“ REAL-TIME AI-POWERED REVENUE ASSURANCE TECHNOLOGY ADOPTION BASED ON THE THEORY OF REASONED ACTION ”

Research Paper

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“Abstract”

Purpose: *Empirical investigation of social influence on adoption of a real-time AI-powered revenue assurance technology (RT-AI-RAT) by retail banks in Cameroon.*

Methodology: *Applied, explanatory, deductive, quantitative and cross-sectional study design. Study instrument psychometric properties tested using Cronbach alpha and exploratory factor analysis. Self-administered questionnaires collected data from participants. Probability-based simple random sampling with a response rate of 14.8% was used. After data screening and regression assumption verifications, GNU PSPP (Release 1.6.2-g78a33a) software employed linear regression for data analysis.*

Main Results: *The hypothesis was supported in significance (p= 0.05) but not directionally (B= -27). Social influence explained 20% of the effects.*

Conclusions: *Social influence had a significant negative effect on Cameroon retail banks’ intention to use RT-AI-RAT hence continuing CAATs use. High unawareness of the technology and mal-practice were speculated causes.*

Paper Type: *Research paper*

Keywords: *Real-time, Artificial Intelligence (AI), Automation, Audit, Banks, Revenue Assurance, Theory of reasoned action (TRA), Cameroon.*

1 Introduction

1.1 General background

Assurance is one of the mandated activities of the internal audit function according to Institute of Internal Audit (Leung et al., 2003) and it is provided under many forms among which revenue assurance. Retail banks have many and varied revenue streams. One such stream was identified to be loan interest revenue. It has the particularity of being a derived revenue and still requires human intervention in its calculation. In Cameroon also, the revenue amounts to multi-billion francs CFA annually (up to XAF 82 billion) and incidence of related-fraud is high (Francis, 2018). Revenue assurance by internal auditors is, therefore, particularly important in view of the materiality of the revenue, related-fraud, untimely reporting and the semi-automatic nature of the process.

The protracted professional experience of the researcher auditing these retail banks in Cameroon indicates a situation of concern even though the senior management executives who constituted the vast majority of the questionnaire respondents of the banks investigated in this study saw to the contrary. Against this backdrop, a real-time AI-powered revenue assurance technology was proposed as a solution to the identified CAATs shortcomings and social influence or subjective norm, a construct of the theory of reasoned action (Fishbein and Ajzen, 2010) was quantitatively investigated to determine its effect on the adoption of such a technology. The study defined real-time artificial intelligence as the use of technologies, hardware and/or software, with real or near real-time capabilities to replace manual or semi-automated audit procedures or to enhance the efficiency and effectiveness of audit quality on site and/or offsite.

1.2 Statement of the problem

According to literature, some aspects of audit has been automated whilst many others are still semi-automated even where professional judgment is not required (Alles et al., 2006). The audit profession as a whole is still lagging behind other professions in regard to process automation (Kogan et al., 1999; Moffitt et al., 2018; Chan & Vasarhelyi, 2011; Sethibe and Naidoo, 2022). The professional experience of the researcher auditing banks in Cameroon aligns with this observation.

Revenue assurance by internal auditors in respect of loan interest revenue is still at a basic computer assisted audit technique (CAATs) level - MS Excel and ACL- in internal audit functions of most retail banks in Cameroon and in some of the retail banks it is not an activity that is carried out for loan interest revenue. This CAATS status results in inefficiency in audit, low audit quality, untimely decision-making and high incidence of fraud amounting to substantial financial losses to banks. Technological advances has compounded some of the issues flagged above by rendering the global economy more real-time or so called 'Now economy' (Vasarhelyi et al., 2010 ; Alles et al., 2002).

1.3 Objective

The objective of the study was to quantitatively investigate the effect of subjective norm, a construct of the theory of reasoned action, on the intention of Cameroon retail banks to use AI-powered revenue assurance technology exemplified by robotic process automation (RPA).

