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FIRM-LEVEL TRAITS AND THE ADOPTION OF COMPUTERISED ACCOUNTING INFORMATION SYSTEM AMONG LISTED MANUFACTURING FIRMS IN NIGERIA

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ABSTRACT:

Inadequate investment in computerised accounting systems (CAIS) remain one of the most noticeable factors that impair the competitive edges of manufacturing firms. Thus, the study intends to ascertain the effect of firm profitability, firm size, firm capital turnover and firm liquidity on the level of accounting software used by listed manufacturing firms in Nigeria. Ex-post facto research design was used on a sample size of 21 listed manufacturing firms purposively selected from a population frame of 34 listed industrial goods and consumer goods firms on the Nigerian Exchange Group. Secondary data were collected from the 2012 to 2021 financial statements of sampled firms. The result of the Prais-Winsten regression conducted at 5% significance level revealed the following: firm profitability has no significant effect on the adoption of CAIS (Pro>|z| = 0.154); firm size has a significant positive effect on the adoption of CAIS (Pro>|z| = 0.000); firm capital turnover has a significant positive effect on the adoption of CAIS (Pro>|z| = 0.024); firm liquidity has a significant positive effect on the adoption of CAIS among listed manufacturing firms in Nigeria (Pro>|z| = 0.027). It was concluded that manufacturing firms that have satisfactory resources attain the organisational readiness status which enhances the adoption of better computerised accounting information system. The study recommends the following: managers of manufacturing companies should extend their support towards implementing and maintaining high quality accounting IT infrastructure in the firms; investors in manufacturing firms should invest in those firms whose level of adoption of CAIS is relatively adequate for the purpose of enhancing the quality of the firms' financial reporting process; accounting software technicians should model accounting IT infrastructure in a way that they can be afforded by firms with slender financial conditions; professional accountants who man accounting IT infrastructure in firms should be regularly trained to meet up with the recent changes in computerised accounting information system.

Key words: *Computerised Accounting Information System, Firm Capital Turnover, Firm Profitability, Firm Size, Firm-Level Traits*
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1. INTRODUCTION

The manufacturing industry is a vital sector of the economy of any nation given its place in the supply chain and value creation in global economy. This sector, in fact, is a significant catalyst which propels rapid economic development and also drives the growth of other sectors in the economy. Thus, business researchers in recognition of this fact pay staid attention to examining not only the performance of firms under the manufacturing sector but also a number of firm-level traits such as firm size, firm liquidity, leverage, firm age, firm capitalisation, et cetera which can define the stability and growth of the industry. The business environment of the manufacturing industry is highly competitive and dynamic; firms under this industry are distinguished based on their respective firm-level attributes, including the level of technological innovation adopted by the firms. This study is timely especially now that some of the listed manufacturing firms in Nigeria experience declining performance (Wofuru, 2022) as a result of low adoption of relevant technological innovations in their business process capabilities. This industry which is characterized by high volume of transactional cost require a cost-efficient tool capable of improving the performance of the industry by means of adopting information technology (Khan, Afridi, Mumtaz, Shad & Iqbal, 2022). Moreso, the various breakthroughs and advancements in technology have brought about numerous benefits and accompanying challenges to firms, especially those in the manufacturing sector. The benefits come from the automation of business processes as against the manual approaches which had hitherto impaired the operational efficiency of firms (Nworie & Oguejiofor, 2023). Application of technology leads to more accuracy and reduced rate of errors; it equally enhanced the reliability of output while delivering output with high speed. On the other hand, the challenges that accompany this technological development are enormous, ranging from risk of data damage or data loss, the risk of security breaches, the risk of virus contaminations, et cetera. In addition to these challenges, breakthroughs and advancements in technology made competition in the business industry skyrocket in recent years and any firm which is incapable of or adamant towards adopting the relevant technologies in its industry gets kicked out from the rivalry (Dirie & Ramli, 2022). Thus, this contributes to the threat facing the survival, growth and operational efficiency of firms whose resources cannot afford the adoption of emerging technologies (Thennakoon & Rajeshwaran, 2022; Sastararuji, Hoonsopon, Pitchayadol & Chiwamit, 2022), especially in the accounting dome where firm's investment in accounting information technology (IT) infrastructure is immanent.

Inadequate investment in computerised accounting systems remain one of the most noticeable factors that impair the competitive edges of manufacturing firms, making them vulnerably unable to compete in a business environment that is digital-first (Osinowo, Ogundajo & Oluwasegun, 2022). Aside low investment in CAIS which is worrisome, there are still some listed manufacturing firms in Nigeria that have zero investment in CAIS in this 21st century where adoption of technology helps to place businesses at the fore front and enhances the growth potentials of the enterprises. The researcher carried out a content analysis of the annual reports of some listed manufacturing firms in Nigeria and discovered that quite a good number of listed manufacturing firms have significantly invested in accounting IT infrastructure; while some others moderately invested in this, there are still manufacturing firms whose investment in accounting IT infrastructure is approximately nil. The attitude of manufacturing firms towards adopting CAIS is often determined by their organisational traits such as firm size, profitability, capital turnover and liquidity. Smaller firms with very fewer transactions prefer to outsource their accounting systems or invest a meagre amount in CAIS; on the other hand, low profitable firms and firms that are not sufficiently liquid time and again have low motivation to adopt high quality computerised accounting information system. The major consequence of low investment in CAIS is reduced business process capabilities which hamper the general financial growth and competitive advantage of any firm (Al-Matari, Amiruddin, Aziz & Al-Sharafi, 2022). Little wonder some manufacturing concerns are unable to create adequate market value using the available resources in the firms. Above all, profit-yielding managerial

decision-making is delayed or distorted mostly by the absence of high quality, timely, reliable and accurate accounting information. The case is even worsened by the presence of inaccurate, untimely and unreliable accounting information produced by low quality CAIS.

