

RESEARCH PAPER

Challenges of implementing management accounting innovations: Evidence from the field

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ABSTRACT

This study investigates the challenges of implementing innovative management accounting techniques, referred to as strategic management accounting (SMA), the interrelationship among the challenges and the impact of the challenges on SMA usage intensity. From the analysis of survey data obtained from listed manufacturing companies in Nigeria, the result supports the conclusion that SMA implementation challenges are interrelated. However, lack of top management support and low awareness/lack of knowledge are contributory to most of the implementation challenges. The challenges discouraging the intensive use of SMA are the perception that SMA implementation is unnecessary as strategy issues are already integrated in other functions within the organization, high implementation cost and problems relating to information flow between departments within the organization. The current study contributes to knowledge in the sense that it is the first (to the researchers' knowledge) to examine specifically the interrelationship among SMA implementation challenges in the Nigerian context, thereby drawing attention to the need to consider the challenges to embracing management accounting innovations holistically. Knowledge of SMA implementation challenges could help explain the low adoption rate of SMA in developing countries. Such knowledge might be helpful in providing a robust response to the challenges of implementing management accounting innovations.

Introduction

There have been calls in recent times for more understanding of the factors affecting the adoption of management accounting innovations (Al-Mawali, 2015; Ha *et al.*, 2022). This stems partly from the observation that early management accounting systems, labelled 'traditional management accounting' (Johnson and Kaplan, 1987), are still preferred to innovative management accounting techniques, generally referred to as 'strategic management accounting' (Simmonds, 1981; Cooper and Kaplan, 1988). Traditional management accounting (TMA) is a collection of cost and management accounting techniques used for routine planning, control and decision-making, with little or no consideration for the external business environment and business strategy (Bromwich and Bhimani, 1989). TMA systems do not provide enough relevant information to management in the new business environment which is adopting advanced technologies. These inherent limitations of early management accounting systems paved the way for the emergence of innovative management accounting techniques (Höglund *et al.*, 2021). Strategic management accounting (SMA) is an umbrella name for contemporary management accounting techniques that provide and analyse

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information about an organization's products in the market, cost structure, the firm's strategies, competitors' strategies and competitors' costs over a considerable period beyond one year (Pasch, 2019). SMA provides information for strategic decision-making. SMA integrates insights from management accounting and marketing management within a strategic management framework for the purpose of providing information for strategic positioning (Oyewo, 2021b). SMA is a form of management accounting in which emphasis is placed on information which relates to factors external to the entity, as well as on non-financial information and internally generated information (Hadid and Al-Sayed, 2021).

SMA may also be viewed in terms of its characteristics in relation to TMA. TMA, no doubt, has been limited by its focus on events in the factory. In comparison to TMA, SMA introduces a longer term and a more external perspective. TMA emphasizes short-term planning and control, decision-making and product costing. TMA may be difficult to integrate into flexible manufacturing systems, computer integrated manufacturing and the optimized manufacturing which characterize the fourth evolution stage of management accounting (Nixon and Burns, 2012). While TMA is restricted to quantitative accounting information, SMA provides both quantitative and qualitative financial and non-financial information.

Research context

A growing number of studies has shown that SMA can enhance organizational competitiveness (Alamri, 2019; Deb *et al.*, 2022). Unlike TMA systems that have internal orientation, lack goal congruence and fail to adapt performance measures to changing circumstances (Shank, 2007; Chartered Institute of Management Accountants, CIMA, 2013), SMA is future-oriented, sensitive to the external environment and emphasizes long-termism. The limitations of TMA, such as internal focus and restriction to analysis of structured data, concentration on operational issues (Chenhall and Langfield-Smith, 1998) and inappropriateness for strategy implementation (Kaplan and Atkinson, 1989), should ordinarily encourage the switch from TMA to SMA. This is because SMA can create considerable value by providing the relevant information that is required for the success of the modern organization (Oboh and Ajibolade, 2017; Endrikat *et al.*, 2020). Considering the omnibus functions of SMA, SMA techniques might be expected to be used extensively. Surprising then that TMA techniques have recorded wider diffusion rates than SMA (Oyewo, 2021a; Ha *et al.*, 2022). This suggests that there are underlying challenges impeding the deployment of innovative management accounting techniques. Against this backdrop, the current study investigates the challenges of implementing management accounting innovations in developing countries, with a focus on manufacturing companies in Nigeria. The research objectives are to examine: (i) the challenges of SMA implementation; (ii) the relationships among the challenges; and (iii) the impact of SMA implementation challenges on SMA usage intensity. Investigating the challenges of SMA is particularly relevant in developing countries as studies have shown that the uptake of management accounting innovation is low in such jurisdictions compared with developed countries (Cescon *et al.*, 2019; Oyewo, 2021a).

The Nigerian manufacturing sector is a suitable context for the current study for a number of reasons. First, the sector is a critical part of the Nigerian economy that can propel industrial transformation in the country. Second, despite the acknowledged importance of the manufacturing sector in engendering economic development, the sector has been bedevilled by challenges, including (but not limited to) lack of finance, poor maximization of production capacity, a high exchange rate, infrastructural challenges, poor public perception of locally manufactured products and an inability to implement strategic initiatives (Orjiude, 2021). Third, because of the inability of the sector to implement strategic initiatives, it is important to examine the challenges of SMA implementation. Gaining insight into the barriers to SMA implementation, with a view to overcoming them, can reinvigorate the performance of manufacturing firms. Finally, with its demography accounting for 47% of West Africa's inhabitants and its economic position in Africa, Nigeria occupies a strategic

spot. The socioeconomic and infrastructural challenges of the country are typical of developing countries. Thus, a study of Nigeria can illuminate the challenges affecting developing countries in SMA implementation. The challenges of the Nigerian manufacturing sector – typical of developing countries – suggest that contextual factors affecting SMA implementation in developing countries may be different from the factors in developed countries (Oyewo, 2021b).

An analysis of survey data obtained from listed manufacturing companies in Nigeria shows that the most significant obstacles to SMA implementation are the high costs involved in the changeover to SMA, lack of relevant experience and skills to implement innovative management accounting techniques, resistance to changing to the new system, a low level of awareness and knowledge about SMA techniques, and perception that the current system is not facing problems significant enough to justify change to SMA. Results support the conclusion that the challenges of SMA implementation are interrelated. However, lack of top management support and low awareness/lack of knowledge are contributory to most of the implementation challenges. The obstacles to the intense use of SMA are the perception that SMA implementation is unnecessary as strategy issues are already integrated in other functions within the organization, high implementation costs, and problems relating to information flow between departments within the organization.

The current study contributes to knowledge in the sense that it is the first (to the researchers' knowledge) to examine specifically the relationship among SMA implementation challenges in the Nigerian context, thereby drawing attention to the need to consider the challenges to embracing management accounting innovations holistically. Knowledge of the factors impeding the use of SMA might well provide better understanding of the prevalence of TMA over SMA despite the supposed superiority of the latter. Such knowledge may also be helpful in providing a more robust response to the challenges of implementing management accounting innovations in general.

Literature review

The challenges of SMA implementation are thematically discussed under five subheadings: (i) human barriers; (ii) entrenchment of strategy issues in corporate practice; (iii) lack of technological equipment; (iv) high costs of implementation; and (v) government action and regulation.

Human barriers

The human barrier refers to problems with SMA implementation attributable to the actions and/or inactions of managers, employees or other personnel involved in implementing innovative management accounting techniques. Such problems include lack of relevant experience and skills to implement or use the techniques, management inertia, problems relating to information flow between accounting and non-accounting departments (such as production, marketing and procurement), fear of failure, resistance to a new system and poor communication (Bright *et al.*, 1992; Jones *et al.*, 1993; Evans and Ashworth, 1995; Dugdale and Jones, 1998; Adler *et al.*, 2000; Yap *et al.*, 2013). Sulaiman *et al.* (2004) attribute the low adoption of SMA in developing countries (such as Malaysia, Singapore and India) to risk avoidance by most managers, conservative attitudes in firms, lack of expertise, lack of awareness and lack of support from top management. For Akenbor and Okoye (2012), high-ranking challenges are the costs of implementing SMA techniques, existing strategy in various functions of the business, resistance of staff to change, and lack of management policies and priorities for SMA practices.

