	4.4	50,000	70,625	100,000	2,460,150	575,000

Source: World Bank 2011 Survey Report

In table 1 above, tax obligation refers to what enterprise owners would have been expected to pay if they had been registered for tax purposes. As is noted from the table over half of the interviewees (53%) believed their businesses were too small to be taxed. This was distantly followed by the argument that taxes were too high at 12%, closely followed by the potential taxpayer's lack of knowledge of the Taxation Identification Number (TIN) at 11.5%. With the overwhelming belief that one's business is too small to

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be taxed, even if the rates were lowered there has to be a very big reduction for one to even remotely think about paying the tax. Indeed, with the two leading arguments for not registering, it would be surprising if a potential taxpayer bothered to know the TIN.

Apart from the reasons given above for not registering, arguments are raised against taxing the informal sector. Low levels of revenues relative to costs incurred in collecting taxes from the informal sector is one of the major arguments. Taxable incomes are usually low or non-existent. Secondly given that majority of informal sector workers are the underprivileged or marginalized, the rural women and youths or those from the ghettos, there is a high possibility that taxation of the informal sector risks being highly income and gender regressive (Pimhidazai & Fox,2012).

VIII. Theoretical Framework

Taxes impact on society in various ways because they are socio-political-economic tools which, through the ways the proceeds are utilized, can greatly change the quality of life people in a community live. A lot of theories have therefore evolved to explain many aspects of taxes and taxation. Some of these are the subject matter of discussion below.

a) Canons of taxation

A Scottish economist argued for a systematic approach to matters of taxation and believed that a tax must be levied on the basis of rules he called canons of taxation. These were equity or ability, certainty, economy and convenience (Adam, 1776).

Table 2: Adam Smith's Cannons of Taxation

Canon	Adam Smith's observation
Equity or ability	The subject of every state ought to contribute towards the support of the government as nearly as possible in proportion to their respective abilities, that is, in proportion to the revenue which they respectively enjoy under the protection of the state
Certainty	The tax which each individual is bound to pay ought to be certain and not arbitrary. The time of payment, the quantity to be paid, ought to be very clear and plain to the contributor and to every other person.
Economy	Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings in to the public treasury of the state.
Convenience	Every tax ought to be levied at the time and in a manner in which it is most likely to be convenient for the contributors to pay it.

Source: Adapted from the An Inquiry into the Nature and Causes of the Wealth of Nations

Adam Smith's canons of taxation outlined above are as valid and sound today as they were in 1776. That his book An Inquiry into the Nature and Causes of the Wealth of Nations came out in five editions during Adam Smith's lifetime, in1776, 1778, 1786 and 1789 is not surprising. All theories and principles of taxation that were postulated later, directly or indirectly derive from these four pillars propounded by the greatly endowed Adam Smith. Indeed, non-compliance arises because of breach of one or several of the canons. A tax that is not equitable, certain, economic or convenient as indicated above provides room for non-compliance. Breach of the cannons of taxation as propounded by Adam Smith will most likely result into non-compliance. Thus, for example a complex tax which the taxpayer does not understand or one which requires the taxpayer to go through a costly process and involving travel to regional tax offices and therefore uneconomic from the taxpayer's point of view is likely candidate for involuntarily evasion. Compliance costs of taxation include three major components, namely money costs, time costs and psychological costs to the taxpayers. Expenditure on professionals such as tax consultants and accountants, investment advisors, tax agents and legal practitioners as well as expenses relating to taxation guides, books and other incidental costs such communication, stationery and travel is referred to as money costs. When these compliance costs are high, they can lead to tax evasion, avoidance or both (Sandford & Hardwick, 1989).

b) The Sacrifice or Ability to Pay theory

The sacrifice (or ability to pay) theory derives form Adam Smith's canon of equity as outlined above. He believed that tax payers should make contributions to the public coffers in proportion to the revenue which they enjoy under the protection of the state' (benefits) and also in proportion to 'respective abilities '(ability to pay) which are reflected by the revenues they derive from the economy. It was generally agreed that this not only just but it was also equitable. This principle seeks to ensure that tax subjects the taxpayers to an equal sacrifice (Clifton et al, 2001). This is through introduction

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of the principle of progression in the tax system. By paying the taxes the individual sacrifices in the form of foregone alternative uses of money paid in terms of taxes. Because equity is concerned with the fair distribution of the tax burden, the ability to pay principle should also consider the incidence of a tax, as the formal incidence, and this is because the person on whom the tax is levied, is not necessarily the same person who actually bears the burden of the tax (Peter & Helen, 2009).

c) The Benefit Theory

The Benefit theory, also known as the insurance theory or the Quid Pro quo theory of taxation, relates the sacrifice of the taxpayer in paying the taxes with the benefits they enjoy from governmental expenditure. The benefit theory states that the taxation should be in accordance with the benefit enjoyed by a taxpayer from the facilities or services provided by the Government (Jon, 2000). The theory has been criticized on various aspects. The poor or underprivileged receive greater benefits from the government in the form of free social services like education and health yet they are the least able to bear the burden of taxation. It is also difficult to record every single taxpayer's benefit. Furthermore, the intensity of desire by a particular taxpayer for service from government is difficult to quantify, and therefore it is equally difficult to determine how much the beneficiary is prepared to pay for it.

d) The Principle of Maximum Social Advantage

Economic welfare of the community is the goal of state's economic policy. The Principle of Maximum Social Advantage extends the ability-to-pay principle to include the benefits of public expenditure in that it seeks to balance the social advantage of public expenditure and the social sacrifice involved in the payment of taxation. It is alternately called the Principle of Maximum Aggregate Welfare or the Principle of Maximum Social Advantage. It is criticized from the point of view that it is difficult to determine the measures which will lead to maximum social advantage (Ngerebo, 2010).

e) Principle of Productivity

To justify its imposition a tax should produce for its government sufficient revenue. Taxes should be productive. The principal tallies with the economy canon propounded by Adam Smith. To justify its imposition. The principle demands of government selection of a few taxes yielding sufficiently large revenues as opposed to a multiplicity of taxes, to avoid high cost of collection, relative the amount collected. This should be so in the medium and long term. The cost-benefit analysis point of view of the principle is attractive because it is logical (Tuan, 2016).

f) Principle of Elasticity or Flexibility

The economic or financial systems in which taxes are charged and collected is dynamic. This in turn requires that the tax system should have the capacity to adjust itself in the ever changing globalised environment. The tax system should be fairly elastic so as to enable government, if it deems it necessary for example to raise more funds, to do so without incurring exorbitant costs in this endeavour (Saez & Giertz, 2012).

g) Principle of Simplicity

Tax systems should be simple, tax laws should be clear and easily understandable to the common man. Simplicity reduces the cost of collection of taxes and inconvenience to the taxpayers. A Complex tax system breeds corruption in tax administration and may lead to temptations for non-compliance. The taxes should be simple to calculate and encourage self-assessment also to some extent. The basis of arriving at tax liability should be easy to comprehend, tax bands where applied should be logical, the rates should be moderate, the manner and timing of payment should be convenient (Philippe, 2017)

h) The lifeblood theory

The theory posits that the system of taxation works like a blood circulatory system. Taxes flow into the government coffers and through government expenditures the taxes flow back into the economy to fund infrastructure and services, among others. Providers of the labour and material inputs are taxed on the profits they generate from their businesses or earnings received as salaries, and the cycle continues (Ajay, 2018).

i) Principle of Diversity

Just like businesses manage risk partly through portfolio diversification, governments should adopt similar strategy in evolving fiscal policy (Federico ,2018). Sectors enjoy success or suffer losses differently because the nature of their activities differ. Agriculture depends very much on the vagaries of nature especially in least developed economies. Issues of climatic change are heavily impacting on the sector. The manufacturing and services sector are impacted upon by basically different factors. Government should therefore be cognizant of the risk posed by a narrow tax base which would expose it to shocks when the few sectors suffer negative revenue trends and consequently losses and falling taxable income. Indeed, diversification also satisfies the canon of equity, by covering as many taxpayers and sectors as possible, instead of burdening a few Chowdhury (2015).

j) conceptual frame work

A conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). It is arranged in a logical structure to provide a picture or visual display of how ideas in a study relate to one another and it assists the researcher in identifying and constructing his/her worldview on the phenomenon

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to be investigated (Grant & Osanloo, 2014). We had dependent and independent variables which are informal trade as the independent and tax compliance as the dependent variable.

