

# Computer-Based Accounting Systems in Small and Medium Enterprises: Empirical Evidence from a Randomized Trial in Nigeria

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**Abstract** The advent of IT has offered significant improvement to the way financial transactions in business are processed by professional accountants. Hence, in most parts of developed countries, it is almost impossible to function as an accountant without requisite IT skills. However, the pattern seem not attain similar forte in SMEs especially in developing economies. Consequently, this study would provide answer to the degree of computer-based accounting systems adoption by SMEs in Nigeria. We have conducted an empirical investigation through a structured survey focused on finance and accounts executives of the enterprises that holds primarily responsibility for business transactions processing. This information was sought in order to expound on the extent of CBAS adoption by Nigerian SMEs. Respondents were obtained from manufacturing, agriculture, construction and mining, hotel and hospitality, IT services, medical services, wholesale and retail trade, and general services industries. Through a combination of cross tabulation and logistics regression analysis, our findings showed that the use of CBAS by Nigerian SMEs is highly significant as all companies operating in all industries surveyed uses one type of accounting software or another. This outcome suggests that professional accountants must endeavour to continually hone their skills for continued relevance in the profession.

**Keywords** Small and Medium Enterprise, Computer-based system, Financial Transaction, Accountants, Nigeria

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## 1. Introduction

Development in information technologies (IT) over the years is fast converting this hitherto luxurious business resource into a necessity as organizations have now

recognized the alignment of IT as business enabler to support business processes (Runge & Lee, 2002) [32]. Without doubts, the emergence of numerous information technology platforms has created a world of strategic opportunities for businesses managers including professional accountants alike. The increasingly low costs associated with generalized accounting commercial packages as compared to customized applications; the emergence of vendors who provides industry specific packages; the growing demand by SME businesses who are often unable to engage full-time in-house systems development staff; and the trend towards downscaling organizational structures into strategic business units (SBU's) as well as the resulting move towards distributed data processing systems environment has made the adoption of commercial software by SME's a great appeal (Hall, 2011) [13]. Accountants recognize the need for AIS's to be able to capture input from non-accounting evidence in order to support input from financial information for improved business decision (Brecht & Martin, 1996) [6]. Ultimately, information provided by computerized accounting systems must possess the basic attributes recognized under any GAAP as those of any good accounting information.

Developed and emerging economies of the world both recognized the enormous contribution to growth and development by SME's. Studies have shown that SMEs provide the keystone on which most economies of the places reliance. Even the world giant (U.S.) largely hinge on the contribution of SMEs as the sector contributes greatly to its novelty, output, reduction of unemployment and stability (SBA Report, 2000) [34]. Empirically, over 99% of U.S. employment is absorbed by about 51% of private-sector workers; 38% of high-technology occupations; 75% of new jobs and over 96% of the country's export (Twist, 2000) [36]. This trend is not peculiar to the U.S. economy although variations may be attributed to the degree, impact and indicators of contributions. By the year 2000, the U.K. SMEs had accounted for closely 99% of businesses and 99.8% of

the country's turnover. Two years later, this figure had risen to 99.8% of all businesses, 55.6% of employment generation and 52.0% in turnover (ODPM, 2005) [23].

Other literature also attributed the quick economic transformations experienced by the "Asian Tigers" to the countries' SMEs contributions. In Nigeria, over 97% of businesses employ less than 100 employee indicating that majority of employers in the country belong to the SMEs (Ariyo, 2000), [5]. In terms of SMEs contribution to industrial growth, this figure is relatively low at 31% compared to other economies given the high level of unemployment, illiteracy and mortality rates (Onugu, 2005) [25]. This development necessitated the establishment of the Small and Medium Enterprises Development Association of Nigeria (SMEDAN) by the Federal government in order to support the growth of SMEs.

Without doubt, SMEs represents the flag-sheep of any economic growth in the world. Hence, the fusion of IT in the strategic success of SMEs in contemporary economies makes the application of computerized accounting systems inevitable as it determines their ultimate survival. SMEs must continually evolve qualitative strategies, plan and control activities effectively, and take decisions aimed at optimizing the use of resources. It is necessary that they also build accounting information systems required to integrate management's requirements for planning, control and decision making. These accounting information systems are significantly enabled through computer technologies and are often designed in accordance with techniques relevant to achieve qualitative decision-making objectives as key success business drivers.

