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Managing Exchange Rate Volatility Through Strategic Management Accounting: Implications for Competitive Advantage

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Abstract

This study examines the association between exchange rate volatility, the use of externally-oriented and strategically-focused management accounting practices (i.e., Strategic Management Accounting, SMA), and competitive advantage among listed manufacturing firms in an emerging economy. Drawing on contingency theory and the resource-based view (RBV), the study investigates whether exchange rate volatility influences SMA usage and whether SMA usage enhances firms' competitive advantage under volatile foreign exchange conditions. Panel regression techniques with firm and year fixed effects were employed using data obtained from the annual reports of 56 listed manufacturing firms over the period 2015–2024. The findings reveal a positive and statistically significant association between exchange rate volatility and SMA usage, including both customer accounting and competitor accounting practices, suggesting that firms intensify externally oriented strategic accounting activities in response to foreign exchange uncertainty. The study further finds that SMA usage intensity positively moderates the relationship between exchange rate volatility and competitive advantage, as firms with more intensive SMA usage exhibit stronger relative competitive advantage in return on assets and market valuation under volatile exchange rate conditions. The findings support contingency theory by demonstrating that firms adapt their management accounting systems to environmental uncertainty, while the resource-based view explains how SMA functions as a strategic organisational capability that enhances competitive resilience. Robustness tests using entropy balancing, Driscoll–Kraay estimations, and alternative measures of exchange rate volatility confirm the stability and reliability of the results. Overall, the study contributes to the strategic management accounting (SMA) and international business literature by providing evidence that exchange rate volatility is associated with greater SMA usage and that more intensive SMA usage is, in turn, associated with stronger competitive resilience under conditions of economic uncertainty. The study also provides important practical implications for managers and policymakers in contexts where persistent exchange rate instability continues to shape business performance and strategic decision-making.

Keywords: competitive advantage; contingency theory; exchange rate volatility; resource-based view theory; strategic management accounting



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1. Introduction and Research Context

Exchange rate volatility has become one of the most significant sources of uncertainty affecting firms operating in increasingly globalised and interconnected markets (Aftab et al., 2024; Olajumoke et al., 2026). Fluctuations in currency values influence corporate cash flows, production costs, import and export pricing, foreign investment decisions, and debt-servicing obligations, thereby shaping the overall financial stability and competitive positioning of firms engaged in cross-border activities (Giofr  & Sokolenko, 2023; Huong, 2025). For multinational corporations, export-oriented enterprises, and import-dependent firms, persistent exchange rate uncertainty can intensify operational risk and weaken strategic planning capabilities. Consequently, organisations are increasingly compelled to adopt innovative managerial and accounting mechanisms that enhance adaptability, resilience, and long-term competitiveness in volatile currency environments (Alamri, 2019; B. Oyewo, 2022; Nazaruddin et al., 2026).

The increasing complexity and uncertainty of contemporary business environments have intensified the need for accounting systems that extend beyond traditional internally focused financial reporting toward more strategic and externally oriented information systems. One important response of the accounting profession to these environmental pressures was the development of innovative management accounting practices collectively referred to as Strategic Management Accounting (SMA). Simmonds (1981), who first introduced the concept of SMA, defines it as a collection of externally oriented management accounting techniques that analyse information relating not only to the firm itself but also to competitors and the broader competitive environment for the purpose of developing and monitoring business strategy. Similarly, Guilding et al. (2000) conceptualise SMA as future-oriented and externally focused accounting practices with long-term strategic emphasis, while Chartered Institute of Management Accountants (CIMA, 2005) emphasises the integration of both external and non-financial information to support strategic alignment and goal congruence.

The strategic orientation of SMA makes it particularly relevant in environments characterised by foreign exchange volatility and heightened environmental uncertainty (L. A. Gordon & Miller, 1976; L. Gordon & Narayanan, 1984; Chong & Chong, 1997; Chenhall, 2003). Exchange rate volatility creates substantial operational and financial pressures for firms by affecting production costs, import prices, export competitiveness, pricing decisions, and profitability. This challenge is especially pronounced in manufacturing environments, where many firms rely heavily on imported raw materials, machinery, and foreign transactions (Vo et al., 2019; Yussif et al., 2024). Under such volatile conditions, firms require sophisticated strategic information systems capable of supporting proactive planning, environmental scanning, competitor monitoring, customer analysis, and adaptive decision-making (Cadez & Guilding, 2008; B. Oyewo, 2022). Thus, SMA practices become critical strategic tools for enhancing organisational responsiveness and sustaining competitive performance.

Proponents of SMA have consistently argued that the use of SMA techniques should generate competitive advantage because of their external orientation, strategic emphasis, market focus, long-term perspective, and ability to facilitate strategic alignment within organisations (Cinquini & Tenucci, 2010; Nixon & Burns, 2012). Competitive advantage itself refers to superior organisational performance relative to competitors operating within the same industry and is often associated with distinctive organisational capabilities and superior resource deployment (Saleem & Rashid, 2011). According to Heimeriks et al. (2012), competitive advantage emerges from dynamic capabilities, which enable firms to systematically modify and improve organisational routines in pursuit of greater effectiveness and superior market positioning. Within the context of foreign exchange volatility,

SMA contributes to competitive advantage by strengthening firms' dynamic capabilities and strategic adaptability. Firms operating under volatile exchange rate conditions must continuously adjust sourcing decisions, pricing structures, customer strategies, production processes, and competitive positioning in response to changing economic conditions. SMA practices such as customer accounting and competitor accounting provide firms with externally oriented strategic intelligence that improves awareness of market developments, customer preferences, and competitor actions (Holm et al., 2016; Wei et al., 2026; Adiguzel et al., 2026). This outward-looking orientation enables organisations to align strategic responses with environmental realities and improve decision-making under uncertainty.

Accordingly, SMA can be expected to positively moderate the relationship between foreign exchange volatility and competitive advantage. Rather than allowing exchange rate volatility to erode competitiveness, firms with stronger SMA capabilities may utilise strategic information to improve flexibility, anticipate environmental changes, manage risks proactively, optimise resource allocation, and sustain strategic positioning under uncertain economic conditions (Alsharari, 2024; Dello Sbarba, 2024). The strategic, future-oriented, and externally focused nature of SMA therefore enables firms to transform environmental uncertainty arising from foreign exchange volatility into opportunities for improved responsiveness, differentiation, and sustained competitive advantage. However, notwithstanding the established importance of SMA in helping firms respond to environmental uncertainty and sustain competitiveness, two important gaps remain insufficiently addressed in the existing literature, both of which the present study seeks to address.

First, limited empirical evidence exists regarding the extent to which exchange rate volatility influences SMA usage. Despite the growing recognition of the usefulness of SMA in addressing environmental uncertainty and supporting strategic adaptation, limited empirical attention has been devoted to examining the specific relationship between foreign exchange volatility and SMA usage. Existing SMA literature has largely focused on the association between SMA practices and organisational performance, competitive advantage, strategic orientation, or environmental uncertainty in broad terms, while relatively little investigation has considered whether exchange rate volatility itself influences the adoption and intensity of SMA practices (e.g., Carlsson-Wall et al., 2015; Cadez & Guilding, 2012; Cescon et al., 2019; B. Oyewo et al., 2024). This represents an important gap in the literature because foreign exchange instability constitutes a distinct and significant source of environmental uncertainty capable of shaping managerial information needs, strategic decision-making processes, and organisational control systems. Furthermore, much of the existing research on exchange rate volatility has concentrated on its direct effects on firm performance, export behaviour, investment decisions, and financial outcomes, with comparatively limited attention given to the internal strategic mechanisms firms adopt in response to such volatility (e.g., Rojid & Rojid, 2024; Alhamran et al., 2025; Bhat et al., 2026). As exchange rate volatility continues to disrupt international business operations and intensify competitive pressures, understanding whether firms respond by strengthening their SMA practices becomes increasingly important. Examining this relationship is therefore necessary to provide deeper insight into how organisations strategically adapt their management accounting systems in response to macroeconomic uncertainty and volatile foreign exchange environments.

Second, the moderating role of SMA usage in the relationship between exchange rate volatility and competitive advantage remains largely underexplored. Despite the growing literature on exchange rate risk and corporate financial stability, relatively limited attention has been given to the role of management accounting innovation as a strategic organisational response to currency fluctuations. Existing studies have largely focused on financial hedging instruments, capital structure adjustments, and macroeconomic policy

interventions as mechanisms for managing exchange rate exposure (Lu et al., 2020; Sheykhi et al., 2026; Singh et al., 2026; Huynh, 2026). However, less is known about how exchange rate volatility influences the adoption of strategic management accounting practices and how such practices subsequently affect firm competitiveness. This represents an important gap in the literature, particularly given the increasing need for firms to integrate financial risk management with strategic and operational decision-making processes. Competitiveness remains a critical determinant of corporate sustainability and long-term financial stability in international markets (Holm et al., 2016; B. Oyewo, 2022). Firms capable of responding effectively to exchange rate uncertainty are more likely to preserve market share, maintain profitability, enhance operational efficiency, and sustain strategic advantage over competitors. Innovative SMA practices may therefore serve as an intermediary strategic capability through which firms transform external currency-related pressures into improved competitive performance and organisational resilience.

Against this backdrop, this study investigates the impact of exchange rate volatility on the adoption of innovative strategic management accounting practices and examines how both exchange rate volatility and SMA adoption influence firm competitiveness using empirical evidence from manufacturing firms in Nigeria. This study pursues two key objectives: first, to analyse the relationship between exchange rate fluctuation and SMA usage; and second, to determine whether SMA usage significantly moderates the impact of exchange rate fluctuation on competitive advantage.

The study is particularly important within the Nigerian context because the manufacturing sector remains central to the country's industrialisation and economic development despite persistent structural and macroeconomic challenges. The sector comprises multinational, national, regional, and local firms operating across diverse industries such as food and beverages, textiles, chemicals, petroleum products, metals, machinery, plastics, electronics, and printing (Alli, 2008; Manufacturers Association of Nigeria [MAN], 2017). Given its strategic role in employment generation, industrial output, and economic diversification, the performance and competitiveness of the sector are critical to Nigeria's long-term economic sustainability. Historically, the sector contributed significantly to national development, with manufacturing contribution to Gross Domestic Product (GDP) rising from about 4% in 1977 to approximately 13% in 1981 before declining to below 10% in subsequent decades (Ku et al., 2010; Ayanwale, 2007). The decline has been linked to a range of policy, structural, and operational challenges that have weakened firms' productive and competitive capacities (Enebong, 2003). During the post-independence era, the inflow of foreign direct investment and manufacturing technologies improved operational efficiency and product quality within the sector (Ku et al., 2010; Ekundayo, 2018). However, the collapse of international oil prices in the early 1980s significantly reduced Nigeria's foreign exchange earnings, thereby constraining manufacturers' access to imported raw materials, machinery, and spare parts (Adenikinju & Chete, 2002; Uwadiogwu, 2015). Government interventions such as import licensing, tariffs, and quotas further intensified production difficulties, resulting in widespread capacity underutilisation and firm closures (Adenikinju & Chete, 2002; Ekundayo, 2018).

These developments underscore the relevance of examining the relationship between SMA, foreign exchange volatility, and competitive advantage within the Nigerian manufacturing sector. Manufacturing firms in Nigeria operate in an environment characterised by exchange rate instability, inflationary pressures, import dependence, infrastructure deficiencies, inadequate financing, shortage of skilled labour, weak strategic planning systems, and increasing competition from foreign firms (Obadina, 1999; Hale, 2002; Dipak & Ata, 2003; Bigsten & Soderbom, 2006; Uwadiogwu, 2015). These conditions heighten

environmental uncertainty and create the need for more strategically oriented management systems capable of supporting adaptive decision-making and long-term competitiveness.

Against this backdrop, SMA becomes particularly relevant because of its externally oriented and future-focused nature. SMA practices such as customer accounting and competitor accounting provide strategic information that enables firms to monitor competitors, understand customer needs, improve resource allocation, and respond proactively to changing market conditions (Simmonds, 1981; Cravens & Guilding, 2001; Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Holm et al., 2016). The adoption of SMA techniques may help manufacturing firms address persistent challenges relating to poor strategic planning, inefficient resource utilisation, weak customer responsiveness, low product quality, technological inertia, and foreign competitive pressures.

The findings show that exchange rate volatility is positively and significantly associated with SMA usage, including customer and competitor accounting practices, indicating greater reliance on externally oriented strategic accounting under uncertainty. The results further reveal that intensive SMA usage strengthens firms' competitive advantage in both profitability and market valuation during periods of exchange-rate volatility. The remainder of the paper is organised as follows. Section 2 presents the hypotheses development, Section 3 discusses the research methods, Section 4 reports the empirical results, Section 5 presents the robustness checks, and Section 6 concludes the paper.

2. Hypotheses Development

2.1. Exchange Rate Volatility and SMA Usage

Increasing environmental uncertainty and macroeconomic instability have intensified the need for organisational systems capable of supporting strategic adaptation and informed managerial decision-making (L. Gordon & Narayanan, 1984; Chong & Chong, 1997; Elmassri et al., 2016; Aftab et al., 2024). Within this context, SMA has emerged as an important strategic capability that enables firms to respond more effectively to volatile business conditions. Unlike traditional management accounting systems that focus primarily on internal financial reporting and historical performance evaluation, SMA incorporates externally oriented information such as competitor analysis, customer information, strategic cost management, and forward-looking performance measures into managerial decision processes (Hadid & Al-Sayed, 2021; Nuhu et al., 2025). Through these capabilities, SMA enhances firms' ability to monitor environmental changes, evaluate strategic risks, improve resource allocation, and strengthen responsiveness to dynamic market conditions.

The relevance of SMA becomes particularly pronounced under conditions of foreign exchange volatility. Exchange rate volatility generates significant uncertainty relating to production costs, import prices, export competitiveness, profitability, cash flows, and long-term investment decisions, especially in import-dependent economies (Tahir et al., 2025; Chen et al., 2026). As firms become increasingly exposed to exchange rate instability, the need for more sophisticated and externally oriented management accounting information also intensifies. Under such conditions, traditional accounting systems may become insufficient for effective strategic planning and risk management, thereby increasing firms' reliance on innovative SMA practices. Firms operating in volatile foreign exchange environments are more likely to adopt and intensify the use of SMA techniques in order to improve strategic flexibility, strengthen environmental scanning, monitor competitor behaviour, understand customer dynamics, and respond proactively to changing economic conditions (Rashid et al., 2024). SMA practices therefore serve as adaptive organisational mechanisms that help firms manage exchange rate exposure and reduce the strategic uncertainty associated with currency fluctuations. In this regard, exchange rate volatility can be expected to positively influence SMA usage because firms facing greater macroeconomic uncertainty are likely to

demand more externally focused, future-oriented, and strategically relevant accounting information for decision-making (De Toni & Vieira, 2026). SMA has increasingly been recognised not only as a strategic tool for enhancing organisational competitiveness, but also as an important organisational response to environmental uncertainty arising from foreign exchange volatility and broader macroeconomic instability.