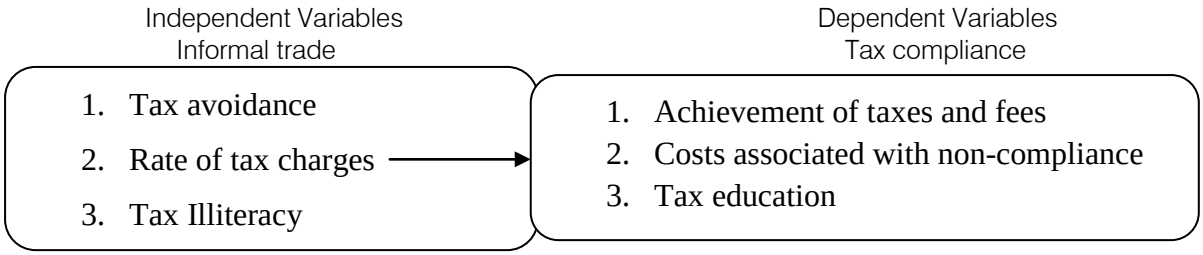


Figure 1: Source: Researcher conceptualization (2006)

IX. Research Methods and Tools

In any research the appropriateness of the methods and tools used contributes a lot on to how the findings of the particular study are reliable and valid.

a) Research design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure in which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data. It includes an outline of what the researcher did from writing the hypothesis or research question and its operational implications to the final analysis of data (Kothari, 2004).Both primary and secondary sources were used. The study used a combination of cross sectional and descriptive designs in which both qualitative and quantitative approaches were adopted. Questionnaires were administered to respondents who answered both open-ended and close-ended questions. Quantitative data was analysed by means of frequencies, percentages and means correlations to arrive at conclusions. A sample of 14 employees and 96 informal traders were involved.

b) Procedures and techniques used for gathering data

We wrote a letter requesting for permission to collect data to the Major of Nyarugenge district who in turn gave an authorization letter to the Executive Secretaries of sectors. These helped in identifying the informal traders and the tax collectors. While collecting data, we obtained relevant information by repeating and putting clear questions to the respondents.

c) Study population

Population refers to an aggregate or totality of all the objects, subjects or members that conform to a set of specifications (Polit and Hungler, 1999). We collected and analyzed the views of Nyarugenge district's informal traders and tax collectors. The targeted population was 4,800 operators in the informal sector and 14 tax collectors of Nyarugenge district. The distinction between informal traders and tax collectors in administering questionnaires was based on the fact that informal traders may live their own experiences in not paying taxes which may be different from those lived by tax collectors in collecting taxes. This is presented in table 3 below.

Table 3: Targeted population

Population category		Population under study
Informal traders		4,800
Tax collectors		14
Total		4,814

Source: Nyarugenge District Department of Finance

d) Interview technique

An interview can be defined as a conversation between an interviewer and the respondent contacted for the purpose of obtaining information. Two types of interviews were used in this study, that is, the formal or structured interview and the informal or unstructured interview. The structured is based on questions predetermined and specific before the onset of the interviews. The unstructured arise out of the responses to the formal interview. The unstructured interview was conducted to obtain complementary tax collection information.

e) Questionnaire

The questionnaire was one of the tools used during the study to collect data. It was in Kinyarwanda, the mother tongue of respondents. This questionnaire comprised both closed and open-ended questions which enabled a mix of qualitative and quantitative information to be gathered. The questionnaire was presented in form of nominal and 5- Likert scale as described in table 4 below.

Table 4: Definitions of Scale

Response	Mean Range	Scale	Interpretation
Strongly Agree	4.20 - 5.00	5	Very High
Agree	3.40 - 4.19	4	High
Undecided	2.60 - 3.39	3	Average

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Disagree	1.80 - 2.59	2	Low
Strongly Disagree	1.00 - 1.79	1	Very Low

f) Sample size

In selecting the respondents, the researchers used convenience and purposive sampling strategies. Convenience sampling is non-probability sampling where the information is collected from the members of the population who are conveniently or readily available to provide it (Sekaran,2003). Purposive sampling is a type of sampling whereby the researcher uses own judgment or common sense regarding the participants from whom information will be collected (Amin, 2005). Given that the population of informal traders and tax collectors is fairly homogeneous on the information required, we used this technique in selecting the taxpayers, tax collectors and other employees such as Director of Finance, Revenue accountant and Revenue inspectors who were available during the distribution of questionnaires. See table 5 five below.

Table 5: Sample size

Strata (Sector)	Number of personnel	Sample size	Justification
Taxation department	8	8	Convenient
Top management	4	4	Convenient
Tax payers	84	84	Convenient
Total	96	96	Convenient

Source: Author (2018)

g) Validity and Reliability of the Instrument

According to (Ochieng et al, 2007), for a study to be of real meaning it ought to apply valid and reliable instrument. We ensured that the research instruments checked for validity and predetermined its reliability.

h) Validity

The level of dependability of the questions in the research instrument or the degree to which a measurement instrument gives the same results each time that it is used, assuming that the underlying item being measured does not change is referred to as validity (Shuttle worth, 2015).

Validity determines whether the research truly measures what it is intended to measure or how truthful the research results are (Hamed, 2016). There are various types of validity but most commonly used are content validity and face validity. Content validity looks at whether the instrument adequately covers all the content that it should with respect to the variable. Face validity, is where experts are asked their opinion about whether an instrument measures the concept intended.

To ensure validity in research, examination of trustworthiness is crucial. For us to establish the validity of the research instrument in this study, we were helped by research advisors and other experts. We were advised on retaining items based on their relevance, representation and clarity of wording. Thereafter, based on the feedback, we eliminated items that were unclear, irrelevant or redundant.

i) Reliability

Reliability refers to the level of dependability of the questions in the research instrument or the degree to which a measurement instrument gives the same results each time that it is used, assuming that the underlying item being measured does not change. Before administering the questionnaires, a pre-test was conducted in Nyarugenge and Muhima sectors, on the instrument whose validity was ensured. The aim was to pre-test the questionnaire with the view to ensure that respondents understood the questions so as to provide appropriate responses. In addition, it helped to check whether administration of the survey procedure as a whole went smoothly (Finn, 2015).

To certify that the instrument is reliable a Cronbach's Alpha coefficient of 0.6 and above must be achieved (Amin, 2005). Using SPSS, the calculated value of the instrument reliability was 0.862 Cronbach's Alpha. See table 6 below.

Table 6: Results of reliability test

Valid items	Sample size	Cronbach's Alpha
45	96	0.862

Source: researchers' data

j) Rigour, Validity and reliability

While establishing good quality studies through reliability and validity in research, trustworthiness of a research report lies at the heart of issues conventionally discussed. Rigour, which refers to the extent to which the researchers worked to enhance the quality of the studies, is achieved through measurement of the validity and reliability (Joppe, 2004).

k) Data Analysis

Raw data from the field was cleaned, coded and by using the SPSS software was entered in the computer. Descriptive statistics, in this case frequencies, percentages, mean and standard deviation scores as were derived.

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Table 7: Evaluation and scoring of the questionnaire: Analysis of perception

Scale Point	Responses	Verbal description	Weighted mean
5	Strongly Agree (SA)	Very high perception	4.21 - 5.00
4	Agree (A)	High perception	3.51 – 4.50
3	Neither Agree nor Disagree (ND)	Fair perception	2.51 – 3.50
2	Disagree (DA)	Low perception	1.51 – 2.50
1	Strongly Disagree (SD)	Very low perception	1.0 – 1.50

A Likert scale with five points was used for the survey. This is because it allowed the respondents to measure how much they agreed or disagreed with a particular statement (McLeod et al, 2015).

There was need to establish or explain to what extent a change in one or several independent variable(s) could explain a change in the dependent variables. Table 8 below indicates the strength of the relationship was rated.

Table 8: Rating of Correlations

Strongly high	0.9 - 1.00
High	0.7 – 0.9
Moderate	0.5 – 0.7
Weak	0.3 – 0.5
Very weak	0 – 0.3

l) Limitations

First, eliciting information from respondents required patience and high degree of tact due to their evasiveness and fear wondering that the researcher may be among the authorities in charge of the District, who after gathering the information, would use it to exact taxes on them. A lot of time was required. Secondly, the informal sector is characterised by lack of or poor records.

X. Findings

This research intended to achieve the following objectives: identify the challenges faced by tax collectors in Nyarugenge District, show the challenges which prevent informal traders not to pay taxes and to analyze the relationship between informal trade and tax compliance.

a) Socio-Demographic characteristics of the respondents

The study findings of socio-demographic characteristics (Gender, Age, Education and Experience) are summarized in the following tables.

Table 9: Respondents Gender

Gender	Frequency	Percentage	Cumulative percentage
Male	32	33.3	33.3
Female	64	66.7	100
Total	96	100	

Source: Primary Data

Table 9 shows that the majority (64/96), thus 66.7% of the total respondents, were female and (32/96), thus 33.3% of the respondents were male. The researchers concluded that the informal sector was dominated by females. This also shows that in real life the more practicable informal trade was performed by women, therefore policy makers and other stakeholders must consider this when making decisions.

Table 10: Respondents education

Education	Frequency	Percent	Cumulative percent
Uneducated	49	51	51
Primary	47	49	100
Total	96		

Source: Primary Data

The revelation in table 10 is that the majority, that is 49 out of 96, thus 51% of the total respondents, were uneducated. Those who had attained primary level schooling were 47 out 96 thus 49%. This is a key guide to policymakers. Read together with the table on gender above, the implication is that the majority women are of very limited education, and the male are not any much better. This shows that the low level of education was the main factor contributing to the informality of conducting informal trade. Related to this is the evident failure to keep both financial and non-financial records, which is incompatible with taxation compliance. If participation in the informal sector is closely related to low levels of education, then policy in the education sector must be aligned to address this. Programs for tax education have to be rolled out cognizant of the challenge.

b) Challenges faced by tax collectors

In order to have accurate information, we prepared questions about the challenges faced by tax collectors from Nyarugenge District on informal trade and the table 11 below provides the field findings.