There has been substantial publications' drawing on Information Communications Technologies (ICT) and Business. Some empirical investigations were aimed at providing representation on generalized application of technologies to business (Lindh, 2012 [20]; Ojukwu, 2006 [24] in Nigeria; Devaraj & Kohli, 2003 [8]; and Brecht & Martin, 1996) [6]. Others which had their focus on IT adoption amongst SMEs (Runge & Lee, 2002 [32]; Kilangi, 2001 [19] in Kenya; Wolf, 2001 [37] in Tanzania and Kenya; Alam & Noor, 2009 [3]; Kharuddin, Ashhari & Nassir, 2010 [18] both in Malaysia; Mullins, Christos & Lannacci, 2011 [22] in Greece) however placed no emphasis on their accounting systems while other researchers investigated conventional accounting information such as policy choices, financial practices and profitability performance amongst SMEs (Zhou, 2010 [38]; Padachi, 2008 & 2012 [26-27]-Mauritius; Adewoye & Akanbi, 2012 [2]- Nigeria; Feteke, Damagum, Mustafa, Matis & Popa, 2010 [11] - Romania; AbdulRaheem, Yahaya, Muhtar & Abogun, 2012 [1] - Nigeria; Ismail & Zin, 2009 [14]; Karunananda & Jayamaha, 2009 [17] both in Malaysia). The few empirical evidence on computer-based accounting systems in SMEs were publicized by authors mainly in Malaysia (Ismail, 2009; Ismail, Abdullah & Tayib, 2003 [15]; Sam, Hoshino & Tahir, 2012 [33]; Ali, Abd-Rahman & Ismail, 2012) [4]; Australia (Breen, Sciulli & Calvert, 2003) [7]; New Zealand

(Pulakanam & Suraweera, 2010 [29]); and Spain (Grande, Estebanez & Colomina, 2011 [12]), and Duschinsky and Dunn, 1998 [9].

Following the significant contributions of SME's in world economies in general and Nigeria in particular, this study is aimed at providing randomized investigation on the level of computerized accounting usage by Nigerian SME's, the classes of commercial packages as well as factors responsible for the degree of CBAS adoption.

### 1.1. Aim and Objectives of the Study

The aim of this study is to provide empirical evidence on the existence of CBAS in Nigerian SMEs. To achieve this aim, the study seeks to:

- i. investigate the extent of CBAS usage by Nigerian SMEs;
- ii. determine the classes of commercial package systems adopted by SMEs;
- iii. identify factors inducing the extent of CBAS adoption;

### 1.2. Significance of the Study

The role of SMEs in economic development has been an area of intense research both in practise and academia. This empirical investigation of CBAS in SMEs is therefore a significant contribution to existing literature. Furthermore, the study provides evidence on the extent to which Nigerian SMEs are IT accounting compliant in readiness for gaining strategic competitive advantages in their businesses.

## 2. Previous Studies

The application of computerized systems in business information processing has been very significant to the accounting profession decades ago especially as it relates to financial transactions. However, its applicability to SMEs began to gain relevance in the twenty-first century especially in developing economies. SMEs like any other profit-seeking establishment must strive for survival through business performance enhancement. They must engage in business strategies aimed at providing competitive advantages in highly competitive societies in which they exist. To achieve these, they must continually engage relevant tools and techniques taking cognizance of cost comparativeness and properly utilized opportunities (El Louadi, 1998) [10]. Technologies provide the relevant prospects required to convert resource utilization into productive, quality and performance-oriented business (Ismail et al., 2003) [6].