Contingency theory provides the principal theoretical basis for explaining the association between exchange rate fluctuation and the adoption of SMA practices. The theory posits that there is no universally appropriate management or accounting system applicable to all organisations; rather, the effectiveness of organisational systems depends on the environmental conditions and uncertainties confronting the firm (Bruns & Kaplan, 1987; Abdel-Kader & Luther, 2008; Ahmad & Zabri, 2015). What is most appropriate for an organisation is determined, in large part, by a combination of internal and external contingent factors. Internal contingencies include characteristics such as the organisation's age, size, stage of growth, degree of centralisation, geographic dispersion, organisational culture, the role of the corporate centre in decision-making, the strategic orientation being pursued, and the extent of technological usage and dependency (Tillema, 2005; Ahmad & Zabri, 2015). These factors shape how authority is distributed, how communication flows, and how effectively different organisational structures and management approaches can operate. At the same time, organisations must respond to external contingencies arising from their broader operating environment. These include the structure and dynamism of the external environment, competitive intensity, economic conditions, market characteristics, regulatory pressures, and technological change.

Contingency theory argues that organisational effectiveness depends on the alignment between internal systems and external environmental conditions, rather than the adoption of universally applicable management practices. Firms operating in stable environments may benefit from formalised structures, whereas those facing uncertainty require more flexible and adaptive management systems. In this study, exchange rate fluctuation is viewed as a key environmental contingency that generates uncertainty in business operations. Exchange rate volatility affects production costs, import prices, export competitiveness, investment decisions, profitability, and overall financial performance (Sheykhi et al., 2026). This is particularly significant for Nigerian manufacturing firms, which depend heavily on imported raw materials, machinery, spare parts, and other foreign-denominated transactions. Under such conditions, conventional management accounting systems that rely primarily on historical financial information become insufficient. Instead, firms require timely, forward-looking management accounting practices that support strategic planning, cost control, risk management, and informed decision-making. Consistent with contingency theory, firms that align their management accounting practices with exchange rate uncertainty are better positioned to respond effectively to environmental challenges, sustain competitiveness, and improve organisational performance.

Contingency theory suggests that firms exposed to heightened environmental uncertainty are more likely to adopt innovative and externally oriented management accounting practices capable of supporting adaptive decision-making (B. Oyewo, 2022). SMA practices such as customer accounting, competitor accounting, strategic cost management, and forward-looking performance measures provide managers with strategic information needed to monitor market dynamics, assess competitive threats, evaluate customer profitability, and respond proactively to environmental changes. Exchange rate volatility is expected to increase firms' demand for sophisticated strategic information systems that facilitate effective planning, risk management, and competitive positioning.

Firms operating under volatile exchange rate conditions are likely to intensify their use of SMA practices because such techniques enhance organisational flexibility, strategic responsiveness, and environmental scanning capabilities (Chong & Chong, 1997; Aftab et al., 2024). The alignment between environmental uncertainty and adaptive management systems therefore becomes critical for organisational survival and performance. In line with contingency theory, the adoption and intensity of SMA usage are thus viewed as contingent upon the level of uncertainty created by exchange rate volatility. This study argues that firms experiencing higher levels of exchange rate fluctuation are more likely to adopt and utilise SMA practices as strategic mechanisms for coping with environmental uncertainty and sustaining competitiveness. This discussion informs our first hypothesis that:

H1. *Exchange rate volatility is positively associated with SMA usage.*

2.2. Exchange Rate Volatility, SMA Usage and Competitive Advantage

The Resource-Based View (RBV) provides a strong theoretical foundation for explaining the moderating role of Strategic Management Accounting (SMA) usage in the relationship between exchange rate fluctuation and competitive advantage (Barney, 1991). The RBV posits that organisations attain sustained competitive advantage when they possess and effectively deploy resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 2002; Tauringana, 2021). These strategic resources may be tangible or intangible and include organisational knowledge, managerial competencies, technological capabilities, information systems, and organisational processes that enhance a firm's ability to respond effectively to environmental uncertainties and outperform competitors (Machado-Licona et al., 2026). From this perspective, SMA can be conceptualised as an important intangible organisational capability because it strengthens managerial decision-making, strategic responsiveness, and environmental adaptability.

Unlike traditional management accounting systems, which primarily focus on internal financial control and historical reporting, SMA emphasises the collection, analysis, interpretation, and utilisation of externally oriented strategic information relating to competitors, customers, markets, costs, and broader environmental conditions (B. Oyewo, 2021; Roslender et al., 2024). Through the application of SMA techniques, firms are better positioned to monitor environmental changes, anticipate competitive threats, evaluate strategic alternatives, and align organisational resources with evolving market realities. Firms that actively utilise SMA practices are also more likely to engage in continuous improvement and strategic differentiation. Awareness of prevailing market conditions and competitor activities enables firms to benchmark performance, identify strategic opportunities, and develop customer-focused strategies capable of enhancing competitiveness. Porter and Millar (1985) argue that competitive advantage arises from strategies implemented to create superior value for customers, while Gan et al. (2006) and Varki and Colgate (2005) emphasise the importance of customer-focused products and services in sustaining competitive advantage. Since SMA techniques emphasise customer orientation, competitor analysis, and strategic positioning, firms that deploy SMA practices are better positioned to strengthen customer value, improve market responsiveness, and sustain competitiveness in dynamic business environments.

The relevance of SMA becomes particularly significant in the context of exchange rate fluctuation. Foreign exchange volatility creates considerable operational and financial uncertainty for manufacturing firms by affecting import costs, export revenues, pricing structures, sourcing decisions, supply chain management, customer demand, and profitability (Vo et al., 2019; Rojid & Rojid, 2024). In the Nigerian manufacturing sector, where firms are highly dependent on imported raw materials, foreign inputs, and foreign exchange availability, exchange rate instability can significantly distort cost structures, reduce profit

margins, disrupt production activities, and weaken competitive positioning. Firms operating in such volatile environments are therefore exposed to substantial macroeconomic risks that may undermine organisational performance and long-term competitiveness if they lack the strategic capabilities required to respond effectively.

However, RBV suggests that firms possessing superior strategic capabilities are better positioned to adapt to uncertain environments and convert external challenges into competitive opportunities. In this regard, SMA practices such as customer accounting and competitor accounting provide firms with strategic intelligence that enhances their ability to anticipate market changes, monitor competitors' actions, evaluate customer profitability, improve resource allocation, and respond strategically to volatile economic conditions (Guilding, 1999; Cadez & Guilding, 2008; Holm et al., 2016). These capabilities become especially important during periods of exchange rate instability because firms must continuously adjust pricing strategies, sourcing arrangements, production decisions, distribution systems, and competitive positioning in response to currency movements. Organisations with strong SMA capabilities are therefore more likely to interpret the strategic implications of exchange rate volatility effectively and respond proactively through informed strategic actions such as cost management, pricing adjustments, market diversification, hedging decisions, operational restructuring, and resource reallocation (Elmassri et al., 2016; Nuhu et al., 2025).

SMA usage may moderate the relationship between exchange rate fluctuation and competitive advantage by enhancing firms' adaptive capacity, strategic flexibility, and organisational resilience. Firms that extensively utilise SMA are more likely to convert environmental uncertainty into actionable strategic insight, thereby reducing the adverse effects of exchange rate instability and strengthening their ability to sustain superior performance relative to competitors (Chong & Chong, 1997; Elmassri et al., 2016). In contrast, organisations with weak SMA capabilities may struggle to process and utilise relevant strategic information effectively, making them more vulnerable to the disruptive effects of exchange rate volatility. From the RBV perspective, SMA usage therefore functions as an intangible strategic resource that enhances firms' ability to manage environmental uncertainty while simultaneously improving competitiveness and long-term organisational performance.

SMA may evolve into a source of sustained competitive advantage when intensively embedded within organisational routines, managerial expertise, knowledge systems, and strategic decision-making processes that competitors cannot easily imitate or substitute (Guilding, 1999; Holm et al., 2016). The intensive integration of SMA practices into strategic planning and operational control not only enhances firms' short-term adaptability but also contributes to the development of enduring organisational capabilities that strengthen long-term competitiveness in dynamic and uncertain business environments. The interaction between exchange-rate fluctuation and intensive SMA usage is expected to positively influence competitive advantage because firms that engage more intensively with SMA practices are better positioned to respond strategically and effectively to volatile currency environments while sustaining customer value, market responsiveness, and competitive superiority. Taken together, this study argues that intensive SMA usage significantly strengthens the relationship between exchange-rate fluctuation and competitive advantage by enhancing firms' ability to strategically adapt, manage risks, and sustain superior competitive performance under uncertain economic conditions. Therefore:

H2. *Intense SMA usage significantly and positively moderates the impact of exchange rate volatility on competitive advantage.*

3. Research Methods

3.1. Research Design

This study adopts a quantitative research design to examine the association between SMA usage, exchange rate volatility, and sustainable competitive advantage among listed manufacturing firms over a ten-year period spanning 2015–2024. The quantitative approach is considered appropriate because the study seeks to empirically assess the extent to which SMA practices influence firms' ability to sustain competitive advantage under conditions of exchange rate uncertainty. Specifically, the study investigates whether the deployment of externally oriented management accounting techniques enhances organisational resilience and competitive positioning in the face of persistent exchange rate volatility. The focus on competitive advantage necessitates a longitudinal perspective because competitive advantage is inherently time-dependent. Competitive advantage may be regarded as temporary when above-average performance dissipates within a short period, whereas sustained superiority over time reflects durable competitive advantage (Holm et al., 2016). Consequently, evaluating the relationship between SMA usage and competitive advantage requires observing firm performance across multiple years rather than at a single point in time. A longitudinal quantitative design therefore enables the study to assess whether firms that adopt SMA practices are better able to maintain superior performance outcomes despite fluctuations in the foreign exchange environment.

The quantitative design is further justified because it facilitates the empirical estimation of the direct and interaction effects between SMA usage and exchange rate volatility on competitive advantage. Foreign exchange volatility constitutes a major source of environmental uncertainty for manufacturing firms, particularly in import-dependent economies such as Nigeria where fluctuations in exchange rates significantly affect production costs, pricing decisions, investment planning, and international competitiveness. In such contexts, firms require sophisticated strategic accounting information to monitor competitors, evaluate customer profitability, anticipate market changes, and support adaptive decision-making. Externally oriented SMA practices, including customer accounting and competitor accounting, are therefore expected to strengthen firms' strategic responsiveness under volatile exchange rate conditions. The quantitative approach allows these relationships to be systematically modelled and statistically tested over time.

The choice of the 2015–2024 period is particularly appropriate for several reasons. First, the decade-long horizon permits the examination of long-term performance dynamics and the sustainability of competitive advantage under varying macroeconomic conditions. This is important because the benefits of SMA implementation and strategic organisational adaptation may not materialise immediately but may emerge progressively over time. T. Kennedy and Affleck-Graves (2001) argue that management accounting innovations often exhibit lagged performance effects, thereby justifying the need for extended periods of observation. The ten-year period therefore enhances the ability of the study to capture the enduring effects of SMA usage on firm competitiveness. Second, the selected period coincides with significant exchange rate instability and macroeconomic turbulence in Nigeria. During this period, the Nigerian economy experienced multiple episodes of currency depreciation, foreign exchange shortages, inflationary pressures, and policy adjustments, all of which intensified environmental uncertainty for manufacturing firms. These conditions provide a suitable empirical setting for assessing whether SMA usage improves firms' ability to cope with exchange rate volatility and sustain competitive advantage. The period is therefore particularly relevant for examining the strategic value of management accounting systems under uncertain economic environments. Third, the Nigerian manufacturing sector during this period continued to face substantial structural and operational challenges, including weak infrastructure, rising production costs, financial

constraints, import dependence, and intensified competition from foreign firms (Obadina, 1999; Bigsten & Soderbom, 2006; Uwadiegwu, 2015). These pressures increased the need for strategic information systems capable of supporting proactive decision-making and competitive positioning. The adoption of SMA techniques during this period can therefore be viewed as part of broader organisational efforts to enhance competitiveness, efficiency, and long-term survival within a volatile business environment.

Overall, the quantitative longitudinal design adopted in this study provides an appropriate framework for examining whether the intensity of SMA usage moderates the relationship between foreign exchange volatility and competitive advantage. By analysing firm-level data over a ten-year period, the study is better positioned to generate empirically reliable evidence on the strategic relevance of SMA practices in sustaining competitive advantage under conditions of macroeconomic uncertainty.

3.2. Data Sources

The population of the study comprises publicly listed manufacturing companies in Nigeria. According to information obtained from the website of the Nigerian Exchange Group, sixty-two (62) manufacturing firms were listed during the period under investigation. However, only fifty-six (56) firms were fully operational and had complete and accessible financial information throughout the study period. The study adopted a census approach by including all fifty-six (56) operational firms in the analysis. The use of a census sampling technique is considered appropriate because it eliminates sampling bias and enhances the representativeness and generalisability of the findings within the Nigerian manufacturing sector (Saunders et al., 2007). The inclusion of all operational listed manufacturing firms provides a comprehensive basis for assessing the relationship between SMA usage, foreign exchange volatility, and competitive advantage.

The study covers a ten-year period from 2015 to 2024. Given the fifty-six (56) firms observed across ten years, the study generated a balanced panel dataset comprising 560 firm-year observations. The longitudinal nature of the dataset is particularly suitable for examining the dynamic effects of SMA usage and foreign exchange volatility on firms' competitive performance over time. Data for the study were collected through documentary analysis of audited annual reports and corporate disclosures available on the official websites of the sampled firms. Specifically, financial and non-financial information relevant to the study variables was extracted from the audited annual reports of the fifty-six (56) companies covering the 2015–2024 period. The use of audited annual reports enhances the reliability, credibility, and consistency of the data employed in the analysis. Data on exchange rate was collected from the World bank database.

3.3. Variable Measurement

3.3.1. Strategic Management Accounting

In this study, strategic management accounting usage (*SMA_USE*) was operationalised using a disclosure-based measurement approach developed specifically to align with the objectives of the research. The measurement framework focused on the externally oriented dimensions of Strategic Management Accounting (SMA), namely customer accounting and competitor accounting, because these practices are most directly aligned with firms' strategic responses to exchange rate volatility and heightened competitive pressures. Exchange rate volatility influences customer purchasing behaviour, pricing decisions, market demand, and competitors' strategic actions, making externally focused accounting information particularly valuable for strategic decision-making. Customer accounting provides information on customer profitability, value, and market segments, enabling firms to manage changing demand conditions and preserve customer relationships. Competitor

accounting, in turn, supports the monitoring of competitors' costs, pricing strategies, market position, and competitive capabilities, thereby facilitating timely strategic responses in uncertain environments. Although the SMA literature identifies additional practices, such as strategic costing, strategic pricing, value chain costing, and brand valuation, this study deliberately concentrates on customer accounting and competitor accounting because they represent the core market-oriented dimensions of SMA that are theoretically most relevant to the study's contingency perspective. Their emphasis on external information aligns with the environmental uncertainty created by exchange rate volatility, which requires firms to continuously monitor market dynamics and competitive behaviour. The exclusion of other SMA techniques reflects a theoretical choice to capture the externally oriented strategic capabilities most likely to mediate the relationship between exchange rate volatility and organisational performance, rather than a limitation arising from data availability.