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Table 11: Challenges faced by tax collectors

Statements	Frequency	Percent	Cumulative (%)
Lack of enough skills of tax collectors in the domain of finance	5.0	35.7	35.7
Poor perceptions on the relevance of tax payment	2.0	14.3	50.0
Taxpayers` culture to evade taxes	1.0	7.1	57.1
Social condemnation among taxpayers against tax offences	3.0	21.4	78.5
Business activity without trading license	1.0	7.1	85.6
Means of transport to facilitate taxpayers to reach the area of tax collection	2.0	14.4	100.0

Source: Primary Data 2015

Table 11 shows that 5 out of 14 (35.7%) of the tax collectors said that the challenge they face is lack of enough skills in the domain of finance. Those faced with the stigma of social condemnation among taxpayers who are against tax offences were 3 out of 14, that is, (21.4%) tax collectors. In third place, 2 out of the 14 tax collectors (14.4%) said that the challenge faced by tax collectors is means of transport to facilitate taxpayers to reach the area of tax collection. A similar percentage is challenged by poor perceptions on the relevance of tax payment. Finally, 1 out of 14 tax collectors (7.1%) out of 14 tax collectors said that the challenge they faced was taxpayers` culture to evade and avoid taxes and carrying on business activity without trading license. The findings reveal that some of the barriers to tax collection and compliance are institutional and can be administratively addressed by the Rwanda Revenue Authority (RRA). Rejection by society is a psycho-socio problem which must be addressed as such before symptoms reveal themselves by way of stress.

c) Challenges faced by informal traders on tax payment

We asked questions about the challenges faced by informal traders in an effort to pay tax in Nyarugenge District.

Table 12: Challenges faced by informal traders on tax payment

Statement	Minimum	Maximum	Mean	Standard deviation
Lack of education on tax payment and procedures	3.0	5.0	4.1771	0.69577
Failure to understand the relevance of paying tax	3.0	5.0	4.1771	0.69577
Higher tax rate imposed compared with business capacity	4.0	5.0	4.6667	0.47388
Low capital of investment	4.0	5.0	4.8438	0.36500

Source: Primary data 2015

Table 12 indicates a telling and qiute significant average mean score of about 4.2000 with reagrd to challenges faced by infromal traders on tax payment. This implies that the chalenges are really potent. At the top are the challenges of low capital investement, with a mean score of 4.8438 and lowest standard deviation of 0.36500. This is closley followed by hihger tax rate imposed compared with business capacity (most likely reflected by the low capitalisation) whose mean is 4.6667 and standard deviation is 0.47388. This means that respondents differ least on the challenge of low capital, and almost similary on high tax rates. Scoring lower but also significant figures are challenges of failure to understand the relevance of paying tax and lack of education on tax payment and procedures with a mean of 4.1771 and standard deviation of 0.69577. First of all, this is not surprising given that the level of education of the participants in the informal sector is barely basic, where it exists. This was revealed in section 10.1 on Socio-Demographic characteristics of the respondents.

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The coincidence of standard deviations with the mean scores, that is, lack of education on tax payment and procedures and failure to understand the relevance of paying tax depicts a high degree of consistency in the findings and therefore reliability and validity of the findings. This is further confirmed by standard deviation of 0.47388 and 0.36500 for 4.6667 and 4.8438 scored for higher tax rate imposed compared with business capacity and low capital of investment respectively. It indicates a high level of research rigour as defined in section 9.10 on rigour, validity and reliability above.

d) Informal traders' opinion on tax payment

After appreciating the challenges faced by tax collectors, as well as those faced by informal traders on tax payment, we found it pertinent that we obtain information on the informal traders` opinions on tax payment. The findings are as in table 13 below.

Table 13: Informal traders' opinion on tax payment

Statement	Minim	Maximum	Mean	Standard deviation
Reduction of rates imposed on taxpayers` business	4.00	5.00	4.6667	.47388
Increasing the purchasing power of the population through poverty reduction program	4.0	5.00	4.8438	.36500
Facilitate informal trade to access the business capital	3.0	5.00	4.6667	.49275
Monitoring and placement of informal trade to the modern market	2.0	5.00	4.3438	.47745
Sensitizing the informal traders for behavior change	4.0	5.00	4.8333	.37463
Training of informal trade regarding tax payment	4.0	5.00	4.3438	.47745

Source: Primary data 2016

The results from the table 13 logically flow with the findings in table 12 which provides findings on challenges faced by informal traders on tax payment. It is therefore not surprising that top on the list is the demand for increase of the purchasing power of the population through poverty reduction programs. It has a mean score of 4.8438 out of 5.0 and a standard deviation of .3650, the highest and lowest in the table respectively. Coincidentally, at the top of the list in the table of challenges was low capital investement, with a mean score of 4.8438 and lowest standard deviation of 0.36500. Poverty reduction is impliedly most crucial as it enhances income, which in turn would increase savings and thereofre the capital in the potential and actual taxpayer's enterprises. In table 13 increase in poverty reduction is followed by sensitising the informal traders for behaviour change which scored a mean of 4.8333 a standard deviation of .37463. In table 11 on chalenges by tax collectors social condemnation among taxpayers against tax offences and poor perceptions on the relevance of tax payment ranked higher than most others, expect lack of enough skills of tax collectors in the domain of finance. In table 12 above lack of education on tax payment and procedures as well as failure to understand the relevance of paying tax scored a high average of 4.1771. It is therefore not surprising that sensitising the informal traders for behaviour is the next most important issue on informal traders' opinion on tax payment. Training of informal traders regarding tax payment and monitoring and placement of informal trade to the modern market follow with a score of 4.3438. Sensitizing and training are about creating awareness and therefore closely related. It is also important that when one objectively trains or sensitizes for a purpose or deliverables, the trainees are monitored to assess whether the training was effective and benefited the trainees. It is about impact assessment.

A population whose poverty is reduced and who have been sensitised and trained are expected to garduate to a higher level. The enhanced skills and management compenteces in turn imply business capacity that will requiure that in addition from internal sources, enterprises can leverage external sources to increase their funding. It is therefore logical that next to poverty alleviation programs, sensitisation and tarining, facilitation of informal trade to access the business capital, scoring a mean of 4.6667 is next. At the same level of score is reduction of rates imposed on taxpayers` business. This is so because with a wider tax base and well sensitized and better capitalized businesses, more revenue can be raised by a responsive community, with more taxable profits.

e) Relationship between informal trade and tax compliance

Correlation is a measure or degree of relationship between variables. Statistical correlation can be positive, negative or zero. In the table below we interrogate the relationship between informal trade and

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tax compliance in Nyarugenge District. The Spearman's correlation coefficient, r, can take values from +1 to -1. The higher the magnitude of the r, the higher the revealed relationship, whether negative or positive.

Table 14: Correlations Analysis

Correlation				Informal trade		Tax compliance
Spearman's rho	Informal trade	Correlation Coefficient		1.000		.660**
		Sig. (1-tailed)		.		.000
		N		96		96
	Tax compliance	Correlation Coefficient		.660**		1.000
		Sig. (1-tailed)		.000		.
		N		96		96

The findings presented in table 14 show that there is a slight positive relationship between tax compliance with informal trade at 0.666, sig .000. This implies that more has to be done to raise the relationship. On the good side, on their part the informal sector taxpayers are not totally oblivious of their statutory role of paying taxes. The government of Rwanda can do a close study elsewhere, especially in Africa to improve on tax compliance.

XI. Conclusions

The factors for tax compliance and non-compliance are two-way. Governments, including that of Rwanda, must promote an equitable legal and regulatory environment for the conduct of business in general, and as revealed in this study, for tax purposes. They must provide enabling tax education programs, set tax rates reasonably, be evidently seen to provide benefits for the taxes paid and have in place adequate and appropriate institutional mechanisms and systems that make appreciation of tax issues and payments convenient for the tax payer. The government has political and social contracts with the people governed, to provide social and other services, as well as the physical infrastructure like roads and utilities like water and power. On their part the governed have the reciprocal and statutory obligation to raise the funds, through among others, paying taxes, to enable government execute its duties and responsibilities under the social and political contracts. They have to pay taxes, which the government will have set, mindful of the canons and principles articulated above.

Respondents were cagey when they were asked about whether there may be inhibitive vices such as frequent payment to non-state actors, for instance criminal gangs or corrupt officials who offer protection to evaders, which reduces individual's likelihood to have tax compliant attitude. With the findings of study which revealed institutional challenges of, for example, lack of transport, there could be gaps which could allow the vices to creep in.

It is noted from the findings that on their part the informal sector taxpayers in Rwanda are not totally oblivious of their statutory obligations of paying taxes. However, government has to substantially enhance public awareness by way of tax education and accompany this with providing tangible benefits in return for the sacrifices the taxpayer makes.

XII. Recommendations

Tax compliance is only one aspect of the multifaceted and very important matter of the tax discipline. Further studies can for example be done with respect to the national budgetary processes and fiscal policies in Rwanda and other developing or emergent countries. These have an impact on compliance or otherwise, with taxation.

Nations are so closely interrelated in the globalised world that the impact of this phenomena can be a very interesting aspect of tax compliance. Study in this area would be value enhance.