Although various stakeholders continue to engage in activities aimed at ensuring survival of SMEs, research has shown that the effective adoption of computerized systems by these firms is relatively low in most developing countries as compared to developed environments, for example, Adewoye and Akambi (2012) [2] reported that generalized

IT adoption by small and medium scale industries in Oyo State, Nigeria recorded 56.7 percent. The study further revealed that the usage of basic office equipment such as fax machine in communicating with customers for exchanging orders was as low as 53.3 percent. In response to factors militating against the use of ICT, breakdown and malfunctioning of IT devices recorded the most significant descriptive which made the authors recommended that SME's should engage in training their employees in the use of ICT and also engage the expertise of external consultants where applicable. The study however conclusively revealed significant positive contribution of investment in ICT to SMEs profitability and business performance.

On the other hand, the adoption of technologies with particular reference to AISs by Malaysian SME's seem relatively high as nearly 80 percent of SME's surveyed in Melaka has adopted CASs or are at various implementation stages (Sam et al., 2012) [33]. Studying the use of computerized accounting systems, 80 percent of responding SMEs chief executives possesses basic knowledge of accounting while 90 percent has at least rudimentary ICT skills and knowledge. In terms of familiarity with accounting applications, over 75 percent of adopters were unfamiliar with computerized accounting systems. This outcome was founded on the possibility that majority of CEOs only access the CAS for financial report purposes and therefore do not have direct connection in accounts preparation using CAS. To describe competitiveness of the SMEs surveyed, the conclusion was that 70 percent of respondents in the manufacturing sector believed that their firms existed in high information intensity industry hence the need for reliable, up-to-date and accurate information to remain competitive. Enquiries about kinds of application systems deployed, majority adopt generalized applications mostly due to their flexibility, low cost and module specificity. Only 19 percent make use of in-house packages.

Engaging SMEs in the manufacturing, agriculture, mining and construction, hotel and hospitality, information technology, medical services, wholesale and retail trade, and general services, Relhan (2013) [30] explored the use of electronic accounting in India. The result indicated that 97 percent of the firms use computers in their accounting functions. As regards software categories, 62 percent make use of turnkey systems in particular generalized accounting packages ranging from Pastel, Sun, Tally, Sage and QuickBooks while 25 percent simply deploy office automation systems. On the use of networks, only 28 percent uses stand-alone systems as other 72 percent deploy multi-user systems using local area networks (LAN). Enquiries about the factors responsible for the deployment of IT systems in their accounting operations revealed that 79 percent indicated cost reduction, efficiency of clerical accounting functions, storage space for data and information processing while others were of the opinion that CASs assist in providing timely information for decision making. Few of the challenges identified in the use CBAS include inaccuracy of reports, frequent systems breakdown, inability of software

to support large volume of data, loose electricity supply (common to most developing economies), inability to carry out data filtering (export/import data), and inability to fully comprehend and interpret results.

Breen et al. (2003) [7], in their study of computerized accounting systems in Australia presented a report for the small enterprise association of Australia and New Zealand (SEAAN) 16<sup>th</sup> annual conference in Ballarat. Using the result of data collected from 122 firms that uses CAS and 99 non-users, evidence discovered that about 96 percent of the SMEs install and use generalized packages ranging from "mind-your-own-business", QuickBooks, cash-flow manager and attaché while the rest 4 percent make use of tailor-made systems. In a related development, Pulakanam and Suraweera (2010) [29] explored the challenges faced by the users of SBA applications in their accounting functions. Although external consultants play significant roles, major issues identified by SMEs in using the software amongst user confusion about software complexity, inadequate user-support from software provider, insufficient accounting knowledge and skills, work pressure and lack of IT and financial resources, owner/manager accounting knowledge.

One study which contradicted majority of positions on the use of CBAS by SMEs was that conducted by Grande et al (2011) [12] in Spain. On the impact of AIS on performance measures, the authors revealed that there is no significant relationship between SMEs productivity and the use of computer-based accounting systems. The findings appeared characterized by inherent bias in recognizing the concept of productivity. Although the researchers ascertain the qualifications in productivity of AIS to mean efficiency, technological change and change of scale, only staff-cost was connected with reviewing productivity in the course of the work.