Unlike prior SMA studies that have relied predominantly on questionnaire-based measures and managerial perceptions, this study adopted a disclosure-based approach that captures observable evidence of SMA usage from publicly available corporate annual reports. The approach was considered particularly appropriate because the study examines the relationship between foreign exchange volatility, SMA usage, and competitive advantage over a ten-year period, thereby requiring a measurement method capable of generating consistent and comparable firm-level data across multiple years.

The use of annual reports as the primary source of SMA measurement provides several methodological advantages. First, annual reports constitute formal corporate disclosures prepared for shareholders, regulators, and other stakeholders, thereby offering more verifiable and externally observable evidence of strategic activities and organisational priorities. This enhances transparency, replicability, and measurement reliability. Second, the disclosure-based approach reduces common methodological limitations associated with survey-based SMA research, including respondent bias, retrospective rationalisation, social desirability effects, and inconsistencies in interpretation (Ahmad & Zabri, 2015; Cadez & Guilding, 2012; B. Oyewo, 2022). Third, reliance on audited annual reports enables systematic tracking of SMA-related practices over time and facilitates the construction of longitudinal measures suitable for panel data analysis and robust empirical testing.

The measurement framework was designed to reflect the externally oriented nature of SMA as conceptualised in prior literature, particularly the dimensions of customer accounting and competitor accounting (Guilding, 1999; McManus & Guilding, 2008; Holm et al., 2016). Customer accounting measures focused on disclosures relating to customer profitability, customer relationships, distribution networks, customer-focused operational initiatives, and information demonstrating strategic attention to customer management. Building on the conceptualisation of customer accounting in prior studies (McManus & Guilding, 2008; Holm et al., 2016), three disclosure-based indicators were developed to capture the extent of customer-oriented SMA practices. Specifically, the measures included: (i) disclosure of customer-related revenue, cost, and return information; (ii) disclosure of major customer accounts, customer categories, distributors, or distribution networks; and (iii) disclosure of strategic initiatives aimed at enhancing customer engagement, customer satisfaction, or distribution efficiency. Each disclosure item was coded using a binary scoring procedure in which a score of one (1) was assigned when the disclosure was present in the annual report and zero (0) when absent. The maximum obtainable score for the customer accounting dimension (*CUST_ACC*) was three (3).

These disclosure indicators were selected because they reflect the extent to which firms systematically monitor customer value, customer profitability, customer relationships, and distribution effectiveness, particularly under volatile market conditions characterised by exchange rate uncertainty. Firms that actively utilise customer-oriented SMA practices are

more likely to develop customer-focused strategies capable of enhancing competitiveness and sustaining superior customer value. Porter and Millar (1985) argue that competitive advantage arises from strategies implemented to create superior value for customers, while Gan et al. (2006) and Varki and Colgate (2005) emphasise the importance of customer-focused products and services in sustaining competitive advantage. Disclosures relating to customer accounting practices provide observable evidence of the extent to which firms integrate customer-related strategic intelligence into managerial decision-making processes.

Similarly, competitor accounting (*COMP_ACC*) was measured through disclosures relating to competitive positioning, identification of competitors, competitor-related market analysis, and strategic initiatives aimed at strengthening competitive performance. Consistent with the conceptualisation of competitor accounting in prior literature (Guilding, 1999; Cravens & Guilding, 2001; Cinquini & Tenucci, 2010), four disclosure-based measures were derived from the annual reports to capture the extent of competitor-oriented SMA practices. These measures included: (i) disclosure of the firm's competitive position within the industry; (ii) disclosure of competitor strategies or competitive dynamics affecting the firm's operations; (iii) identification or discussion of key competitors; and (iv) disclosure of strategic initiatives aimed at strengthening market position or outperforming competitors. As with the customer accounting dimension, each disclosure item was coded using a binary scoring system in which a score of one (1) was assigned when present and zero (0) when absent. The maximum obtainable score for the competitor accounting dimension was four (4).

These indicators capture the extent to which firms monitor competitors, assess competitive threats, benchmark strategic performance, and incorporate external competitive intelligence into strategic decision-making processes. This dimension is particularly relevant in the context of foreign exchange volatility because changes in exchange rates may significantly alter production costs, pricing structures, import dependence, supply chain decisions, and competitive positioning relative to both domestic and foreign rivals. Firms employing competitor-oriented SMA practices are therefore expected to demonstrate greater strategic awareness, adaptability, and responsiveness under uncertain macroeconomic conditions.

The overall SMA score (*SMA_SCORE*) was computed by combining the customer accounting (*CUST_ACC*) and competitor accounting (*COMP_ACC*) dimensions to capture the broader externally oriented aspects of SMA usage. Specifically, the customer accounting dimension had a maximum obtainable score of three (3), while the competitor accounting dimension had a maximum obtainable score of four (4). The aggregate SMA usage score (*SMA_SCORE*) was derived by summing the scores from both dimensions, resulting in a maximum obtainable SMA score of seven (7). Higher scores indicate greater utilisation of externally oriented SMA practices and stronger integration of customer and competitor information into strategic decision-making processes. To enhance the reliability of the content analysis, two researchers independently coded all annual reports using the predefined disclosure checklist. Each disclosure item was assessed using a binary coding scheme, where a score of one (1) was assigned if the disclosure was present and zero (0) if absent. This objective coding procedure minimised subjectivity, as each item represented a clear disclosure/non-disclosure decision. The independently generated coding results showed complete convergence between the two researchers, indicating a high level of coding reliability. As a result, no ambiguous or disputed cases arose that required reconciliation or adjudication.

The use of annual report disclosures is particularly justified in the present study because SMA practices are conceptualised not merely as internal accounting techniques, but as strategic organisational capabilities that enhance firms' ability to sustain competitive

advantage under conditions of macroeconomic instability. From the Resource-Based View (RBV), SMA constitutes an important intangible strategic resource that strengthens firms' adaptive capacity, strategic flexibility, and responsiveness to environmental uncertainty (Barney, 1991; Barney, 2002; Tauringana, 2021). Observable disclosures relating to customers, competitors, and strategic positioning therefore provide evidence of the extent to which firms utilise externally oriented strategic intelligence in responding to foreign exchange volatility and competitive pressures. The measurement approach aligns closely with both the theoretical foundations of SMA and the study's objective of examining whether SMA usage strengthens firms' competitive resilience under exchange rate instability.

To enhance content validity and practical relevance, the SMA measurement checklist was subjected to expert review prior to data collection. The instrument was evaluated by four experts comprising two senior academics specialising in management accounting and two management accounting practitioners from Big-4 consulting firms. The involvement of both academic and industry experts ensured that the measurement items adequately reflected established SMA constructs while also capturing practices that are observable and meaningful within real organisational settings. Feedback obtained during the validation process was incorporated to improve clarity, refine item definitions, eliminate ambiguities, and ensure alignment between the measurement framework and the objectives of the study.

The checklist adopted a binary coding procedure to enhance consistency, transparency, and objectivity in the coding process by minimising subjective interpretation of disclosure quality or intensity. The resulting composite SMA score therefore reflects the extent of observable SMA usage by each firm over the study period and provides a consistent metric for analysing the relationship between SMA practices, foreign exchange volatility, and competitive advantage.

Finally, the natural logarithm of the composite SMA score (*SMA_SCORE*) was taken to derive the variable *SMA_USE*. The logarithmic transformation was adopted to improve the distributional properties of the variable, reduce potential skewness, and minimise the influence of extreme observations. The transformation also enhances the suitability of the variable for regression analysis by promoting linearity and improving the stability of coefficient estimates. The log transformation enables the measure to better capture proportional variations in the intensity of SMA usage across firms rather than simple absolute differences in scores. *SMA_USE* represents the logarithmically transformed measure of the extent of externally oriented SMA practices employed by firms.

3.3.2. Exchange Rate Volatility

Exchange rate volatility was measured as the year-to-year percentage change in the official exchange rate (*EXR_VOL*). This measure captures the extent of fluctuations in the domestic currency value over time and reflects the level of foreign exchange uncertainty faced by firms (Giofr  & Sokolenko, 2023; Huong, 2025). The data was obtained from World bank database. The official exchange rate represents the nominal exchange rate determined or recognized by the monetary authority and reflects the price of the domestic currency relative to foreign currencies. Consistent with prior studies examining macroeconomic uncertainty and firm responses, the use of the official exchange rate provides an appropriate measure of currency instability and external financial uncertainty faced by firms. The study focuses on official exchange-rate volatility because it directly captures fluctuations in nominal currency values that may influence firms' strategic planning, pricing decisions, cost management, budgeting, and overall SMA practices. Variability in the official exchange rate increases uncertainty regarding future cash flows, import costs, foreign transactions, and competitive positioning, thereby potentially intensifying firms' demand for strategic accounting information and decision-support systems. Exchange-rate volatility was opera-

tionalised using the year-to-year changes in the official exchange rate as a proxy for external macroeconomic uncertainty affecting firm-level SMA adoption and usage intensity. As a robustness measure, real exchange-rate volatility (*EXR_VOL_2*) was employed to capture fluctuations in the inflation-adjusted exchange rate, thereby reflecting changes in the real purchasing power of the domestic currency.

3.3.3. Relative Competitive Advantage

Competitive advantage is superior performance of an organisation over others (Eisenhardt & Martin, 2000; Zahra et al., 2006). Relative competitive advantage was measured using both an internal performance-based measure (Relative Competitive Advantage in ROA), and a market-based measure (Relative Competitive Valuation).

Relative competitive advantage in ROA (*ROA_ADV*) serves as a proxy for relative competitive advantage by capturing a firm's profitability performance relative to its subsector peers. It is measured as firm return on assets (ROA) minus the subsector-average ROA, thereby reflecting the extent to which a firm outperforms or underperforms comparable firms within the same competitive environment (Holm et al., 2016). By adjusting for subsector-level profitability, the measure isolates the firm-specific component of performance beyond broader industry effects, reflecting abnormal returns (Easton & Jarrell, 1998; Crabtree & DeBusk, 2008). Consistent with the resource-based view, firms that persistently achieve superior profitability relative to their subsector peers may be considered to possess stronger competitive capabilities, strategic resources, or superior managerial competencies that enable them to sustain a competitive advantage over rivals.

Relative Competitive Valuation (*VAL_ADV*) is measured as firm Tobin's Q minus the subsector-average Tobin's Q, thereby capturing the extent to which a firm is valued by the market above or below comparable firms operating within the same competitive environment (Lo & Sheu, 2007). By adjusting firm-level Tobin's Q for the subsector average, the measure isolates the firm-specific component of market valuation beyond broader industry or subsector conditions. The variable reflects a firm's relative valuation position compared to its direct competitors rather than absolute market valuation alone. The use of this measure is particularly appropriate within a competitive advantage framework because Tobin's Q is widely regarded as a forward-looking indicator that incorporates investors' expectations regarding a firm's future growth opportunities, strategic capabilities, and ability to generate economic rents. Firms with Tobin's Q values exceeding the subsector average are likely to be perceived by the market as possessing superior strategic resources, stronger managerial capabilities, greater innovation potential, or more valuable intangible assets relative to peers. Consistent with the resource-based view, firms that sustain higher market valuations relative to competitors may be considered to possess unique resources and capabilities that are valuable, difficult to imitate, and capable of generating superior long-term performance. Similarly, from a strategic management perspective, a positive relative competitive valuation may reflect stronger competitive positioning, superior adaptability to environmental uncertainty, or enhanced ability to exploit strategic opportunities compared to rival firms within the same subsector. Employing a subsector-adjusted measure improves comparability across firms by controlling for common industry-level influences on market valuation, such as sector growth trends, technological conditions, or macroeconomic shocks. As such, the measure serves as a market-based proxy for firm-specific competitive advantage and relative strategic positioning within the industry.

3.3.4. Control Variables

We control for various variables that may affect the association between foreign exchange volatility, SMA usage and competitive advantage.

Market penetration (*MKT_PEN*) was controlled for using the natural logarithm of sales (Peel, 2018). Firms with higher sales levels are typically more established in the market, possess greater operational scale, and are more likely to have wider international exposure. Larger firms also tend to possess superior financial and managerial resources, enabling them to hedge foreign exchange risk more effectively and invest in sophisticated SMA practices. Controlling for market penetration is therefore important because differences in sales volume may independently influence both SMA usage and competitive advantage.

Growth opportunities (*GRWTH_OPP*) was measured using Tobin's Q, which captures market valuation relative to asset replacement cost. Firms with strong growth prospects and higher intangible strategic value are more likely to invest in innovative strategic capabilities, including SMA practices, to sustain future performance. Such firms may also exhibit stronger competitive positioning irrespective of exchange rate conditions. Controlling for growth opportunities helps isolate the effect of exchange rate volatility and SMA usage from the influence of firms' underlying strategic growth potential.

Firm size (*FIRM_SZE*) was measured using the natural logarithm of market capitalisation (Elsayih et al., 2021). Larger firms generally possess stronger financial capacity, broader investor confidence, and more sophisticated organisational systems (O. Oyewo et al., 2026). They are also more likely to operate internationally and face greater exposure to exchange rate volatility. In addition, large firms may have more resources to adopt advanced SMA techniques and maintain competitive advantage. Controlling for firm size therefore helps account for scale-related differences in strategic capabilities and market influence.

Borrowing capacity (*BORRW_CAP*) was proxied by the natural logarithm of total assets (Gull et al., 2023). Firms with greater asset bases are typically better positioned to obtain external financing for strategic investments, technology adoption, and operational expansion. Such firms may possess stronger financial resilience and greater capacity to implement SMA systems in response to environmental uncertainty. Including borrowing capacity as a control variable helps account for differences in firms' financial flexibility and investment capability.

Environmental uncertainty (*ENV_UNCRT*) was measured using the coefficient of variation of sales (Dev & Brown, 1995). The coefficient of variation of sales is an appropriate measure of environmental uncertainty because it captures the degree of instability and unpredictability in a firm's sales performance over time. Higher fluctuations in sales relative to average sales indicate greater uncertainty in market demand, customer behaviour, and operating conditions. Since environmental uncertainty reflects the extent to which firms face unpredictable external conditions, variability in sales provides a practical proxy for the instability of the business environment confronting the firm. Firms operating in more uncertain environments may experience greater fluctuations in demand, sales performance, and competitive conditions, which can influence both SMA adoption and competitive outcomes. Controlling for environmental uncertainty is therefore important because firms facing higher operational uncertainty may be more inclined to adopt strategically oriented accounting practices to improve responsiveness and decision-making.

