MARKETING ENGINEERING PHILOSOPHY AND THE GROWTH TRAJECTORY OF SMALL AND MEDIUM SCALE ENTERPRISES (SMEs) IN NIGERIA

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ABSTRACT
This study aimed at examining growth trends of SMEs with application of technology driven marketing management tools. The specific objective was to assess the impact of data-driven decision, technology integration and analysis on growth of SMEs. Research questions and hypotheses were coined inline with the study specific objectives. Related Literature were reviewed extensively as well as theories guiding the study. The study uses a cross-sectional survey research design. Operators of small and medium-sized businesses (SMEs) in Nigeria made up the study's population. Slovin's formula was used to determine the sample size, which came out to be 211. A well-designed 5-point likert scale questionnaire, named "Marketing Engineering Philosophy and Growth of SMEs Questionnaire (MEPGQ)" is the instrument used for this study. The findings revealed that, data-driven decision, technology integration and analysis have significant impact on SMEs. Based on the findings , the Researcher recommended that, Governmental and private sector organizations ought to fund training initiatives that give employees and owners of SMEs the digital skills and data analytics tool knowledge they need to upscale the growth of enterprises in Nigeria , among other things.
KEYWORDS: Data-driven decision, technology integration, analysis, growth, SMEs.

INTRODUCTION

It is commonly acknowledged that Nigeria's small and medium-sized businesses (SMEs) are the foundation of its economic growth. They play a major role in reducing poverty, creating jobs, and diversifying the country's economy. Nevertheless, despite their crucial role, Nigerian SMEs continuously encounter a variety of difficulties that impede their ability to grow sustainably. These difficulties range from a lack of infrastructure and restricted financial access to intense competition and a market that is changing quickly (Inameti, 2024). Effective marketing strategies are essential for SMEs to not only survive but also flourish in this dynamic and competitive environment. Many SMEs in Nigeria have historically depended on traditional, frequently unofficial marketing strategies. Although these approaches might have been useful in the past, they are becoming less and less effective in light of the digital revolution and the complexity of the present market (Alsamydai, 2019). A prospective paradigm change is presented by the rise of marketing engineering. This way of thinking places a strong emphasis on using quantitative and scientific approaches when making marketing decisions. Marketing engineering helps companies to better understand consumer behavior, market trends, and the effectiveness of their marketing campaigns by utilizing data analytics, modeling, and technology. More accurate targeting, efficient resource allocation, and quantifiable returns on investment are made possible by this data-driven strategy (Lilien et al., 2002).

According to Lilien et al. (2002), a lot of senior managers think that marketing is an art and experience in and of itself, and that it cannot be subjected to the methodical approach to decision-making that is characteristic of management disciplines like finance, production, and logistics. This suggests that there is a gap between marketing theory and marketing practice, but the current competitive environment demands that marketing decisions be more sophisticated. It is no

longer sufficient to justify marketing programs and expenditures solely on the basis of a "strategic rationale," or simply as "costs of doing business." Marketing is increasingly seen as an investment in the company's future — as a means of attracting and keeping profitable clients.

In Nigeria, where SMEs face resource constraints and market volatility, the adoption of marketing engineering principles could be transformative. By adopting a data-driven culture, SMEs can move beyond intuition-based decisions and embrace a more systematic and analytical approach to marketing. Moreover, the rapid proliferation of digital technologies in Nigeria presents both opportunities and challenges for SMEs. While the growing use of smartphones and internet access has created new avenues for reaching customers and engaging with them, it also necessitates a shift towards digital marketing strategies that are based on data and analytics (Inameti, et al, 2024).

In order to better understand the relationship between the marketing engineering philosophy and the growth trajectory of SMEs in Nigeria, this study looked at how much SMEs adopt and implement marketing engineering principles and how these practices affect their performance, which is lagging in marketing literature, particularly in the Nigerian context. Marketing engineering gives SMEs the framework to effectively navigate this digital landscape, allowing them to leverage online platforms and tools to enhance their visibility, reach, and customer engagement (Inameti et al., 2024). The goal of this study is to offer insightful information to scholars, company owners, and politicians alike. By encouraging the use of data-driven marketing techniques, it ultimately aims to support the growth of a more resilient and sustainable SME sector in Nigeria. Hence, to what extent does data-driven decision, technology integration and analysis impact the expansion of SMEs in Nigeria?