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Economic Estimation of Profit and Selling Price Across Supply Chain

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Abstract- This article aimed at Economic Estimation of Profit and Selling Price across supply chain. Business chain management is crucial for effective operations and Economic Profit and Selling Price Estimation and management across supply chain and meet customer and suppliers needs. Companies should try to establish Mathematical kinds of economic productive relationships with their suppliers that they have with their customers. By developing partnerships, customers and suppliers can build economic relationships that will help them satisfy their shared customers and end users further along the customer-supplier chain.

Keywords: *economics; supply chain; profit; price; customer; supplier.*

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Economic Estimation of Profit and Selling Price Across Supply Chain

Ibrahim Bedane [α] & Mahmud Abdurahmen Mohammed [σ]

Abstract- **This article aimed at Economic Estimation of Profit and Selling Price across supply chain. Business chain management is crucial for effective operations and Economic Profit and Selling Price Estimation and management across supply chain and meet customer and suppliers needs. Companies should try to establish Mathematical kinds of economic productive relationships with their suppliers that they have with their customers. By developing partnerships, customers and suppliers can build economic relationships that will help them satisfy their shared customers and end users further along the customer-supplier chain.**

Keywords: economics; supply chain; profit; price; customer; supplier.

I. Introduction

The process of business economy management is now presenting a multitude of challenges to governments and all organizations that both provide, directly or indirectly, services to citizens, and undertake large-scale projects with national and international impacts. Global competition for profitability of market actors and citizens demand for fair priced technologically empowered quality product and service worldwide are making these challenges more formidable, and governments can no longer hide behind bureaucratic rules, inadequate resources, and managerial inefficiency while performing their functions.

We are facing inflation daily with out any tangible reason. Price is surging trimendesly. Managing trade is weak and trading become uneconomically surging price of products and services across business chain. Individuals usually add price on products they sells and services they offers. Organizations are increasing price of product they produce and service they offers because of unbalanced economic conditions and their own uneconomical profitability desires. Product and service Price is increasing across Business chain and purchasing cost of product is become high and higher which affect economy of end users. End users, customers, are challenged by demands for better quality services, improved performance standards, and more fair and responsiveness commodity price across Business chain. While there is a long way to go, the first steps must be taken and this article offers strategic instrument toward optimal economic goal of improved Economic Estimation of Profit and Selling Price across Business chain mathematically.

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Suppliers are those business firm that provide goods and services that help them to satisfy the needs of their own customers. The idea of creating mutually beneficial relationships with both customers and suppliers is a major departure from the traditional approach to customer and supplier relationships. Thus, there must be economic method of managing price of products and services across supply chain. This article present the general concept of business and business chain management. Core concepts of Economic Profit And Selling Price Estimation using mathematical techniques to measure, analyze and implement Economic customer-supplier relationships and productive business chain Profit And Selling Price management across business chain is aim of this article.

II. Analysis and Result

Every Business is part of a long chain (actually many long chains) of customers and suppliers. Each Business is a customer to its suppliers and a supplier to its customers, so it does not make sense to think of a Business as only one or the other. One implication of this concept is that your customer's customers are, in a sense, your customers as well. Sometimes a Business must focus on both their immediate customers and those next in the chain. Business firm must works hard to satisfy the needs of both the people who use their products and the retail establishments that sell them, labeling the former price and across customer-supplier business chain of consumers and the latter customers.

We are trading and offers services across supply chain from raw material producers, processors, product producers or importers, whole sellers, retailers, distributors to shops. At every stage of supply chain there is needs of profits and profitability. However, end users need and require quality product and services with fair price. Both suppliers and end users or customers need profit and price that must be economical so that they get need and requirement satisfaction. Costs and time (number of days product waits to be solled) are two basic factors to manage profits and price of products and services let alone quantity is one of determining factor of number of days product waits. Initial cost of product is one of basic factor to determine profits and product prices across Business chain with expected mean number of days product waits.

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Note: Commodity with low initial cost per unit product should have higher unit product profit in relation to initial unit cost where as Commodity with higher initial unit cost should have lower unit profit in relation to initial unit cost. Moreover, Commodity waiting short mean number of days shall have lower profitability rate where as Commodity waiting longer mean number of days shall have higher profitability rate as per mean number of days Commodity stored and waits to be solled at each Business chain mathematically. Thus, expected profit of unit Commodity at Business chain shall be:

$$E.\Pr = IC * Log^{Wd} IC$$

Where

- E.Pr - expected unit Commodity Business chain profit
- IC- Initial cost of unit Commodity
- Wd- unit Commodity waiting days

$$Wd = \frac{\sum_{BC1}^{BC-n} mean_days}{n} = \frac{T.days}{n}$$

Where n is number of actors across business chain

Note: Unit cost of unit Commodity at each chain of Business chain is base where as mean unit Commodity waiting days is factor of rate of profit logarithm function of business chain.

The quality of goods and services received from suppliers, the upstream potion of the supply chain, has a significant effect on the quality of goods and services that downstream customers receive. Similarly, The price of goods and services payed to unit Commodity received from suppliers, the upstream potion of the business chain, has a significant effect on the price of goods and services that downstream customers shall pay to receive. Thus, unit Commodity selling price at each chain of supply chain shall be:

$$C + (IC * Log^{Wd} IC) * \frac{M.days}{T.days}$$

Where

- C- cost of unit Commodity
- M,days- mean unit Commodity waiting days of actor
- T,days- Total unit Commodity waiting days of chain

Note: Initial cost of unit Commodity at upstream potion of the business chain has a significant effect to set profitability at every stage of business chain and become constant for all actors across business chain. unit Commodity profit of chain actors shall be:

$$E.\Pr * \left(\frac{Mean_BC_days}{Total_mean_days}\right)$$

With the help of GGOOCHAA let as see some examples

Example: trading across five actors of supply chain from product producers or importers, whole sellers, retailers, distributors to shops to reach end user with Initial cost of unit Commodity 9br and mean Commodity waiting days at business actors across business chain are as shown on figure.



Unit Commodity waiting days of Business chain

Wd=31/5 = 6.2 days

Expected profit of unit Commodity of chain is:

$$IC * Log^{Wd} IC = 9 * Log^{6.2} 9 = \underline{7.473Br.}$$

Unit Commodity selling price at end of chain

$$IC + IC * Log^{Wd} IC = 9 + 7.473 = 16.473 \text{ Br.}$$

Share of Profit of each actors of chain depends on mean Commodity waiting days of each actor across business chain. They share profit as per their mean Commodity waiting days. unit Commodity profit of BC actors shall be based on expected unit Commodity Business chain profit= 7.473 Br.:

Unit Commodity profit of producers or importers is

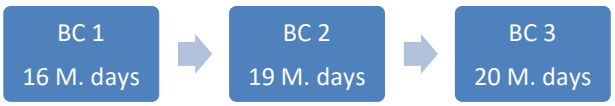
$$7.473 * \left(\frac{3}{31}\right) = 0.723\text{Br.}$$

Unit Commodity selling price of producers or importers is: 9Br. + 0.723 Br. = 9.723 Br.

Similarly

Unit profit of whole sellers= 1.205Br.
Unit selling price of whole sellers =10.928Br.
Unit profit of retailers, =1.687Br.
unit selling price of retailers,= 12.616Br.
Unit profit of distributors=1.687Br.
Unit selling price of distributors =14.304Br.
Unit profit of shops=2.169Br.
Unit selling price of shops=16.473Br.

Example: trading across three business actors of supply chain of producers or importers (BC 1), whole sellers or retailers (BC 2), distributors or shops (BC 3) to reach end user with Initial cost of unit Commodity 4,000br and mean unit Commodity waiting days at actors varies across business chain as shown on figure.



Unit Commodity waiting days of Business chain

Wd=55/3 =18.33days

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Expected profit of unit Commodity of Business chain is:

$$= 4{,}000 * Log_{4{,}000}^{18.33} = 1402.798\text{Br.}$$

Unit Commodity selling price at end of chain

$$= 4000 + 1402.798 = 51402.798\text{Br.}$$

Expected profit and selling price of unit Commodity at each Business chain

Producers or importers unit Commodity profit 408.087Br.	Producers or importers unit Commodity selling price=4408.087Br.
Whole sellers or retailers unit Commodity profit 484.603Br.	Whole sellers or retailers unit Commodity selling price=4892.689Br.
Distributors or shops unit Commodity profit 510.108Br.	distributors or shops unit Commodity selling price 5402.798Br.

Example: trading across supply chain of single business actor act as producers or importers and sellers to reach end user acts with Initial cost of unit Commodity 300,000br and mean unit Commodity waiting days of business chain is 20 days.

Expected profit of unit Commodity = 71261.705Br.

Unit Commodity selling price is= 371,261.705Br.

Note: as number of days increase income increase due to cost corresponding days. For instance, if mean unit Commodity waiting days of business chain of example 3 increase from 20 days to 29 days expected profit of unit Commodity at Business chain will be increased to 80,100.36276 with additional income of 8,838.657831.

Note: if there is shortage of supply of commodity we can manage it economically by:

1. Increasing initial cost of commodity economically as per supply and need and requirement of commodity and reducing days as per demand.
2. Increasing initial cost of commodity economically as per supply and letting days constant as per need and requirement of commodity.
3. Using initial cost of commodity economically as per supply and letting days constant and reducing chain actors as per need and requirement of commodity.