3.4. Model Specification

To evaluate the association between exchange rate volatility and SMA usage, model specification is stated in Equation (1):

$$SMA_USE_{i,t} = \beta_0 + \beta_1 EXR_VOL_{i,t} + \beta_2 CONTROLS_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

where

SMA_USE_{i,t} is SMA Usage of firm *i* in year *t*

EXR_VOL_{i,t} is Exchange Rate Volatility of firm *i* in year *t*

$CONTROLS_{i,t}$ is vector of control variables

μi represents firm fixed effects for firm i

δt captures year fixed effects for year t

$i = \text{firm}, t = \text{year}$

$\varepsilon_{i,t}$ = stochastic error term

To assess the moderating impact of SMA usage intensity on the relationship between exchange rate volatility and relative competitive advantage in ROA, we estimate model 2 in Equation (2):

$$ROA_ADV_{i,t} = \beta_0 + \beta_1 SMA_USE_INTENSE_{i,t} + \beta_2 EXR_VOL_{i,t} + \beta_3 (SMA_USE_INTENSE_{i,t} \times EXR_VOL_{i,t}) + \beta_4 CONTROLS_{i,t} + \mu i + \delta t + \varepsilon_{i,t} \quad (2)$$

where

$ROA_ADV_{i,t}$ is relative competitive advantage in ROA of firm i in year t

$SMA_USE_INTENSE_{i,t}$ is SMA Usage Intensity of firm i in year t

$EXR_VOL_{i,t}$ is Exchange Rate Volatility of firm i in year t

$CONTROLS_{i,t}$ is vector of control variables

μi represents firm fixed effects for firm i

δt captures year fixed effects for year t

$i = \text{firm}, t = \text{year}$

$\varepsilon_{i,t}$ = stochastic error term

To assess the moderating impact of SMA usage intensity on the relationship between exchange rate volatility and relative competitive valuation, we estimate model 3 in Equation (3):

$$VAL_ADV_{i,t} = \beta_0 + \beta_1 SMA_USE_INTENSE_{i,t} + \beta_2 EXR_VOL_{i,t} + \beta_3 (SMA_USE_INTENSE_{i,t} \times EXR_VOL_{i,t}) + \beta_4 CONTROLS_{i,t} + \mu i + \delta t + \varepsilon_{i,t} \quad (3)$$

where

$VAL_ADV_{i,t}$ is relative competitive valuation of firm i in year t

$SMA_USE_INTENSE_{i,t}$ is SMA Usage Intensity of firm i in year t

$EXR_VOL_{i,t}$ is Exchange Rate Volatility of firm i in year t

$CONTROLS_{i,t}$ is vector of control variables

μi represents firm fixed effects for firm i

δt captures year fixed effects for year t

$i = \text{firm}, t = \text{year}$

$\varepsilon_{i,t}$ = stochastic error term

Variable measurement is described in Table 1.

Exchange rate volatility (EXR_VOL) is measured at the national level and therefore is common to all firms in a given year. Accordingly, there is no cross-sectional variation in EXR_VOL within a year. The inclusion of year fixed effects controls for aggregate annual shocks that may simultaneously affect firm performance. While the main effect of exchange rate volatility overlaps with these common time effects, the interaction between EXR_VOL and SMA usage intensity remains identifiable because SMA usage intensity varies across firms. Thus, the interaction coefficients in Equations (2) and (3) capture whether firms with higher SMA usage intensity exhibit differential performance during periods of greater exchange rate volatility relative to firms with lower SMA usage intensity.

Table 1. Variables and measurement.

Variable Name	Mnemonic	Measurement
Strategic Management Accounting usage	<i>SMA_USE</i>	Captures externally oriented dimensions of strategic management accounting. Derived through a composite score by additively combining customer accounting score (<i>CUST_ACC</i>) and competitor accounting score (<i>COMP_ACC</i>) to derive <i>SMA_SCORE</i> . Natural logarithm of <i>SMA_SCORE</i> was computed to derive <i>SMA_USE</i> .
Strategic Management Accounting usage intensity	<i>SMA_USE_INTENSE</i>	Dummy variable measuring intensity of SMA usage, coded ‘1’ for firms with <i>SMA_SCORE</i> at or above 70% threshold, indicating substantial engagement with SMA practices, and ‘0’ otherwise.
Customer Accounting	<i>CUST_ACC</i>	Disclosure-based score derived from three customer-oriented SMA measures: (i) customer-related revenue, cost, and return information; (ii) disclosure of major customer accounts, customer categories, distributors, or distribution networks; and (iii) customer engagement or distribution efficiency initiatives. Each disclosed item was scored ‘1’, otherwise ‘0’.
Competitor Accounting	<i>COMP_ACC</i>	Disclosure-based score derived from four competitor-oriented SMA measures: (i) disclosure of competitive position; (ii) disclosure of competitor strategies or competitive dynamics; (iii) identification of key competitors; and (iv) disclosure of strategies aimed at outperforming competitors. Each disclosed item was scored ‘1’, otherwise ‘0’.
Exchange Rate Volatility	<i>EXR_VOL</i> ; <i>EXR_VOL_2</i>	Exchange Rate Volatility (<i>EXR_VOL</i>) as main measurement of variable, is measured as the year-to-year percentage change in the official exchange rate to capture fluctuations in the domestic currency value over time. Alternative measure of exchange rate volatility computed as the year-to-year percentage change in the real effective exchange rate (<i>EXR_VOL_2</i>).
Market penetration	<i>MKT_PEN</i>	Measured as the natural logarithm of sales to capture firm market presence and operational scale.
Growth opportunities and intangible strategic value of a firm	<i>GRWTH_OPP</i>	Measured using Tobin’s Q. Measures market valuation relative to asset replacement cost. It captures growth opportunities, and intangible strategic values
Firm size	<i>FIRM_SIZE</i>	Measured as the natural logarithm of market capitalisation to reflect firm size from an investor perspective.
Borrowing capacity for investment	<i>BORRW_CAP</i>	Measured as the natural logarithm of total assets to proxy firms’ capacity to support long-term investment.
Environmental Uncertainty	<i>ENV_UNCRT</i>	Measured using the coefficient of variation of sales to capture instability in the operating environment.
Relative competitive advantage in ROA	<i>ROA_ADV</i>	Measured as firm return on assets (ROA) minus subsector-average ROA to capture profitability performance relative to industry peers.
Relative Competitive Valuation	<i>VAL_ADV</i>	Measured as firm Tobin’s Q minus subsector-average Tobin’s Q to capture market valuation relative to comparable firms within the same subsector.

3.5. Method of Data Analysis and Robustness Tests

The study employed panel data regression techniques to examine the association between exchange-rate volatility, Strategic Management Accounting (SMA) usage, and competitive advantage over the 2015–2024 period. Panel data analysis was considered appropriate because it combines both cross-sectional and time-series dimensions, thereby enabling the study to control for unobservable firm-specific heterogeneity and improve estimation efficiency. Firm-level fixed-effects regression models were adopted as the primary estimation approach because the fixed-effects specification controls for time-invariant firm characteristics that may simultaneously influence exchange-rate exposure, SMA usage, and competitive advantage. Year fixed effects were additionally incorporated in selected models to account for macroeconomic and institutional shocks affecting all firms within a given year.

The empirical analysis proceeded in stages. First, the association between exchange-rate volatility and overall SMA usage was examined. Second, separate estimations were conducted for customer accounting and competitor accounting to assess whether exchange-rate volatility influences specific externally oriented dimensions of SMA. Third, moderation analysis was performed to investigate whether SMA usage intensity strengthens the relationship between exchange rate volatility and competitive advantage, measured using relative competitive advantage in return on assets and relative competitive valuation.

Several diagnostic and robustness procedures were undertaken to strengthen the reliability of the findings. Correlation and Variance Inflation Factor (VIF) analyses were conducted to assess multicollinearity. As an additional robustness procedure, entropy balancing was employed to mitigate observable differences between firms with intense and non-intense SMA usage. This approach reweighted observations to achieve covariate balance while preserving the full sample. Driscoll–Kraay standard error estimations were performed to address potential heteroskedasticity, autocorrelation, and cross-sectional dependence in the panel data. Finally, robustness was further assessed using an alternative measure of exchange-rate volatility based on real effective exchange-rate volatility. These alternative specifications were carried out to assess the stability and validity of the study's conclusions.

3.6. Descriptive Analysis and Multicollinearity

Table 2 presents the descriptive statistics for the study variables and demonstrates the suitability of the data for examining the relationship between SMA, foreign exchange volatility, and competitive advantage among listed manufacturing firms in Nigeria. The mean *SMA_SCORE* of 3.725, with a standard deviation of 1.916, indicates moderate adoption of SMA practices among sampled firms. Given the maximum score of seven (7), the result suggests reasonable utilisation of externally oriented SMA practices. The spread across the percentile values further indicates substantial variation in SMA usage, supporting the appropriateness of the data for assessing differences in firms' strategic responses to exchange rate volatility. The component variables show similar variation. *CUST_ACC* records a mean of 1.721 out of three (3), while *COMP_ACC* has a mean of 2.004 out of four (4), suggesting slightly higher use of competitor-oriented accounting practices relative to customer-oriented practices among Nigerian manufacturing firms. The statistics for *EXR_VOL* are particularly important within the context of the study. The variable records a mean of 24.800 and a high standard deviation of 41.741, indicating substantial exchange rate volatility during the study period. The large gap between the mean and median (7.241) further suggests periods of extreme currency instability, reflecting the volatile macroeconomic environment in Nigeria and justifying the study's focus on exchange rate uncertainty. The control variables also exhibit reasonable variation across firms. *MKT_PEN*, *FIRM_SZE*,

and *BORRW_CAP* indicate differences in market presence, firm size, and investment capacity, while *ENV_UNCRT* reflects moderate environmental uncertainty within the sector. In addition, the substantial dispersion in *GRWTH_OPP* suggests differences in growth opportunities and market valuation among firms.

Table 2. Descriptive Statistics.

	Mean	SD	p25	p50	p75
<i>SMA_SCORE</i>	3.725	1.916	2.000	4.000	5.000
<i>CUST_ACC</i>	1.721	1.077	1.000	2.000	3.000
<i>COMP_ACC</i>	2.004	1.143	1.000	2.000	3.000
<i>EXR_VOL</i>	24.800	41.741	2.844	7.241	9.347
<i>MKT_PEN</i>	9.884	0.895	9.305	9.936	10.553
<i>GRWTH_OPP</i>	5.171	77.538	0.300	0.670	1.450
<i>FIRM_SIZE</i>	9.893	0.976	9.166	9.668	10.603
<i>BORRW_CAP</i>	9.388	2.568	9.327	9.884	10.521
<i>ENV_UNCRT</i>	1.451	0.653	1.090	1.200	2.050
Observations	560	560	560	560	560

Overall, the descriptive statistics indicate sufficient variability across the variables, supporting the appropriateness of the dataset for regression analysis and hypothesis testing within the Nigerian manufacturing context.

Table 3 (Panels A and B) presents the correlation matrix and Variance Inflation Factor (VIF) results used to assess multicollinearity among the explanatory variables. Overall, the results indicate that multicollinearity is not a serious concern in the study.

Table 3. (Panel A): Correlation Matrix. (Panel B): Variance inflation factor.

Panel A						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>EXR_VOL</i> (1)	1.000					
<i>MKT_PEN</i> (2)	0.015	1.000				
<i>GRWTH_OPP</i> (3)	−0.022	0.058	1.000			
<i>FIRM_SIZE</i> (4)	−0.016	0.065 ***	0.064	1.000		
<i>BORRW_CAP</i> (5)	0.017	0.130 **	−0.025	0.124 **	1.000	
<i>ENV_UNCRT</i> (6)	0.026	−0.078	−0.019	−0.080	−0.104 *	1.000
Panel B						
	VIF		1/VIF			
<i>MKT_PEN</i>	4.241		0.236			
<i>FIRM_SIZE</i>	4.239		0.236			
<i>BORRW_CAP</i>	1.028		0.972			
<i>ENV_UNCRT</i>	1.016		0.984			
<i>GRWTH_OPP</i>	1.006		0.994			
<i>EXR_VOL</i>	1.004		0.996			
Mean VIF	2.089					

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3 (Panel A) presents the pairwise correlation matrix for the explanatory variables and provides preliminary evidence that multicollinearity is unlikely to be a serious concern in the study. The correlation coefficients among the independent variables are generally low, suggesting the absence of strong linear relationships between the regressors. Specifically, the correlations range from −0.104 to 0.130, which are substantially below the conventional multicollinearity concern threshold of 0.80 (Tabachnick et al., 2007). For

instance, the highest positive correlation is observed between *MKT_PEN* and *BORRW_CAP* ($r = 0.130$, $p < 0.05$), while the correlation between *FIRM_SZE* and *BORRW_CAP* is 0.124 ($p < 0.05$). Similarly, *MKT_PEN* and *FIRM_SZE* exhibit a modest positive correlation of 0.065 ($p < 0.01$). The highest negative correlation is between *BORRW_CAP* and *ENV_UNCRT* ($r = -0.104$, $p < 0.10$). These coefficients are relatively small in magnitude, indicating that the explanatory variables capture distinct firm characteristics rather than overlapping constructs. Importantly, exchange rate volatility (*EXR_VOL*), which represents the key explanatory variable, exhibits very weak correlations with all control variables, ranging from -0.022 to 0.026 . This further suggests that the estimated effect of exchange rate volatility is unlikely to be distorted by collinearity with other regressors included in the model.

The low pairwise correlations provide strong preliminary evidence that multicollinearity does not pose a significant threat to the reliability or stability of the regression estimates (P. Kennedy, 1998). The VIF results in Table 3 (Panel A) further confirm this conclusion. The mean VIF of 2.089 is substantially below the commonly accepted threshold values of 5 or 10 (P. Kennedy, 1998), indicating low multicollinearity. While *MKT_PEN* and *FIRM_SZE* record the highest VIF values (4.241 and 4.239 respectively), these remain within acceptable limits and are expected given the conceptual relationship between firm size and market presence. The remaining variables report VIF values close to 1 , indicating minimal collinearity.

Overall, the correlation and VIF results suggest that the explanatory variables are sufficiently distinct, supporting the reliability and stability of the regression estimates.

4. Results

4.1. Association Between Exchange Rate Volatility and SMA Usage

Table 4 presents the regression results on the association between exchange rate volatility (*EXR_VOL*) and SMA usage using both the logarithmic measure of SMA (*SMA_USE*) and the raw composite SMA score (*SMA_SCORE*). Across all model specifications, the coefficient of *EXR_VOL* is positive and statistically significant at the 1% level, providing strong evidence that exchange rate volatility is positively associated with SMA usage among listed manufacturing firms in Nigeria.