LITERATURE REVIEW AND THEORETICAL FOUNDATION

Concept of Marketing Engineering Philosophy

Kotler et al. (2014) state in Alsamydai (2019) that Lilien and Arvind coined the phrase "marketing engineering" in 1998 and stated that it was created by employing computers and decision forms to make marketing judgments. According to their 2002 report, marketing engineering is a systematic approach to using and using data and knowledge to drive efficient marketing processes and make decisions using models and technology. The methodical process of putting data and marketing knowledge to use in real-world situations involves planning, designing, and constructing decision-making aids and systems, as well as implementing computer networks and local communication networks that help people use personal computers and collaborate on the development and application of marketing engineering (Alsamydai, 2019; Alsamydai, 2018). A recent development in marketing is marketing engineering, which combines information, managerial expertise, data, and computer tools to assist make decisions easier. According to Lilien et al. (2000), there is strong evidence that marketing engineering can raise company profit and other performance indicators. It is a crucial tool for closing the gap between theory and practice in marketing (Hashem, 2020).

Data-Driven Decision

This focuses on leveraging data to obtain insights and make informed decisions. It can be further classified into: Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, and Prescriptive Analytics. By implementing marketing information systems, which comprise marketing research, marketing intelligence, internal reports, and work to process and manipulate data through marketing decisions support systems, marketing management is able to receive enormous volumes of data and information. This system offers data on market trends, rivals, consumer attitudes for specific markets, awareness, experience, and sales forecasts, demand estimation, and the degree of marketing mix effectiveness. It also follows alterations in the external environment. Marketing engineering finds data and information in a useful sequence for the purpose of reaching successful and effective marketing decisions (Avramovi, 2010). Data and information collection is typically done through marketing research and marketing intelligence, and analysis is carried out using mathematical and statistical methods in the marketing decisions support system (Al-samydai, et al, 2019). All of these factors have caused marketing management to deal with enormous volumes of data that require the use of modern technology to gain and gather data and information, then process and analyze them to reach positive results when used properly. The market, business, management, outside partners including distributors, suppliers, marketing services companies, and other matters are all covered by this system. In order to effectively gather, categorize, analyze, assess, and disseminate crucial and significant information to marketing decision makers, a marketing information system (MIS) is made up of individuals, tools, technologies, and processes. Marketing research and marketing intelligence are typically used to gather data and information, and the marketing decisions support system uses statistical and mathematical techniques to analyze the data (Alsamydai, 2019). The market, business, management, outside partners including

distributors, suppliers, marketing services companies, and other matters are all covered by this system.

Technology Integration

Devices, equipment, internet networks, quick communication techniques, and social media strategies were all impacted by technology and its quick advancements, which helped businesses and marketing departments better manage and process marketing campaigns and connect with or approach customers. Creation is regarded as an important, critical, and crucial factor to deliver new products that are capable of following up with developments occurring in consumption patterns in today's dynamic world, where globalization processes and the rapid development of technology have brought about huge and tremendous changes in the market (Alsamydai, 2019). In a complex and evolving market, these goods helped businesses establish a significant and long-lasting competitive edge. Producing, developing, and adapting to the changing environment will be easier for creative firms. They will only possess new abilities that enable them to function well at every level. Organizations were able to build strategies for all marketing activities and produce and develop products and all connected disciplines thanks in large part to technological advancements in the field of marketing. In a setting that is changing quickly, it also helps businesses maintain their competitive positions in the marketplace. For these companies to gain a sustainable competitive edge, innovation and development became a crucial indicator of success. According to Breznik (2016), the term "marketing technology" is interchangeable with "technology expression" in the context of marketing.