(A) LACK OF TOP MANAGEMENT SUPPORT

Top management support is crucial to ensure timely and accurate data throughout the organization (Maelah *et al.*, 2017), funding for implementation (Ha *et al.*, 2022), as well as embracing the further change brought about by the innovation (Tsamenyi *et al.*, 2017; Warren and Jack, 2018; Abernethy

and Wallis, 2019). Yazdifar and Askarany's (2010) study finds that top management support has a strong influence on the successful adoption of SMA techniques. The Dugdale and Jones (1998) study of the adoption of throughput accounting in the United Kingdom also observes that lack of management support is contributory to the challenges of embracing new management accounting techniques. A study of three family-controlled businesses in Bangladesh by Uddin and Ahmed (2018) reports that family directors ignored a newly adopted governance framework capable of compelling top management teams to act in the best interest of the general shareholders, preferring to carry on with existing internal practice. This demonstrates the role of top management in promoting the implementation of management accounting innovations. Uddin, Mori and Shahadat (2020) observe from the study of a Japanese public hospital that the intended objective of cost management was unable to be achieved because of the actions of the chief executive officer.

(B) RESISTANCE TO CHANGE

Resistance to change has been widely documented as a challenge to management accounting practice (e.g., Grabner *et al.*, 2018; O'Leary and Smith, 2020). Resistance to change from TMA to the SMA system may be born out of fear of the adverse effect that such a switch can have on short-term profits, employee performance scorecard and the perception of the capital market (Shields and Young, 1989). Resistance to change may also be fuelled by organizational structure, especially in organizations with bureaucratic structures where implementing change involves a lot of red tape (Alamin *et al.*, 2019). Managers and employees may fear the unknown, or fear that their relevance in the organization may wane because of their inability to imbibe the new skills required for successful SMA implementation. After studying the adoption of management accounting innovation in New Zealand, Adler *et al.* (2000) find that the highest-ranking barriers to adopting new management accounting techniques are the firm's human resources, the cost of change related to people and time, and lack of relevant skills. Yap *et al.* (2013) assert that resistance to new management accounting techniques by middle-level managers and subordinates is a limitation in SMA implementation. Overall, the majority of studies on the challenges of SMA implementation report that a common challenge is resistance to new practices by both middle-level managers and subordinates (Shields and Young, 1989; Roslender, 1996; Dugdale and Jones, 1998; Sulaiman *et al.*, 2004). This resistance may be born out of fear of the unknown.

(C) LOW LEVEL OF AWARENESS OF SMA TECHNIQUES

SMA implementation may be opposed because of paucity of information on its techniques (Pitcher, 2015). Limited information may not be unconnected to the lack of skills, lack of expertise, and lack of awareness. Shank (2007) observes that the awareness level of SMA is low, suggesting that SMA is not adequately taught in academic programmes, whereas traditional cost and management accounting techniques are extensively covered. For example, lack of knowledge in activity-based costing (ABC) techniques could lead to wrong apportionment of cost, which yields a distorted picture of product performance in customer profitability analysis. In applying the balanced scorecard, even a financially trained manager may have difficulty in making sense of the numbers or interpreting the results (BPP, 2009). Lybaert's (1998) investigation of the influence of owner/manager characteristics in Belgian enterprises observes that managers with greater strategic awareness consider the adoption of ABC. The study reinforces the relevance of knowledge in SMA implementation success.

Although top-management intervention determines the effectiveness of the performance measurement system (Tung *et al.*, 2011; Akroyd and Kober, 2020), senior management support for an innovation is dependent on the extent to which the management team is knowledgeable about the innovation (Wilson *et al.*, 2008; Yazdifar and Askarany, 2010). Noting lack of awareness as a top challenge in SMA implementation in Nigerian manufacturing firms, Akenbor and Okoye (2012) call for the inculcation of SMA in the curriculum of tertiary institutions to promote its diffusion.

(D) LACK OF SKILLED PERSONNEL

The type and quality of skills available in an organization affect the implementation of management accounting innovation (López and Hiebl, 2015; Fleischman *et al.*, 2017; Cockrell *et al.*, 2018). SMA implementation will call for the development of new skills (Ahl, 1999; Gomez-Conde *et al.*, 2019) as SMA techniques integrate knowledge of management of customers, processes, human resources and finance (Cadez and Guilding, 2008). Cooper (1996) contends that, since accountants are usually trained on scorekeeping using conventional costing techniques, it is not surprising that they are ill-equipped in the business strategy, management and marketing issues which underpin SMA. Management accountants would have to learn about product and process technology, operations, systems, marketing, strategy and organizational behaviour. These specialist skills are crucial for the implementation of management accounting practice (Pitcher, 2015). Akenbor and Okoye (2012) observe that lack of accounting staff skilled in SMA is the foremost challenge affecting SMA adoption by listed manufacturing firms in Nigeria.

(E) FAILURE TO PRIORITIZE STRATEGY ISSUES

Some organizations may subsume the management accounting function within the general accounting/finance department, thereby losing the benefits of implementing strategy-driven accounting techniques. Overlooking strategy issues may be attributable to the priority given to the implementation of international financial reporting standards (IFRS) by many business executives in the wake of the increased pressure on public entities to adopt IFRS. Routine monthly reporting may squeeze out longer term strategic activities (Pitcher, 2015). Bromwich (1990, p.28) argues that ‘there is a need to release management accounting from the factory floor to allow it also to aid directly in meeting these market challenges’. Ask *et al.* (1994) contend that the refusal of management to see cost accounting as a high priority area is the major challenge hindering the implementation of innovative management accounting techniques.

(F) LACK OF INVOLVEMENT OF ACCOUNTING PERSONNEL

Lack of involvement of internal accounting staff in strategic accounting issues has also contributed to the challenges of SMA deployment (Shank, 2007). Gawiser (1994), corroborated by Ahl (1999), recommends that management accountants need to get involved and fully participate in information technology decisions to avoid technological risk (risk that the technology may not work as expected), operational risk (risk that the system may no longer fit with changes in the organization and the business environment in the long run), economic risk (risk that the costs of supporting and adapting the system are hidden and are not estimated) and political risk (risk that stakeholders, such as employees, customers and business partners, may not support the system because of the discomfort it may impose). Maelah *et al.* (2017) observe from the study of a Malaysian public university that the successful implementation of ABC requires the deployment of competent personnel, especially from finance and IT departments, for data inputting, data integration and technical assistance. Shank’s (2007) study also notes that the lack of involvement of *real* accounting staff instead of *shadow* accounting staff contributed to the problem of SMA implementation, as *real* accounting staff were bogged down with tight internal control and fraud detection. Both studies (Shank, 2007; Maelah *et al.*, 2017) reiterate the need to separate the management accounting function from general accounting and internal control.

Entrenchment of strategy issues in corporate practice

Some scholars have argued that SMA is unnecessary because elements of SMA are already enshrined in corporate practices (Dixon and Smith, 1993; Kaplan and Anderson, 2007). There is a thin boundary between SMA and management/marketing practices, made thinner by lack of consensus among academics and practitioners on what constitutes SMA (Oboh and Ajibolade, 2017). For example,

techniques such as the balanced scorecard, value-chain analysis, cost management, and customer profitability analysis have made inroads into accounting, management and marketing. The overlap of SMA, management and marketing is further evidence of the multi-disciplinary nature of SMA as distinct from TMA.

Lack of technological equipment

To support the overall competitive strategy of the organization, SMA requires the use of information technology (IT) to develop more refined products and services (Cooper and Kaplan, 1991; Kushwaha, 2011; Njuki *et al.*, 2013). IT is also important for collecting the external information needed for strategy formulation, decision-making and business process improvement (Agasisti *et al.*, 2008).