Using the main dependent variable (*SMA_USE*) in Panel A, the coefficient of *EXR_VOL* ranges from 0.001 to 0.003 across Models 1–4, with highly significant t-statistics ranging from 6.76 to 10.28 . Similarly, when the alternative dependent variable (*SMA_SCORE*) is employed in Panel B, the coefficient of *EXR_VOL* remains positive and highly significant, ranging from 0.004 to 0.022 with t-statistics between 7.47 and 9.17 . The consistency of the positive and significant coefficients across all specifications indicates that firms experiencing higher levels of exchange rate volatility tend to intensify their usage of SMA practices, thereby supporting acceptance of H1. The robustness of the findings across alternative model specifications and measurements of SMA strengthens confidence in the reliability of the results. The explanatory power of the models is also reasonably strong. The adjusted R-squared values range from 0.199 to 0.463 , suggesting that the explanatory variables account for between approximately 20% and 46% of the variation in SMA usage. In addition, the F-statistics, which range from 19.281 to 47.174 , are statistically significant and indicate that the models are jointly significant and appropriately specified.

The findings are consistent with the propositions of contingency theory, which argues that organisational systems and management practices are contingent upon environmental conditions and uncertainty (Bruns & Kaplan, 1987; Abdel-Kader & Luther, 2008; Ahmad & Zabri, 2015). The result also supports discussion in extant literature (Tillema, 2005; Ahmad & Zabri, 2015; B. Oyewo, 2022). Exchange rate volatility represents a significant environmental contingency that increases uncertainty relating to production costs, import prices,

profitability, and strategic planning. Under such conditions, firms are expected to adapt their internal systems and strategic processes in order to maintain competitiveness and operational stability. The positive association between *EXR_VOL* and SMA usage therefore suggests that manufacturing firms respond to exchange rate instability by increasing their reliance on externally oriented and strategically focused accounting practices. Specifically, the findings imply that firms operating in more volatile foreign exchange environments are more likely to adopt SMA techniques such as customer accounting and competitor accounting in order to improve environmental scanning, strategic planning, resource allocation, and competitive responsiveness. The result supports the central argument of contingency theory that the suitability and intensity of management accounting systems depend on the level of environmental uncertainty confronting the organisation (Chong & Chong, 1997; Aftab et al., 2024). The evidence suggests that SMA usage functions as an adaptive organisational response to foreign exchange volatility within the Nigerian manufacturing sector.

Table 4. Association between Exchange rate volatility and SMA usage.

	Panel A: Main Measurement of Dependent Variable				Panel B: Alternative Measurement of DV	
	(1) <i>SMA_USE</i>	(2) <i>SMA_USE</i>	(3) <i>SMA_USE</i>	(4) <i>SMA_USE</i>	(5) <i>SMA_SCORE</i>	(6) <i>SMA_SCORE</i>
<i>EXR_VOL</i>	0.001 *** (8.26)	0.003 *** (10.28)	0.001 *** (6.76)	0.003 *** (6.95)	0.004 *** (7.47)	0.022 *** (9.17)
<i>MKT_PEN</i>	-	-	-0.042 * (-1.86)	-0.062 *** (-2.99)	-0.228 ** (-2.01)	-0.213 ** (-2.16)
<i>GRWTH_OPP</i>	-	-	0.000 ** (2.47)	-0.000 (-0.17)	0.001 *** (3.52)	0.000 (0.09)
<i>FIRM_SIZE</i>	-	-	0.026 * (1.78)	0.027 ** (1.99)	0.071 (0.79)	0.071 (0.89)
<i>BORRW_CAP</i>	-	-	0.080 *** (2.92)	-0.002 (-0.07)	0.725 *** (4.36)	0.032 (0.20)
<i>ENV_UNCRT</i>	-	-	0.084 *** (3.55)	0.015 (0.58)	0.495 *** (3.39)	-0.108 (-0.72)
Constant	0.218 *** (9.28)	0.152 *** (6.73)	-0.488 ** (-2.27)	0.449 ** (1.99)	-4.329 *** (-3.30)	2.112 (1.63)
Firm Effect	YES	YES	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES	NO	YES
Adj R-squared	0.199	0.408	0.231	0.372	0.450	0.463
F-statistic	36.768	19.281	47.174	47.134	44.568	45.770
Observations	560	560	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4 reports fixed-effects regression estimates examining the association between exchange-rate volatility and SMA usage. Panel A employs *SMA_USE* (the natural logarithm of *SMA_SCORE*) as the primary dependent variable, while Panel B re-estimates the models using the raw *SMA_SCORE* as an alternative measure for robustness purposes. Across all model specifications, the coefficient on *EXR_VOL* is positive and statistically significant, indicating that higher exchange-rate volatility is associated with greater SMA usage. The consistency of the positive coefficients across both the logged and unlogged SMA measures suggests that firms intensify strategic management accounting practices in response to foreign exchange uncertainty. *EXR_VOL* captures year-to-year official exchange-rate volatility. Columns (1), (3), and (5) include firm fixed effects only, whereas columns (2), (4), and (6) additionally include year fixed effects. All variables are defined in the variable

definition Table 1. All variables are defined in the variable definition table. t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.2. Association Between Exchange Rate Volatility and Customer Accounting

Table 5 presents the regression results on the association between exchange rate volatility (*EXR_VOL*) and customer accounting (*CUST_ACC*). The results show that exchange rate volatility is positively and significantly associated with customer accounting across all model specifications. Specifically, the coefficient of *EXR_VOL* remains positive and statistically significant at the 1% level in all four models, with coefficients ranging from 0.002 to 0.016 and t-statistics between 4.93 and 8.48. The consistency of the positive coefficients across models with and without year effects and control variables indicate robust evidence that firms experiencing higher exchange rate volatility tend to intensify customer-oriented SMA practices. The adjusted R-squared values range from 0.311 to 0.398, suggesting that the models explain between approximately 31% and 40% of the variation in customer accounting practices. Similarly, the F-statistics, ranging from 33.061 to 37.329, indicate that the models are jointly significant and appropriately specified.

Table 5. Association between Exchange rate volatility and Customer Accounting.

	(1) <i>CUST_ACC</i>	(2) <i>CUST_ACC</i>	(3) <i>CUST_ACC</i>	(4) <i>CUST_ACC</i>
<i>EXR_VOL</i>	0.003 *** (7.29)	0.012 *** (8.48)	0.002 *** (4.93)	0.016 *** (7.66)
<i>MKT_PEN</i>	-	-	-0.224 ** (-2.42)	-0.214 ** (-2.53)
<i>GRWTH_OPP</i>	-	-	0.001 *** (3.28)	0.000 (0.32)
<i>FIRM_SIZE</i>	-	-	-0.025 (-0.33)	-0.031 (-0.45)
<i>BORRW_CAP</i>	-	-	0.531 *** (3.92)	0.026 (0.19)
<i>ENV_UNCRT</i>	-	-	0.218 * (1.83)	-0.273 ** (-2.14)
Constant	1.708 *** (14.16)	1.431 *** (11.99)	-1.391 (-1.30)	3.346 *** (3.00)
Firm Effect	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES
Adj R-squared	0.389	0.311	0.398	0.315
F-statistic	33.219	33.061	37.329	33.540
Observations	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The findings appear to indicate that exchange rate instability may lead firms to rely more on customer-focused strategic information. Under volatile foreign exchange conditions, manufacturing firms are likely to place greater emphasis on monitoring customer profitability, strengthening customer relationships, improving distribution efficiency, and understanding customer needs in order to maintain market share and competitiveness. This is particularly important in the Nigerian manufacturing sector, where exchange rate volatility can significantly affect production costs, product pricing, and customer purchasing behaviour.

The results are consistent with contingency theory, which posits that organisational systems and management practices are shaped by environmental conditions and uncer-

tainty. Exchange rate volatility constitutes an important environmental contingency that compels firms to adopt more externally oriented and strategically responsive accounting practices. The positive relationship between *EXR_VOL* and *CUST_ACC* therefore suggests that firms adapt to exchange rate uncertainty by increasing their use of customer-oriented accounting information to support strategic decision-making, market responsiveness, and competitive survival. Exchange rate volatility represents a salient form of environmental uncertainty, and contingency theory suggests that organisations respond to such uncertainty by adopting management practices that enhance information quality, control, and decision-making relevance. In this context, heightened currency fluctuations destabilise input costs, selling prices, and customer level margins, thereby increasing the difficulty of forecasting performance and maintaining stable profitability. As these conditions intensify, firms become more reliant on customer accounting because it provides granular, customer specific information that helps them monitor profitability, assess risk exposure, and prioritise resource allocation. Volatile exchange rates can also alter customers' purchasing behaviour, payment reliability, and sensitivity to price adjustments, making customer level analysis essential for identifying which relationships remain viable and which become financially vulnerable. Customer accounting thus supports firms in evaluating the differential impact of currency movements across customer segments, guiding pricing decisions, credit terms, and strategic focus. From a contingency theoretic perspective, the increased use of customer accounting is not merely a discretionary choice but a rational organisational response to uncertainty: as environmental volatility rises, firms adopt more sophisticated information systems to reduce ambiguity, protect margins, and stabilise decision processes. Exchange rate volatility can be expected to strengthen firms' reliance on customer accounting as a means of managing risk, safeguarding cash flow, and sustaining performance under uncertain economic conditions.

Table 5 reports fixed-effects regression estimates examining the association between exchange-rate volatility and customer accounting practices (*CUST_ACC*). The results show that *EXR_VOL* is positive and statistically significant across all model specifications, with coefficients ranging from 0.002 to 0.016 and t-statistics between 4.93 and 8.48, indicating that higher exchange-rate volatility is associated with greater adoption of customer-oriented SMA practices. The findings suggest that firms respond to foreign exchange uncertainty by intensifying customer-focused strategic accounting activities, including customer profitability analysis, customer relationship monitoring, and distribution-related disclosures. Columns (1) and (3) include firm fixed effects only, while columns (2) and (4) additionally control for year fixed effects. All variables are defined in the variable definition Table 1. t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.3. Association Between Exchange Rate Volatility and Competitor Accounting

Table 6 presents the regression results on the association between exchange rate volatility (*EXR_VOL*) and competitor accounting (*COMP_ACC*). The results indicate that exchange rate volatility is positively and significantly associated with competitor accounting across all model specifications. The coefficient of *EXR_VOL* remains positive and statistically significant at the 1% level in all four models, with coefficients ranging from 0.002 to 0.008 and t-statistics between 3.39 and 6.98. The consistency of the positive coefficients across models with and without year effects and control variables provide robust evidence that firms facing higher levels of exchange rate volatility tend to intensify competitor-oriented SMA practices. The adjusted R-squared values range from 0.335 to 0.344, indicating that the models explain approximately 34% of the variation in competitor accounting practices.

In addition, the F-statistics, which range from 25.573 to 35.687, confirm that the models are jointly significant and appropriately specified.

Table 6. Association between Exchange rate volatility and Competitor Accounting.

	(1) <i>COMP_ACC</i>	(2) <i>COMP_ACC</i>	(3) <i>COMP_ACC</i>	(4) <i>COMP_ACC</i>
<i>EXR_VOL</i>	0.002 *** (6.16)	0.008 *** (6.98)	0.002 *** (5.07)	0.006 *** (3.39)
<i>MKT_PEN</i>	-	-	-0.005 (-0.06)	0.002 (0.02)
<i>GRWTH_OPP</i>	-	-	0.000 (1.25)	-0.000 (-0.24)
<i>FIRM_SIZE</i>	-	-	0.096 (1.56)	0.102 * (1.68)
<i>BORRW_CAP</i>	-	-	0.194 * (1.71)	0.006 (0.05)
<i>ENV_UNCRT</i>	-	-	0.277 *** (2.78)	0.166 (1.47)
Constant	-0.047 (-0.49)	-0.213 ** (-2.12)	-2.938 *** (-3.29)	-1.234 (-1.25)
Firm Effect	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES
Adj R-squared	0.337	0.344	0.335	0.340
F-statistic	34.026	35.687	28.567	25.573
Observations	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The evidence suggests a potential link between exchange rate instability and an increased need for firms to track competitors, evaluate their relative position, and respond strategically to shifting market dynamics. Under volatile foreign exchange conditions, firms may experience fluctuations in production costs, pricing structures, and market competitiveness, thereby increasing the importance of competitor-focused strategic information. Firms are likely to intensify activities relating to competitor analysis, assessment of competitive threats, and strategic positioning in order to sustain market relevance and competitive advantage. The results align with contingency theory, which argues that organisational systems and management practices are contingent upon environmental conditions and uncertainty (Ahmad & Zabri, 2015; B. Oyewo, 2022). Exchange rate volatility represents a significant environmental contingency that compels firms to adopt more externally oriented and strategically responsive accounting systems. The positive relationship between *EXR_VOL* and *COMP_ACC* therefore suggests that firms adapt to exchange rate uncertainty by strengthening competitor-oriented accounting practices to improve strategic responsiveness and competitive positioning within uncertain business environments.

Firms operating in environments characterised by high exchange-rate volatility also face intensified competitive pressures, as currency movements can alter relative cost structures, pricing power, and market positioning across rival firms. Contingency theory posits that organisations adapt their management control systems to fit the level of environmental uncertainty they encounter, and competitor accounting becomes particularly valuable under such conditions. When exchange rates fluctuate unpredictably, firms must continuously reassess their competitive standing, because rivals may gain or lose cost advantages depending on their exposure to foreign inputs, export markets, or currency-denominated financing. Competitor accounting provides systematic information on competitors' cost structures, pricing strategies, market shares, and strategic moves, enabling firms to inter-

pret how currency shocks reshape competitive dynamics. This information supports more informed strategic responses, such as adjusting pricing, reallocating resources, or revising market entry and exit decisions. From a contingency-theoretic perspective, increased reliance on competitor accounting is therefore a rational response to heightened uncertainty: as volatility obscures the competitive landscape, firms require richer, externally oriented information systems to reduce ambiguity and maintain strategic alignment. Therefore, exchange-rate volatility is likely to strengthen firms' use of competitor accounting as they seek to monitor rivals, anticipate competitive threats, and sustain performance in unstable economic conditions.