1.4 Scope of the study

The study targeted only the retail bank sector of the financial services sector of Cameroon, comprising of sixteen retail banks, for its investigation. The questionnaires of the study were administered in Yaounde and Douala, respectively the political and economic capitals of Cameroon where most of the banks were headquartered. The target technology was robotic process automation (RPA) for its real-time capabilities. Methodologically, the study was designed to be applied, explanatory, deductive, cross-sectional and quantitative in nature and multiple linear regression technique was used for data analysis.

1.5 Literature review

Revenue assurance is one of the assurance services (IIA, 2019) provided by auditors who may be internal and/or external. In this study, it is considered that such a service is provided by internal auditors of the retail banks. Within these retail banks, revenue streams are many and varied. One such stream was identified in this study to be loan interest revenue. It has the particularity of being a derived revenue and within retail banks in Cameroon, on the basis of the professional experience of the researcher, its calculation still requires human intervention. In Cameroon also, the revenue amounts to multi-billion francs CFA annually (up to XAF 82 billion) and incidence of related-fraud is high (Francis, 2018). Outside of Cameroon on the other hand, Alles et al., (2006) notes that revenue assurance in banks like in telecom companies is so important because banks face multi-billion dollar transactions on a daily basis, therefore, the cost of delay in providing assurance is intolerable thus pushing real-time to the top of the revenue assurance agenda. Moffitt et al. (2018) and Prasad and Webster (2022) add that revenue constitutes a high audit risk area on the basis of PCAOB inspection briefings which consistently highlight revenue as an audit area with recurring audit deficiencies. Revenue assurance by internal auditors and the automation thereof is, therefore, particularly important in view of the materiality of the revenue, financial consequences of untimely reporting, the semi-automatic nature of the process and related-fraud.
The literature (Bumgarner and Vasarhelyi, 2015; Moffit et al., 2018; Alles et al., 2002) indicated the availability of real-time AI-powered revenue assurance technology, as exemplified by robotic process automation (RPA), which can be used to mitigate the effects of untimely reporting and semi-automation in the revenue assurance process arising from CAATs use. This technology was proposed as a possible solution to the shortcomings associated with CAATs use. According to Chui et al.,(2014), the demise of Enron, Worldcom and the financial crisis of 2008 could have been averted if a timelier reporting regime was being practised by companies. Technology adoption literature (Dasgupta et al., 2000; Curran and Meuter, 2005) revealed many different factors that can influence the implementation of technologies and that such studies have been mostly carried out in the developped world with developping countries under researched (Nor and Pearson, 2008). Some of the factors were noted to be constructs of influential technology adoption frameworks such as theory of reasoned action and its derivatives, amongst others. The theory of reasoned action (Fishbein and Ajzen, 2010) with origin in social psychology is premised on four constructs: attitude, subjective norm, intention to use (ITU) and actual usage. The theory asserts that actual usage is predicted by an individual's intention to engage in a given behaviour. Intention, in turn, is predicted by two factors, the individual's attitude towards the outcome of the behaviour and by the opinions of the person's social environment, which is called the subjective norm or social influence (Fishbein and Ajzen, 2010). Attitude toward the behaviour reflects an individual's evaluation or general feeling toward a target behaviour. It indicates an individual's positive or negative evaluation about performing the behaviour. The attitude toward behaviour is a product of beliefs about the behaviour and the individual's evaluation of the outcome resulting from that behaviour. The theory postulates that the intention to perform a behaviour will be higher when the individual has positive evaluation of performing the behaviour. Subjective norm refers to an individual's perceived social pressure to perform or not to perform a target behaviour. The subjective norm is a composite of normative beliefs about a certain behaviour and the individual's motivation to comply with relevant others (Fishbein and Ajzen, 2010).

In this study, subjective norm and ITU have been used in the investigation. The literature revealed TRA was rarely used in technology adoption (Otieno et al., 2016). The literature (Otieno et al., 2016; Nor et al., 2008; Liker and Sindi, 1997; Oluyinka et al., 2013; Bankole et al., 2011; Shaikh and Karjaluoto, 2015) reviewed for this study further indicated that the theory of reasoned action (TRA) has, thus far, not been used in connection with a real-time AI-powered revenue assurance technology (RT-AI-RAT) within the Internal audit function of retail banks in Cameroon, especially loan interest revenue.