SMA techniques require data collection and the automation of business processes to capture data at source. This is to be expected as the evolution of SMA is traceable to the era of industrialization when accounting systems were integrated with automated production systems. With the advent of business process automation, management accounting systems have to be automated as well to optimize performance. The inability of an organization to acquire the technology for automation of accounting system is a barrier to SMA implementation. Such technology may be expensive for small firms. This partly strengthens the argument that large firms have a higher propensity to adopt innovative management accounting techniques because they have more resources (Alamri, 2019; Cescon *et al.*, 2019; Hutaibat, 2019).

Resource availability affects SMA implementation (Pitcher, 2015; Ha *et al.*, 2022). There may be lots of data required for SMA techniques, but no technology to capture them (Yap *et al.*, 2013). The implementation of ABC, for example, requires cost data-collection for cost pools and cost drivers which can be enhanced by the installation of appropriate software. BPP (2008) states that a target costing system cannot operate in isolation because information is needed for it to work successfully. A wide range of support systems, such as sales pricing support systems (that can break down product functions into sub-functions and provide information on that basis, and can also convert the value placed on each function into a price), target-profit computation support systems (which can calculate the optimum product mix in the future), research and development support systems (which include computer-assisted design and computer-aided engineering), cost support systems (for incorporating target costs into products) and human resource management systems (for training and support for first-time adopters of target costing), are needed for the target costing system to work. An organization without appropriate IT may be unable to implement SMA. Lack of relevant software is another IT challenge affecting SMA implementation (Maelah *et al.*, 2017).

High cost of implementation

The cost of implementing SMA may be so high that it outweighs the benefits (Yap *et al.*, 2013). The cost of changing from the existing system to a new one may be viewed in terms of equipment cost, cost of hiring qualified personnel and time (Adler *et al.*, 2000; Sulaiman *et al.*, 2004). In the light of the inconvenience SMA implementation may impose in terms of time required to install, test and change to new management accounting techniques, some organizations may prefer to stick to the status quo of the TMA system. Yap *et al.* (2013) report that some Malaysian firms preferred to use TMA because there was no time to implement SMA. As SMA calls for the development of new skills, managers and employees have to be trained to handle the new techniques. The cost of training increases the overheads of the company. Sulaiman *et al.* (2004) find that high cost is a constraint on the implementation of innovative accounting techniques in developing countries.

Government action and regulation

Challenge may also come from the actions of the government of a country in terms of protection of local firms and foreign trade regulation (Chenhall and Langfield-Smith, 1998; Yap *et al.*, 2013).

A highly protective economy, through government policies, may shield local companies from global competition. This may weaken the resolve of firms to adopt new approaches to management, including the use of innovative accounting practices. Conversely, if government policy exposes local firms to international competition, there may be motivation to remain competitive by deploying SMA techniques. Meanwhile, the development of SMA is encouraged by the clamour for management accounting techniques that enhance organizational competitiveness. Firms facing less competition may, therefore, see no need to adopt SMA as TMA may serve their information needs.

To promote manufacturing activities and international trade, the Nigerian government has adopted a flexible exchange rate mechanism and raised taxes on imports, especially for foreign goods competing with domestic products. These steps were taken to protect local manufacturing firms as a strategy for growing the Nigerian manufacturing sector (Mazumdar and Mazaheri, 2003). Adenikinju and Chete (2002) reckon that the problem of the Nigerian manufacturing sector is also attributable to increased government interference. Dipak and Ata (2003) argue that when there is less protection for companies, there will be intense competition which will force unprotected companies to improve the quality of their products to remain in business.

Complexity and interrelatedness of SMA implementation challenges

SMA implementation challenges could be complicated by the interrelationship among the challenges, as one challenge may have spillover effects on others. With this in mind, addressing a challenge may lead to resolving other related challenges. The challenges of SMA implementation should, therefore, be tackled holistically. For example, lack of top management support for management accounting innovation may give rise to other problems, such as failure to see SMA as a top priority, refusal to make resources available to facilitate change from TMA to SMA, exclusion of accountants in the implementation process and resistance of employees to change.

Low level of awareness and lack of knowledge of SMA techniques may give rise to such problems as lack of top management support (managers want to support an initiative or innovation they are knowledgeable about), fear of failure in using an innovation, failure to recognize the limitations of TMA, lack of experience and skills or low level of awareness and knowledge. When SMA implementation is perceived as unnecessary, this may cause resistance to change and impede the flow of information among departments. Resistance to change may be expressed in hoarding of useful information by strategic business units/departments/divisions within the organization.

Studies have documented the interrelationship between SMA implementation challenges (e.g., Sulaiman *et al.*, 2004; Akenbor and Okoye, 2012; Yazdifar and Askarany, 2010; Maelah *et al.*, 2017). Sulaiman *et al.* (2004) argue that the use of TMA is still widespread because of lack of expertise, low awareness and lack of support from top management. Akenbor and Okoye (2012) report that high implementation cost and failure to prioritize strategy issues affect SMA implementation. As exchange of information between departments/strategic business units is important for organizational success (McLean *et al.*, 2015), top management support facilitates networking among departments. Top management support is also essential in defraying implementation cost (Maelah *et al.*, 2017). Dugdale and Jones (1998) document the importance of management support in breaking the barrier of resistance to change among employees. Shields and Young (1989) suggest that resistance to change may stem from fear of failure.

Gaps in the literature

While admitting that organizations often benefit from innovative management accounting techniques (Bromwich, 1990; Bui and Villiers, 2017), some studies are critical of SMA. They identify human barriers, entrenchment of strategy issues in corporate practice, lack of information technology, high cost of implementation, and government action and regulation as some of the barriers to SMA implementation (Yap *et al.*, 2013). The results of other studies are inconsistent (e.g., Evans and Ashworth, 1995; Pitcher, 2015; Ojua, 2016; Maelah *et al.*, 2017). Evans and Ashworth (1995) find that too few

data, as well as failure to act on the information generated, are problems when activity-based costing/management is put into practice. They discover that the inability to reap the benefits of SMA deployment at the early stage of implementation discourages adoption of ABC as staff are not well-informed of the long-term nature of SMA implementation benefits. They also find that failure to link activity-based costing/management to process improvement initiatives, and simply following the consultant's recommendations, are problems associated with lack of awareness. Yap *et al.* (2013) report that management's inability to understand why SMA implementation is required and the notion that implementing SMA techniques is not part of their job responsibilities are top challenges. From an investigation of UK firms, Pitcher (2015) concludes that availability of resources is a key factor determining SMA implementation. From the study of the implementation of ABC by a public university in Malaysia, Maelah *et al.* (2017) declare that the successful implementation of ABC is highly dependent on the IT system already in place. Maelah *et al.* (2017) observe that the utilization of the ABC software is imperative for successful ABC. Kaplan and Anderson (2007) agree, postulating that ABC implementation may be difficult if the current accounting system does not support the collection of needed information. Ojua (2016) investigates the use of SMA techniques for decision-making among just ten Nigerian small and medium enterprises (SMEs) engaged in manufacturing. The study concludes that awareness level and usage intensity of SMA is low. The study reports further that the most important obstacles to the adoption of SMA are lack of financial resources, inadequate knowledge and preference for TMA techniques by owner-managers.

The current study is necessary because the challenges discussed in the foregoing could be contextual and interrelated. This perhaps explains the mixed results reported in literature. While the challenges of SMA implementation may not be unrelated (Yazdifar and Askarany, 2010; Akenbor and Okoye, 2012), empirical evidence on how a challenge/set of challenges could trigger other challenges is still lacking. Prior studies have done little in the way of investigating the interrelatedness and complexity of SMA implementation challenges. There is limited knowledge on the extent to which the challenges impact SMA usage intensity. In the meantime, a holistic approach to investigating how one challenge gives rise to other challenges may provide useful insight into how the challenges can be comprehensively addressed. Further, most studies on SMA have been conducted in developed countries. Little is known on the challenges inhibiting the diffusion of management accounting innovations in developing countries, including sub-Saharan Africa. As developed and developing countries differ in cultural, economic, political and historic settings (Hutaibat, 2019), findings from developed countries may be inapplicable to developing countries. These circumstances make it compelling to conduct country-specific studies.