III. Discussion and Conclusion

Businesses have recognized that supply chain management is crucial for effective operations and meeting customer needs. In business today, operations are often highly decentralized and dispersed around the world. Consequently, managing a complex network of suppliers becomes a critical inter organizational issue. Suppliers play a vital role throughout from design through distribution. Suppliers can provide technology or production processes not internally available, early design advice, and increased capacity, which can result in lower costs, faster time-to-market, and improved quality for their customers. In turn, they are assured of stable and long-term business.

Supply chain management is crucial for effective operations and meeting customer and suppliers needs. Companies should try to establish economic productive relationships with their suppliers that they have with their customers. By developing partnerships, customers and suppliers can build relationships that will help them satisfy their shared customers further along the customer-supplier chain.

Three governing principles describe customer-supplier relationships:

- Recognition of the strategic importance of customers and suppliers,
- Development of win-win relationships between customers and suppliers, and
- Establishing relationships based on trust.

Customer must be at the center of the business universe. Satisfying their needs leads to repeat business and positive referrals, as opposed to one-shot business and negative referrals. Suppliers must also be considered crucial to Business success, because they make it possible to create customer satisfaction economically. Neither the quality nor the cost can be brought to competitive levels and continuously improved without the contributions of suppliers.

The second principle of customer-supplier relationships is the need to develop mutually beneficial (often called win-win) relationships between customers and suppliers economically. This was discussed previously as working together to increase the size of the pie, rather than competing over how to divide it. The goal of building partnerships with customers and suppliers can be seen as an extension of the teamwork principle that applies to economic activities and as recognition that the needs of both partners must be satisfied if economic productive long-term relationships are to be created.

The third principle of effective customer-supplier relationships is that they must be based on trust rather than suspicion. Aside from the obvious teamwork implications for relationships based on trust versus suspicion, monitoring supplier or customer behavior does not add any value to the product and customers satisfaction. If a trusting relationship between customers and suppliers can be developed so that neither must check up on the behavior and profitability of the other.

Customer-supplier chain can be broken at any point by one person or one piece of equipment not meeting the requirements of the customer. Failure to meet the requirements in any part of a chain has a way of multiplying, and failure in one part of the system creates problems elsewhere, leading to yet more failure and problems, and so the situation is exacerbated. The

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ability to meet requirements is vital. To achieve quality throughout a business, every person in the chain must be trained how to build and maintain customer-supplier relationships economically.

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Determinants of the Adoption of Dashboards in SMEs

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Keywords: *dashboard; econometric model; manage-ment control; financial performance; Cameroon.*

GJMBR-B Classification: *JEL Code: C58, G40, L25, M21*



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Determinants of the Adoption of Dashboards in SMEs

Alain Takoudjou Nimpa [α], Camille Kamga Wendji [σ], Adriana Burlea Schiopoiu [ρ] & Francine Yimga Ngassam [ω]

Abstract- The objective of this research is to highlight the factors driving the structural and behavioural contingencies to the adoption of dashboards by small and medium sized enterprises (SMEs) in the Cameroonian context. Using data collected from 314 SMEs, we conducted an exploratory analysis, in order to investigate the factors that could have an influence on the use of dashboards and a multiple correspondence factorial analysis in order to identify the characteristics of SMEs using dashboards. On the other hand, a binary logistic regression was done to unveil the factors that stand behind the usage of dashboards in Cameroonian SMEs. Our findings indicate that the formal nature of the SME, the power delegation, the presence of an experienced leader, the pressure of foreign competition, the age of the company, the use of follow-up software in organizational processes and the implementation of a system to reward the employees when they achieve positive results, are the factors that enable the adoption of the dashboard.SMEs managers, informed by the results of our research, will be able to improve the control of their organizational processes by better identifying the recent contextual factors likely to influence their management information gathering processes from the dashboard. This study provides value in the recent contextual factors that may drive the adoption of management process and tools management such as dashboards. Our research is innovative because it expands the angle of the analysis by incorporating both the formal and informal sector.

Keywords: dashboard; econometric model; management control; financial performance; Cameroon.

I. Introduction

The adoption of management performance tools is presented in analysis as an enabling factor for SMEs to face the current challenges of an increasingly complex environment (Julien 2000), and also to help their own personal growth. Therefore, if the instrumentation of management constitutes a strategic issue for the viability of SMEs, the fact remains that there is still an unfavourable echo of the prescriptions of management tools. Part of the unfavourable echo however can be explained by criticisms made about management tools (Berry 1983; Moisdon 1997), but most especially the particularities of SMEs in relation to its organizational style and the profile of its leader given the central role he plays (Schmitt et al. 2002). In fact, the introduction of management measures will lead to resistance tendencies that must be taken into account because they condition the success or failure of the approach.

Since the second half of the 1980s, many studies have proven that traditional tools are inefficient. (Johnson and Kaplan 1987). They are primarily based on financial situations, with historical information, and not enough openness to the external world. The clarification they bring to managers is ultimately less relevant to help them make strategic decisions. Today, the cycle of management control has been completely enriched. The strategy and choice of management tools (balanced dashboard, ABC method, cost target, etc.) condition the process of management control and it is interesting to know the factors that predispose SMEs to adopt management tools, among which the best known is the dashboard.

Both in the field and as a research topic, one can see the legitimacy of the SME. In Cameroon, the National Institute of Statistics (INS) through its report on the 2016 RGE -2 revealed a strong increase of companies in the national territory, of the order of 123% compared to 2009 (between 2009 and 2016, we went from 93969 units to 209482 units). There is a predominance of Very Small Enterprises (SMEs) and Small Businesses (SB) with 98.5% units followed by Medium Enterprises (ME) with 1.3% and finally LE (Large Enterprises) with 0.2%. This enables us to confirm that SMEs constitute the major economic force of our country and therefore represent an undeniable factor of job creation. However, this legitimacy suffers due to the context in which it evolves. In fact, it faces the same challenges as large companies with different of resources and organization. Cameroonian SMEs are mostly family businesses with a high concentration of capital. Shares are constituted by family, tribal or friendly affinities, with a strong propensity of the shareholders' borrowed name (Wamba, 2001; Sangué-Fotso, 2011). The management style of a very small company is not very different from that of the medium seize company. In fact, the family greatly influences decision-making process, staff recruitment, and so on. The proprietor concentrates almost all power himself regardless of the

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type business. He relies on experience, or even empiricism to organize and manage his company. The results of the last general census of enterprises (GCE-2, 2016) suggest that Cameroonian SMEs suffer from a structural and organizational weakness that does not permit them to do effective bookkeeping in order to produce reliable financial statements, summary and give readability of the activity.

The management control tools, first and foremost, the dashboard was originally set up in large companies to cope with the complexity of management situations and to drive the overall performance of the company (Kaplan and Norton 1996). However, some authors (Epstein and Manzoni 1998; Mendoza and Bescos, 1999; Mendoza et al., 2002; Germain 2001, 2004 and 2005), stated that the use of the dashboard should be contingent, depending on the specificities of each company and not following a standard model. Chapellier (1994) proposes taking into account structural contingencies such as size, age, the degree of computerization of management and the nature of the activity; or the profile of the leader.

Given the particularities of SME and the more or less rational and standardized nature dashboards, including the BSC, a question emerges:

What are the determinants of the adoption of dashboards in the Cameroonian SMEs?

Our goal is twofold. On the one hand, determine the structural contingencies to the adoption of DB and on the other hand, behavioural contingencies. This article is structured around three axes. The theoretical framework and research hypotheses are first discussed. The methodological framework is then presented. Finally, the results are exposed and discussed.

II. Theoretical Framework and Research Hypotheses

a) *Psycho-cognitive logic in the adoption of management tools*

Contingent vision (Lawrence and Lorsch 1973; Mintzberg 1982) is undoubtedly important in identifying the determinants of adoption of DB. It introduces the notion of contextualization of management tools. An instrument would have different consequences for management decisions depending on the type of organization in which it is introduced (Moisdon 1997). However, in the context of SME and the central role played by its leader, it seems useful to address the theoretical anchoring by a cognitive logic.

Here we review the work of Lorino (2002) which shows that the management tool, as an instrument, has a practical impact only by its insertion in human activity. Two elements are generally involved in the mechanisms of psycho-cognitive appropriation of management tools. First, we rely on the work of Justin (2004), which puts forward the said "behavioural" approach of management tools. It shows that the tool is dependent on the actor and three types of intentions: strategic (conscious willingness to generate organizational performance), influence (the tool is chosen according to its persuasiveness or stakeholder orientation) and manipulation (acting on one's own interests or personal values) Secondly, the appropriation and use of a management tool will depend on the intrinsic characteristics of the individual and behavioural (Piaget 1998; Goffman 1991; Piaget and Inhelder 1998).

b) *The management tools used by SMEs: the place of the dashboards*

Studies have shown that the management of SMEs is not totally intuitive. Thus, Fernandez, Picory and Rowe, (1994), through their study of 102 SMEs, have shown that there are a large number of management tools. They classify them into three groups: forecasting tools (plans and budgets), monitoring tools (dashboards) and analysis tools (management and financial accounting). According to Nobre (2001b), while carrying on a study on a sample 86 companies between 50-500 employees, points out that management tools such as the dashboard, budgets and gap calculation are widely used by the SMEs.