Table 6 reports fixed-effects regression estimates examining the association between exchange-rate volatility (*EXR_VOL*) and competitor accounting practices (*COMP_ACC*). The coefficient on *EXR_VOL* is positive and statistically significant across all model specifications, with coefficients ranging from 0.002 to 0.008 and t-statistics between 3.39 and 6.98, indicating that firms increase competitor-oriented SMA practices in response to heightened exchange-rate volatility. The findings suggest that foreign exchange uncertainty encourages firms to intensify strategic monitoring of competitors, competitive positioning, and market dynamics in order to strengthen responsiveness under volatile economic conditions. Columns (1) and (3) include firm fixed effects only, while columns (2) and (4) additionally control for year fixed effects. All variables are defined in the variable definition Table 1. t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

4.4. Association Between Exchange Rate Volatility, SMA Usage Intensity and Competitive Advantage

Table 7 presents the regression results on the moderating effect of SMA usage intensity on the relationship between exchange rate volatility (*EXR_VOL*) and competitive advantage. In this analysis, SMA usage intensity (*SMA_USE_INTENSE*) was operationalised using a 70% threshold on the *SMA_SCORE*, such that firms scoring at or above 70% were classified as intense SMA users, while firms below this threshold were classified as non-intense users. The 70% benchmark represents substantial engagement with externally oriented SMA practices and allows the study to assess whether deeper SMA adoption strengthens firms' ability to manage exchange rate uncertainty and sustain competitive advantage. The results show that the interaction term (*EXR_VOL * SMA_USE_INTENSE*) is positive and statistically significant across all model specifications. For relative competitive advantage in ROA (*ROA_ADV*), the interaction coefficient is 0.534 ($p < 0.05$) in Model 1 and 0.390 ($p < 0.10$) in Model 2. Similarly, for relative competitive valuation (*VAL_ADV*), the interaction term remains positive and significant, with coefficients of 0.055 ($p < 0.05$) and 0.041 ($p < 0.10$) in Models 3 and 4 respectively. These findings indicate that firms with intense SMA usage are better able to sustain competitive advantage under conditions of exchange rate volatility than firms with less intensive SMA usage. The direct effect of *EXR_VOL* becomes negative in the year-fixed effect models, particularly for *VAL_ADV*, where the coefficient is negative and weakly significant ($-0.227, p < 0.10$). This suggests that exchange rate volatility, by itself, may adversely affect firms' competitive positioning by increasing operational uncertainty, input costs, and financial pressures. However, the positive interaction effect demonstrates that firms engaging intensively with SMA practices are more capable of mitigating these adverse effects and translating environmental uncertainty into superior competitive outcomes.

The findings are strongly consistent with the resource-based view (RBV) theory, which argues that sustainable competitive advantage arises from the possession and effective deployment of valuable, rare, inimitable, and non-substitutable organisational resources and capabilities (Barney, 2002; Taurinana, 2021). Within this framework, intense SMA

usage represents a higher-order strategic capability because it reflects substantial organisational commitment to externally oriented strategic information systems, including customer accounting and competitor accounting practices. Firms with intense SMA usage are likely to possess stronger information-processing capabilities, superior strategic awareness, and greater adaptive capacity than firms with weaker SMA engagement. Under conditions of exchange rate volatility, such firms are better positioned to monitor competitor behaviour, anticipate market changes, evaluate customer profitability, adjust pricing strategies, optimise resource allocation, and respond proactively to macroeconomic instability (Cadez & Guilding, 2008; Holm et al., 2016). Intense SMA usage enhances organisational flexibility and strategic responsiveness, enabling firms to maintain competitiveness despite volatile foreign exchange conditions.

Table 7. Association between Exchange rate volatility, SMA usage intensity and competitive advantage.

	(1) ROA_ADV	(2) ROA_ADV	(3) VAL_ADV	(4) VAL_ADV
SMA_USE_INTENSE	−144.419 (−1.05)	321.181 ** (2.43)	−15.697 (−1.08)	34.420 ** (2.47)
EXR_VOL	0.317 (1.26)	−1.988 (−1.61)	0.033 (1.25)	−0.227 * (−1.74)
EXR_VOL * SMA_USE_INTENSE	0.534 ** (2.40)	0.390 * (1.73)	0.055 ** (2.34)	0.041 * (1.73)
MKT_PEN	−92.435 (−1.55)	7.344 (0.14)	−10.771 * (−1.71)	−0.203 (−0.04)
GRWTH_OPP	8.938 *** (53.00)	9.269 *** (62.04)	0.930 *** (52.30)	0.965 *** (61.30)
FIRM_SIZE	29.404 (0.75)	−18.073 (−0.53)	4.410 (1.07)	−0.490 (−0.14)
BORRW_CAP	−77.675 (−1.05)	22.298 (0.33)	−8.618 (−1.11)	2.318 (0.33)
ENV_UNCRT	8.253 (0.13)	−2.891 (−0.05)	0.338 (0.05)	−0.577 (−0.09)
Constant	1294.433 ** (2.24)	−109.414 (−0.20)	138.716 ** (2.28)	−14.372 (−0.24)
Firm Effect	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES
Adj R-squared	0.350	0.364	0.349	0.363
F-statistic	33.225	17.045	29.959	26.053
Observations	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The significance of the interaction term further suggests that the benefits of SMA emerge more strongly when firms engage substantially with SMA practices rather than adopting them superficially. Firms crossing the 70% SMA threshold are likely to have embedded SMA practices more deeply into strategic planning and decision-making processes, thereby improving their ability to convert environmental uncertainty into strategic opportunities. In this regard, intense SMA usage functions as an intangible strategic resource that strengthens organisational resilience and enhances firms' ability to sustain superior performance relative to competitors during periods of exchange rate instability. The adjusted R-squared values, ranging from 0.349 to 0.364, indicate that the models explain approximately 35% to 36% of the variation in competitive advantage, while the significant F-statistics confirm that the models are jointly significant and appropriately specified. Overall, the findings provide strong empirical support for the Resource-Based

View proposition that firms with superior strategic capabilities are better able to achieve and sustain competitive advantage under uncertain environmental conditions.

Taken together, the results in Table 7 provide evidence that SMA intensity moderates the relationship between exchange-rate volatility and competitive advantage. The consistently positive and significant interaction terms across both accounting-based and market-based measures suggest that firms employing SMA more intensively are better positioned to maintain superior profitability and market valuation relative to competitors under conditions of exchange-rate uncertainty. These findings are broadly consistent with the resource-based view and dynamic capabilities perspective, which argue that strategic management capabilities enhance firms' ability to respond effectively to external environmental turbulence and sustain competitive advantage over rivals.

Table 7 reports fixed-effects regression estimates examining whether SMA usage intensity (*SMA_USE_INTENSE*) moderates the association between exchange-rate volatility and competitive advantage. *ROA_ADV* captures relative competitive advantage in return on assets, while *VAL_ADV* measures relative competitive valuation. *SMA_USE_INTENSE* is a dummy variable coded '1' for firms with SMA scores at or above the 70% threshold and '0' otherwise, reflecting substantial engagement with SMA practices. The interaction term (*EXR_VOL * SMA_USE_INTENSE*) is positive and statistically significant across all specifications, with coefficients ranging from 0.041 to 0.534 and t-statistics between 1.73 and 2.40. The findings indicate that firms with more intensive SMA usage are better able to sustain superior competitive performance under conditions of exchange-rate volatility. The results therefore suggest that intensive SMA usage strengthens firms' strategic responsiveness and competitive resilience during periods of foreign exchange uncertainty. Columns (1) and (3) include firm fixed effects only, while columns (2) and (4) additionally control for year fixed effects. All variables are defined in the variable definition Table 1. t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5. Robustness Check

5.1. Addressing Self-Selection Bias Using Entropy Balancing

5.1.1. Entropy Balancing Re-Estimation of the Association Between Exchange Rate Volatility, SMA Usage, Customer Accounting and Competitor Accounting

Firms exhibiting intense SMA usage may systematically differ from less intensive users in characteristics such as firm size, market valuation, growth opportunities, borrowing capacity, and environmental uncertainty, potentially biasing the estimated associations (Abdel-Kader & Luther, 2008; Ahmad & Zabri, 2015; B. Oyewo et al., 2024). As a robustness analysis, entropy balancing was employed to mitigate observable differences between firms classified as intensive and non-intensive SMA users based on *SMA_USE_INTENSE*. Entropy balancing reweights the comparison group to achieve covariate balance across observable firm characteristics prior to estimation (Essieku & Bosompim, 2026). Because firms may self-select into intensive SMA usage based on underlying organisational characteristics, entropy balancing was implemented to reduce observable selection bias and improve comparability between intensive and non-intensive SMA users. Specifically, firms were split using *SMA_USE_INTENSE* classification, where firms with SMA scores at or above the 70% threshold were classified as intensive SMA users, while firms below the threshold were classified as non-intensive users. The 70% threshold was adopted as an analytical decision to distinguish firms exhibiting substantial rather than merely occasional use of strategic management accounting (SMA) practices. Given the absence of a universally accepted cut-off for categorising SMA usage intensity in the literature, a threshold of at least 70% of the maximum attainable SMA disclosure score was considered indicative

of meaningful integration of SMA into strategic planning and decision-making processes. This level reflects consistent implementation of the majority of the externally oriented SMA practices examined, rather than isolated or symbolic disclosures. Firms meeting or exceeding the 70% threshold are classified as intensive SMA users because they demonstrate a broader and more systematic application of customer and competitor accounting practices. This classification enhances the interpretability of the analysis by distinguishing firms with relatively mature SMA adoption from those exhibiting lower levels of strategic accounting engagement.

Entropy balancing then generated observation weights that satisfied covariate balance conditions across the two groups while preserving the full sample, thereby reducing model dependence commonly associated with conventional matching procedures (Ma et al., 2026). The entropy-balanced estimates are intended as a robustness assessment of the baseline fixed-effects results rather than a standalone causal identification strategy. Given that exchange rate volatility is measured at the country-year level and therefore does not generate firm-level cross-sectional treatment variation within the sample, entropy balancing was appropriately applied to SMA usage intensity (*SMA_USE_INTENSE*) rather than to exchange rate volatility exposure. Result of entropy balancing is presented in Table 8.

Table 8. Entropy balancing re-estimation of the association between Exchange rate volatility, SMA usage, Customer Accounting and Competitor Accounting.

	(1) <i>SMA_USE</i>	(2) <i>SMA_USE</i>	(3) <i>CUST_ACC</i>	(4) <i>CUST_ACC</i>	(5) <i>COMP_ACC</i>	(6) <i>COMP_ACC</i>
<i>EXR_VOL</i>	0.001 *** (3.80)	0.002 *** (4.85)	0.002 *** (3.30)	0.024 *** (5.38)	0.001 *** (2.99)	0.002 *** (3.10)
<i>MKT_PEN</i>	0.120 * (1.83)	0.062 (0.92)	0.219 (0.69)	−0.166 (−0.63)	0.136 (1.01)	0.041 (0.28)
<i>GRWTH_OPP</i>	0.000 (0.68)	−0.000 (−0.84)	0.001 ** (2.29)	−0.000 (−0.52)	0.000 (1.60)	0.000 (0.67)
<i>FIRM_SIZE</i>	0.013 (0.59)	0.011 (0.47)	−0.162 (−0.97)	−0.092 (−0.74)	0.038 (0.59)	0.034 (0.51)
<i>BORRW_CAP</i>	0.017 (0.49)	−0.032 (−0.84)	0.535 ** (2.15)	−0.127 (−0.65)	0.133 (1.35)	0.062 (0.57)
<i>ENV_UNCRT</i>	0.055 (1.55)	0.011 (0.30)	0.415 ** (2.42)	−0.452 ** (−2.33)	0.164 (1.57)	0.168 (1.22)
Constant	−1.188 *** (−2.96)	−0.198 (−0.49)	−4.266 * (−1.81)	4.804 *** (2.76)	−2.964 ** (−2.54)	−1.399 (−0.95)
Firm Effect	YES	YES	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES	NO	YES
Adj R-squared	0.327	0.334	0.355	0.396	0.358	0.359
Observations	560	560	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8 presents entropy-balanced fixed-effects regression estimates re-examining the association between exchange-rate volatility and SMA usage (*SMA_USE*), customer accounting (*CUST_ACC*), and competitor accounting (*COMP_ACC*). Entropy balancing was implemented as a robustness procedure to minimise observable differences between firms with high and low SMA usage intensity by reweighting observations to achieve covariate balance while retaining the full sample. The coefficient on *EXR_VOL* remains positive and statistically significant across all specifications, with coefficients ranging from 0.001 to 0.024 and *t*-statistics between 2.99 and 5.38. The consistency of the positive and significant association across SMA usage, customer accounting, and competitor accounting supports the robustness of the baseline findings and indicates that exchange-rate volatility is

associated with greater adoption of externally oriented SMA practices even after addressing potential observable selection bias. Columns (1), (3), and (5) include firm fixed effects only, while columns (2), (4), and (6) additionally include year fixed effects. All variables are defined in the variable definition Table 1. t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 8 presents the entropy balancing re-estimation results used as a robustness test for the baseline findings on the association between exchange rate volatility (*EXR_VOL*) and SMA usage, customer accounting, and competitor accounting. The purpose of the entropy balancing procedure is to reduce observable selection bias by improving covariate balance between firms exhibiting intense and non-intense SMA usage. Overall, the results strongly support the baseline findings reported earlier, indicating that the positive association between exchange rate volatility and SMA-related practices is robust to alternative estimation procedures. For the overall SMA usage models (*SMA_USE*), the coefficient of *EXR_VOL* remains positive and statistically significant at the 1% level across both specifications. Specifically, the coefficients are 0.001 ($t = 3.80$) in Model 1 and 0.002 ($t = 4.85$) in Model 2. These results are consistent with the baseline regression results, which also showed a positive and significant association between exchange rate volatility and SMA usage. The persistence of significance after entropy balancing suggests that the baseline findings are not driven by observable differences between firms with varying SMA usage intensity.

Similarly, the results for customer accounting (*CUST_ACC*) continue to show a positive and highly significant relationship with exchange rate volatility. The coefficient of *EXR_VOL* is 0.002 ($t = 3.30$) in Model 3 and increases to 0.024 ($t = 5.38$) in Model 4, both significant at the 1% level. These findings reinforce the earlier evidence that firms exposed to greater exchange rate uncertainty intensify customer-oriented SMA practices in order to improve responsiveness to changing market conditions and customer behaviour.

The results for competitor accounting (*COMP_ACC*) also remain consistent with the baseline estimations. The coefficient of *EXR_VOL* is positive and statistically significant at the 1% level in both Model 5 (0.001; $t = 2.99$) and Model 6 (0.002; $t = 3.10$). This suggests that firms facing higher exchange rate volatility continue to strengthen competitor-oriented accounting practices even after controlling for observable differences through entropy balancing.

The adjusted R-squared values, ranging from 0.327 to 0.396, indicate reasonable explanatory power across the models and are broadly consistent with the baseline regressions. The stability in coefficient signs, significance levels, and explanatory power across the entropy-balanced estimations further strengthens confidence in the reliability and robustness of the baseline results. Overall, the entropy balancing re-estimation confirms the robustness of the baseline findings by demonstrating that the positive association between exchange rate volatility and SMA-related practices remains statistically significant even after adjusting for potential observable selection bias. The results therefore provide additional evidence that firms respond to exchange rate uncertainty by intensifying their usage of SMA, customer accounting, and competitor accounting practices. The entropy balancing analysis strengthens confidence in the baseline findings by demonstrating that the positive association between exchange-rate volatility and SMA adoption remains stable across alternative balanced specifications and after controlling for firm and year effects.

5.1.2. Entropy Balancing Re-Estimation of the Association Between Exchange Rate Volatility, SMA Usage Intensity, and Competitive Advantage

Table 9 presents the entropy balancing re-estimation results for the association between exchange rate volatility (*EXR_VOL*), SMA usage intensity (*SMA_USE_INTENSE*), and competitive advantage. The entropy balancing procedure serves as a robustness test by

reducing observable differences between firms exhibiting intense and non-intense SMA usage. Overall, the results strongly support the baseline findings reported in Table 7, indicating that the moderating effect of intense SMA usage on the relationship between exchange rate volatility and competitive advantage remains robust after controlling for observable selection bias.