Data-Driven Decision and Smes Growth

According to Ryals (2014), using data to inform decisions gives marketers and marketing departments new ways to make decisions about their campaigns. It also gives them interactive indicators of market movement and presents them in an understandable and efficient manner that would benefit the entire company. In the meantime, marketing strategy, target sector selection, market segmentation, consumer behavior understanding, marketing campaign management, and market comprehension all benefited from the use of communications and information technology by businesses and marketing management. According to Avramovi ć (2010), successful businesses must be adaptable and interactive in order to deal with the ever-changing market and surrounding environment. This leads to a constant, quick, and precise flow of potential and possible information via technology and information systems. Businesses and their operations, including sales, marketing, purchasing, fundraising, accounting, and research and development, have been significantly impacted by the ongoing advancements in information and communication technology. Alsamydai et al. (2016) assert that technology had facilitated the growth of marketing relationships, which enhanced the relationship between the company and its customers by managing customer relations and improving the marketing mix (Liu et al., 2017; Tindal et al., 2016 as in Hashem, 2020).

Technology Integration and Smes Growth

Marketing research and marketing intelligence are typically used to gather data and information, and the marketing decisions support system uses statistical and mathematical techniques to analyze the data (Alsamydai, 2019). The market, business, management, outside partners including distributors, suppliers, marketing services companies, and other matters are all covered by this system. These days, though, this system cannot be effectively implemented without the use of tools and devices such as computers, communication techniques, and tools, as well as the availability of knowledge and experience in using these tools and devices, as well as the appropriate mathematical and statistical techniques (Soo et al., 2018). Organizations were able to build strategies for all marketing activities and produce and develop products and all connected disciplines thanks in large part to technological advancements in the field of marketing. In a setting that is changing quickly, it also helps businesses maintain their competitive positions in the marketplace. For these companies to gain a sustainable competitive edge, innovation and development became a crucial indicator of success. The phrase "marketing technology" is interchangeable with "technology expression" in the context of marketing (Alsamydai, 2014). Finding tools and communication channels for all of its departments and organizations is a shared responsibility of technology development (Anoke et al., 2022).

It simultaneously created and developed tools, gadgets, and communication strategies that were essential to the success of marketing initiatives. As a result, marketing technology is embodied in the expertise and experiences that help create and implement marketing strategies through the use of tools, devices, instruments, communication channels, and information that support the growth of marketing initiatives and the satisfaction of consumer demands (Alsamydai et al., 2017). By using software, programs, and computer equipment, it made it easier and possible for marketing departments to conduct research and studies and gather data quickly and accurately (Alghamdi et al., 2014). According to Alsamydai et al. (2017), the idea of technology embodies the actual

possibilities of applying scientific knowledge to real-world applications. It involves applying scientifically derived methods, systems, and devices for practical applications that result in accumulated knowledge, experience, creation, and invention in order to provide more advanced techniques than those of the previous era. These techniques are the product of technology. According to Hashem (2010), the methodology is a way to conduct business by using created gadgets, programs, software, and communication technologies. It also relies on mathematical or statistical equations for data processing and analysis.

Theoretical Foundation

The following two theories serve as the basis for this investigation:

Technology Acceptance Model (TAM) (Divis, 1980). The Technology Acceptance Model (TAM) is a popular information systems theory that explains how users come to accept and use technology. Application: Researchers can evaluate the factors that influence SMEs' adoption of marketing engineering technologies. Relevance: Because marketing engineering is heavily dependent on technology, TAM can help understand why SMEs adopt or resist marketing technologies and data analytics tools. It can also help understand the perceived usefulness and ease of use of marketing technologies.

Theories of Firm Growth (Penrose, 1959)

• Significance: A number of theories, like Penrose's theory of firm growth, describe how businesses grow and change over time. These ideas can offer a foundation for comprehending the role that marketing engineering plays in the expansion of SMEs. These ideas aid in the comprehension of the external and internal elements that support a company's expansion.

• Use: Scholars can examine the ways in which marketing engineering techniques impact important growth metrics like profitability, market share, and sales revenue.