A good number of studies has been carried out to examine the factors that determine the extent of computerised accounting information system adoption. Among the studies are: Mahama and Dahlan (2022); Thuan et al. (2022); Lutfi (2022); Mohamed and Ramli (2022); Abdalwal (2022); Oduro et al. (2022); Al-Khasawneh et al. (2022); Sastararuji et al. (2022); Almgrashi (2021); Eldalabeeh, Al-Shbail, Almuiet, Bany Baker and E'leimat (2021); et cetera. However, existing related studies focused more on SMEs sector and virtually none of the studies, to the best of our knowledge, was carried out using evidence from the Nigerian listed manufacturing sector. In addition to the knowledge gap above, existing studies used only primary data to measure the level of computerised accounting information system adoption whereas secondary data could be more valid in measuring the adoption of CAIS. In this research, the identified gaps in literature are addressed by the use of secondary data evidence to examine the firm-level traits which influence the adoption of computerised accounting information system among listed manufacturing firms in Nigeria.

1.1 Objectives of the Study

The broad objective of the study is to examine the effect of firm-level traits on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. The broad objectives are broken down into the following specific objectives:

i. To determine the effect of firm profitability on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
ii. To examine the effect of firm size on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
iii. To ascertain the effect of firm capital turnover on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
iv. To determine the effect of firm liquidity on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.

1.2 Hypotheses

a) Firm profitability has no significant effect on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
b) Firm size has no significant effect on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
c) Firm capital turnover has no significant effect on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.
d) Firm liquidity has no significant effect on the adoption of Computerised Accounting Information System among listed manufacturing firms in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual review

2.1.1 Firm-Level Traits

Firm-level traits are attributes which are used to distinguish a manufacturing firm from another firm in the same industry. Firm structure, firm attributes, firm heterogeneity, firm specifics and firm characteristics are the alternative names of firm-level traits (Onyali & Okafor, 2018). They are aspects of a firm which identifies show the financial and non-financial condition of the firm as a distinct entity in an industry. Firm-level traits are differently conceptualized based on the criteria used in defining them. However, the common agreement in literature is that firm-level traits connote both the organisational objectives of the firm and the resources used in achieving those objectives (Al-Khasawneh et al., 2022). Of note, the resources deployed by firms in achieving their corporate goals are analysed using structural criterion, market criterion and capital criterion (Gachoka, Aduda,

Kaijage & Okiro, 2018; Olowokure, Tanko & Nyor, 2016). Therefore, firm-level traits broadly encompass all the structural, market, and capital resources which a firm uses in achieving its corporate objectives. Firm size, firm age, firm profitability, ownership, et cetera represent structural firm-level traits; environmental uncertainty, industry type, and market environment are classed as market firm-level traits while capital firm-level traits include leverage, liquidity and capital intensity. Furthermore, firm-level traits are also considered as the wide varieties of characteristics and information which are disclosed in the firm's financial reporting as the factors that predict the firms' performance and also the firm's quality of accounting information (Nworie & Mba, 2022). They are summarised as the factors which determine the behavioural patterns of the firm's corporate decisions as well as operation (Lutfi, Md Idris & Mohamad, 2017). Therefore, firm-level traits exercise an enormous influence in the affairs of any country. Managers consider the firm-level traits of their organisations before embarking on any financing decision, dividend decision, or investing decision.

Firm-level traits are a set of fundamental qualities which define a specific firm uniquely from other firms existing in same industry. The general financial condition of a manufacturing concern is shown by a number of its firm-level traits (Adong, 2019). A financially healthy firm normally has sound operating performance rations, attractive dividend policy ratios, good-looking solvability ratios and safe liquidity ratios. The calculation of ratios used to measure firm-level traits essentially provides relevant stakeholders with the idea about the performance of the firm in the period under focus. This is why we argue in this study that the extent to which manufacturing firms adopt computerised accounting information system depends on the firm-level traits of the organisations such as size, profitability, capital turnover and liquidity. Thus, in the present study, firm-level traits are represented solely by firm profitability, size, capital turnover and firm liquidity.

2.1.2 Firm Profitability

Firm profitability refers to the measure of managerial efficiency in using firm resources such as asset or funds to generate earnings (George & Ogonda, 2022). It is the extent to which the revenue generated by the firm covers the resultant expenses incurred while generating the revenue (Nworie, Moedu & Onyali, 2023). Management performance is indicated by how profitable the organisational processes are with respect to earning income more than its operating expenditures. Basically, profit represents the difference between revenue and costs incurred (Onyali & Okafor, 2018). However, when this difference (profit) is compared to the resources that were used to generate it, the effectiveness of resource utilisation is therefore shown. Profitability can now be re-defined as the degree to which a firm utilises available resources contributed by capital providers in order to yield positive returns on the resources. It is pertinent to note at this point that the resources may be assets, equity, liabilities or a combination of some of their components (Aggreh, Nworie & Abiahu, 2022). For instance, the noncurrent liabilities of a firm can be combined with equity to arrive at capital employed resource. In this case, profit realised can be compared with capital employed in order to ascertain how much profit was generated from the use of capital employed during the period under focus.

A well profitable firm has the ability of earning high amount of revenues from its operational activities (Nworie, Moedu & Onyali, 2023). It is said that the extent of the profitability of a firm shows the extent of the financial health of that firm (Uzrail & Bardai, 2019). This is because a firm with an overly reduced profitability will struggle throughout its business processes while a firm with an overly increased profitability is considered to have some stout financial health, comparably. Profitability indices provide the monetary framework used in comparing firms' financial results within a given industry or to compare firms' financial results across different sectors.

There are various measures of firm profitability in practice. Ratios such as return on equity, return on investment, return on assets, return on employed capital, operating income margins, earnings before tax margin, earnings after tax margin, et cetera indicate an aspect of profitability of the firm

(George & Ogonda, 2022). However, in this study, firm profitability in this study is measured using return on asset. Return on assets is a ratio used to measure how much earnings before tax that is generated from asset utilization.