### 3. Research Methodology

Data obtained during the course of this study were gathered from SME's systematically selected through the city of Lagos. In deciding on the sample selection from Lagos, consideration was given to the city as a good representation due to reasons such as accessibility to target respondents, concentration of commercialization and population. To examine impact of size on the adoption of CBAS, participants were defined as those having 100 employees or less. The basis for the number of workers is found in the experience of the authors and corroborated by the findings of Montazemi (1998) [21] who opined that most SME's are often unwilling to disclose financial performance related data. Similar view were also shared by Robinson and Pearce's (1984) 31[] as they opined that owner-managers of SMEs are often characterized by lack trust and plainness and are sensitive about disclosure of business related information.

#### 3.1. Survey Instrument

Prior to the collection of data, a pilot test of the initial survey instrument was directed at 12 practicing accountants and 10 others in academia to ensure content validity. The Likert scale was used with metric and dichotomous questions for analysing the variables and for conditions prediction evaluation. The Cronbach's Alpha was used in estimating internal consistency and the coefficient revealed a value of 0.789 in the pilot survey. The field work was carried out between May and July 2013. Evaluation of the 27 questionnaire items eventually revealed Cronbach's Alpha coefficient of 0.602 was found while final sampling error was calculated at 9.72% and considered acceptable for a study without the existence of previously established parameters. In this study, constructs were employed and measured as follows in order to determine the extent of CBASs in use by the surveyed firms. The instrument was sectionalized into four. Consequently, information contained in first section was on general company details amongst ownership status, industry and/or sector, number of employees engaged on full-time and number of years in business. The second section was targeted at extracting information on the adoption as well as the extent of usage of CBAS. Section three was on factors inhibiting the effectiveness of CBAS while the last section sought information on probable means of improving the CBASs from users' perspectives. All variables were placed on pointed linear numeric Likert scale. This model is a blend of that adopted by Powell and Xiao's (1996) [28] in Malasia; and Relhan (2013) [30] on Indian SMEs. Afterwards, the items were filtered and adapted accordingly. Respondents in the study were end-users in finance and accounts functions holding primary responsibility for financial transactions processing by computerized systems of the surveyed firms.

### 3.2. Identification and Measurement of Variables

#### 3.2.1. General Background of Firms

In order to obtain an assessment of the impact of general company's background in the use of CBAS, information on subjects' background were obtained. This list includes ownership, legal status, industry, year of years in operation, and number of full-time employees. For the purpose of this study, number of employee is considered a basis for categorization between small and medium enterprises. A small enterprise is considered such wherein the number of employee is 50 or less while that of medium firms employ 100 or less.

#### 3.2.2. Adoption of CBAS

For the purpose of examining the extent of adoption of CBAS, four categories of indicators were used. The level of accounting systems automation (LSA), i.e. combination of manual and computerized systems, fully computerised systems, and wholly computerized-linked to web-based applications; types of software/packages in use (TSP), i.e. turnkey systems, backbone systems and vendor support

systems; transaction processing models (TPM) i.e. batch, and real-time systems; networking utilization mode (NUM) i.e. stand-alone systems, LAN-based multi-user systems, and WAN-based multi-user systems.

#### 3.2.3. Factors inhibiting effective utilization of CBAS

This category of items were classified and applicable indicators applied viz. inaccuracy of reports generated (CHL1), frequency of systems breakdown (CHL2), lack of support for large data volume (CHL3), inconsistent supply of electricity (CHL4), absence of data-filtering (import/export) functions (CHL5), inability to fully comprehend and interpret output (CHL6). The items were placed on a scale ranging between "never" represented by 1 to "a great deal" represent by 5.

#### 3.2.4. Improving CASs performance

This last part was divided to seek respondents input to feasible solutions to problems inherent in utilizing CBASs. Thus, applicable variables and indicators include online-real-time user support (IMP1), easier access to fixes and upgrades (IMP2), inclusion of multiple windows mode (IMP3), and reports customization (IMP4) as possible ways of improving accounting software effectiveness and identifiable from users' perspective. The variables were also placed on a five points scale between 1 denoting "very undesirable" to 5 represented by "very desirable", and applied accordingly.