Methodology

Research design, population and sample

This study adopts a quantitative research design. The population of the study comprises 62 publicly listed manufacturing companies in Nigeria as of December 2018. After expunging six non-operational firms from the list, the final sample comprises 56 companies. Data collection was through a structured questionnaire administered to senior finance officers in each of the 56 companies. From the 56 copies administered, 47 copies were retrieved, but two were unsuitable for use because of incomplete responses, reducing the usable copies to 45, representing an effective response rate of 80.4%. The 45 valid responses were processed for analysis.

Measurement of variables

SMA USAGE INTENSITY

SMA usage was measured by requesting respondents to rank the extent to which their firms use a list of 19 SMA techniques on a five-point scale of 1 (not at all) to 5 (very great extent) employing

the following question: To what extent does your organization use the following accounting techniques? Immediately following the question, 19 SMA techniques were briefly described (see Guilding and McManus, 2002; Cadez and Guilding, 2008; Cinquini and Tenucci, 2010; Fowzia, 2011; Alsoboa *et al.*, 2015). The scores for the techniques were averaged to develop an index for SMA usage intensity. The list of the SMA techniques investigated is provided in Table 1.

SMA IMPLEMENTATION CHALLENGES

SMA implementation challenges were measured on a self-developed scale underpinned by the review of the literature. Respondents were requested to rank on a scale of 1 (not applicable) to 5 (very high extent) how much the following affects the decision to implement SMA in their organizations: (i) cost of implementation; (ii) resistance to change; (iii) lack of top management support; (iv) low awareness level and knowledge; (v) lack of relevant experience and skills; (vi) satisfaction with current accounting system; (vii) problem of information flow between departments; (viii) fear of failure; (ix) failure to prioritize management accounting; (x) lack of technological equipment/resources; (xi) lack of involvement of accountants during implementation; and (xii) little need for SMA.

VALIDITY AND RELIABILITY

Internal validity was achieved by adopting and adapting existing scales used in prior studies to measure variables (Robson, 2002). An additional measurement scale was also developed by the researchers, guided by a review of literature. To minimize respondents' misinterpretation, a short description of the SMA techniques was provided at the front of the questionnaire (Al-Mawali, 2015; Pitcher, 2015). Because most variables were measured using multi-item scales, exploratory factor analysis was applied to assess construct validity and reliability using a 0.30 threshold for factor loading (Hair *et al.*, 2010). Internal consistency was assessed using Cronbach's alpha and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Results of the analysis are presented in Table 2.

Table 2 shows that the Cronbach's alpha coefficients for all the multi-item variables are above the recommended 0.70 minimum (Qingping, 2009; Drost, 2011). The KMO test confirms that the sampling is adequate since the coefficients are above the recommended minimum of 0.5 (Cerny and Kaiser, 1977). The KMO statistics also confirm the factorability of variables, thus validating reliability. Furthermore, the *p* value of Bartlett's test of sphericity is significant for all items at 5% (i.e., $p < .05$), indicating sufficient items for each factor. These results confirm internal consistency.

Table 1. Clustering of SMA techniques investigated in the study

S/N	Category	Techniques
1	Costing	(i) Attribute costing; (ii) Life cycle costing; (iii) Quality costing; (iv) Target costing; (v) Value chain costing; (vi) Activity-based costing* (vii) Activity-based management*
2	Planning, control and performance measurement	(i) Benchmarking; (ii) Integrated performance measurement; (iii) Environmental management accounting*
3	Strategic decision-making	(i) Strategic costing (strategic cost management); (ii) Strategic pricing; (iii) Brand valuation
4	Competitor accounting	(i) Competitor cost assessment; (ii) Competitive position monitoring; (iii) Competitor performance appraisal
5	Customer accounting	(i) Customer profitability analysis; (ii) Lifetime customer profitability analysis; (iii) Valuation of customers as assets

Source: Adapted from Cadez and Guilding (2008). *Addition by researchers

Table 2. Summary of reliability test result

Variable	No. of items	Cronbach alpha	KMO Coefficient	Bartlett's test (p value)
SMA usage intensity	19	0.963	0.827	.000
SMA implementation challenges	12	0.853	0.715	.000

COMMON METHOD BIAS

To address the problem of common method bias typical of survey design (Speklé and Widener, 2018), questionnaire items were presented on separate pages. Different measurement scales were used to operationalize variables, and exploratory factor analysis, using principal component analysis, was performed for multi-item scales. The results from factor analysis of SMA usage intensity is presented in Appendix 1a while SMA implementation challenges are shown in Appendix 1b.

From Appendix 1a, three components were generated for SMA usage, with 61.101%, 9.197% and 7.886% variance explained for components 1, 2 and 3 respectively. All 19 SMA techniques loaded strongly on component 1 (the component with the highest variance explained), well above 0.70. The communalities extraction coefficients also show that a high proportion of each variable was extracted; the lowest extraction among the variables was at 0.657 (i.e., 65.7%). The result in Appendix 1a confirms construct validity for SMA usage.

Four components were generated for SMA implementation challenges with 42.193%, 16.025%, 11.373% and 8.970% variance explained for components 1, 2, 3 and 4 respectively (Appendix 1b). However, all the challenges loaded strongly on component 1 (the component with the highest variance explained) above 0.30. The communalities extraction coefficients also show that a high proportion of each variable was extracted, as the lowest extraction was 0.0554 (i.e., 55.4%). Appendix 1b confirms that all the items enumerated are challenges of SMA implementation.

Overall, factor analysis for SMA usage and SMA implementation challenges generated more than one component in both cases, with the percentage of variance spread among the components (Appendices 1a and 1b). The results show that the percentage of variance is well distributed among the components as no single factor accounts for a large portion of the variance in the data. Thus, the likelihood of common methods bias is very low (Podsakoff *et al.*, 2003).

METHOD OF DATA ANALYSIS

Descriptive statistics and hierarchical cluster analysis (variable clustering) were applied to assess SMA implementation challenges. Structural equation modelling (maximum likelihood estimation method) was used to explore relationships among the SMA implementation challenges. Structural equation modelling was also applied to assess the impact of SMA usage intensity.

Results

Respondent profiles and company characteristics

The profile of respondents and characteristics of companies are summarized in Table 3. As indicated in Table 3, the educational qualification, length of work experience and job title of the informers responding on behalf of their companies suggest that the respondents should be sufficiently familiar with their companies' operating environment and accounting systems. The heterogeneity in the characteristics of the companies, such as affiliation (i.e., location of parent company/head office) and the structure of the management accounting function (i.e., existence of a management accounting department and how the management accounting function is handled), provides an appropriate context for examining issues affecting SMA implementation in diverse organizational settings.