2.1.3 Firm Size

Firm size refers to a variable used to determine the proportion is resources controlled by a firm. It indicates the firm's operational strength since it also entails the amount of workforce (Sastararuji et al., 2022) or quantity of earnings generated by the firm (Trigo, Varajão, Soto-Acosta, Gonzálvez-Gallego & Castillo, 2015). Often, firm size connotes the amount of assets under the control of the firm (Mohammed et al., 2021) with which revenues are generated for the purpose of maximising the value of the shareholders. Firms whose size grow often have enormous opportunity of operating in bigger markets where its market share can be expanded (Nworie & Mba, 2022). The assumption which is theoretically acceptable but empirically arguable is that larger firms have more financial and non-financial resources available in the firm which they can commit to investment opportunities (Tilahun, 2019). Thus, larger manufacturing firms are deemed to have enough financial resources that can be used to acquire good quality accounting IT infrastructure. However, small-sized manufacturing firms seem to have lesser resources for the adoption or implementation of a robust computerised accounting information system. Additionally, large-sized firms often have large number of transactions which make them prone to adopting high quality CAIS unlike small-sized firms with manageably lower number of business transactions.

Contrarily, small-sized firms that want to be able to compete with large-sized firms can as well be motivated to adopt high quality computerised accounting information system in order to enhance their competitive edge. Firm size can be explained using either total assets, total sales, operation scale or number of employees in the firm. However, firm size in this study is operationalised as the natural logarithm of firm's total assets.

2.1.4 Firm Capital Turnover

Firm capital turnover is the degree to which the shareholders' fund deployed by the manager in the course of business operation generates sales for the business enterprise (Dyson & Franklin, 2020). The argument that firm capital turnover affects the adoption of computerised accounting information system stem from the premise that the net sales volume of the enterprise need to be sufficiently large enough in order to enable the enterprise to cover the fixed costs that comes with the adoption of the system. Growing firm capital turnover implies that fewer amount of shareholders' funds are generating more revenues and vice versa. However, this may not be the case always as there are firms whose increasing capital turnover ratio simply shows that their asset base is highly financed by debts, and not shareholders' equity. The classes of transactions carried out in the manufacturing sector keep on expanding gradually together with the volume and value of transactions. The capital turnover will therefore rise when the capital provided by shareholders are invested in profitable ventures.

Manufacturing firms whose capital turnover ratio are high are deemed to have the financial wherewithal to invest in good quality computerised accounting information system (Ismail & Ali, 2013). This ratio shows the amount of net sales made relative to total equity. If after the calculation and a low sales to equity ratio is found, it means that managers are not effective enough in using the capital contribution of shareholders to generate income for the firm. Firm capital turnover is operationalized as the ratio of sales revenue to shareholders' fund at the end of an accounting period.

2.1.5 Firm Liquidity

Firm liquidity implies the amount of available current assets which the firm has and can use to meet its maturing current debts (Mutula, 2018). It indicates strength of the firm to meet immediate demand for working capital items (Nworie & Ofoje, 2022). Liquidity is widely regarded as the

amount of cash available for the near future after the maturing short-term obligations have been considered. Liquid assets can be used by firms in financing their investments most especially in the absence of external financing. In the time when earnings are low, less liquid firms encounter enormous difficulty in coping with their maturing obligations and also in facing unexpected emergencies. The problems associated with liquidity risks are enormously a threat to the smooth running of an organisation. Thus, it is only when a firm is free from liquidity risks that it can contemplate on either adopting or increasing its investments in computerised accounting information system.

High level of working capital enables firms overcome the liquidity risk (Ezeana, Okoye & Nwoye, 2022) that is pervasive in the manufacturing industry. A liquid manufacturing firm pays down its current debts as they mature without having to dispose of its noncurrent assets. The characteristic of a liquid firm is that it has an adequate cash position and is able to easily convert near cash items into cash or cash equivalent in order to meet the daily operational needs of the firm in addition to meeting the maturing short-term debts of the firm. Examples of liquidity ratios are working capital ratio, quick ratio, current ratio, operating cash flow ratio, et cetera. Regardless of which proxy for liquidity ratio used, the essence of any of the ratios is to indicate the capacity of a firm to satisfy its current obligations. Firm liquidity is defined as the ratio of current asset (less inventory) to current liability of a firm at the end of the financial year.

2.1.6 Computerised Accounting Information System

A computerised accounting information system was conceptualized by Mohamed and Ramli (2022) as a set of intersected subsystems operating together to process financial data into financial information to support management decision-making processes. Computerising the accounting information system of a business implies using computer-based programs and computer peripherals to process and store accounting information. Chiefly, accounting software is the main driver of a computerised accounting information system. It is the use of this software that will enable a firm input and process accounting data into the system with the aim of producing accounting information about the operation of the entity for management decision-making. In simpler terms, computerised accounting information system refers to the software and other relevant components used by accountants to input and process financial data, store them and produce financial information for the purpose of decision-making by relevant stakeholders. In this system, there is an orderly combination of computers and accounting software assembled together to automate the accounting processes (Abdulle, Zainol & Mutalib, 2019; Rotich, 2017). The system is customized often in order to meet the specific technology and accounting needs of the individual firm. Computerised accounting information system are either designed as a backbone system, turnkey system or vendor-supported system (Oladipupo & Ajape, 2013). A backbone system is made up of structured programmes and logic which will enable the vendor design the user interface with respect to the specific needs of the client. It is the duty of the software vendor to design, implements and maintain the CAIS of its clients under vendor-supported systems (Chude & Chude, 2022). However, in turnkey systems, the CAIS are both tested and finished systems, ready to be implemented in the business processes. Companies mostly go for turnkey systems and Enterprise Resource Planning systems such as Oracle, Sage, Systems Applications and Products, People Soft, with small-sized firms for the most part patronising Myob, Tally, Pastel, Alpha, QuickBooks, Peachtree, et cetera (Anaeli, 2018; Kwatinyuy, 2018).