Table 9. Entropy balancing re-estimation of the association between Exchange rate volatility, SMA usage intensity, and Competitive advantage.

	(1) <i>ROA_ADV</i>	(2) <i>VAL_ADV</i>
<i>SMA_USE_INTENSE</i>	−98.171 (−0.65)	−12.465 (−0.79)
<i>EXR_VOL</i>	0.581 * (1.85)	0.062 * (1.86)
<i>EXR_VOL * SMA_USE_INTENSE</i>	0.456 ** (2.21)	0.047 ** (2.19)
<i>MKT_PEN</i>	−115.255 (−1.23)	−14.744 (−1.48)
<i>GRWTH_OPP</i>	8.859 *** (42.20)	0.924 *** (41.56)
<i>FIRM_SIZE</i>	122.537 * (1.68)	14.586 * (1.88)
<i>BORRW_CAP</i>	−133.673 (−1.11)	−13.481 (−1.06)
<i>ENV_UNCRT</i>	17.185 (0.37)	0.842 (0.17)
Constant	1184.575 * (1.69)	128.574 * (1.73)
Firm Effect	YES	YES
Adj R-squared	0.301	0.398
Observations	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The key variable of interest is the interaction term (*EXR_VOL * SMA_USE_INTENSE*), which remains positive and statistically significant across both models. Specifically, the interaction coefficient is 0.456 ($t = 2.21$, $p < 0.05$) for Relative Competitive Advantage in ROA (*ROA_ADV*) and 0.047 ($t = 2.19$, $p < 0.05$) for Relative Competitive Valuation (*VAL_ADV*). These coefficients are consistent in both sign and significance with the baseline regression results, thereby reinforcing the earlier conclusion that intense SMA usage strengthens firms' ability to sustain competitive advantage under conditions of exchange rate volatility. The direct effect of *EXR_VOL* also remains positive and weakly significant in both models, with coefficients of 0.581 ($t = 1.85$) for *ROA_ADV* and 0.062 ($t = 1.86$) for *VAL_ADV*. More importantly, the persistence of the positive and significant interaction effect after entropy balancing suggests that the baseline findings are not merely driven by systematic differences between firms with high and low SMA usage intensity. Rather, the results indicate that firms engaging more intensively with SMA practices are genuinely better positioned to manage exchange rate uncertainty and sustain competitive performance. The adjusted R-squared values of 0.301 and 0.398 indicate reasonable explanatory power for the models, further supporting the reliability of the estimations. The consistency of the interaction effect across both the baseline and entropy-balanced estimations strengthens confidence in the validity and robustness of the study's central argument.

Overall, the entropy balancing results confirm the robustness of the baseline findings by demonstrating that the positive moderating effect of intense SMA usage on the

relationship between exchange rate volatility and competitive advantage remains statistically significant even after adjusting for observable firm-level differences. This provides stronger evidence that intensive engagement with SMA practices enhances firms' strategic responsiveness and competitive resilience under volatile foreign exchange conditions.

Table 9 presents entropy-balanced fixed-effects regression estimates re-examining the moderating role of SMA usage intensity on the association between exchange-rate volatility and competitive advantage. *ROA_ADV* measures relative competitive advantage in return on assets, while *VAL_ADV* captures relative competitive valuation. Entropy balancing was applied to reduce observable differences between firms with intense and non-intense SMA usage by reweighting observations to achieve covariate balance across firm characteristics. *SMA_USE_INTENSE* is a dummy variable coded '1' for firms with SMA scores at or above the 70% threshold and '0' otherwise. The interaction term (*EXR_VOL* * *SMA_USE_INTENSE*) remains positive and statistically significant across both models, with coefficients of 0.456 ($t = 2.21$) for *ROA_ADV* and 0.047 ($t = 2.19$) for *VAL_ADV*. The persistence of the positive interaction effect after entropy balancing supports the robustness of the baseline findings and indicates that firms with more intensive SMA usage sustain stronger competitive performance under conditions of exchange-rate volatility. All models include firm fixed effects. t -statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5.2. Robustness Analysis Using Driscoll–Kraay Standard Errors

As an additional robustness procedure, the study employs panel regressions with Driscoll–Kraay standard errors to account for potential econometric issues arising from the structure of the data and the nature of the key explanatory variables (Benesova & Gawel, 2026). Specifically, the study investigates the relationship between exchange-rate volatility and SMA usage using firm-level panel data, where exchange-rate volatility is measured at the country-year level while SMA usage and other control variables vary across firms and time. This structure creates the possibility that firms may be simultaneously affected by common macroeconomic shocks associated with fluctuations in exchange-rate volatility, thereby generating cross-sectional dependence in the regression residuals. For example, periods of heightened exchange-rate volatility may affect multiple firms within the sample concurrently through common channels such as inflationary pressures, foreign exchange risk exposure, import costs, financing conditions, and macroeconomic uncertainty. The error terms across firms may become correlated within the same period. Conventional fixed-effects regressions may not adequately address this issue because they typically assume cross-sectional independence among panel units. Failure to account for such dependence can result in downward-biased standard errors and overstated statistical significance. In addition, the panel nature of the data raises the likelihood of serial correlation and heteroskedasticity. Variables such as SMA usage intensity, firm sales, market capitalisation, Tobin's Q, and environmental uncertainty are likely to exhibit persistence over time within firms, implying that regression disturbances may be serially correlated. Similarly, the variance of the error terms may differ across firms due to differences in firm size, operational complexity, market exposure, and strategic orientation.

To address these concerns, Driscoll–Kraay standard errors are employed because they provide robustness to heteroskedasticity, autocorrelation, and cross-sectional dependence simultaneously (Hyusein & Seraj, 2026). This approach is particularly appropriate in the present study given the inclusion of a macroeconomic explanatory variable, notably exchange-rate volatility, that is common across firms within each year and may induce correlated disturbances across panel units. Accordingly, the Driscoll–Kraay estimations strengthen the reliability of statistical inference regarding the relationship between

exchange-rate volatility and SMA usage, as well as the moderating role of SMA usage intensity on competitive advantage measures such as relative competitive advantage in ROA and relative competitive valuation. By correcting for potential dependence structures within the panel data, the robustness tests provide greater confidence that the reported significance levels are not driven by biased standard errors arising from common macroeconomic shocks or persistent firm-level effects.

Table 10 presents the re-estimation of the association between exchange rate volatility (*EXR_VOL*) and SMA usage using the Driscoll–Kraay standard errors regression model as a robustness check. The use of Driscoll–Kraay standard errors is particularly important because it corrects for potential heteroskedasticity, serial correlation, and cross-sectional dependence in panel data estimations. As such, the procedure provides more reliable standard errors and strengthens confidence in the validity of the regression results. The results show that the coefficient of *EXR_VOL* remains positive and statistically significant at the 1% level across both model specifications. Specifically, the coefficient is 0.001 ($t = 3.72$) in Model 1 and increases to 0.007 ($t = 7.90$) in Model 2 after controlling for year effects. The persistence of the positive and highly significant relationship between exchange rate volatility and SMA usage supports the robustness of the baseline findings reported earlier.

Table 10. Re-estimation of the association between Exchange rate volatility and SMA usage using Driscoll–Kraay Standard Errors Regression model.

	(1) <i>SMA_USE</i>	(2) <i>SMA_USE</i>
<i>EXR_VOL</i>	0.001 *** (3.72)	0.007 *** (7.90)
<i>MKT_PEN</i>	−0.042 (−1.26)	−0.062 (−1.62)
<i>GRWTH_OPP</i>	0.000 * (2.11)	−0.000 (−0.15)
<i>FIRM_SIZE</i>	0.026 *** (3.45)	0.027 *** (4.17)
<i>BORRW_CAP</i>	0.080 * (1.96)	−0.002 (−0.05)
<i>ENV_UNCRT</i>	0.084 * (2.15)	0.015 (0.50)
Constant	−0.179 (−0.82)	0.591 *** (8.11)
Firm Effect	YES	YES
Year Effect	NO	YES
R-squared	0.222	0.379
F-statistic	34.996	38.647
Observations	560	560

t statistics in parentheses. * $p < 0.10$, *** $p < 0.01$.

Importantly, the magnitude, direction, and significance of the *EXR_VOL* coefficient remain broadly consistent with the baseline fixed-effects estimations, suggesting that the earlier results are not driven by biased standard errors arising from cross-sectional dependence or serial correlation. The stronger coefficient and higher *t*-statistic observed in Model 2 further reinforce the evidence that firms respond to exchange rate uncertainty by increasing their usage of SMA practices. The explanatory power of the models also remains reasonable, with R-squared values of 0.222 and 0.379, while the statistically significant F-statistics of 34.996 and 38.647 confirm that the models are jointly significant and appropriately specified.

Overall, the Driscoll–Kraay re-estimation provides additional robustness evidence for the study’s central findings. The results confirm that the positive association between exchange rate volatility and SMA usage remains stable even after correcting for potential panel data estimation problems, thereby strengthening confidence in the reliability and validity of the baseline regression results.

Table 10 reports robustness estimations of the association between exchange-rate volatility and SMA usage using the Driscoll–Kraay standard errors regression approach, which adjusts for heteroskedasticity, autocorrelation, and cross-sectional dependence in panel data. The coefficient on *EXR_VOL* remains positive and statistically significant across both specifications, with coefficients of 0.001 ($t = 3.72$) and 0.007 ($t = 7.90$), indicating that the positive association between exchange-rate volatility and SMA usage is robust to alternative error correction procedures. The persistence of the results under Driscoll–Kraay estimation strengthens confidence that the baseline findings are not driven by cross-sectional dependence or serial correlation. Column (1) includes firm fixed effects only, while column (2) additionally controls for year fixed effects. All variables are defined in the variable definition Table 1. t -statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5.3. Alternative Independent Variable and Robustness Check Using Real Exchange-Rate Volatility

As an additional robustness test, the study re-estimates the baseline models using real exchange-rate volatility (*EXR_VOL_2*) as an alternative measure of exchange-rate conditions. While the primary analysis employs volatility in the official exchange rate to capture nominal currency instability and macroeconomic uncertainty, the real exchange rate incorporates relative price levels and inflation differentials between domestic and foreign economies. Real exchange rate provides a broader measure of external economic conditions by reflecting both currency fluctuations and changes in international competitiveness. The use of real exchange-rate volatility as an alternative specification enables an assessment of whether the documented relationship between exchange-rate volatility and SMA usage remains robust after accounting for inflation-adjusted exchange-rate movements. This robustness analysis strengthens the reliability of the findings by demonstrating that the results are not solely dependent on the specific operationalization of exchange-rate volatility employed in the baseline estimations. This section presents the results.

5.3.1. Re-Estimation of the Association Between Exchange Rate Volatility and SMA Usage Using an Alternative Measurement of Independent Variable

Table 11 presents the re-estimation of the association between exchange rate volatility and SMA usage using an alternative measure of exchange rate volatility, namely Real Exchange-Rate Volatility (*EXR_VOL_2*). This analysis serves as a robustness check to determine whether the baseline findings remain stable when the key independent variable is measured differently. Overall, the results strongly support the baseline estimations and confirm the robustness of the positive association between exchange rate volatility and SMA usage. Across all four model specifications, the coefficient of *EXR_VOL_2* remains positive and statistically significant at the 1% level. Specifically, the coefficients range from 0.005 to 0.013, with strong t -statistics ranging from 5.54 to 10.28. The consistency in both the direction and significance of the coefficients indicates that firms experiencing higher levels of real exchange-rate volatility tend to intensify their usage of SMA practices. The persistence of this relationship across models with and without year effects and control variables provide strong evidence that the baseline findings are not sensitive to the measurement of exchange rate volatility. The explanatory power of the models also remains reasonable and broadly consistent with earlier estimations. The adjusted R-squared values range from 0.320 to 0.340, suggesting that the models explain approximately 32% to 34% of

the variation in SMA usage. Similarly, the statistically significant F-statistics, ranging from 23.771 to 39.524, indicate that the models are jointly significant and appropriately specified.

Table 11. Re-estimation of the association between Exchange rate volatility and SMA usage using an alternative measurement of independent variable.

	(1) SMA_USE	(2) SMA_USE	(3) SMA_USE	(4) SMA_USE
EXR_VOL_2	0.007 *** (9.01)	0.013 *** (10.28)	0.005 *** (5.54)	0.013 *** (6.95)
MKT_PEN	-	-	-0.037 (-1.62)	-0.062 *** (-2.99)
GRWTH_OPP	-	-	0.000 ** (2.46)	-0.000 (-0.17)
FIRM_SIZE	-	-	0.016 (1.06)	0.027 ** (1.99)
BORRW_CAP	-	-	0.091 *** (3.24)	-0.002 (-0.07)
ENV_UNCRT	-	-	0.044 * (1.76)	0.015 (0.58)
Constant	0.193 *** (8.17)	0.175 *** (8.03)	-0.520 ** (-2.36)	0.472 ** (2.08)
Firm Effect	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES
Adj R-squared	0.321	0.340	0.320	0.337
F-statistic	39.524	29.281	23.771	27.134
Observations	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results demonstrate that the positive association between exchange rate volatility and SMA usage is not limited to the initial volatility measure employed in the study. Rather, the findings remain stable even when real exchange-rate volatility is used as an alternative proxy. This strengthens confidence in the reliability and validity of the study's central conclusion that firms respond to exchange rate uncertainty by increasing their adoption and usage of strategically oriented management accounting practices. Overall, the re-estimation using *EXR_VOL_2* confirms the robustness of the baseline results and provides additional empirical support for the argument that exchange rate volatility functions as an important environmental contingency driving greater SMA usage among Nigerian manufacturing firms.

Table 11 presents robustness estimations of the association between exchange-rate volatility and SMA usage using an alternative measure of exchange-rate volatility (*EXR_VOL_2*), defined as the year-to-year volatility in the real effective exchange rate. Across all model specifications, *EXR_VOL_2* remains positive and statistically significant, with coefficients ranging from 0.005 to 0.013 and t-statistics between 5.54 and 10.28. The consistency in the direction, magnitude, and significance of the coefficients confirms that the positive association between exchange-rate volatility and SMA usage is not sensitive to the specific measurement of exchange-rate volatility employed. The findings therefore reinforce the robustness of the baseline results by demonstrating that firms intensify SMA usage under both official exchange-rate volatility and real effective exchange-rate volatility conditions. Columns (1) and (2) report baseline specifications, while columns (3) and (4) additionally incorporate control variables. Firm fixed effects are included in all models, whereas year fixed effects are incorporated in columns (2) and (4). t-statistics are

reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5.3.2. Re-Estimation of the Association Between Exchange Rate Volatility, Customer Accounting and Competitor Accounting Using an Alternative Measurement of Independent Variable

Table 12 presents the re-estimation of the association between real exchange-rate volatility (*EXR_VOL_2*) and the two dimensions of SMA, notably customer accounting (*CUST_ACC*) and Competitor Accounting (*COMP_ACC*). The analysis serves as a robustness check by employing an alternative measure of the independent variable. Overall, the results strongly support the baseline findings and confirm the robustness of the positive relationship between exchange rate volatility and both dimensions of SMA.