Table 3. Respondent profiles and characteristics of study companies

Panel A: Respondent profiles				
Variable	Category	Freq.	%	Total
Educational Qualification	BSc/ HND	18	40.0	45
	Masters	27	60.0	
Length of experience	5–10 years	13	28.9	45
	11–20 years	23	51.1	
	Above 20 years	9	20.0	
Job title	Chief finance officer/Financial director	12	26.7	45
	Chief accountant	10	22.2	
	Senior accountant/Financial controller	13	28.9	
	Management accountant	10	22.2	
Panel B: Company characteristics				
Variable	Category	Freq.	%	Total
Location of parent Company/ Head office	In Nigeria	36	80.0	45
	Outside Nigeria	9	20.0	
Existence of management accounting department	Yes	33	73.3	45
	No	12	26.7	
How management accounting is handled in the absence of a management accounting department	Each of the functional departments manages its own management accounting needs	3	25.0	12
	Overlooked by the financial controller as and when the need arises	5	41.7	
	Financial accounting information is used for this purpose by the functional departments	4	33.3	

Challenges of SMA implementation

From the result presented in Table 4a, high-ranking challenges with mean score above 2.50 (equivalent to 50% on the 5-point tapered scale) are the high costs of the changeover to SMA ($M = 3.00$), lack of relevant experience and skills to implement innovative management accounting techniques ($M = 2.89$), resistance to changing to the new system ($M = 2.82$), low level of awareness and knowledge of SMA techniques ($M = 2.76$) and the notion that the current system is not facing problems sufficiently significant to justify implementing SMA ($M = 2.73$). A thematic analysis of these five highly rated challenges shows that three of the items relate to human barriers, such as lack of relevant experience and skills to implement the techniques ($M = 2.89$), reluctance to change to the new system ($M = 2.82$) and low level of awareness and knowledge of SMA techniques ($M = 2.76$). Meanwhile, lack of experience and skills and low levels of awareness relate to knowledge about SMA.

Table 4a gives a general view of the ranking of the challenges based on their statistical properties in terms of mean, but does not reveal how widespread the challenges are across the companies. To profile the challenges in terms of their commonness among companies, hierarchical cluster analysis (variable clustering) was applied, splitting the prevalence of the challenges using both 2-cluster and 3-cluster grouping. The analysis is presented in Table 4b.

High costs of changeover from the present system (item 1) and resistance to the new system (item 2) both retained their classification as 1 under the 2-cluster and 3-cluster grouping (Table 4b). The majority of the other challenges are classified as 2 in both the 2-cluster and 3-cluster grouping,

Table 4a. Challenges of SMA implementation

S/N	Item	Range	Mean	SD
1	High costs involved in changing from the present system	1–5	3.00	1.225
2	Lack of relevant experience and skills for implementation	1–5	2.89	1.172
3	Resistance to change to the new system	1–5	2.82	1.193
4	Low level of awareness and knowledge of SMA techniques	1–4	2.76	.981
5	Current system is not facing significant problems to justify change to, or use of, SMA	1–5	2.73	1.009
6	Management accounting not seen as a top priority compared with financial reporting (IFRS implementation), internal control and fraud detection	1–5	2.38	1.114
7	Problems relating to information flow between accounting and non-accounting departments (e.g., production, marketing, procurement)	1–5	2.33	1.108
8	Lack of technological equipment/resources to support SMA implementation	1–4	2.33	1.044
9	SMA implementation not perceived necessary as strategy issues already integrated in other functions within the organization	1–5	2.24	1.131
10	Lack of top management support	1–5	2.24	1.069
11	Fear of failure in using the SMA techniques	1–5	2.16	.952
12	Lack of involvement of accountants in implementation as they are bogged down with tight internal control, fraud detection and financial reporting issues	1–4	2.07	1.009

Table 4b. Clustering of SMA implementation challenges

S/N	Case	Grouping of items based on 3 cluster	Grouping of items based on 2 cluster
1	High costs involved in the changeover from the present system	1	1
2	Resistance to accept change to the new system	1	1
3	Lack of top management support	2	2
4	Low level of awareness and knowledge on SMA techniques	3	2
5	Lack of relevant experience and skills to implement the techniques	3	2
6	Current system not facing significant problems to justify change to, or use of, SMA	2	2
7	Problems relating to information flow between accounting and non-accounting departments (e.g., production, marketing, procurement)	2	2
8	Fear of failure in using the SMA techniques	2	2
9	Management accounting not seen as a top priority compared with financial reporting (IFRS implementation), internal control and fraud detection	2	2
10	Lack of technological equipment/resources to support SMA implementation	2	2
11	Lack of involvement of accountants in implementation as they are bogged down with tight internal control, fraud detection and financial reporting issues	2	2
12	SMA implementation not perceived necessary as strategy issues are already integrated in other functions within the organization	2	2

except low level of awareness/knowledge (item 4) and lack of relevant experience/skills (item 5), both classified as 3 in the 3-cluster grouping. The consistent appearance of items 1 and 2 in the category of 1 in the 2-cluster and 3-cluster grouping on the one hand, and the inclusion of both items among the five top challenges on the other hand (Table 4a) imply that the two high-ranking and most prevalent challenges of SMA implementation among companies are the high cost of changing from TMA to SMA and resistance to innovative management accounting techniques. In sum, the high-ranking challenges of SMA implementation are the expense of change to SMA, human barriers in terms of lack of experience and knowledge of SMA techniques, resistance to change, and the suspicion that the current accounting system is not facing problems sufficiently serious to justify the use of SMA.

Relationship among SMA implementation challenges

For the purpose of carrying out a structural equation modelling to assess the interaction among the challenges, the twelve items representing the challenges and SMA usage are assigned variable names/coded as specified in Table 5. Analysis of the interaction between the challenges is presented in Tables 6a and 6b (total effect analysis) and Appendices 2 (direct effect analysis) and 3 (indirect effect analysis).

Appendix 2 (direct effect) shows that lack of involvement of accountants directly increases the risk of failure ($\beta = 0.7684708, p < 0.01$). Lack of top management support stems from low level of awareness and knowledge of SMA techniques ($\beta = 0.4431958, p < 0.01$). Resistance to change from TMA to SMA is caused by lack of top management support ($\beta = 0.4211913, p < 0.05$) and low level of awareness and knowledge of SMA techniques ($\beta = -0.3535358, p < 0.05$). Disruption in the flow of information between accounting and non-accounting departments stems from the perception that SMA implementation is unnecessary as strategy issues are already integrated in other functions within the organization ($\beta = -0.3684049, p < 0.01$). The lack of involvement of accountants during implementation also exacerbates the problem of information flow ($\beta = 0.8779718, p < 0.01$). Lack of top management support creates further problems, such as lack of involvement of accountants in implementation ($\beta = 0.5532463, p < 0.01$), failure to see management accounting

Table 5. Variable coding for structural equation modelling

S/N	Item	Variable name/acronym
1	High costs involved in the changeover from the present system	cost
2	Resistance to accepting change to the new system	change
3	Lack of top management support	management
4	Low level of awareness and knowledge of SMA techniques	knowledge
5	Lack of relevant experience and skills to implement the techniques	experience
6	Current system is not facing problems serious enough to justify change to, or use of, SMA	system
7	Problems relating to information flow between accounting and non-accounting departments (e.g., production, marketing, procurement)	information
8	Fear of failure in using SMA techniques	fear
9	Management accounting not seen as a top-priority area compared with financial reporting (IFRS implementation), internal control and fraud detection	priority
10	Lack of technological equipment/resources to support SMA implementation	technology
11	Lack of involvement of accountants in implementation	accountant
12	SMA implementation not perceived necessary as strategy issues are already integrated in other functions within the organization	necessity
13	SMA usage intensity	sma_us

Table 6a. Total effect analysis of the relationship among SMA implementation challenges