2.2 Theoretical Review

2.2.1 Resource Based Theory

Jay Barney in 1991 propounded the Resource-Based Theory with the view that the primary way by which a firm achieves a sustainable advantage is by doing things in a superior approach using the resources at the disposal of the firm (Thuan et al., 2022). Put in other words, Resource-Based Theory purports that firms should develop superior capabilities and/or resources that will enable

them sustain their existence (Al-Khasawneh et al., 2022). The theory recognizes the divergent and dynamic nature of business environment and advocates for a competitive edge for firms in business. However, the theory stresses that all resources do not have equal potentials; that is, not every resource can confer sustainable competitive advantage on firms. Thus, it is now the duty of that firm to evaluate its resources and determine which can position the firm in a place of superior advantage. The Resource-Based Theory postulates that all resources of the firms can be summarised as capability, skills and competence which are deployed in business processes in order to achieve the corporate goals of the firms (Smith, 2020; Mutula, 2018). While capability refers to how the managers of a firm utilize and organize their resources, competence refers to how well and efficient the resources are managed. More so, skills refer to those technical know-how that are deployed in managing organizational resources. This theory of Resource-Based View emphasizes the need for a sustained competitive advantage and indirectly suggests that firms often look out for resources that can help maximize the value of the shareholders (Ahmad, Smith, Ismail, Djajadikerta & Roni, 2016).

As a result, manufacturing firms that want to improve on their managerial efficiency and effectiveness tends to adopt computerised accounting information system resource in order to attain some level of competitive advantage (Ismail, Ali & Rashid, 2017).Thus, the relevance of this theory to the topic of our discourse is that since manufacturing firms would like to maximize the value of their owners through sound management decisions, they can easily achieve that by optimizing their computerised accounting information system resource. This is because a high quality CAIS, when optimized and maintained, is a demonstrated source of competitive advantage in the business world. That aside, this theory is related to the argument posed in this study since firms' adoption of CAIS is tremendously determined by the resources at the disposal of the firm.

2.3 Empirical Review

Mohamed and Ramli (2022) examined the factors which influence the implementation of computerised accounting systems in SMEs in Somalia. The study collected primary data from 110 respondents using questionnaire. The results of the regression analysis showed that human capital efficiency, management commitment, cost capabilities and business user competency significantly affect the implementation of computerised accounting system in SMEs in Somalia.

Lutfi (2022) examined the factors that determine the adoption of cloud-based accounting information system by SMEs in Jordan. A structured questionnaire was used in collecting data from a sample size of 156 SMEs owners/managers. The results of the PLS-structural equation modelling revealed that organization readiness, top management support, security concern, perceived usefulness, competitive pressure, and supplier computing support affect the adoption of cloud-based accounting information system.

Mahama and Dahlan (2022) carried out an examination of the factors influencing SMEs in Ghana to adopt accounting information systems. Secondary data were obtained from the review of 54 journal publications between 2015 to 2021. The findings of the thematic analysis showed that organisation, human, environmental, and technological factors determine the adoption of accounting information system.

Dirie and Ramli (2022) examined the computerised accounting system adoption status of small scale enterprises in Mogadishu, Somalia. Primary data collected from the distribution of questionnaire to 124 respondents were analysed using frequency counts and percentage analysis. It was found that small-sized firms extensively adopt computerised accounting system.

Sastararuji et al. (2022) inspected the factors which determine the adoption of cloud accounting among SMEs in Thailand. The study used the interview method to obtain qualitative data from 17

respondents. The thematic analysis disclosed that the adoption of cloud accounting is determined by technological, environmental, vendor, and organisational factors. It was concluded that firm characteristics such as firm size determine the level of cloud computing adoption in Thailand.

Oduro et al. (2022) ascertained the effect of the adoption of computerised accounting information system on financial performance in the public sector. Primary data were collected from 227 local governments in Ghana via questionnaire while structural equation modelling was deployed in the data analysis. The study found that readiness to adopt CAIS and cost of adopting CAIS have significant effect on financial performance while the effects of CAIS complexities and data security threat are not significant.

Eldalabeeh et al. (2021) examined the factors which determine the adoption of cloud accounting in the financial sector of Jordan. Primary data were sourced using questionnaire administered on 187 sampled participants. Applying structural equation modelling, the study found that the adoption of cloud accounting is shaped by top management support, service quality, organizational competency, system quality, perceived ease of use and perceived usefulness.

Zaini, Hamad and Najim (2020) examined the factors that determine accounting information system adoption in tourism firms in Jordan. The primary data collected from questionnaires distributed to 210 respondents were subjected to structural equation modelling. It was found that organizational resources and technical infrastructure positively influence the adoption of accounting information system by tourism firms in Jordan.

Uzrail and Bardai (2019) examined the determinants of the adoption of computerised accounting information system among companies in Palestine. The study was carried out using a sample size of 500 from whom primary data were collected via questionnaire. The Simple linear regression conducted showed that financial performance significantly and positively affects the adoption of computerised accounting information system among companies in Palestine.

Habiba et al. (2019) examined the factors which affect the adoption of computerised accounting information system among SMEs in Addis Ababa, Ethiopia. Primary data were sourced from a sample size of 300 firms via questionnaire. The result of the logistic regression showed that firm size and financial readiness positively and significantly influence the adoption of computerised accounting information system among SMEs in Addis Ababa.

The study carried out by Tilahun (2019) to examine factors which determine the adoption of computerised accounting information system in hospitals in Addis Ababa used questionnaire to source primary data from 52 respondents. The result of the ordinal logistic regression reveled that firm size has a positive but non-significant effect on the adoption of computerised accounting information system by hospitals in Addis Ababa.

Qi and Ismail (2019) examined the factors influencing the adoption of IT-based Accounting Information System among SMEs. Questionnaires were administered on a sample size of 100 respondents while data were analysed using regression technique which revealed that perceived usefulness, perceived ease of use and Task-technology Fit are significantly associated with the adoption of IT-based Accounting Information System among SMEs.

The study carried out by Ezenwoke (2017) examined the factors affecting the implementation of e-accounting system in Micro and Small Enterprises in Nigeria. 660 copies of questionnaire were administered on the sampled respondents. The results of the Binary Logistic Regression showed that financing method negatively affects the implementation of e-accounting but firm size has a positive effect on the implementation of e-accounting by the firms.