In the Cameroonian context, several studies (Djoutsa, Takoudjou and Simo 2013; Ngongang 2006, 2010; Nyengue and Edimo 2003; Nimpa, Wendji and Wendji 2019), conclude that the most common CDG tools in SMEs are traditional (cost approach).

The place reserved for the dashboard in the management of companies remains quite controversial. Tool designers and many other authors (Epstein and Manzoni 1997; Kaplan and Norton 2001; Fernandez 2003), regard the dashboard as being a central tool, an alternative to the traditional budget system. Contrarily, authors such as Mendoza and Zrihen (1999)consider that the reporting cannot replace dashboard.Zecri (2000) adds to the debate and stated that it is impossible to run a business without budgets. Gray and Pesqueux (1993) adopt a compromising position, and put forward the idea that if the dashboard serves to follow the general objectives at the level of the head office, then it can be one tool among others, if it serves to monitor the day-to-day activities at the operational level, then it must be a central tool.

c) *The factors influencing the adoption of DBs*

Several studies have examined the link between the use of the dashboard and some contingent factors (Zian 2013). These factors can be classified in several groups such as structural, organizational and managerial or individual.

i. *Structural factors of influence*

Regarding the defining elements of the company, Nobre (2001a) conducted a study in France

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and concluded that the size of the company constitutes a contingency factor and reason for the use of the dashboard (DB). Several other authors in different contexts confirmed this insight, notably Lavigne (2002) on 282 Québec manufacturing SMEs and Van Caillie (2002) in an exploratory research conducted among 100 medium-sized manufacturing SME in Belgium; Hoque and James (2000), using a sample of 66 Australian companies. Larger organizations therefore have the performance measurement practices that are closest to those of the balanced dashboard (Jorissen et al. 1997, Germain 2004, Elhamma 2013, Ngongang 2013). The age of the firm represents also a contingency to management instrumentation (Mintzberg 1982). The ownership structure of the company or the family nature of the company can also constitute a significant contingency factor of the use of the dashboard (Lavigne, 1999) or a blockage to the establishment of the CDG (Meyssonnier and Zawadwki 2007).

With respect to environmental and contextual factors, several studies (Choffel and Meyssonnier2005; Chapman 1997; Fisher 1998; Hartmann 2000) suggest that uncertainty as well competitive environment will force organic structures that favour the search for external and non-financial information (Condor and Rebut 2008) to conclude that a company operating in a highly competitive industry will be more motivated to use management tools than one operating in a less competitive industry.

ii. *Organizational and managerial factors*

In addition to the environmental factors, SME are subject to the organization and managerial practices of their companies. The strategy adopted by the company (differentiation, cost control, internationalization) generally forces it to implement more or less sophisticated tools (Bergeron 2000; Lorino 2003). This management instrumentation is also dependent on certain practices such as the promotion of research and development activities (Simons 1995), strategic planning (Pettersen et al. 2011), the delegation of power (Couturier 2007; Aizicovici 2007; Oumy, 2018) the gratifications granted (Derraz 2014), the use of Integrated Management Software (Chiapello and Delmond 1994, Elhamma 2011, Edwards 2001) or the ability to innovate of the company (Dangereux 2016).

iii. *Individual factors related to the leader*

Some researchers (Holmes and Nicholls, 1989; Meyssonnier 2015; Santin and Van Caillie 2008; Ndjambou and Sassine 2014) are going beyond the framework of organizational factors and integrate cognitive aspects or intrinsic value. According to Bayad and Garand (1998), decisions in SME would be guided by the way the leader is perceived, that is to say by his learning style (his cognitive strategies) and his expectations, result of his past learning. In the write up the accounting and CDG practices are, in SME context, strongly influenced by the manager's level of education (Ngongang 2013, Ngongang and Noumouen Njoyo 2018), his basic training (Lavigne 1999; Abi Azar 2005) or complementary (Bamboky and Meysonnier 2012) or by his experience (Gottesman and Morey 2004; Ngongang 2006).

III. Methodology

a) Source of data and characteristics of the sample

The data used in this study resulted from a survey as part of the international project on the analysis of the determinants of business performance in French-speaking sub-Saharan Africa, funded by IDRC (International Development Research Center). As part of its "Growth for All" Program. This data was collected from 642 companies in the three main cities of Cameroon (Yaoundé, Douala and Bafoussam), based on the data from the World Bank's Regional Program on Enterprise Development Cameroon-2009 (RPED). We finally selected 314 SMEs with 6 and 100 employees, thus constituting our sample. The characteristics are presented in Table 1 below.

Table 1: Characteristics of the sample

Criteria	%	Criteria	%
Legal Status		Leader Status	
Unique owner	38,1%	Owner	71,65%
Limited liability companies	50%	Non owner	28,35%
Unlimited liability companies	11,9%		
Turnover in (FrsCFA)[1]		Basic training of the leader	
[15 – 50 million]	40,48%	Basic training in relation with enterprise related fields.	55,73%
[51 – 100 million]	23,81%	No basic training in enterprise related fields.	44,27%
[101 – 500 million]	28,57%		
[501millions – 1bilion]	7,14%		
Age of SME		Leader's experience	
[1 – 5 years]	33,33%	Experience acquired from another enterprise	53,18%
[6 – 10 years]	19,05%		

[1]1euro=655,957 francs CFA

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[11 – 20 years]	28,57%	No experience	46,82%
+ de 20 years]	19,05%		
Nature of activity		Use of dashboards (DB)	
Food industry	35,71%	Yes	27,39%
Transformation industry	9,52%	No	72,61%
Services	42,86%		
General trade	11,91%		
Formality of the SME			
Informal SME	83,44%		
Formal SME	16,56%		

Source: DATA from CRDI research

A simple analysis shows that amongst the 314 SME sampled, 86 are using the dashboard (27.39%) and 228 do not use it yet. This result adds to that of Ngongang (2010) which indicates the presence and the use of dashboards in Cameroonian SMS but with a limited proportion compared to practice of costing.

b) Operationalization of variables

We have identified in the write up that the table that summarizes these factors is the following table.

Table 2: Operationalization of variables

		The variables	Description of the variable	Authors
1	2	3	4	5
Dependent variable		Adoption of the Dashboard in SME (DB)	Dichotomous variable that takes the value of 1 if the SME uses dashboard (DB) and 0 value if not	Kaplan and Norton 1992, 1996; Simons 1995; Elhamma 2012; Said et al. 2003; Takoudjou and Teulon 2018; Nimpa & al 2019.
Independent variables	Characteristics of the SME	Age of SME 10 years and above (*AgGreater than10*)	Dichotomous variable that takes the value of 1 if the SME is 10 years or more than 10 years and 0 if not.	Mintzberg, 1982; Chapellier, 1994
		Medium Seize Enterprise (*Meseize*)	Dichotomous variable that takes the value 1 if the enterprise is a medium seize enterprise and if 0 if not.	Nobre 2001a, 2001b; Lavigne 2002; Van Caillie 2002; Hoque and James 2000; Elhamma 2013; Ngongang 2013.
		Formal SME (*Formalite*)	Dichotomous variable that takes the value 1 if the SME is formal and 0 if not.	Hernandez, 1997; Kamdem, 2000.
		Ownership structure (*STRUCAPI_SA*)	Dichotomous variable that takes the value 1 if the SME is an unlimited liability company and 0 if.	Ngongang 2006; Ngongang and NoumouenNjoyo 2018.
	Environmental and contextual factors	Competition/Competition of the foreign companies / Environment (*presccrétra*)	Dichotomous variable that takes the value 1 if the SME is undergoing a strong foreign competition and 0 if not	Dimaggio and Powel 1983
		Competition/Competition of the of national enterprises/ Environment (*presccrnat*)	Dichotomous variable that takes the value 1 if the SME is undergoing a strong national competition and 0 if not.	Pettersen at al. 2011
	Organizational factors	The vision/goals targeted by the main manager (*infvisObjEls*)	Dichotomous variable that takes the value 1 if the main manager has a training in an enterprise related fields and 0 if not.	Chapellier 1994, 1997; Pettersen at al. 2011; Ndjambou and Sassine 2014
		Encouraged research activities for the past 2 years (*redev2ane*)	Dichotomous variable that takes the value 1 if the SME has carried out research activities for the pass and 2 years 0 if	Simons 1995; Katia 2016

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			not	
		Strategic Planning (*Bplancrea*)	Dichotomous variable that takes the value 1 if the business had a business plan at the beginning of the enterprise and 0 if not.	Pettersen at al. 2011
		Delegation of Responsibilities (*Delpridec*)	Dichotomous variable that takes the value 1 if the manager delegates powers and 0 if not	Oumy, 2018
		Offers special gratifications when impressed with positive results (*Gratspe*)	Dichotomous variable that takes the value 1 if the manager offers gratifications and if not	Derraz 2014
		Use of follow up software (*logicsuiproc*)	Dichotomous variable that takes the value 1 if the enterprise uses follow up software and 0 if not	Woodward 1965; Chiapello and Delmond 1994; Elhamma 2011.
		Innovation in organisational procedures (*invOrg11_13*)	Dichotomous variable that takes the value 1 if the main manager innovates in his organisational procedures and 0 if not	Simons 1995; Katia 2016
	Individual factors linked to the manager	Level of studies (*BacEtPlus*)	Dichotomous variable that takes the value 1 if the main manager has a qualification equivalent or superior to GCE Advanced level and 0 if not	Ngongang 2006, 2018.
		Continuous training of the manager for the past 5 years (*Form5ane*)	Dichotomous variable that takes the value 1 if the main manager is trained and 0 if not.	Bampoky and Meyssonnier 2012; Ngongang 2018.
		Experience of the manager due to the fact the must have acquired competence and aptitude in other enterprises where worked (*ExpManager*)	Dichotomous variable that takes the value 1 if the main manager is experienced and 0 if not	Gottesman and Morey 2004; Chapellier 1994, 1997; Bergeron, 2000; Ngongang 2006, 2018.
		Basic training of the main manager of the enterprise (*FormetierElse*)	**Dichotomous variable that takes the value 1 if the main manager has a training in an enterprise related fields and 0 if not.**	**Gottesman and Morey 2004; Chapellier 1994, 1997; Lavigne 1999; Bergeron 2000; Abi Azar 2005; Ngongang 2013.**

Source: The authors

c) Econometric model of dashboard

The general form of the econometric model is as follows:

$$Tablobord = \alpha 0 + \alpha 1FCS + \alpha 2FCC + \varepsilon$$

With Tablobord, the dependent variable indicating the adoption or not of dashboards in Cameroonian SME.