Amongst the technologies investigated using the TRA were internet banking, mobile phone, mobile banking, self-service technology, amongst others but not Robotic Process Automation (Bankole et al., 2011; Bagchi et al., 2004; Nor and Pearson, 2008).

Rogers (2003) proposed a 5-step framework for technology adoption which enhances the chances of implementation success. It has, therefore, been recommended for use in the implementation of the proposed real-time AI-powered revenue assurance technology.

The gaps relating to the theoretical framework and target technology uncovered by literature begged the guiding research question thus:

> **RQ1:** What effect does subjective norm have on the intention to use real-time AI-powered revenue assurance technology (RT-AI-RAT) by Internal Audit functions of retail banks in Cameroon?

On the basis of the above question, it was hypothesized that:

> **Hypothesis 1 (H1):** Subjective norm (SN) positively and significantly affects retail banks intention to use real-time AI-powered revenue assurance technology.

The resulting research model based on the hypothesis is as depicted below.

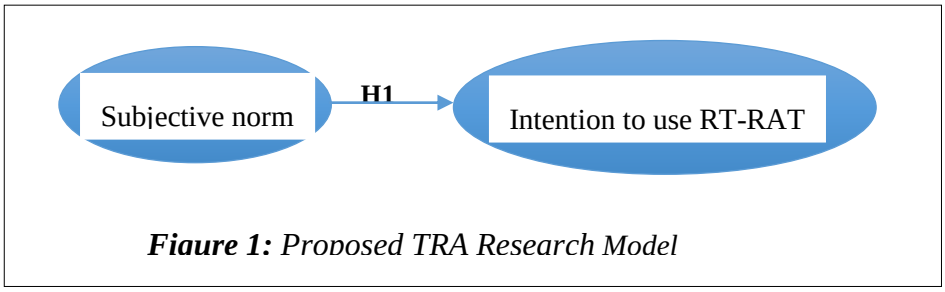

Figure 1: *Proposed TRA Research Model*

2 Materials And Methods

The study was designed as applied, explanatory, deductive, cross-sectional and quantitative. Numeric data was then captured using questionnaire instruments to test a causal relationship hypothesized between subjective norm and intention to use. Since the data was captured in a single point in time, the study was cross-sectional. With the study thus designed and because of change of study context and translation, pre-validated questionnaires (Nor et al., 2008; Todd and Taylor, 1995; Bhattacherjee et al., 2012) were pilot tested using convenience sampling for their intelligibility and psychometric properties using Cronbach alpha (Cronbach, 1951). Once cleared by the pilot test, the study data collection was initiated after respecting ethical standards (Jhangiani et al., 2009; Bhattacherjee et al., 2012) and questionnaire administration and data collection protocols. Probability-based simple random sampling was used to select the sample. Collected data was screened for outliers, normality of distribution, multi-collinearity and heteroscedasticity. Lastly, a positive outcome from the screening exercise led to the analysis of the study data using multiple linear regression technique and the GNU PSPP statistical software and Microsoft Excel 2013 as the analysis soft wares.

2.1 Operational definition

The study was underpinned by the theory of reasoned action which argues that an individual's behavioural intention to use a certain technology is influenced by his/her attitude and subjective norm (Fishbein and Ajzen , 2010). As a theory, it is highly abstract and, therefore, do not lend itself to direct measurement in empirical studies such as this one. As a result, the study operationally defined the theory of reasoned action in terms of two constructs, subjective norm and behavioural intention or

intention to use. Fishbein & Ajzen (2010) define subjective norm as an individual's perceived social pressure to perform or not to perform a target behaviour. Behavioural intention or intention to use is a determination to act in a certain way (Mishra et al., 2014). As these constructs were directly measurable, they were considered as variables of the TRA and their direct measurement permitted the theory to be indirectly measured. Pre-validated items of the above variables used in earlier empirical studies carried out by Nor et al (2008), Todd and Taylor, (1990) and Bhattacherjee et al. (2012) were adopted, adapted, translated and used to directly measure subjective norm construct. Intention to use was measured using a single Yes/No question of the researcher. Operational definitions are important to facilitate and ensure the accuracy of the measurement of the study variables.