Wongsim (2016) examined the factors that influence the adoption of accounting information systems in manufacturing firms in Thailand. Questionnaires were used to source data from 189 respondents and the regression analysis conducted showed that organisation size influences the adoption of accounting information systems in manufacturing firms in Thailand.

Munasinghe and Munasinghe (2015) examined the factors that influence the usage of computerised accounting system by SMEs in Sri Lanka. The primary data that were collected from 100 respondents were analysed using regression technique. The findings revealed that firm size has a significant positive effect on the usage of computerised accounting system.

Oladipupo and Ajape (2013) examined the factors affecting the adoption of computer-based accounting systems in small and medium enterprises in Nigeria. Primary data were collected from a sample size of 181 respondents. The study carried out a logistic regression which showed that firm size significantly and positively affect the adoption of computer-based accounting systems in SMEs in Nigeria.

3. MATERIAL AND METHOD

The study adopted an ex-post facto research design in order to examine the effect of firm-level traits on the adoption of computerised accounting information system (CAIS) among listed Nigerian manufacturing firms. Ex-post facto research deign uses past events to retrospectively examine the causal-relationship between variables (Saunders et al., 2012). It is famously used by researchers in management sciences who want to examine the effect of predictor variable on a response variable which co-occurred in the past. The pros of ex-post facto design is that none of the variables can be manipulated since the researcher can only go back in time to collect already existing data over which they have no control (Schenker & Rumrill, 2004). The justification for the use of this design in conducting the present study is that firm-level attributes and adoption of computerised accounting information system already took place and the study goes back in time to collect data on these variables from 2012 to 2021 accounting periods.

This study targeted those listed manufacturing firms that deal on either industrial or consumer goods. The justification for this is to obtain a population size whose elements are not highly heterogeneous. The number of manufacturing firms listed under the industrial and consumer goods sub-sectors is presented in Table 1. See Appendix A. The sample size of the study was obtained from the population frame of 34 listed manufacturing firms enumerated in Table 1. Purposive sampling technique was deployed in choosing the firm participants. Purposive sampling technique is a method of judgmental sampling whereby elements of a study population are selected to be in the sample based on a given criterion or criteria (Kothari, 2004). The criteria used in selecting the sample size were: (1) the firm must have been listed on the Nigerian Exchange Group as at 2012 and (b) the firm must have uploaded its annual reports from 2012 to 2021 either on its website or on the website of Nigerian Exchange Group. Applying the two criteria above resulted in a sample size of twenty-one (21) listed manufacturing firms since thirteen (13) firms from the population failed to meet up with at least one of the criteria. Thus, the study was carried out using a sample size of 21 listed manufacturing firms purposively selected from a population frame of 34 listed industrial goods and consumer goods firms on the Nigerian Exchange Group. The list of the firms selected is shown in Table 2.

Table 2 Sample Size of the Study

Firms Selected into the Sample			
1.	Cadbury Nigeria Plc.	12.	PZ Cussons Nigeria Plc.
2.	Champion Brewery Nig. Plc.	13.	Unilever Nigeria Plc.
3.	Dangote Sugar Refinery Plc.	14.	Vitafoam Nigeria Plc.
4.	Flour Mills Nig. Plc.	15.	Berger Paints Plc.
5.	Guinness Nig. Plc	16.	Beta Glass Plc.
6.	Honeywell Flour Mill Plc.	17.	Cap Plc.
7.	International Breweries Plc.	18.	Cutix Plc.
8.	Northern Nig. Flour Mills Plc	19.	Dangote Cement Plc.
9.	Nascon Allied Industries Plc.	20.	Greif Nigeria Plc.
10.	Nestle Nigeria Plc	21.	Lafarge Africa Plc.
11.	Nigerian Breweries Plc		

Source: Researcher's Compilation (2023)

The study was carried out using only secondary data collated from the annual reports and accounts of the sampled firms over a ten year accounting period, spanning 2012 to 2021. Data on the value of accounting software were collected from the Notes to the Accounts; data on firm profitability, firm size, firm capital turnover, and firm liquidity were calculated using raw data extracts from both statement of financial position and income statement. The reliability of the data was assumed since the financial statements have been subjected to statutory audits.

The data analysis of the study was done in three phases such as descriptive analysis, robustness tests and hypotheses testing. Descriptive analysis was done with the aid of central tendencies and measures of dispersion. The regression model formulated was tested using panel regression analysis at 5% significance level. The use of panel regression approach is justified because the data for the study have cross-sectional identities and time series properties. Panel regression approach offers the advantage of enabling the researcher control for cross-sectional heterogeneity. The three robustness tests conducted are: heteroskedasticity test, cross-sectional dependence test and test for autocorrelation. The essence of these robustness tests was to diagnose the model and establish whether it met the basic assumptions of panel regression analysis (Griffiths, Judge, Hill, Lütkepohl & Lee, 1985). For the reason that the model suffered from autocorrelation and heteroskedasticity, it was necessary that a more robust panel regression tool be used to address these issues. Thus, Prais-Winsten regression with panel corrected standard errors was applied in estimating the model for the study. The presence of autocorrelation and heteroskedasticity in a model produces invalid regression estimates as a result of over-inflated standard errors. To avoid this issue from leading to spurious panel regression, the researcher deployed Prais-Winsten regression with panel corrected standard errors which has been proven to correct the above identified anomalies in data panel (Beck, Nathaniel & Jonathan, 1995; Johnson, 2004; Brodzicki, 2009).

3.1 Model Specifications

To the best of the researcher's knowledge, related studies conducted so far to examine the determinants of the adoption of computerised accounting information did not specify any regression model using secondary data. Therefore, the present study was carried out on the framework that the adoption of computerised accounting information system is a function of firm-level traits such as profitability, size, capital turnover and liquidity.