FCS and FCC are respectively the vectors of independent variables in relation to the structural and behavioural contingency factors, likely to determine the adoption or not of dashboards by SME.

$\alpha 0$ = the constant; and the others α ranging from 1 to 2 = regression coefficients and i = individuals or SME

At the end of the Factorial Analysis of Multiple Correspondences (AFCM) which followed the review of the literature of this research, and given the general model above, we can have the following specific model:

$$Tablobord = \alpha 0 + \alpha 1Age10etplu + \alpha 2Measurement + \alpha 3Formality + \alpha 4Presccret + \alpha 5Delpridec + \alpha 6Gratspe + \alpha 7logicsuiproc + \alpha 8ExpManager + \alpha 9BacEtPlus + \alpha 10\ FormetierEse + \varepsilon i$$

With $\alpha 0$ being the constant, the others α ranging from 1 to 10, the regression coefficients. As determinants of the use of the dashboards in the SMEs selected at the end of the phase of multidimensional exploratory analysis (MCA), we have: the age of the company above 10 years (Age10etplu); the size of the company (Moytaille); the formal or informal character of the SME (Formalite), the pressure of foreign competition or the external environment (Presccrétr); delegation of decision-making (Delpridec), the use of special bonuses in case of positive employee results (Gratspe); process

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tracking software (logicsuiproc); the experience of the main SME manager (ExpManager); the level of education of the manager superior or equal to the baccalaureate (BacEtPlus) and the basic training of manager (FormetierEse).

d) Choice of tools and methods of data analysis

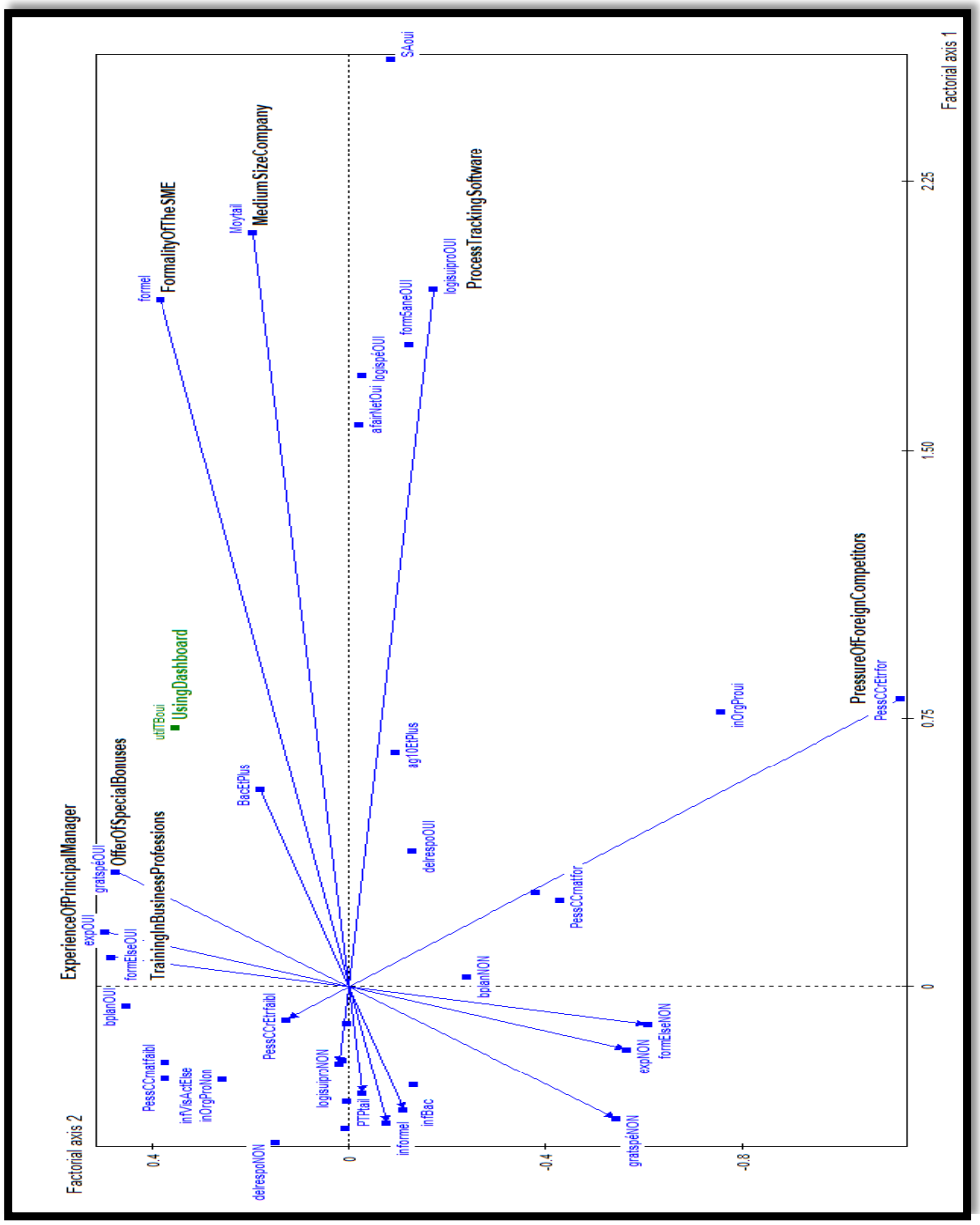
Data collected from a secondary source was coded and processed using Spad5.5 and Stata 13 software. These data were processed in two phases. The first phase is subdivided into two stages. In the first step, we started from the existing work on contingency factors to select those factors that served as a basis for exploration in Cameroonian SMEs. In the second step, we have developed an ACM of the factors found in the previous exploratory phase to draw the most important factors likely to have an influence on the adoption of the dashboard in Cameroonian SMEs. In the second phase, a logistic regression made it possible to establish the link between these contingency factors and the use of the dashboard.

IV. Results and Discussion

The discussion of the results of this study is based on both exploratory analysis and binary logistic regression.

a) Interpretation and discussion of the results of the ACM

The figure 1 serves as the basis for the interpretation of the ACM. It also makes it possible to justify the variables contained in the econometric model of the previous section.



Source: Data analysis in spad5.5

Figure 1: Representation of the data in the first two dimensions by AFCM (dim1 and dim2)

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By observing the figure above indicating the relationships between the determining variables in the use of the dashboards and the non-use of the said dashboards, it is easy to notice that the characteristics that best define the use of the dashboards modalities are: formality, delegation of decision-making (decentralization), age of SME greater than or equal to 10 years, average company, special bonuses offered to employees in case of positive results, the experience of the principal manager, the level of education higher or equal to GCE Advanced level, the basic training of the main manager of the company (in relation to the business or non-business professions), software for monitoring procedures, pressure from the external competition. These modalities are selected on the basis of the principle according to which each modality or each variable is positioned in the graph at the centre of gravity of the individuals who possess it, or modalities and variables which are close to it.

b) Interpretation and discussion of the results of the correlation matrix

The following table summarizes the results from the correlation matrix.