3 Results

Data collected in respect of this study were used for descriptive and inferential analyses. Descriptive analysis used employee data while inferential analysis made use of data related to subjective norm and intention to use, both constructs of the theory of reasoned action.

3.1 Demographic results

This section of the analysis deals with the composition of the total number of respondents. **Table 3.1.1** below provides a summary demographic variables and related statistics of the retail bank employees who responded to the survey questionnaires.

S/N	Variable	Statistics					
1	Gender	Frequency	Mode	Mean	Min	Max.	Range
	Male	20 (66.7%)	Male	-	-	.	.
	Female	10 (33.3%)					
2	Employee Age (Years)						
	< 30	5 (16.7%)		-	< 30		29-60
	30 - 40	12 (40.0%)	30 - 40				
	41 - 50	10 (33.3%)					
	51 - 60	3 (10.0%)				51 - 60	
3	Level of Education (Degree)						
	First	8 (26.7%)					
	Master	22 (73.3%)	Master		First	Master	
4	Longevity (Years)						
	Longevity < 2	9 (30.0%)		-	< 2		
	2 < Longevity< 4	5 (16.7%)					
	4 < Longevity < 6	2 (6.7%)					
	6 < Longevity < 8	1 (3.3%)					
	Longevity > 8	13 (43.3%)	>8yrs	-		> 8	-

Table 1: *Demographic Variables and Related Statistics*

From **Table 1** above, about 67% of the respondents were male and 33% were female. Their age ranged from 29 to 60 years with modal age in 30 – 40 years age bracket. Most of them were graduate holders of a master degree representing 73% of the total sample. With respect to service longevity, 43% had been in service for more than 8 years.

3.2 Inferential analysis results

As a result of the review of literature in relation to the theory of reasoned action and target technology, gaps were identified in respect of which a research question was posed in order to fill the gap thus:

> **RQ1:** What effect does subjective norm have on the intention to use real-time AI-powered revenue assurance technology by Internal Audit functions of retail banks in Cameroon?

In order to answer the above research question and based on the findings of prior empirical studies (Shih and Fang, 2006, Nor et al., 2008), it was hypothesized that:

Hypothesis 1 (H1): Subjective norm (SN) positively and significantly affects Cameroon retail banks intention to use a real-time AI-powered revenue assurance technology.

The above hypothesis was tested via multiple linear regression which yielded results as below.

S/N	Hypothesis	Results
1	**H1:** Subjective norm (SN) positively and significantly affects retail banks intention to use real-time AI-powered revenue assurance technology.	Did not support directionally (B= -0.27) but supported in significance (p=0.05=0.05; t stat = t stat = 2.11 > +1.96). 20% of ITU variation explained.(R^2=0.20,Adj.R^2 = 0.15)

Table 2: *Results of Hypothesis 1 (H1).*

3.3 Reliability of the results

The Cronbach alpha statistic was used in this study to evaluate the reliability of instrument items with a threshold of 0.7 or higher considered to be acceptable (Bhattacherjee et al., 2012). The coefficient was each 0.97 for the 5 items relating to subjective norm. This indicates a relatively high internal consistency of the items. Exploratory Factor Analysis (EFA) was used to verify construct validity. Same-factor loadings were above 0.6 and cross-factor loadings below 0.3 thus good internal consistency. Adjusted R^2 (threshold: 0 - 1) was used to test and validate internal validity (Adj $R^{2=}$ 0.15 > 0) and significance level (threshold: 0.05 or less) to test the external validity (p=0.05) thus both validities verified and found satisfactory.