Therefore, the function is shown below:
ACAIS = f(PROF, SZE, FCT, LIQ)…….Eq (I)
Transforming the Eq (I) into a regression model produced the model in Eq (II) below.

$$ACAIS_{it} = \alpha_0 + \beta_1 PROF_{it} + \beta_2 SZE_{it} + \beta_3 FCT_{it} + \beta_4 LIQ_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{Eq (II)}$$

Where,
$ACAIS_{it}$ = Adoption of computerised accounting information system for firm *i* in year *t*
$PROF_{it}$ = Firm profitability for firm *i* in year *t*
SZE_{it} = Firm size for firm *i* in year *t*
FCT_{it} = Firm capital turnover for firm *i* in year *t*
LIQ_{it} = Firm liquidity for firm *i* in year *t*
α = constant
$\beta_{1\text{-}5}$ = Coefficients of the predictor variables
The variables of the study were calculated as shown in Table 3 below.

Table 3 Operationalization of Variables

Variables	Type of Variables	Measurement	Source
ACAIS	Dependent	The natural logarithm of the value of accounting software	Researcher's concept
Firm Profitability	Independent	$\frac{Earnings\ Before\ Tax}{Total\ Assets}$	(Heikal, Khaddafi & Ummah, 2014)
Firm Size	Independent	Natural Logarithm of Total Assets	(Nworie & Mba, 2022)
Firm Liquidity	Independent	$\frac{Current\ Assets - Inventory}{Current\ Liabilities}$	(Carton, 2005)
Firm Capital Turnover	Independent	$\frac{Sales}{Total\ Equity}$	(Dyson & Franklin, 2020)

Source: Researcher's Compilation (2023)

4. RESULT AND DISCUSSIONS

4.1 Data Analysis

4.1.1 Descriptive Statistical Analysis of the Data

Descriptive analysis was done with the aid of central tendencies and measures of dispersion. The result of the analysis is shown below in Table 4.

Table 4 Descriptive Analysis of Data

Variable	Obs	Mean	Std. Dev.	Min	Max
ACAIS	210	221481.6	428185.7	0	3204505
PROF	210	.1071276	.2098373	-1.795168	1.238237
SZE	210	7.581524	.8678539	5.239405	9.412006
FCT	210	2.533077	2.215171	-.4241718	17.73269
LIQ	210	-.1064111	6.820782	-80.37689	2.636377

Source: Output from Stata 14.2 (2023)

The output of the descriptive statistical analysis above shows that the sampled firms have an average amount of 221481.6 (in thousands of naira) accounting software infrastructure. The standard deviation of 428185.7 reveals that the adoption of CAIS among the sampled firms is highly heterogeneous. This was equally evidenced by the lowest value of ACAIS (0) and its highest value (3204505). The mean value of .1071276 implies that the sampled firms earned about 10.71% income after tax from every 100% asset used in operation. The lowest PROF was -1.795168 while the highest PROF was 1.238237. Firm size averaged 7.581524 with a standard deviation of

.8678539. SZE ranged from 5.239405 to 9.412006. The average value of FCT reveals that the firms generated about ₦2.53 sales from every ₦1 equity invested in the firm. The standard deviation for FCT is 2.215171; it minimum and maximum values are -.4241718 and 17.73269, respectively. The average value of Firm Liquidity from 2012 to 2021 was -.1064111, showing that the removing stock from the current assets of the sampled firms will make the firms unable to meet their current debts, on average. This statistic shows that the liquidity positions of the sampled firms are comparably the same.

4.1.2 Model Diagnostics

The analysis of panel data using regression approach is governed by a number of assumptions. Unlike in cross-sectional data which requires model diagnostics of six assumptions, the most relevant assumptions to be assessed in data panel are groupwise heteroskedasticity, autocorrelation and cross-sectional dependence (Wooldridge, 2015). The three assumptions would determine whether or not to carry out the traditional Fixed Effect/Random Effect Estimation or to go for a more robust approach that can accommodate the problems of autocorrelation, cross-sectional dependence and heteroskedasticity.

4.1.3 Groupwise Heteroskedasticity

The assumption of heteroskedasticity supposes that the residuals of the regression model must have a constant variance (Baum, 2001). If this is the case, the model is said to be homoscedastic. This was tested using the modified Wald test for groupwise heteroskedasticity. If the probability value of the test is less than 0.05, the null hypothesis of homoscedasticity is rejected and vice versa.

Table 5 Modified Wald Test for Groupwise Heteroskedasticity

chi2 (21)	38724.60
Prob>chi2	0.0000

Source: Output from Stata 14.2 (2023)

In line with the result of the heteroskedasticity test shown in **Table 5** above, the regression model is not homoscedastic since the Prob>chi2 = 0.000 is less than 0.05. Thus, the null hypothesis of homoscedasticity was rejected. The absence of homoscedastic variance in a panel regression model is an evidence that the variance of the regression coefficients are excessively more than they should (Baum, 2001). Since Ordinary Least Square does not notice this increase, a statistical tool such as Prais-Winsten regression can be used to obtain heteroskedastic panels corrected standard errors (Greene, 2012).

4.1.4 Panel Data Autocorrelation

Autocorrelation is a condition whereby the some observations of the residuals predict the next observations (Frost, 2019). This problem reduces the precision of the Ordinary Least Square regression estimates (Gujarati, 2011). Thus, Wooldridge test for autocorrelation in panel data was used to assess the assumption of no autocorrelation in the model. The null hypothesis of no autocorrelation would be accepted if the *Prob*>F is greater than 0.05, and vice versa.

Table 6 Wooldridge Test for Autocorrelation in Panel Data

F(1, 20)	**48.177**
Prob>F	0.0000

Source: Output from Stata 14.2 (2023)

Having conducted the test of autocorrelation to ascertain whether some observations of the residuals predicted the next observations, the output of the Wooldridge Test shows that there is a presence of autocorrelation in the model. Thus, since the Prob>F = 0.000 is less than 0.05, the researcher failed to accept the null hypothesis of no autocorrelation at 5% significance level. The implication is that a

regression approach capable of producing valid estimates amidst autocorrelated residuals is needed to avoid spurious regression estimates. Here again, Prais-Winsten regression model was also applied assuming panel-specific AR(1) in line with the recommendation of Thombs (2022).