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
-----+-----						
fear <-						
Fear	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
management	.393971***	.1376676	2.86	0.004	.1241475	.6637945
Accountant	.7121078***	.0942077	7.56	0.000	.5274641	.8967514
Knowledge	.189994	.1772026	1.07	0.284	-.1573168	.5373047
Experience	-.126011	.1304067	-0.97	0.334	-.3816035	.1295815
-----+-----						
management <-						
Fear	-.1725126	.2781651	-0.62	0.535	-.7177062	.372681
management	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
Accountant	-.1325709	.2291011	-0.58	0.563	-.5816008	.316459
Knowledge	.4078253***	.1534874	2.66	0.008	.1069955	.7086551
Experience	.0234591	.0473706	0.50	0.620	-.0693857	.1163038
-----+-----						
necessity <-						
Knowledge	.1817227	.1698273	1.07	0.285	-.1511327	.5145781
-----+-----						
change <-						
Fear	-.0973497	.1664638	-0.58	0.559	-.4236127	.2289133
management	.5229162***	.1563014	3.35	0.001	.216571	.8292614
Accountant	.1838691	.2226734	0.83	0.409	-.2525628	.620301
Knowledge	-.1233981	.1813544	-0.68	0.496	-.4788462	.23205
Experience	.0132381	.0278346	0.48	0.634	-.0413167	.0677929
-----+-----						
system <-						
Knowledge	.0015756	.1533928	0.01	0.992	-.2990688	.30222
-----+-----						
information <-						
Fear	-.0932565	.176779	-0.53	0.598	-.4397369	.253224
management	.5009293***	.1325118	3.78	0.000	.2412109	.7606477
Necessity	-.3684049***	.1127388	-3.27	0.001	-.589369	-.1474409
Change	.0971868	.0985633	0.99	0.324	-.0959937	.2903672
Accountant	.8314472***	.1869509	4.45	0.000	.4650302	1.197864
Knowledge	.1191547	.1251453	0.95	0.341	-.1261257	.364435
Experience	.0126815	.0287562	0.44	0.659	-.0436796	.0690425

P close probability RMSEA <= 0.05

***p value significant at 1% **p value significant at 5%

as a top priority area compared with other accounting functions ($\beta = 0.4540636$, $p < 0.01$), reluctance to finance implementation as such costs are considered high in relation to expected benefits ($\beta = 0.4571555$, $p < 0.01$) and failure to provide technological equipment/resources to support SMA implementation ($\beta = 0.6227915$, $p < 0.01$). The strong, positive and statistically significant relationship between knowledge and experience ($\beta = 0.9061728$, $p < 0.01$) suggests that the level of

Table 6b. Total effect analysis of the relationship among SMA implementation challenges

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
-----+-----						
accountant <-						
fear	-.095442	.1826286	-0.52	0.601	-.4533875	.2625035
management	.5126688***	.1259155	4.07	0.000	.2658789	.7594587
accountant	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
knowledge	.2256278**	.1083798	2.08	0.037	.0132072	.4380484
experience	.0129786	.0296409	0.44	0.661	-.0451164	.0710737
-----+-----						
priority <-						
fear	-.0783317	.1285844	-0.61	0.542	-.3303525	.1736891
management	.4207606***	.1460596	2.88	0.004	.134489	.7070322
accountant	-.0601956	.105663	-0.57	0.569	-.2672912	.1469
knowledge	.1851786**	.0900254	2.06	0.040	.0087321	.3616251
experience	.0106519	.0217576	0.49	0.624	-.0319923	.0532961
-----+-----						
cost <-						
fear	-.0788651	.1300009	-0.61	0.544	-.3336621	.1759319
management	.4236257***	.160232	2.64	0.008	.1095768	.7376746
accountant	-.0606055	.1067713	-0.57	0.570	-.2698734	.1486624
knowledge	.1864396**	.0948665	1.97	0.049	.0005047	.3723744
experience	.0107244	.0219649	0.49	0.625	-.0323261	.0537749
-----+-----						
technology <-						
fear	-.1074394	.1743163	-0.62	0.538	-.449093	.2342142
management	.5771133***	.1392715	4.14	0.000	.3041461	.8500805
accountant	-.082564	.143455	-0.58	0.565	-.3637308	.1986027
knowledge	.2539901**	.1059729	2.40	0.017	.0462871	.4616931
experience	.0146101	.0296192	0.49	0.622	-.0434424	.0726626

P close probability RMSEA <= 0.05

***p value significant at 1% **p value significant at 5%

awareness/knowledge of SMA affects implementation success. The result of the direct effect is depicted in Figure 1.

From the result in Appendix 3 (indirect effect), lack of top management support ($\beta = 0.393971, p < 0.01$) and low awareness/lack of knowledge ($\beta = 0.1733884, p < 0.10$) create fear of failure. Low awareness level/lack of knowledge causes resistance to change ($\beta = 0.2301377, p < 0.05$). Lack of top management support contributes to the problem of information flow between departments ($\beta = 0.5009293, p < 0.01$). Low level of awareness is contributory to ignoring accountants during implementation ($\beta = 0.2256278, p < 0.05$) and the failure to prioritize the management accounting function ($\beta = 0.1851786, p < 0.05$). Lack of awareness of the long-term benefits of SMA will condition organizations to think of the high implementation cost ($\beta = 0.1864396, p < 0.05$) while losing focus on the future benefits of SMA. Lack of awareness and knowledge will also discourage the acquisition of technological equipment and resources to support SMA implementation ($\beta = 0.2539901, p < 0.05$).

Tables 6a and 6b (total effects) are consistent with Appendices 2 and 3 in which lack of management support and low awareness/lack of knowledge appear to trigger other challenges. Lack of top management support significantly contributes to other problems, such as fear of failure in SMA usage ($\beta = 0.393971, p < 0.05$), resistance to change ($\beta = 0.5229162, p < 0.01$), disruption in the free flow of information between departments ($\beta = 0.5009293, p < 0.01$), non-involvement of accountants during implementation ($\beta = 0.5126688, p < 0.01$), failure to prioritize the management accounting function ($\beta = 0.4207606, p < 0.01$), the impression that the cost of implementation is high ($\beta = 0.4236257, p < 0.01$) and the refusal to supply the technological equipment and resources needed for successful implementation ($\beta = 0.5771133, p < 0.01$).

Closer inspection of Tables 6a and 6b reveals that, wherever top management support emerged as a predictor, its contribution is statistically significant. It is also the variable wielding the greatest influence in most cases, going by its beta coefficients (except for the *fear <- management* and *information <- management* interaction). This establishes the centrality of top management support in the implementation of management accounting innovation. Lack of knowledge also appears to be a common problem as it prompts other problems, such as lack of top management support ($\beta = 0.4078253, p < 0.01$), lack of involvement of accountants in implementation ($\beta = 0.2256278, p < 0.05$), failure to prioritize the management accounting function ($\beta = 0.1851786, p < 0.05$), the impression that the cost of implementation is high ($\beta = 0.1864396, p < 0.01$) and the refusal to supply the technological equipment/resources needed for successful implementation ($\beta = 0.2539901, p < 0.05$). Meanwhile, lack of knowledge is the only predictor that is statistically significant, which also has the highest coefficient among the six variables influencing lack of top management support ($\beta = 0.4078253, p < 0.01$). From these results, it is evident that the challenges of SMA implementation are interrelated. However, lack of top management support and low awareness/lack of knowledge contribute to most of the implementation challenges.

Impact of implementation challenges on SMA usage intensity

The impact of the implementation challenges on SMA usage intensity is presented in Table 7. From the result in Table 7, notable challenges adversely affecting SMA usage intensity are the perception that SMA implementation is unnecessary as strategy issues are already integrated in other functions within the organization ($\beta = -0.5510487, p < 0.01$), problems relating to information flow between accounting and non-accounting departments ($\beta = -0.2559045, p < 0.10$) and high implementation cost ($\beta = -0.3883386, p < 0.01$). Although some of the problems have no statistically significant impact on SMA usage, most (8 out of 12 items) have a negative coefficient, implying that implementation challenges are negatively associated with SMA usage intensity (Thong, 1999; Rogers, 2003; Vagnani and Volpe, 2017). In sum, it is concluded that the challenges discouraging the intense usage of SMA are the perception that SMA adoption is unnecessary as strategy issues are already integrated in other functions within the organization, high implementation cost and problems relating to information flow between departments within the organization. Meanwhile, lack of top management support significantly contributes to these three obstacles (Tables 6a and 6b).