4 Discussion

The results in **Table 2** above found that subjective norm has a linear relationship with intention to use RT-AI-RAT as evidenced by a non-zero regression coefficient (B= - 0.27) relating subjective norm, the independent variable, to intention to use , the dependent variable. A negative regression coefficient (B= -0.27) means that as subjective norm towards RT-AI-RAT use increases by one unit, the intention to use RT-AI-RAT decreases by 0.27 unit. Thus directionally the hypothesis was not supported. The result is otherwise interpreted to mean that retail banks in Cameroon will be less willing to adopt RT-AI-RAT and, therefore, continue using CAATs. This negative subjective norm is speculated to be due to a very low awareness level of the technology in Cameroon (Bumgarner and Vasarhelyi, 2015). The negative relationship was, however, inconsistent with empirical studies carried out by Nor et al. (2008)

in their study of internet banking adoption in Malaysia which found that social pressure positively affects internet banking adoption. They cited findings by Limayem et al., (2002) and Rimenschneider et al., (2002) as also positively affecting intention to adopt a technology.

This study also found that subjective norm significantly influenced behavioural intention which is consistent with that of Nor et al. (2008) who investigated internet banking adoption in Malaysia. It was, however, contrary to that of Shih and Fang (2006) who investigated adoption of the same technology in Taiwan. Differences in culture of the study contexts speculated to be the cause of the divergent results especially when the same target technology yields different results.

With an adjusted $R^2 = 0.15$, this means subjective norm uniquely accounted for 15% of variations in intention to use RT-AI-RAT controlling for the effects of other external variables thus causal. The internal validity of hypothesis was, thereby, confirmed and with p=0.05, the sample relationship was also inferred at the population of retail banks in Cameroon thus external validity also confirmed.

The research model was relatively less parsimonious as with one construct (subjective norm) it explained only 20% of the variations in intention to use RT-AI-RAT. As such, it was considered to be of low predictive value vis-à-vis TAM at 40% and 13-construct DTPB at 36% (Taylor and Todd, 1995; Davis, 1993, Yousafzai et al., 2007). **Figure 2** below depicts the results of the hypothesis test developed from the research question and its related research model.

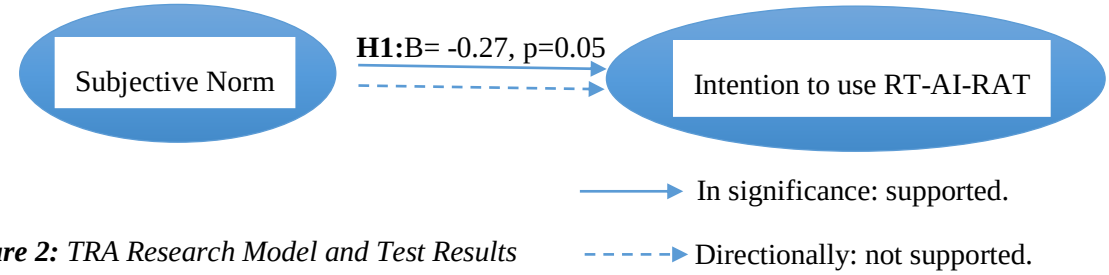

Figure 2: *TRA Research Model and Test Results*

5 Summary And Conclusion

5.1 Summary

Semi-automation and untimeliness in reporting, with attendant financial consequences, in retail bank revenue assurance in Cameroon were noted as some of CAATs shortcomings. The study proceeded further to propose robotic process automation (RPA), a real-time AI-powered technology, in that regard. It then quantitatively investigated subjective norm as a possible factor influencing its adoption for revenue assurance purposes within retail banks in Cameroon.

A thematic literature review was conducted in four areas: revenue assurance process, role of the internal audit function in revenue assurance, target technology and adoption framework and the underpinning theoretical framework (theory of reasoned action -TRA). The literature revealed that whereas real-time revenue assurance in the telecom sector was mature (Kar et al., 2012), this was not similarly the case within retail banking circles generally and Cameroon in particular. The TRA was used sparingly in technology adoption and an AI-powered technology the like of RPA had not been investigated for adoption using the TRA. In the light of these gaps, the study was designed as applied, explanatory, deductive, cross-sectional and quantitative in order to achieve its aim and objectives. The questionnaire instruments were pilot tested for their intelligibility and psychometric properties as a result of translation into French and change of context prior to the main data collection.