4.1.5 Test of Cross Sectional Independence

Longitudinal researches are characterised by repeated measurement obtained from a number of cross-sectional units over time. Even though it is more efficient to carry out a regression analysis using panel data, this efficiency may be lost if some observations in a cross-sectional unit depend on observations from other cross-sections. This problem is mostly caused by unobserved common factors which affect the observations across the cross-sections. The researcher evaluated the model against cross-sectional dependence using Pesaran's test of cross sectional independence. The null hypothesis of cross-sectional independence would be accepted if the *p*-value is greater than 0.05. Otherwise, the error terms across the cross sections are considered inter-dependent or strongly correlated.

Table 7 Pesaran's Test of Cross Sectional Independence

Pesaran's test of cross sectional independence	-0.655
Probability	1.4874

Source: Output from Stata 14.2 (2023)

The result of the test for cross-sectional dependence reveals that there is no unobserved common factor that makes the observations in the cross-sectional unit depend on observations from other cross-sections. It was shown by the *p*-value = 1.4874 that there is a very weak and negligible cross-sectional dependence in the model. Having met the requirement for cross-sectional independence, the Prais-Winsten regression estimation will only be designed to address autocorrelation and heteroskedasticity only.

4.2 Test of Hypotheses

The null hypothesis guiding the study is that the effect of firm profitability, firm size, firm capital turnover and firm liquidity on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria is not statistically significant. The regression model estimated was:

$$ACAIS_{it} = \alpha_0 + \beta_1 PROF_{it} + \beta_2 SZE_{it} + \beta_3 FCT_{it} + \beta_4 LIQ_{it} + \varepsilon_{it}$$

The estimation was done using Ordinary Least Square Technique, Fixed Effect Regression Approach and Random Effect Estimation Tool. The results are presented in Appendix III of this thesis report. However, model diagnostic test conducted revealed that the model suffer from autocorrelation and heteroskedasticity. This required a robust test technique that would correct the problems associated with autocorrelated and homoscedastic residuals. Prais-Winsten regression with panel corrected standard errors was therefore deployed in estimating the model with which the hypotheses were tested. This test technique helped to avoid the production of spurious panel regression estimates (Kashin & Kashin, 2014; Thombs, 2022; Greene, 2012). The result of the test is shown in Table 8 below.

Table 8 Prais-Winsten Regression Result

```
Group variable:   id                              Number of obs      =       210
Time variable:    Year                            Number of groups   =        21
Panels:           heteroskedastic (balanced)      Obs per group:
Autocorrelation:  panel-specific AR(1)                          min =        10
                                                                avg =        10
                                                                max =        10
Estimated covariances      =        21          R-squared          =    0.5821
Estimated autocorrelations =        21          Wald chi2(4)       =     26.09
Estimated coefficients     =         5          Prob > chi2        =    0.0000

------------------------------------------------------------------------------
             |             Het-corrected
    LogACAIS |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        PROF |  -.5992339   .4200788    -1.43   0.154    -1.422573    .2241054
         SZE |   .5944474   .1550179     3.83   0.000     .2906179    .8982769
         FCT |   .1155536   .0512516     2.25   0.024     .0151024    .2160049
         LIQ |   .0305516   .0137822     2.22   0.027     .0035389    .0575643
       _cons |  -.7014285   1.209792    -0.58   0.562    -3.072577     1.66972
-------------+----------------------------------------------------------------
        rhos =   .8403411   .3896081   .1349505   .9475877   .8814762 ...  .0487418
------------------------------------------------------------------------------
```

Source: Output from Stata 14.2 (2023)

The result of the Prais-Winsten Regression above determined the effect of firm-level traits on the adoption of computerised accounting information system by listed manufacturing firms in Nigeria. The data used in the regression analysis were panel data of 210 firm-year observations since twenty firms were assessed over 10 years. The value of the R-Squared = 0.5821 means that firm profitability, firm size, firm capital turnover and firm liquidity accounted for 58.21% of the variations in the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. This statistic shows that the adoption of CAIS by the firms in focus is weightily influenced by the firm-level traits that were included in the model. More also, the corresponding Prob > chi2 = 0.0000 for the Wald chi2(4) = 26.09 confirmed that the joint effect of PROF, SZE, FCT and LIQ on ACAIS is significant at 5% alpha level. The null hypothesis of the Wald test was that the regression coefficients of PROF, SZE, FCT and LIQ are jointly equivalent to zero. This null hypothesis was rejected since the Prob > chi2 = 0.0000 is less than 0.05.

4.2.1 Hypothesis I

1. Firm profitability has no significant effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria.

In testing the above null hypothesis, the coefficient of PRO and its Pro>|z| as shown in **Table 8** were used. Firm profitability whose coefficient is -.5992339 has a negative effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. This supposes that as the firms make more profit, their level of adoption of computerised accounting information system reduces.

4.2.1.1 Decision: This effect is not significant since the Pro>|z| = 0.154 is greater than 0.05. The null hypothesis that firm profitability has no significant effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria was accepted (Pro>|z| = 0.154). In a way, this result agrees with Resource-Based Theory which submitted that the need for a sustained competitive advantage makes every firm to look out for resources that can help maximize the value of the shareholders (Ahmad, Smith, Ismail, Djajadikerta & Roni, 2016). Thus, despite low profitability levels, adoption of more level of CAIS can be observed in low-profitable firms that want to improve on their managerial efficiency and effectiveness (Ismail, Ali & Rashid, 2017). However, this result negated the results found by Uzrail and Bardai (2019); Zaini, Hamad and Najim (2020).

4.2.2 Hypothesis II

Firm size has no significant effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria.

In testing the above null hypothesis, the coefficient of SZE and its Pro>|z| as shown in **Table 8** were used. Firm size whose coefficient is .5944474 has a positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. This supposes that as the firms grows bigger, their level of adoption of computerised accounting information system increases.