### 3.3. Data Collection

As identified in earlier question, the survey instrument was distributed across SMEs in Lagos. The total of 320 copies of questionnaire was delivered to responding SMEs. Preliminary retrieval stood at 249 copies. Of this proportion, 19 copies were not entirely completed while the rest 230 were confirmed fully completed, and ascertained valid for input in data analysis representing an initial response of 72 percent. However, since the study made particular emphasis on firms utilizing CBAS only, 49 others were confirmed non-users of CBAS and ultimately discarded. The use of CBAS within this context refers exclusively to at least the use of one module of an accounting package. Afterwards, only 181 copies of questionnaire were certified fit for analysis representing an overall response rate of 57 percent.

### 3.4. Data Process

In the first place, preliminary analyses via cross-tabulations were conducted, focused on exploring descriptive characteristics of data items. This assisted in effecting a comparative analysis as well as contrast the tendencies of different variables across SME industries and across size classification. Secondly, to determine the factor(s) which are most influential in the adoption of CBAS, logistic regression was applied analysing the influence of the dependent variable i.e. CBAS automation (LSA) against the

independent variables i.e. years in operation (YOP), industry (IND), and number of employees on full-time clarified under SME classification (i.e. small or medium). Thirdly, in answering the question on challenges inhibiting CBAS implementation, LSA was also adopted as the dependent variable and regressed against the variables identified earlier. For users' perspective as regards avenues to improve systems performance, LSA was again adopted and regressed accordingly.

## 4. Data Analysis and Interpretation of Results

### 4.1. Industry Classification

Responding firms were classified industry-wise and presented in Figure 1. Analysis indicate 80 percent were from hospitality industry; 68 percent response obtained from wholesale and retail; 60 percent general services; 58 percent manufacturing; 53 percent agriculture; 48 percent IT services; 45 medical services; and 43 percent from construction and mining industries. This may suggest that there are more SMEs operating under the hotel and hospitality industry.

Industry	Number of	Number of	Proportion
	Survey	Responses	
Manufacturing	40	23	58%
Agriculture	40	21	53%
Construction & Mining	40	17	43%
Hotel & Hospitality	40	32	80%
IT Services	40	19	48%
Medical Services	40	18	45%
Wholesale & Retail Trade	40	27	68%
General Services	40	24	60%
<b>Total</b>	<b>320</b>	<b>181</b>	<b>57%</b>

Source: Analysis of survey data (2013).

Figure 1. Survey Responses.

### 4.2. CBAS Adoption by Industry

The adoption of CBAS across industry is substantiated in the result of cross-tabulation.

Virtually 84% of responding firms combine manual and computerized accounting systems as those who are fully computerized with web-enabled applications were found to be just about 16%. We may from this outcome conclude that more SMEs are not e-commerce compliant. The forms of commercial accounting packages shared across SMEs were essentially Turnkey Systems (i.e. general accounting systems, special-purpose systems, and office automation systems); Backbone systems; and Vendor-Supported Systems. Across all industries, majority of responding firms, about 87% are users of Turnkey systems (manufacturing-13%; agriculture-12%; construction & mining-9%; hotel and hospitality-18%; IT services 10%; and wholesale and retail trade-15%). Only general services industry uses both Backbone and Vendor-Support systems, with Backbone users constituting 7% of total sample and 6%

Vendor-Support Systems. The use of Turnkey Systems is widespread amongst users of CBAS (Ismail et al, 2003) [16]; Relhan (2013) [30]; Sam et al.,(2012) [33];. They are often completely finished applications, tested ready for implementation, usually either generalized or industry-specific. They are also made available as compiled program modules although with limited allowance for customization. (Hall, 2011) [13].

### 4.3. Scope of Computer-Based Accounting System

According to the questionnaire, the most common transaction processing mode is the batch and online processing system recorded by 70% of users. Other 23% process their transactions via batch mode only while another 8% are online real-time process users. Further evaluation also indicated frequency of transactions processing. About 18% of respondents process their transactions on daily basis while 35% does same weekly. 46% of CBAS users process theirs monthly. Concerning network utilization mode, a cursory evaluation of cross tabulation result also discovered that bulk of respondents tie data processing around stand-alone systems – 46%; about 40% does same via local-area-network (LAN) based multi-user systems while the rest, closely 18% are WAN based multi-user systems operators.