Captured numeric data by pre-validated questionnaires during the main data collection were screened in respect of outlying data, normality in data distribution, multi-collinearity and

heteroscedasticity. Using GNU PSPP statistical software, collected data was analyzed via multiple regression analysis to determine the effect of a construct of the theory of reasoned action on an AI-powered revenue assurance technology as exemplified by robotic process audit.

5.2 Conclusion

On the basis of the research question, objective and hypothesis, the study concluded that subjective norm negatively and significantly affected intention to use real-time AI-powered revenue assurance technology by retail banks in Cameroon thus meaning continuing CAATs use by internal auditors of all the retail banks in Cameroon. It singularly explained 20% of the variation in intention to use an AI-powered revenue assurance technology leaving, thereby, up to 80% to other factors. It was lower in predictive value vis-à-vis TAM at 40% and DTPB at 36% noted in other studies.

The underpinning theoretical framework (TRA) of the study argued that an individual's behavioural intention to use a certain technology is influenced by his/her attitude and subjective norm (Fishbein and Ajzen , 2010). The study finding supported the theory as subjective norm was found to affect behavioural intention to use RT-AI-RAT.

On the basis of the professional experience of the researcher, the literature and current trends regarding process automation, a compelling case is made by this study for retail bank internal audit functions to deploy a real-time AI-powered revenue assurance technology in order to report timelier, enhance audit quality, decimate revenue fraud incidents and address understaffing challenges in some audit functions, amongst others. The advent of AI-powered technology may calm the waters in cultures where industrial action or acts of sabotage by sudden unannounced employee departure is rampant.

In the light of the negative social influence, retail banks in Cameroon may undertake awareness campaigns to promote the AI-powered revenue assurance technology which targets the referent group (Nor and Pearson, 2008).

5.3 Limitations of the study

The study was limited in the following respects.

1. Multiple linear regression used in this study seeks to prove a causal linear relationship but does not provide reasons for observed effects. The study, therefore, only speculated the reasons for the effects which may be inaccurate.

2. The study considers the banks to be physical entities meanwhile they are legal entities. Sometimes the business objectives, that is those of the banks, are different from employee objectives resulting in lack of goal congruency and dysfunctional behaviour. The question arises whether employees can truly be taken as proxies of, or faithfully represent, the banks especially when the study indicates employees refuting the phenomenon of loan interest revenue fraud within retail banks (self-interest vs bank interest) when indeed it existed?

3. Other data that may be oral in nature or based on gestures and thus cannot be captured by a questionnaire survey were not considered in this study and, therefore, to have a more comprehensive view of the results, a study that uses triangulation (qualitative and quantitative methods) in data collection should be considered.

4. The results of this study may not be generalizable to retail banks in other countries and cultures. Retail banks in these countries are likely to have different exposure, level of information technology infrastructure and comprehensiveness of legal framework and policies to those of Cameroon.

5.4 Future research

The current study may be improved by considering these other possibilities.

1. The study has investigated the influence of a single factor, subjective norm, on RT-AI- RAT adoption by retail banks in Cameroon. Subjective norm could be extended with other factors such as attitude, another construct of the TRA.

2. The study indicated that the retail banks were not aware of the RT-AI-RAT technology which was speculated to be a primary reason for the negative subjective norm towards the adoption of the technology. Future research could further extend the TRA with awareness (Mishra et al., 2014) or indeed use other influential technology frameworks such as TAM, etc.

3. Multiple linear regression was used for the data analysis of this study due to the small sample size. Another study can be carried out using a bigger sample size which will permit a more robust analytical technique such as structural equation modelling (SEM) to be used which tests instrument reliability at construct level (Yousafzai et al., 2007a).

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