4.2.2.1 Decision: This effect is statistically significant since the Pro>|z| = 0.000 is less than 0.05. The alternate hypothesis that firm size has a significant positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria was accepted (Pro>|z| = 0.000). Researchers such as Lutfi (2022); Mohamed and Ramli (2022); Mahama and Dahlan (2022); Zaini, Hamad & Najim (2020); Habiba, Azhar, Annuar and Mastora (2019); Ezenwoke (2017); Wongsim (2016); et cetera found similar results with the present study unlike Dirie and Ramli (2022) that found a negative relationship between firm size and CAIS adoption. Tilahun (2019)'s study reported a positive but non-significant effect.

4.2.3 Hypotheses III

Firm capital turnover has no significant effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria.

In testing the above null hypothesis, the coefficient of FCT and its Pro>|z| as shown in **Table 8** were used. Firm capital turnover whose coefficient is .1155536 has a positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. This supposes that as the firms generate more sales per every shareholders' fund invested in the firms, their level of adoption of computerised accounting information system increases.

4.2.3.1 Decision: This effect is statistically significant since the Pro>|z| = 0.024 is less than 0.05. The alternate hypothesis that firm capital turnover has a significant positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria was accepted (Pro>|z| = 0.024). This finding is in line with the results found by Sastararuji, Hoonsopon, Pitchayadol and Chiwamit (2022); Zaini, Hamad and Najim (2020).

4.2.4 Hypotheses IV

Firm liquidity has no significant effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria.

In testing the above null hypothesis, the coefficient of LIQ and its Pro>|z| as shown in **Table 8** were used. Firm liquidity whose coefficient is .0305516 has a positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. This supposes that as the firms increase their quick liquid assets relative to their current liabilities, their level of adoption of computerised accounting information system increases.

4.2.4.1 Decision: This effect is statistically significant since the Pro>|z| = 0.027 is less than 0.05. The alternate hypothesis that firm liquidity has a significant positive effect on the adoption of computerised accounting information system among listed manufacturing firms in Nigeria was accepted (Pro>|z| = 0.027). This finding agrees with the results found by Oduro, Enyan, Acquah and Quarm (2022); Eldalabeeh, Al-Shbail, Almuiet, Bany Baker and E'leimat (2021); Zaini, Hamad and Najim (2020).

CONCLUSION AND RECOMMENDATIONS

Firms integrate information technology infrastructure into their systems in order to reap the benefits offered there-in. Computerised accounting information system offers the benefits of speed, accuracy,

reliability, security, storage, network and improved coordination. Managers try to enhance the effectiveness and efficiency of their decision-making processes by resorting to a high quality computerised accounting information system. This study found that despite the benefits offered by this system, its adoption is somewhat influenced by the resources at the disposal of the management. The findings revealed that firm-level traits such as firm size, firm liquidity and firm capital turnover are positively and significantly related to the adoption of computerised accounting information system. The reason for this positive effect is that the aforementioned firm-level traits point towards the extent of organisational readiness which entails the amount of financial resources available in a firm to enable it adopt computerised accounting information system. However, the study found that profitability does not drive the adoption of computerised accounting information.

The results of this study show that it is likelier that firms with large size, higher capital turnover and healthier liquidity tend to adopt computerised accounting information system compared to firms with relatively lower size, low capital turnover and unhealthy liquidity. Even when a firm is not financially profitable, low-profitable firms still have motivations to invest more on computerised accounting information system since they would like to invest in resources that will boots it competitive advantage. The study concludes that manufacturing firms whose resources such as asset-base, liquidity, and capita turnover are satisfactory consequently attain the organisational readiness status which enhances the adoption of better computerised accounting information system. Even though profitability is one of the major indicators that a firm is financially ready to adopt computerised accounting information system, the adoption of more level of CAIS can be observed in low-profitable firms that want to improve on their managerial efficiency and, consequently, effectiveness. The study makes the following recommendation:

i. Managers of manufacturing companies should extend their support towards implementing and maintaining high quality accounting IT infrastructure in the firms so that the business process capabilities of the firms will be carried out more effectively and efficiently.
ii. Investors in manufacturing firms should invest in firms whose level of adoption of CAIS is relatively adequate for the purpose of enhancing the quality of the firms' financial reporting process.
iii. Accounting software technicians should model accounting IT infrastructure in a way that they can be afforded by firms with slender financial conditions.
iv. To enhance the organisational readiness of the firm, professional accountants who man accounting IT infrastructure in firms should be regularly trained to meet up with the recent changes in computerised accounting information system.

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APPENDIX A

Table 1 Population of the Study

Firms

1. Bua Foods Plc
2. Cadbury Nigeria Plc.
3. Champion Brew. Plc.
4. Dangote Sugar Refinery Plc
5. Dn Tyre & Rubber Plc
6. Flour Mills Nig. Plc.
7. Golden Guinea Brew. Plc.
8. Guinness Nig Plc
9. Honeywell Flour Mill Plc
10. International Breweries Plc.
11. Mcnichols Plc
12. Multi-Trex Integrated Foods Plc
13. N Nig. Flour Mills Plc.

14. Nascon Allied Industries Plc
15. Nestle Nigeria Plc.
16. Nigerian Brew. Plc.
17. Nigerian Enamelware Plc.
18. P Z Cussons Nigeria Plc.
19. Unilever Nigeria Plc.
20. Union Dicon Salt Plc.
21. Vitafoam Nig Plc.
22. Austin Laz & Company Plc.
23. Berger Paints Plc.
24. Beta Glass Plc.
25. Bua Cement Plc.
26. Cap Plc.
27. Cutix Plc.
28. Dangote Cement Plc.
29. Greif Nigeria Plc.
30. Lafarge Africa Plc.
31. Meyer Plc.
32. Notore Chemical Ind. Plc.
33. Premier Paints Plc.
34. Tripple Gee And Company Plc.

Source: Researcher's Compilation (2023)