### 4.4. Logistic Regression

#### 4.4.1. Determinants of CBAS Adoption

In order to provide support for factors which were most significant in the use of CBAS, we employ a Logistic regression. The result was that the optimal variable in the model with the most significant relationship with the dependent variable were “firm-size (classification)” and “years of existence”. Table 2, Table 3 and Table 4 detailed the results of logistics regression. Subsequently, propensity in the use of CBAS is greater with firm size (Exp (B) = 6.247E8), and number of years in existence (Exp (B) = 1.074) increase.

#### 4.4.2. Challenges to CBAS

The various variables analysed under this category were evaluated against the dependent factor (LAS) identified earlier and findings shown that the most significant encounters as revealed in Table 5, Table 6, table 7, and Table 8 experienced by users of CBAS by users were inaccuracy of reports at (Exp (B) = 1.645); inability to support large volume of data (Exp (B) = 1.399); epileptic power supply (Exp (B) = 3.787); lack of data filtering (import/export function) (Exp (B) = 1.556) increase.

#### 4.4.3. Recommendations for Improvement in CBAS Applications

When respondents were requested to provide input as propositions to improving CBAS applications, the factors which were concluded as most valuable were easier access to

fixes and upgrades (Exp (B) = 2.912); and access to multiple windows platform (Exp (B) = 1.221). These propositions suggest measures which users perceive as fundamental to enhance effectiveness of CBAS software.

#### 4.5. Comparison with Similar Studies

A study was conducted by Ismail et al., (2003) [6] in Melaka, Malaysia on SMEs adoption of computer-based accounting system. Using related survey, relationship amongst variables was clearly related with those found herein. SMEs in Malaysia were reported to be at their early stage of CBAS adoption as majority of firms surveyed barely utilize web-enabled applications. In addition, through statistical inference similar conclusions were reached as regards the use of turnkey systems more than Backbone and Vendor-supported applications. Hence, similarity of subjects with those of this study makes both more comparable.

In another study directed at small and medium accounting agencies carried out in India, Relhan (2013) [30] discovered that majority of surveyed firms utilize accounting software in processing their transactions. Their primary reasons were tendency to reduce overhead cost, achieve operational efficiency and acquire large data storage space as well as provide for continuity in case of business process disruption. The outcome of the study found factors as frequent breakdown in electricity supply and systems interruption as utmost encounters. We are of the view that although electricity supply is a major challenge in Nigeria, most companies including SMEs continue to provide sufficient backing for power supply by putting in place power generating machines. Hence, reliance on public power supply is considerably low as at the time of putting this work together.

## 5. Conclusions and Suggestions for Further Studies

### 5.1. Conclusions

The application of IT to the accounting profession has been a subject of study both in academia and practise. Studies have shown considerable efforts in examining the extent to which companies including SMEs across the world has adopted computerized accounting. Several factors have been identified with this trend amongst which are overhead cost reductions, business process effectiveness and efficiency, the need to store large amount of data and the provision of qualitative information for management decision.

This study empirically examined the use of computerized accounting systems by Nigerian SMEs by evaluating finance and accounts executives who owes primary responsibilities for financial transactions processing. It considered the extent

of CBAS by responding firms, types and classes of commercial applications in use, mode of transactions processing and factors with greatest incidence on the use of automated systems by the underlying companies.

Responding firms were categorized into their manufacturing, IT services, wholesale and retail, agriculture, construction and mining, hotel and hospitality, medical services, and general services industries. Out of the total 320 copies of questionnaire copies administered, only 181 were returned fully completed and certified appropriate for the purpose of analysis. This represents a response rate of 57 percent. Findings showed that the use of CBASs is highly prominent in Nigerian SMEs.

Larger proportion of responding firms combine manual and computerized accounting systems and those who are fully computerized with web-enabled applications were found to be of insignificant proportion. We concluded from this outcome that more SMEs are not e-commerce compliant. The forms of commercial accounting packages shared across SMEs were essentially Turnkey Systems (*i.e.* general accounting systems, special-purpose systems, and office automation systems); Backbone systems; and Vendor-Supported Systems.