Discussion

The most serious obstacles to SMA implementation are the high costs involved in the changeover to SMA, lack of relevant experience and skills to implement innovative management accounting techniques, reluctance to accept change to the system, low level of awareness and knowledge of SMA techniques, and perception that the current system is not facing problems serious enough to justify the use of SMA (Table 4a). Since SMA implementation would place a demand on organizational resources, it is not surprising that the high cost involved in the switch from TMA to SMA is the foremost challenge. Almost all publicly listed manufacturing companies have repeatedly bemoaned high operating costs in their annual reports. They lament that the cost of doing business

Table 7. Impact of implementation challenges of SMA usage intensity

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
sma_us <-						
Fear	.2843073	.1783991	1.59	0.111	-.0653485	.6339632
management	-.1427745	.144567	-0.99	0.323	-.4261206	.1405716
Necessity	-.5510487***	.1455744	-3.79	0.000	-.8363694	-.2657281
Change	.3420572**	.1332511	2.57	0.010	.0808898	.6032246
System	-.1163305	.1315179	-0.88	0.376	-.3741008	.1414399
priority	-.0260062	.1797808	-0.14	0.885	-.3783701	.3263577
information	-.2559045*	.15498	-1.65	0.099	-.5596597	.0478507
Cost	-.3883386***	.1265392	-3.07	0.002	-.6363509	-.1403262
accountant	.6753118***	.2424015	2.79	0.005	.2002135	1.15041
technology	-.2324822	.2392657	-0.97	0.331	-.7014344	.23647
Knowledge	.0924691	.2626573	0.35	0.725	-.4223299	.607268
experience	-.0680897	.2249886	-0.30	0.762	-.5090593	.3728798
_cons	4.283027***	.6646808	6.44	0.000	2.980276	5.585777
P close probability RMSEA <= 0.05						

***p value significant at 1% **p value significant at 5% *p value significant at 10%

in Nigeria has been escalating as a result of poor infrastructure (especially poor power supply, deplorable road networks and unreliable transportation), high taxation, high cost of importation of resource inputs (because of unstable and unfavourable exchange rates) and high personnel costs. As manufacturing companies are already tackling these problems, they may have limited resources to devote to the implementation of innovative management accounting techniques. Thus, the adoption of SMA may depend on a high level of commitment of leaders in the organization, while intense usage may rest squarely on the shoulders of top management. As a result, for companies to adopt SMA, management must be truly convinced of its relative advantage over TMA. Benefits of SMA adoption must also be visible if extensive use is to be encouraged. Empirical evidence abounds that SMA implementation delivers benefits, such as process improvement, cost reduction, enhanced product quality, successful strategy implementation and value creation in organizations (Sedevich-Fons, 2018; Alamri, 2019; Deb *et al.*, 2022)

Three of the five top obstacles are human barriers. Two of the three human barriers are to knowledge about SMA. The finding that human barriers are prominent is consistent with the literature (Adler *et al.*, 2000; Sulaiman *et al.*, 2004; Shank, 2007; Akenbor and Okoye, 2012; Yap *et al.*, 2013). Lack of knowledge of some SMA techniques could have been responsible for the low usage rate of SMA techniques in developing countries as reported in earlier studies (Cinquini and Tenucci, 2010; Ojua, 2017). This brings to the fore the issue of effectiveness of the management accounting function. One of the elements of an effective management accounting function is management accounting skills (CIMA, 2015; Oyewo *et al.*, 2022). Quality of management accounting skills is fundamental to the effectiveness of the management accounting function (Oyewo *et al.*, 2022). While most companies have a management accounting department (Table 3), it is the competence (knowledge and experience) of persons manning the function that is crucial. Change agents are effective only if they discharge their duties in educating staff. Resistance to changing to the new system requires management accountants, also required in their role as strategic business partners (Pasch, 2019; Karlsson *et al.*, 2019).

Another noteworthy challenge is the suspicion that the current accounting system does not need to be replaced by SMA. The ossification of TMA, especially in mature organizations, may have contributed to this. Connectedly, satisfaction with the current accounting system may be

responsible for the resistance to change to SMA, proliferation of TMA among manufacturing companies in Nigeria and the moderate usage of SMA. It appears that some manufacturing companies in Nigeria are satisfied with the current TMA system and are complacent about adopting SMA to improve their competitiveness (Akenbor and Okoye, 2012; Ojua, 2017), perhaps because they do not face intense competition with international manufacturers owing to government protectionism (Adenikinju and Chete, 2002).

The results also show that there is interrelationship among the problems – as documented in the literature (e.g., Yazdifar and Askarany, 2010; Maelah *et al.*, 2017). The emergence of top management support as crucial reinforces the role of top managers in promoting or discouraging management accounting innovation (Hecht *et al.*, 2019; Kolk *et al.*, 2020; Akroyd and Kober, 2020). The results also extend ‘manager effects’ studies in accounting research (e.g., Abernethy and Wallis, 2019; Firk *et al.*, 2019; Braumann *et al.*, 2020).

Conclusion

This study investigates the challenges of implementing management accounting innovations (referred to as strategic management accounting (SMA) techniques), the interrelationship among the challenges and the impact of the challenges on SMA usage intensity. The study concludes that the greatest obstacles to SMA implementation are the high costs involved in the changeover to SMA, lack of relevant experience and skills to implement innovative management accounting techniques, reluctance to accept change to the new system, low level of awareness and knowledge of SMA techniques, and the perception that the current system is not facing significant problems to justify the use of SMA. Although the challenges of SMA implementation are interrelated, lack of top management support and low awareness/lack of knowledge are contributory to most of the implementation challenges. The challenges discouraging the intense usage of SMA are the perception that SMA implementation is unnecessary as strategy issues are already integrated in other functions within the organization.

The current study contributes to knowledge in the sense that it is the first, to the researchers’ knowledge, to examine specifically the interrelationship among SMA implementation obstacles in the Nigerian context, thereby drawing attention to the need to consider holistically the challenges to embracing management accounting innovations. Knowledge of the factors impeding the intense usage of SMA could provide a better understanding of the prevalence of TMA over SMA, despite the supposed superiority of the latter. Such knowledge may also be helpful in providing a more robust response to the challenges of implementing management accounting innovations in developing countries.

In that top management support is critical in addressing most of the obstacles, management of companies is encouraged to support the implementation of management accounting innovations because of the value they add to the organization. Management can demonstrate commitment by sincerely addressing the implementation challenges – especially lack of relevant experience and skills, resistance to change and low level of awareness and knowledge of SMA among accounting staff. To tackle lack of experience and skills, organizations may consider engaging the services of well-versed management consultants to guide and support the organization in the implementation process. Consultants can also serve as external change agents in facilitating the changeover process.

While it is recommended that companies engage seasoned management consultants familiar with SMA, training and retraining of internal management accounting staff in order to hone their skills is also important. This is because the management accounting function within the organization has vital roles to play in the implementation process. As a result, the competence of personnel manning the management accounting function cannot be overlooked. SMA implementation will call for the development of new skills, as SMA techniques integrate proficiency in

customer management, business processes, human resources and finance. Management accountants who will succeed in implementing innovative management accounting techniques must develop competence in these fields. In fact, training of accounting personnel on SMA should be accorded greater priority, considering that it is the management accounting function that provides most of the information that aids the effective discharge of managerial duties which, in turn, determines organizational performance. Considering that SMA implementation challenges are interrelated, addressing management inertia to embrace management accounting innovation could correct the notion that SMA duplicates strategy functions in the organization. Top management support will also facilitate the availability of resources for implementation. To address management reluctance to embrace SMA because of a lack of knowledge, management accountants should leverage their position as strategic business partners to educate other members of the top management team on the value relevance of SMA. By so doing, they will be performing their duties as change agent at the upper echelon.