Conceptual Model

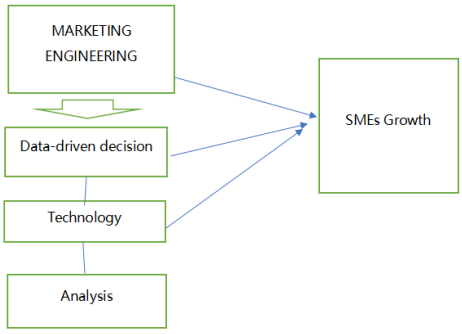

FIG1: Source, Researcher's desk, 2025

Figure 1 depicts a conceptual model of marketing engineering that includes elements of analysis, technological integration, and data-driven decision-making. The growth lag of SMEs may be resolved by connecting two or three of these dimensions.

METHODOLOGY

The study uses a cross-sectional survey research design, which allows for the collection of the necessary primary data from target respondents at a single point in time for analysis and the generation of findings. It is quantitative research that focuses on gathering detailed amounts of primary data from relatively large samples of subjects. Operators of small and medium-sized businesses (SMEs) in Nigeria made up the study's population. The study's scope was restricted to the south-south due to time constraints. Slovin's formula was used to determine the sample size, which came out to be 211. Using the convenience sample technique, managers of SMEs operating in the zone were selected in their respective classes and given questionnaires to complete as part of the survey. This served as the unit of analysis. By enabling the researcher to gather the required primary data from respondents who were easily accessible, available, and willing to complete the questionnaire survey, the sampling approach is appropriate for the study and reduces sampling time waste. A well-designed 5-point likert scale questionnaire, named "Marketing Engineering Philosophy and Growth of SMEs Questionnaire (MEPGQ)" is the instrument used for this study. The researcher used the content validation approach to validate the survey instrument. Marketing experts who could offer knowledgeable input to ensure the statements matched the objectives of the study were given copies of the questionnaire. An instrument's reliability is determined by how well it can produce consistent results over time. The reliability of the instrument was evaluated using the test-retest option and the Cronbach Alpha technique. Thirty operators of SMEs took part in the pilot study. Using the collected data, the standardized coefficient and alpha were computed.

RESULT AND DISCUSSION

Table 1 showing Cronbach's coefficient Alpha reliability **and Descriptive Statistics**

	N	NO. of items	Reliability	Mean	Std. Deviation
Data	211	5	.796	5.78	4.446
Technology	211	5	.718	6.03	4.217
Analysis	211	5	.621	6.00	4.137
Growth	211	5	.774	6.65	4.113
Valid N (listwise)	211				

SOURCE: SPSS output, 2025

According to Table 1, two hundred and eleven copies of questionnaire were administered after which same number were retrieved and used for the study analysis. Each construct's coefficient result fell between 0.6.21 and 0.796. If a construct's coefficient alpha is 0.50 and above, it is considered reliable. The scales' adequate average inter-item correlation was guaranteed by these criteria. It guarantees that throughout the survey, the constructs stay internally consistent. Construct-by-construct mean ratings showed that, technology integration ranks highest with mean of 6.03 and SD of 4.217, analysis has mean of 6.00 with SD of 4.137 while data-drive decision ranks the lowest with mean value of 5.78 and SD of 4.446.

Table 2, showing Model Summary of marketing engineering and SMEs growth

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.558[a]	.312	.302	1.786

a. Predictors: (Constant), Analysis, data, technology

Table 3, showing ANOVA of marketing engineering and SMEs growth

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	298.945	3	99.648	31.251	.000[b]
	Residual	660.050	207	3.189		
	Total	958.995	210			

a. Dependent Variable: growth

b. Predictors: (Constant), Analysis, data, technology

Table 4, showing Coefficients of marketing engineering and SMEs growth

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.310	.435		5.316	.000
	Data	.240	.063	.275	3.813	.000
	Technology	.071	.077	.270	.926	.003
	Analysis	.304	.069	.315	4.386	.000