The study provides evidence about the challenges faced by users of CBAS. Limits identified as most significant were inaccuracy of reports, inability to support large volumes of data, lack of constant power supply, and lack of data filtering (import and export function). In order to obtain users response on ways to achieve improvement by software developers, evidence suggested that the most important factors were the need to provide instant and easier access to frequent fixes and upgrades, and availability of multiple window modes.

Finally, this study challenged professional accountants as they must continually hone their IT skills without which their applicability of their accounting knowledge would rapidly become obsolete.

This study is limited to Nigerian small and medium enterprises. Hence, caution must be exercised in generalizing our conclusions as regards the use of computerized accounting systems by other variants of businesses across the country. Only factors which are peculiar to SMEs are considered appropriate in reaching our conclusions.

### 5.2. Suggestions for Further Studies

The authors have considered Lagos as the primary area of survey. Hence it is suggested that comparable research be conducted in other locations within the country. Such future investigation may also consider wider group of respondents to enhance research credibility when drawing conclusions about the population. Ultimately, it may be substantial if other factors such as ownership structure, acquisition and maintenance cost, and accounting qualification amongst other factors capable of influencing the use of CBAS are reflected.

**APPENDIX**

**Table 2.** Result of the Logistic Regression

		Variables in the Equation						95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1a	Classification	20.253	4580.414	.000	1	.006	6.247E8	.000	.
	Constant	-41.456	9160.828	.000	1	.996	.000		

a. Variable(s) entered on step 1: Classification.

**Table 3.** Result of the Logistic Regression

		Variables in the Equation						95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	IND	18.832	1172.708	.000	1	.987	1.509E8	.000	.
	Constant	-133.304	8208.957	.000	1	.987	.000		

a. Variable(s) entered on step 1: IND.

**Table 4.** Result of the Logistic Regression

		Variables in the Equation						95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	YOP	.072	.116	.379	1	.038	1.074	.855	1.349
	Constant	-2.150	.835	6.632	1	.010	.116		

**Table 5.** Result of the Logistic Regression – Challenges to CBAS

		Variables in the Equation						95% C.I.for EXP(B)	
		B	S.E.	Wald	Df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	CHL1	15.472	1927.164	.000	1	.004	1.645	.000	.
	CHL2	-29.884	2273.308	.000	1	.620	2.511	.000	.
	CHL3	-9.720	1277.070	.000	1	.001	1.399	.000	.
	Constant	5.047	7186.159	.000	1	.999	155.506		

a. Variable(s) entered on step 1: CHL1, CHL2, CHL3.

**Table 6.** Result of the Logistic Regression

		Variables in the Equation					95% C.I.for EXP(B)		
		B	S.E.	Wald	Df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	CHL4	-.240	.259	.856	1	.000	3.787	.473	1.308
	CHL5	-17.532	4755.354	.000	1	.007	1.556	.000	.
	CHL6	2.663	5925.213	.000	1	1.000	14.343	.000	.
	Constant	10.167	21777.682	.000	1	1.000	26028.202		

**Table 7.** Result of the Logistic Regression – Suggested Improvements to CBAS

		Variables in the Equation					95% C.I.for EXP(B)		
		B	S.E.	Wald	Df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	IMP1	.000	7393.578	.000	1	.985	1.000	.000	.
	IMP2	-21.680	6059.315	.000	1	.001	2.912	.000	.
	Constant	87.196	58503.684	.000	1	.999	7.393E37		

a. Variable(s) entered on step 1: IMP1, IMP2.

**Table 8.** Result of the Logistic Regression

		Variables in the Equation					95% C.I.for EXP(B)		
		B	S.E.	Wald	Df	Sig.	Exp(B)	Lower	Upper
Step 1 <sup>a</sup>	IMP3	.000	7776.384	.000	1	.000	1.221	.000	.
	IMP4	20.881	6059.313	.000	1	.997	1.171	.000	.
	Constant	-104.728	18991.455	.000	1	.996	.000		

a. Variable(s) entered on step 1: IMP3, IMP4.

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