Appendices

Appendix 1a. Factor analysis result for SMA usage

Items	Component			Communalities extraction
	1	2	3	
Attribute costing	.725	.275	.237	.657
Life cycle costing	.727	.471	.301	.841
Quality costing	.820	.249	-.217	.781
Target costing	.610	.547	.317	.773
Value chain costing	.782	.252	-.260	.743
Activity-based costing	.787	-.197	-.213	.704
Activity-based management	.897	.015	-.196	.844
Benchmarking	.788	-.262	-.042	.691
Integrated performance measurement	.882	.036	-.117	.793
Environmental management accounting	.831	.259	.170	.787
Strategic costing/Strategic cost mgt.	.853	-.259	.184	.828
Strategic pricing	.543	-.166	.669	.770
Brand valuation	.841	.222	.201	.797
Competitor cost assessment	.750	-.495	.153	.830
Competitive position monitoring	.715	-.510	.189	.807
Competitor performance appraisal	.798	-.429	.115	.834
Customer profitability analysis	.797	-.092	-.345	.763
Lifetime customer profitability analysis	.832	.069	-.413	.867
Valuation of customers as assets	.787	.052	-.353	.746
% total variance explained (initial eigenvalues)	61.101% (11.609)	9.197% (1.748)	7.886% (1.498)	

Appendix 1b. Factor analysis result for SMA implementation challenges

Items	Component				Communalities extraction
	1	2	3	4	
High costs involved in the changeover from the present system	.532	-.571	.332	.097	.729
Resistance to accept change to the new system	.387	-.647	.261	-.451	.840
Lack of top management support	.678	-.145	.238	.130	.554
Low level of awareness and knowledge on SMA techniques	.537	.583	.522	.149	.924
Lack of relevant experience and skills to implement the techniques	.427	.782	.322	-.080	.904
Current system is not facing problems significant enough to justify change to, or use of, SMA	.315	-.030	-.534	.679	.847
Problems relating to information flows between accounting and non-accounting departments (e.g., production, marketing, procurement)	.687	-.293	.222	.320	.710
Fear of failure in using the SMA techniques	.715	-.099	-.368	-.185	.691
Management accounting not seen as a top priority area compared with financial reporting (IFRS implementation), internal control and fraud detection	.828	.089	-.166	-.033	.723
Lack of technological equipment/ resources to support SMA implementation	.923	.096	-.029	-.039	.863
Lack of involvement of accountants in implementation as they are bogged down with tight internal control, fraud detection and financial reporting issues	.883	-.044	-.176	.007	.812
SMA implementation not perceived necessary as strategy issues are already integrated in other functions within the organization	.546	.298	-.473	-.467	.830
% total variance explained (initial eigenvalues)	42.19% (5.063)	16.03% (1.923)	11.37% (1.365)	8.97% (1.076)	

Appendix 2. Direct effect analysis of the relationship among SMA implementation challenges

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
+-----+						
fear <-						
accountant	.7684708***	.133627	5.75	0.000	.5065667	1.030375
knowledge	.0166056	.1676499	0.10	0.921	-.3119821	.3451933
experience	-.1359847	.1418019	-0.96	0.338	-.4139113	.1419419
+-----+						
management <-						
fear	-.1861669	.3298289	-0.56	0.572	-.8326197	.372681
knowledge	.4431958***	.1660171	2.67	0.008	.1178082	.2183738
+-----+						
necessity <-						
knowledge	.1817227	.1698273	1.07	0.285	-.1511327	.5145781
+-----+						
change <-						
management	.4211913**	.1739619	2.42	0.015	.0802322	.7621504
accountant	.2586795	.1794248	1.44	0.149	-.0929867	.6103457
knowledge	-.3535358***	.1742504	-2.03	0.042	-.6950604	-.0120112
+-----+						
system <-						
knowledge	.0015756	.1533928	0.01	0.992	-.2990688	.30222
+-----+						
information <-						
necessity	-.3684049***	.1127388	-3.27	0.001	-.589369	-.1474409
change	.0971868	.0985633	0.99	0.324	-.0959937	.2903672
accountant	.8779718***	.131848	6.66	0.000	.6195546	1.136389
+-----+						
accountant <-						
management	.5532463***	.2030944	2.72	0.006	.1551885	.9513041
+-----+						
priority <-						
management	.4540636***	.1397324	3.25	0.001	.1801931	.7279341
+-----+						
cost <-						
management	.4571555***	.1565493	2.92	0.003	.1503244	.7639865
+-----+						
technology <-						
management	.6227915***	.1121699	5.55	0.000	.4029425	.8426406
+-----+						
cov						
(knowledge, experience)	.9061728	.2152052	4.21	0.000	.4843783	1.327967

Appendix 3. Indirect effect analysis of the relationship among SMA implementation challenges

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
+-----+						
fear <-						
fear	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
management	.393971***	.1376676	2.86	0.004	.1241475	.6637945
accountant	-.056363	.1213466	-0.46	0.642	-.2941979	.181472
knowledge	.1733884*	.0973132	1.78	0.075	-.0173421	.3641188
experience	.0099737	.0238925	0.42	0.676	-.0368548	.0568022
+-----+						
management <-						
fear	.0136543	.0517997	0.26	0.792	-.0878713	.1151798
management	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
accountant	-.1325709	.2291011	-0.58	0.563	-.5816008	.316459
knowledge	-.0353706	.0780874	-0.45	0.651	-.188419	.1176779
Experience	.0234591	.0473706	0.50	0.620	-.0693857	.1163038
+-----+						
necessity <-						
+-----+						
change <-						
fear	-.0973497	.1664638	-0.58	0.559	-.4236127	.2289133
management	.1017249	.1099371	0.93	0.355	-.113748	.3171977
accountant	-.0748104	.1364803	-0.55	0.584	-.3423069	.1926861
knowledge	.2301377**	.1077052	2.14	0.033	.0190395	.441236
experience	.0132381	.0278346	0.48	0.634	-.0413167	.0677929
+-----+						
system <-						
+-----+						
information <-						
fear	-.0932565	.176779	-0.53	0.598	-.4397369	.253224
management	.5009293***	.1325118	3.78	0.000	.2412109	.7606477
accountant	-.0465246	.1465606	-0.32	0.751	-.3337782	.2407289
knowledge	.1191547	.1251453	0.95	0.341	-.1261257	.364435
experience	.0126815	.0287562	0.44	0.659	-.0436796	.0690425
+-----+						
accountant <-						
fear	-.095442	.1826286	-0.52	0.601	-.4533875	.2625035
management	-.0405775	.0953291	-0.43	0.670	-.2274192	.1462642
accountant	-.0733444	.1488385	-0.49	0.622	-.3650626	.2183738
knowledge	.2256278**	.1083798	2.08	0.037	.0132072	.4380484
experience	.0129786	.0296409	0.44	0.661	-.0451164	.0710737
+-----+						
priority <-						
fear	-.0783317	.1285844	-0.61	0.542	-.3303525	.1736891
management	-.033303	.0683548	-0.49	0.626	-.167276	.10067
accountant	-.0601956	.105663	-0.57	0.569	-.2672912	.1469
knowledge	.1851786***	.0900254	2.06	0.040	.0087321	.3616251
experience	.0106519	.0217576	0.49	0.624	-.0319923	.0532961

	Coef.	Std. Err.	Z	P> z	[95% confidence interval]	
-----+-----						
cost <-						
fear	-.0788651	.1300009	-0.61	0.544	-.3336621	.1759319
management	-.0335298	.0690043	-0.49	0.627	-.1687758	.1017162
accountant	-.0606055	.1067713	-0.57	0.570	-.2698734	.1486624
knowledge	.1864396**	.0948665	1.97	0.049	.0005047	.3723744
experience	.0107244	.0219649	0.49	0.625	-.0323261	.0537749
-----+-----						
technology <-						
fear	-.1074394	.1743163	-0.62	0.538	-.449093	.2342142
management	-.0456782	.0930598	-0.49	0.624	-.228072	.1367155
accountant	-.082564	.143455	-0.58	0.565	-.3637308	.1986027
knowledge	.2539901**	.1059729	2.40	0.017	.0462871	.4616931
experience	.0146101	.0296192	0.49	0.622	-.0434424	.0726626

***p value significant at 1% **p value significant at 5% *p value significant at 10%

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