a. Dependent Variable: growth

Tables 2, 3, and 4 displayed the results of the multiple regression analysis carried out on marketing engineering philosophy and the growth trajectory of SMEs. The model summary depicted in table 2 shows a strong marketing engineering philosophy on SMEs growth, with a value of 55.8 percent. The R^2 value of 0.312 signifies 31.2 percent of the variance in SMEs growth can be anticipated based on marketing engineering philosophy. The statistical results in Table 3, reveals by the F-test (31.251, P< .05), demonstrates that, the independent variable effectively predicts changes in the dependent variable. This confirms that, marketing engineering philosophy significantly affects SMEs growth. Table 4 shows that, all the dimensions tested (data-driven decision, technology integration, and analysis.) exhibit significant predictive power for SMEs growth [data-driven decision (B = .275; p-value = .000 < .05), analysis (B= .315, p-value = .000< .05). technology integration (B = .270, p-value = .003 < .05). Hence, the regression results are summarized thus:

1. Data-driven decision has significant effect on SMEs growth
2. Technology integration has significant effect on SMEs growth
3. Analysis has significant effect on SMEs growth

DISCUSSION

From theoretical frameworks to empirical facts, the claim that "data-driven decision-making has a significant effect on SME growth" is well-supported. SMEs may divide their markets, find their ideal client profiles, and adjust their marketing messaging by using data analysis. Higher conversion rates, more precise targeting, and lower marketing expenses result from this. SMEs may utilize this data to maximize return on investment, optimize marketing, and allocate resources efficiently. In order to ensure that SMEs provide goods and services that satisfy consumer demands, product development decisions can be informed by market data and customer feedback (Hashem, 2020). This lowers the possibility of creating goods that don't appeal to consumers.

The research clearly points to data-driven decision-making as a key factor in the expansion of SMEs. SMEs can obtain important insights, streamline their processes, and establish a long-lasting competitive edge by skillfully utilizing data. Increased productivity and cost savings can result from the automation of jobs, streamlining of procedures, and enhancement of overall efficiency through technology integration (Anoke et al., 2022).

Technology improves coordination and responsiveness by facilitating communication and collaboration between suppliers, customers, and employees (Hashem, 2010). Technology gives SMEs access to data and analytics tools, empowering them to optimize their operations and make well-informed decisions. The claim that "analysis has a significant effect on SME growth" is essentially accurate and consistent with good business management practices. SMEs may make well-informed strategic and operational decisions by using the data-driven insights that analysis offers. As a result, less guesswork and intuition are needed, producing better results. Essentially, analysis enables SMEs to negotiate the intricacies of the business environment, optimize their

operations, and make data-driven decisions—all of which contribute to long-term, sustainable success.

CONCLUSIONS AND RECOMMENDATIONS

The crucial connection between Nigerian SMEs' growth trajectory and the marketing engineering philosophy has been examined in this study. Traditional marketing strategies are failing in today's competitive and quickly changing market environment. Nigerian SMEs have a great chance to improve their marketing efficacy and attain sustainable growth by implementing marketing engineering concepts, which prioritize data-driven decision-making, analytical rigor, and technology integration. The utilization of theories like the Technology Acceptance Model, and theories of firm growth has yielded important insights into the ways that marketing engineering affects SME success. SMEs can increase their competitiveness, enhance their customer relationships, and boost profitability by utilizing data analytics, allocating resources optimally, and adjusting to digital technology. But there are still difficulties. A lack of digital skills, restricted access to technology, and resource limitations plague many SMEs in Nigeria. For marketing engineering techniques to be widely used, several challenges must be resolved. The following suggestions are made in light of the study's findings:

Governmental and private sector organizations ought to fund training initiatives that give employees and owners of SMEs the digital skills and data analytics tool knowledge they need to upscale their enterprises.

Examine programs aimed at giving SMEs access to reasonably priced CRM systems, data analytics software, and other marketing tools. Urge SMEs to give data collecting and analysis top priority when making marketing decisions.

LIMITATIONS AND SUGGESTION FOR FUTURE STUDY

Problems with Causality: It was challenging to prove a direct causal relationship between marketing engineering techniques and the expansion of SMEs.