Table 12. Re-estimation of the association between Exchange rate volatility, Customer Accounting and Competitor Accounting using an alternative measurement of independent variable.

	(1) <i>CUST_ACC</i>	(2) <i>CUST_ACC</i>	(3) <i>COMP_ACC</i>	(4) <i>COMP_ACC</i>
<i>EXR_VOL_2</i>	0.021 *** (4.74)	0.074 *** (7.66)	0.014 *** (3.76)	0.029 *** (3.39)
<i>MKT_PEN</i>	−0.229 ** (−2.47)	−0.214 ** (−2.53)	−0.012 (−0.15)	0.002 (0.02)
<i>GRWTH_OPP</i>	0.001 *** (3.17)	0.000 (0.32)	0.000 (1.38)	−0.000 (−0.24)
<i>FIRM_SIZE</i>	−0.052 (−0.71)	−0.031 (−0.45)	0.066 (1.07)	0.102 * (1.68)
<i>BORRW_CAP</i>	0.548 *** (4.05)	0.026 (0.19)	0.243 ** (2.12)	0.006 (0.05)
<i>ENV_UNCRT</i>	0.056 (0.45)	−0.273 ** (−2.14)	0.168 (1.60)	0.166 (1.47)
Constant	−1.221 (−1.13)	3.477 *** (3.09)	−3.040 *** (−3.32)	−1.184 (−1.19)
Firm Effect	YES	YES	YES	YES
Year Effect	NO	YES	NO	YES
Adj R-squared	0.298	0.215	0.233	0.240
F-statistic	36.992	33.540	25.307	25.573
Observations	560	560	560	560

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

For customer accounting (*CUST_ACC*), the coefficient of *EXR_VOL_2* remains positive and statistically significant at the 1% level across both model specifications. The coefficients are 0.021 ($t = 4.74$) in Model 1 and 0.074 ($t = 7.66$) in Model 2. These findings are consistent with the baseline results and indicate that firms experiencing higher levels of real exchange-rate volatility intensify customer-oriented accounting practices. The persistence of significance across models with and without year effects suggests that the earlier findings are stable and not sensitive to alternative measures of exchange rate volatility.

Similarly, for competitor accounting (*COMP_ACC*), the coefficient of *EXR_VOL_2* remains positive and statistically significant at the 1% level in both models, with coefficients of 0.014 ($t = 3.76$) and 0.029 ($t = 3.39$) respectively. This confirms the baseline evidence that firms exposed to higher exchange rate uncertainty strengthen competitor-focused strategic accounting practices in order to improve strategic responsiveness and competitive positioning.

The adjusted R-squared values remain reasonably stable across the models, ranging from 0.215 to 0.298 for customer accounting and from 0.233 to 0.240 for competitor accounting, while the significant F-statistics indicate that the models are jointly significant and appropriately specified. Overall, the results confirm the robustness of the baseline findings by demonstrating that the positive association between exchange rate volatility and both customer accounting and competitor accounting persists even when real exchange-rate volatility (*EXR_VOL_2*) is used as an alternative proxy for exchange rate uncertainty. The consistency in coefficient signs and significance levels strengthens confidence in the reliability and validity of the study's conclusions.

Table 12 reports robustness estimations of the association between exchange-rate volatility and the two dimensions of SMA practices, notably Customer Accounting (*CUST_ACC*) and Competitor Accounting (*COMP_ACC*), using an alternative measure of exchange-rate volatility (*EXR_VOL_2*), defined as real effective exchange-rate volatility. The coefficients on *EXR_VOL_2* remain positive and statistically significant across all specifications, with coefficients ranging from 0.014 to 0.074 and t-statistics between 3.39 and 7.66. Specifically, exchange-rate volatility exhibits a significant positive association with customer accounting in columns (1) and (2), and with competitor accounting in columns (3) and (4). The consistency of these findings with the baseline estimations indicates that the documented positive relationship between exchange-rate volatility and externally oriented SMA practices is robust to alternative measurements of exchange-rate volatility. These results further support the argument that firms intensify customer-focused and competitor-focused strategic accounting activities in response to heightened foreign exchange uncertainty. Firm fixed effects are included in all specifications, while year fixed effects are incorporated in columns (2) and (4). t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

6. Conclusions

This study examines the relationship between exchange rate volatility, strategic management accounting (SMA) usage, and competitive advantage. Specifically, the study pursues two interrelated objectives. First, it analyses the extent to which exchange rate volatility influences SMA usage practices among firms. Second, it investigates whether SMA usage significantly moderates the relationship between exchange rate volatility and competitive advantage. Drawing on contingency theory and the resource-based view (RBV), the study conceptualises exchange rate volatility as an important environmental contingency that compels firms to adopt adaptive strategic management practices, while SMA was viewed as a valuable organisational capability capable of strengthening competitive resilience under uncertainty.

Using panel regression techniques with firm and year fixed effects on data obtained from listed manufacturing firms in Nigeria over the period 2015–2024, the findings revealed a positive and statistically significant association between exchange rate volatility and SMA usage. The results further showed that exchange rate volatility is positively and significantly associated with both customer accounting and competitor accounting practices, indicating that firms respond to foreign exchange uncertainty by intensifying externally oriented strategic accounting activities. These findings support the propositions of contingency theory, which argues that organisational systems and management practices are contingent upon environmental conditions and uncertainty. In periods of exchange rate instability, firms appear to rely more heavily on SMA practices to improve environmental scanning, strategic responsiveness, customer management, and competitive positioning.

The study found that SMA usage intensity positively moderates the relationship between exchange rate volatility and competitive advantage. The interaction between

exchange rate volatility and intense SMA usage was positive and statistically significant across measures of both relative competitive advantage in return on assets and relative competitive valuation. This suggests that firms engaging more intensively with SMA practices may be better positioned to respond to the challenges associated with exchange rate volatility and to maintain relatively stronger competitive performance than their competitors. The findings therefore provide strong empirical support for the Resource-Based View, which posits that sustainable competitive advantage derives from valuable and strategically deployed organisational capabilities. In this context, SMA functions as an intangible strategic capability that enhances firms' adaptability, strategic flexibility, and resilience under macroeconomic instability.

The robustness of the findings was confirmed through several additional analyses, including entropy balancing, Driscoll–Kraay standard error estimations, and alternative measures of exchange rate volatility. The consistency of the results across these alternative estimations strengthens confidence in the reliability and validity of the study's conclusions. We recognise that exchange rate volatility may coincide with broader macroeconomic shocks that could potentially affect firms' strategic management accounting (SMA) practices and competitive performance. To mitigate potential confounding effects, our empirical analysis incorporates firm fixed effects to control for time-invariant unobserved firm characteristics, together with firm-level control variables capturing important observable determinants of competitive advantage. We also estimated alternative model specifications, including models with and without year effects, alternative measures of exchange rate volatility, and Driscoll–Kraay estimators, which account for heteroskedasticity, serial correlation, and cross-sectional dependence. The consistency of results across these specifications provides confidence that the reported associations are not driven by a particular modelling approach.

Based on the findings of the current study, firms operating in environments characterised by persistent foreign exchange volatility should institutionalise strategic management accounting (SMA) by embedding customer and competitor accounting into routine strategic planning, budgeting, performance evaluation, and risk management processes. Rather than treating SMA as a reactive tool during periods of currency instability, organisations should integrate exchange rate information into regular management reporting and decision-making processes. This includes continuously monitoring customer profitability, competitor pricing strategies, and market dynamics alongside exchange rate movements to support timely adjustments to pricing, sourcing, investment, and market positioning decisions. Embedding these practices within the firm's management control systems can strengthen strategic responsiveness and improve the organisation's ability to navigate uncertain foreign exchange conditions while sustaining competitive performance.

The study makes several contributions to knowledge. First, this study contributes to the literature by examining whether SMA usage enhances firms' ability to gain competitive advantage under conditions of foreign exchange volatility. In doing so, it provides context-specific evidence on the strategic relevance of SMA practices within an economically volatile and highly competitive manufacturing environment. By linking macroeconomic uncertainty with internal strategic accounting responses and competitive outcomes, the study contributes to the emerging discourse on corporate financial resilience under volatile currency conditions. Specifically, the study extends existing research by integrating perspectives from international finance, strategic management, and management accounting to explain how firms adapt to exchange rate uncertainty beyond conventional financial hedging approaches.

A second major contribution of this study to knowledge is the development and application of a secondary-data-based measurement framework for SMA usage. Prior

SMA studies have predominantly relied on survey-based approaches in which managers self-report the extent of SMA adoption and usage within their organisations (Guilding, 1999; Cadez & Guilding, 2012; Ahmad & Zabri, 2015; B. Oyewo, 2022). Although these studies have advanced SMA research, survey methods are often associated with limitations such as respondent bias, social desirability effects, retrospective rationalisation, common method variance, and inconsistencies in respondents' interpretation of SMA constructs. This study extends the literature by operationalising SMA usage through a disclosure-based approach using publicly available annual reports. Specifically, SMA was measured using externally oriented dimensions of customer accounting and competitor accounting derived from disclosures relating to customer profitability, distribution networks, customer-focused initiatives, competitive positioning, competitor analysis, and strategic market initiatives. By relying on audited corporate disclosures, the study provides observable and verifiable evidence of SMA practices rather than subjective managerial perceptions. The study therefore contributes methodologically by demonstrating that SMA can be measured using secondary data in a manner consistent with the conceptualisation of SMA as an externally oriented strategic capability (Roslender & Hart, 2003; McManus & Guilding, 2008; Holm et al., 2016). Unlike prior cross-sectional survey studies, the disclosure-based approach supports longitudinal and panel-data analysis, enabling systematic examination of SMA usage over time. The study enhances objectivity, transparency, replicability, and measurement reliability in SMA research. It also contributes to the Resource-Based View (RBV) literature by conceptualising SMA usage as an observable strategic organisational capability that enhances firms' adaptive capacity and competitive resilience under conditions of environmental uncertainty (Barney, 1991, 2002; Tauringana, 2021).

Third, the study provides practical implications for managers, policymakers, and investors. For corporate managers, the findings may offer insights into the strategic importance of innovative accounting systems in managing exchange rate risk and sustaining competitiveness. For policymakers, understanding the organisational responses to exchange rate volatility may inform the development of regulatory and monetary frameworks that support corporate resilience in unstable currency environments. Additionally, the study contributes to the broader objectives of cross-border financial stability by highlighting the importance of strategic managerial capabilities in mitigating the adverse effects of exchange rate volatility.

Finally, the study is important because it responds to longstanding calls for research capable of supporting the revitalisation of the Nigerian manufacturing sector. Meagher (2006) argues that one of the major constraints confronting the sector is the insufficient level of academic and research support directed toward industrial development, while Ku et al. (2010) emphasise the need for strategies that can improve competitiveness and sustainability. Although SMA has been identified as a strategically oriented management accounting approach associated with competitive advantage and long-term organisational performance (Dunk, 2004; CIMA, 2013), empirical evidence on SMA usage within developing economies such as Nigeria remains limited.

Despite the contributions of this study, several limitations provide opportunities for future research. First, the study focused exclusively on listed manufacturing firms, which may limit the generalisability of the findings to unlisted firms and other sectors of the economy. Future studies could extend the analysis to non-listed firms, service-oriented industries, financial institutions, or small and medium-sized enterprises to determine whether the observed relationships remain consistent across different organisational contexts. Second, the study measured SMA usage primarily through disclosures relating to customer accounting and competitor accounting obtained from annual reports. Although this approach enhances objectivity and verifiability, annual report disclosures may not

fully capture the depth, sophistication, or informal application of SMA practices within firms. Future research could complement archival measures with survey or interview-based approaches to obtain richer insights into the internal implementation and strategic utilisation of SMA techniques. Third, the study concentrated on exchange rate volatility as the principal source of environmental uncertainty. Future studies may examine the influence of other macroeconomic uncertainties, such as inflation volatility, interest rate volatility, geopolitical risk, or supply chain disruptions, on SMA adoption and competitive performance. Fourth, this study is limited by its use of a country-year measure of exchange rate volatility, which captures macroeconomic exchange rate uncertainty but does not reflect firm-specific variation in currency exposure within the same year. While this measure appropriately reflects the macroeconomic environment faced by all firms, it does not capture differences in firm-specific exposure to currency risk arising from variations in export intensity, import dependence, foreign currency borrowing, or hedging activities. The estimated effects should be interpreted as the impact of economy-wide exchange rate uncertainty rather than firm-level exchange rate exposure. Future research could address this limitation by incorporating firm-specific measures of foreign exchange exposure to provide a more nuanced understanding of how currency risk influences strategic management accounting practices and organisational performance.

Although the study employed robust econometric techniques, including entropy balancing and Driscoll–Kraay estimations—the findings remain associational rather than strictly causal. Future research could strengthen causal inference through longitudinal case studies, quasi-experimental designs, or dynamic panel estimation methods. As an additional robustness check, entropy balancing was used to address observable differences between firms with high and low SMA usage intensity. Because firms may self-select into intensive SMA adoption based on characteristics such as size, market valuation, growth opportunities, and exposure to environmental uncertainty, baseline estimates may be sensitive to covariate imbalance. Entropy balancing reweights observations to achieve covariate balance between intensive and non-intensive SMA adopters while retaining the full sample. Given that exchange-rate volatility is measured at the country-year level and therefore does not vary across firms within a given year, the balancing procedure was implemented on SMA usage intensity rather than on exchange-rate volatility exposure. The entropy-balanced regressions thus serve as a robustness assessment of whether the documented association between exchange-rate volatility and SMA usage persists among observationally comparable firms.

A further avenue for research involves incorporating firm-level heterogeneity in foreign-exchange exposure when examining the relationship between exchange-rate volatility and SMA adoption. In this study, exchange-rate volatility is measured at the country-year level and therefore lacks cross-sectional variation. Future work could enhance identification by interacting exchange-rate volatility with firm-specific indicators of foreign-exchange exposure—such as export intensity, foreign sales, import dependence, multinational operations, or foreign-currency-denominated debt. These interaction terms would introduce both temporal variation (from exchange-rate volatility) and cross-sectional variation (from firms' differing exposure to currency risk). Moreover, such firm-level exposure measures could be used to construct treatment and control groups for entropy balancing or related quasi-experimental approaches. For example, firms with high export intensity or substantial foreign operations could be compared with firms exhibiting limited foreign-exchange exposure, providing a more theoretically grounded and econometrically rigorous framework for assessing whether exchange-rate volatility differentially influences SMA adoption across firms facing varying degrees of external currency risk.

Finally, future studies could investigate additional dimensions of SMA, such as strategic pricing, value chain analysis, and balanced scorecard usage, as well as explore the mediating or moderating roles of organisational culture, digital transformation, and corporate governance in shaping the relationship between environmental uncertainty and competitive advantage.

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