Table 3: Summary of the correlation matrix between variables at the 1% threshold

Presccrétr	Gratspe	Logicsuiproc	Ag10etPlus	Moytaille	Formalite	BacEtPlus	Delpridec	FormetierElse	Exp Manager	Tablobord	Variables
0.1236 0.0285	0.2575* 0.0000	0.2277* 0.0000	0.2450* 0.0000	0.2667* 0.0000	0.3796* 0.0000	0.1594* 0.0046	0.3005* 0.0000	0.0154 0.7860	0.2614* 0.0000	1.0000	Tablobord
-.0426 0.4520	0.1619* 0.0040	0.0752 0.1840	0.0375 0.5079	0.1017 0.0718	0.1776* 0.0016	-.0046 0.9348	0.0723 0.2014	0.2817* 0.0000	1.0000		ExpManager
-.0601 0.2886	0.2233* 0.0001	0.0370 0.5132	-.1074 0.0572	0.1023 0.0701	0.1211 0.0320	-0.0057 0.9192	-0.0210 0.7114	1.0000			FormetierElse
0.1663* 0.0031	0.1039 0.0660	0.1373 0.0149	0.2512* 0.0000	0.2349* 0.0000	0.2435* 0.0000	0.1871* 0.0009	1.0000				Delpridec
0.0145 0.7985	0.2002* 0.0004	0.1328 0.0185	0.2053* 0.0002	0.3169* 0.0000	0.4218* 0.0000	1.0000					BacEtPlus
0.1331 0.0183	0.2951* 0.0000	0.4844* 0.0000	0.3496* 0.0000	0.7414* 0.0000	1.0000						Formalite
0.1285 0.0228	0.2349* 0.0000	0.4580* 0.0000	0.3161* 0.0000	1.0000							Moytaille
0.1035 0.0670	0.1013 0.0732	0.1352 0.0165	1.0000								Ag10etPlus
0.1708* 0.0024	0.1373 0.0149	1.0000									Logicsuiproc
-0.0026 0.9640	1.0000										Gratspe
1.0000											Presccrétr

Source: Data Analysis in Stata 13 **Significant influence at 1%.*

Since the logistic regression can interpret only the signs of the coefficients, it is very often recommended to calculate the marginal effects in order to deepen the interpretation in terms of the level of influence of one variable on another.

Table 4: Logistic regression results

Iteration 0: logpseudolikelihood = -184.34473
Iteration 1: logpseudolikelihood = -144.957
Iteration 2: logpseudolikelihood = -142.96356
Iteration 3: logpseudolikelihood = -142.95689
Iteration 4: logpseudolikelihood = -142.95689

Number of observations = 314
Wald chi2(8) = 61.35
Prob>chi2 = 0.0000
Pseudo R2 = 0.2245

Log pseudolikelihood = Logisticregression

Tablobord	Robust		Z	P>|z|	95% Confidence Interval	
	Coefficient	Std. Err.				
ExpManager	1.063099	0.3110853	3.42	0.001	0.4533832	1.672815
Delpridec	1.10571	0.3275424	3.38	0.001	0.4637385	1.747681

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BacEtPlus	-0.0979665	0.3306821	-0.30	0.767	-0.746091	0.5501584
Formalite	0.9944033	0.4652157	2.14	0.033	0.0825973	1.906209
Ag10etPlus	0.5633079	0.337157	1.67	0.095	-0.097507	1.224124
Logicsuiproc	0.5119689	0.4686117	1.09	0.275	-0.406493	1.430431
Gratspe	0.7778446	0.3252537	2.39	0.017	0.1403591	1.41533
Presccrétr	0.4561205	0.4630565	0.99	0.325	-0.451453	1.363695
_cons	-3.240438	.4058445	-7.98	0.000	-4.035879	-2.444997

Source: Data Analysis in Stata 13

The marginal effects in a censored regression model correspond to the deformation of the predictions on the dependent variable caused by a variation of one unit of one of the explanatory variables (Cameron and Trivedi 2005). Thus, the following table presents the marginal effects of logistic regression.

Table 5: Marginal effects related to logistic regression results

Marginal effects after logit			y = Pr (Tablobord) (predict) = 0.22091718				
variable	dy/dx	Std. Err.	z	P>|z|	95% Confidence Interval		X
ExpManager*	0.1793271	0.04988	3.60	0.000	0.081567	0.277087	0.531847
Delpridec*	0.1860001	0.05164	3.60	0.000	0.08478	0.28722	0.535032
BacEtPlus	-0.0167554	0.05625	-0.30	0.766	-0.127011	0.0935	0.38535
Formalite *	0.2001043	0.10602	1.89	0.059	-0.0077	0.407909	0.165605
Ag10etPlus*	0.1021438	0.06457	1.58	0.114	-0.02441	0.228698	0.324841
logicsuiproc*	0.0979191	0.09748	1.00	0.315	-0.093132	0.288971	0.098726
Gratspe *	0.1317673	0.05391	2.44	0.015	0.026102	0.237432	0.535032
Presccrétr*	0.086267	0.09525	0.91	0.365	-0.100416	0.27295	0.101911
(*) dy/dx is for discrete change of dummy variable from 0 to 1							

Source: Data Analysis in Stata 13

Referring to the data in Table 4 and Table 5, it appears that the adoption or use of DBs by Cameroonian SMEs is significantly and positively influenced by four groups of variables.

First, the use of DBs is dependent on the characteristics of the SME (its formal character and its age greater than 10 years). In fact, Hernandez (1997) and Kamdem (2000) consider that the management style of African companies depends on the specificities of their context. For them, the strong presence of the informal sector in African economies would justify the weak management instrument. In addition, the older the SME is, the more it is structured, which requires more tools in the same direction of management; however, this idea is not shared by Holmes and Nicholls (1988), for whom the detailed acquisition of management information decreases as the age of the enterprises increases, and more precisely that SMEs with less than five years of business operations have more often more detailed information than SMEs with more than 10 years of market activity.

Secondly, foreign competitive pressure also has a positive influence on the use of the dashboards. In a context of higher globalization and intense level of competitiveness, the use of management tools in SMEs determines, initially, the operational performance, and then the financial performance (Pettersen et al., 2011).

Thirdly, the organizational and managerial factors influence the use of DBs in SMEs. In fact, some business managers still showreluctance in letting someone else manage their organizations (usually family businesses), and at some point in the life of a business, this decentralization is necessary in order to change the company, especially when the company is expanding. In the current digital environment, SMEs should also consider the use of ERP (Enterprise Resources Planning) or specific software to improve the day-to-day management.

Fourth, the individual factors related to the key leader of the SME (his professional background and expertise). In fact, the use of dashboards in companies depends partly on the experience that the manager has acquired from his previous profession or simply during the exercise of his profession. These results are in line with those of many other authors (Marchesnay 1985; Nelson 1987; Bergeron 2000), while some authors find different results including Reix (1981). The variable regarding the manager training in relation to enterprise related fields as we noticed above proved to be negative and not significant. This means that the training of the manager in relation to enterprise related fields is not related to the use of dashboards in SMEs in Cameroon. This result is conflicting with the one obtained by Djongoue (2007). The baccalaureate level and above, was found to have no influence on the use of dashboards in Cameroonian SMEs. Indeed, there is a negative and significant relationship between the level of higher education or equal to the baccalaureate and the

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use of dashboards. Such a result may be justified by the fact that the vast majority of SME managers in Cameroon generally have a lower level of education or equivalent to GCE Advanced level.

V. Conclusions

The objective of this research was to highlight the contingency factors likely to foster the use of dashboards in Cameroonian SMEs. Our results suggest two major directions.

First, the proportion of Cameroonian SMEs using DBs remains very low (27% of SMEs in the sample). According to some authors (Hudson et al. 2001; Garengo et al. 2005; Souza et al., 2006; Takoudjou and Teulon 2018), the barriers to the implementation of DBs in SMEs are threefold: factors inherent in the attributes of the tool (complexity, high cost, standard character), the factors inherent in SMEs (lack of formal objectives, low-skilled human resources and turnover, low perceived usefulness, database that is strictly financial, absence communication between management and operational staff, corporate culture not conducive to adoption) and environmental factors (lack of reference base or target values in business sectors, and low diffusion of DB in SMEs).

Secondly, the factors that influence the adoption of the dashboards are those related to the characteristics of the SME (formal character, size and age), the environmental context linked to foreign competition, and organizational and managerial factors (delegation responsibility, special reward systems, use of software) and individual factors related to the SME manager (professional experience). The research insights resulted from this study incorporate both theoretical and practical contributions.

On one hand, our research provides theoretical support to the question of management instrumentation in SMEs. The results already noted in the existing body of literature are enriched by others making it easy to give a content to this question in a context marked by the exponential growth of SMEs. It is a confirmation of the complex nature of this concept. Furthermore, this research has found that the adoption of a management tool is strongly correlated to the cognitive resources and managerial skills of the main manager of the SME.

On the other hand, at a managerial level, beyond the growing criticism of management tools, particularly the increased rationalization and standardization of tools (Berry, 1983), or consistency with the organization (Moisdon, 1997), the use of DBs is advantageous because it is a tool that changes the perception of the performance of the SME, considering both internal and external stakeholders. Then we also noticed that SMEs often caricatured in write ups as a category of companies with a simple structure and intuitive management are capable of controlling their structure with DBs. Finally, it also provides policy makers with a new research direction on the parameters that require the management attention in order to improve the assessment of the performance of SMEs seeking external funding. It gives the leaders of SMEs, of course, some elements that can help them in the process of implementation of DB in their management.

These results also challenge us about the need to question the priorities in the management instrumentation of SMEs. The lower rate of usage of DBs by Cameroonian SMEs (27%) suggest the hypothesis according to which these tools are not well known among SMEs or that they do not match their business needs.

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Acknowledgments

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Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
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Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
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e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

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The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

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One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

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Numerical methods used should be transparent and, where appropriate, supported by references.

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Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

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23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
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- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

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This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

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Mistakes to avoid:

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- Use paragraphs to split each significant point (excluding the abstract).
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Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

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Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
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Approach:

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- An outline of the job done is always written in past tense.
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The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

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Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

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When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

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- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

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- Leave out information that is immaterial to a third party.

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The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.



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- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

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- Recommendations for detailed papers will offer supplementary suggestions.

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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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