Bias in Sample Selection: Because the current study's sample is restricted to south-south Nigeria, its conclusions might not be typical of all SMEs in the country.

The best ways to use marketing engineering in places with low levels of digital literacy should also be the subject of research.

REFERENCES

Alghamdi , S. & Bach, C. (2014). Technological factors to improve performance of marketing strstegy . ASEE 2014 zone 1 conference , . April 3-5 university of Bridgeport , CI , USA.

Alsamydai , A. M. & Rudiana, F. (2017). Othman Marketing Technology , Dar Almanhg for publishing and distribution .Amman, Jordan , 22-26.

Alsamydai , M. (2018). Modern Marketing Strategies. Dar Al Hamed Publishing and Distribution, Amman. Jordan.

Alsamydai, A. M. J. (2014). The opinions of pharmacists about the possibility of using electronic means of communication by pharmaceutical companies to facilitate the process of trade exchange. *International Journal of Business Management & Research.* 4 (6), 63-72.

Alsamydai, M. & Yousif, R. (2019). Factors Influencing Woman Behavior to Visit Dental Clinic to Improve their Smile. *Indian Journal of Public Health Research and Development.* 10. 504-409.

Alsamydai, M. J. & Dajani D. M. (2016). Measuring the Impact of Information Technology Use on the Marketing Performance of Business Organizations. *International Review of Management and Business Research.* 5(3).

Alsamydai, M. J. (2019). Marketing Engineering And Making Marketing Decisions. International *journal of scientific & technology research.* 8,(12), 352-358

Al-Samydai, M.; Al-kholaifeh, A; & Alsamydai, A. (2019). The Impact of Social Media in Improving Patient's Mental Image Towards Healthcare Provided by Private Hospitals' in Amman/Jordan. *Indian Journal of Public Health Research & Development.* 10(2). 62-73.

Anoke, A. F., Nzewi, H. N. , Eze, S. U. , Igwebuike, J. (2022). Entrepreneurial marketing and SMEs growth in post covid-19 era in Awka, Anambra state Nigeria. *International Journal of Financial, Accounting, and Management. 4(2). 115-127*

Avramovi ć. M. (2010). Information Communication Technology in The Function of Improvement of Competitive Position of Tourist Destination. Economics and Organization, facta universitatis series*: Economics and Organization.* 7(2), 209 – 217.

Breznik, L. (2016). Can information technology be a source of competitive advantage*?. Economic and Business Review for Central and South-Eastern Europe.* 14(3), 251.

Effiom, L. & Edet, S. E. (2018). Success of small and micro enterprises in Nigeria: do environmental factors matter? *Journal of economics and sustainable development.* 9(4). 117-128

Hashem, P. (2020). The Role Of Marketing Engineering Approach In Supporting Marketing Decision Making: Mediating Role Of Marketing Creativity. *International Journal of Scientific & Technology Research*, 9, 223-230.

Hashem, T. N. (2010). Impact of Managers' Emotional Intelligence on Marketing Creativity in Jordan Commercial Banks. *Innovative Marketing*, 6(3), 78-86.

Inameti, E. E. & Diminyi, C. A. (2024). Internet Marketing and perception of Farmers in Cross River State, Nigeria. *Federal university otuoke Journal of Management Sciences.* 8, 69-78

Inameti, E.E. (2024). Relationship Marketing Strategies And Performance Of Small And Medium Scale Enterprises (SMEs) Outlets In Yenagoa, Bayelsa State, Nigeria. UBS Journal of business and Economic policy- journals.unizik.edu.ng. 2(3), 1-13

Lilien, G. A., Rangaswamy, A., Bruggen, G., Wierenga, B. (2002). Bridging the marketing theory-practice gap with marketing engineering. *Journal of business research*. 55(2). 111-121. *https://doi.org/10.1016/S0148-2963(00)00146-6*

Soo, C., Chen, S., & Edwards, M. G. (2018). A Knowledge-Based Approach to Public Value Management: A Case Study of Change Implementation in Disability Services in Western Australia. *Australian Journal of Public Administration,* 77(2), 187-202.