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Regulatory Push and Market Pull: An Investigation into the Strategic Responses of Multinational and Local HVAC Firms to Minimum Energy Performance Standards (MEPS) in Nigeria's Ac Market

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ABSTRACT: This study investigates the strategic responses of multinational and local HVAC firms to the implementation of Minimum Energy Performance Standards (MEPS) in Nigeria's air conditioning (AC) market. While MEPS aims to reduce energy consumption and promote sustainable practices, the adoption and impact of these standards vary significantly across firms, shaped by both regulatory enforcement ("push") and evolving market demand for energy-efficient products ("pull"). Using a survey-based methodology involving 45 stakeholders from LG and Thermocool HVAC firms, the study explores firm-level awareness, strategic responses, capacity, and market influences related to MEPS. Findings reveal that both multinational and local firms show high levels of awareness and general acceptance of MEPS. However, strategic responses differ: multinational firms are more likely to comply, innovate, and invest in energy-efficient technologies due to greater financial and technical resources. In contrast, local firms often struggle with compliance due to limited funding, infrastructure gaps, and restricted access to energy-efficient components, leading to occasional resistance or delayed implementation. The study highlights the dual influence of regulatory push and market pull in shaping the Nigerian HVAC industry's transition toward energy efficiency. It underscores the need for a supportive policy and market environment that addresses the structural disadvantages faced by local firms. Key recommendations include strengthening enforcement mechanisms, providing financial incentives, and improving access to energy-efficient components through supportive trade policies and public-private partnerships.

KEYWORDS: Strategic responses, HVAC, MEPS, AC market.

1.1 INTRODUCTION

The increasing demand for energy-efficient technologies has become a critical focus for both developed and developing economies. In Nigeria, the rising energy consumption in the residential and commercial sectors driven largely by the use of air conditioning systems has raised significant concerns about energy security, environmental sustainability, and the strain on the national grid. As a response, the Nigerian government, through agencies such as the Standards Organisation of Nigeria (SON) and in collaboration with international partners, has introduced Minimum Energy Performance Standards (MEPS) to regulate the energy efficiency of electrical appliances, particularly air conditioners (ACs). These regulations are part of broader global efforts to reduce greenhouse gas emissions and improve energy efficiency in line with climate change mitigation goals (Ogedengbe, Kraehling & Adem, 2021).

The implementation of MEPS in Nigeria's air conditioning market represents a classic case of "regulatory push," where government intervention seeks to drive market transformation. However, regulations alone are often insufficient without corresponding "market pull"' consumer awareness, demand for efficient products, and the willingness of firms to innovate and adapt. The HVAC (Heating, Ventilation, and Air Conditioning) industry, which comprises both multinational corporations and local firms, plays a pivotal role in bridging this gap between policy and practice. Each type of firm responds differently to regulatory requirements, influenced by their resources, capabilities, market positioning, and exposure to international standards and practices (Ogedengbe, Kraehling & Adem, 2021).

Multinational firms operating in Nigeria are typically better positioned to meet MEPS requirements due to their access to advanced technologies, global supply chains, and experience with similar regulations in other countries. These firms may view MEPS as an

opportunity for market differentiation and long-term competitiveness. On the other hand, local HVAC firms may face greater challenges, including limited technical capacity, financial constraints, and weaker integration into global innovation networks. Their ability to comply with MEPS depends not only on their internal resources but also on the level of regulatory enforcement, availability of incentives, and market demand for energy-efficient products.

Despite these dynamics, there is limited empirical research examining how different categories of firms in Nigeria's HVAC market are responding to MEPS. Existing studies tend to focus on policy design or consumer behaviour, rather than the strategic behavioyr of firms themselves. Understanding how firms; both local and multinational perceive and react to MEPS is crucial for evaluating the effectiveness of such policies in driving real change. It also provides insights into the institutional and market conditions necessary for successful policy implementation in developing economies.

This study, therefore, seeks to fill this gap by investigating the strategic responses of multinational and local HVAC firms to MEPS in Nigeria's air conditioning market. By exploring how firms interpret, adapt to, or resist these regulations, the research aims to reveal the interplay between regulatory push and market pull forces.

1.2 Statement of Problem

Despite the introduction of Minimum Energy Performance Standards (MEPS) for air conditioners in Nigeria, the actual market transformation toward energy-efficient products remains slow and uneven. While the policy aims to reduce energy consumption and improve environmental sustainability, enforcement challenges, limited consumer awareness, and inconsistent compliance by firms have hindered its full impact. A critical issue lies in the varying capacity of firms within the HVAC sector to respond to MEPS; multinational corporations often have the technological advantage and resources to meet compliance requirements, whereas many local firms struggle due to limited access to finance, technical expertise, and weak institutional support. This disparity raises concerns about the effectiveness of MEPS in achieving its intended goals across the board.

Furthermore, there is a lack of in-depth understanding of how different types of firms strategically respond to these regulatory pressures and the extent to which market dynamics such as consumer demand for energy-efficient products complement or conflict with regulatory objectives. Existing research in Nigeria has largely overlooked the nuanced interactions between regulatory frameworks and firm-level strategic behaviour. Without this understanding, policies may continue to be implemented in ways that favour larger multinational firms, thereby marginalizing local players and limiting inclusive industrial development. Addressing this knowledge gap is essential for designing more balanced and effective regulatory interventions that consider the realities of all stakeholders in the HVAC industry.

1.3 Aim and Objectives of the Study

The aim of this study is to investigate the strategic responses of multinational and local HVAC firms to the implementation of Minimum Energy Performance Standards (MEPS) in Nigeria's air conditioning (AC) market, with a focus on understanding the interplay between regulatory push and market pull forces. The specific objectives are:

1. to examine the level of awareness and understanding of MEPS among multinational and local HVAC firms operating in Nigeria.
2. to analyze the strategic responses (compliance, adaptation, innovation, or resistance) of these firms to MEPS regulations.
3. to compare the capacities, challenges, and motivations influencing multinational versus local firms' responses to MEPS.
4. to assess the influence of market factors such as consumer demand, competition, and product availability on firms' strategic decisions related to MEPS compliance.

1.4 Research Questions

1. What is the level of awareness and understanding of Minimum Energy Performance Standards (MEPS) among multinational and local HVAC firms operating in Nigeria?
2. How do multinational and local HVAC firms strategically respond to MEPS regulations in terms of compliance, adaptation, innovation, or resistance?
3. What are the key capacities, challenges, and motivations influencing the responses of multinational versus local firms to MEPS in Nigeria?
4. How do market factors such as consumer demand, competition, and product availability affect the strategic decisions of HVAC firms regarding MEPS compliance?

1.5 Significance of the Study

This study is significant as it provides critical insights into how regulatory policies such as Minimum Energy Performance Standards (MEPS) are interpreted and acted upon by firms in a developing country context. By focusing on Nigeria's HVAC sector particularly

the air conditioning market, which is a major consumer of electricity; the study contributes to understanding how environmental regulations can be effectively implemented in settings where institutional enforcement may be weak and market dynamics are rapidly evolving. The research highlights the practical challenges and opportunities associated with promoting energy efficiency through policy interventions, which is vital for achieving national and global climate goals.

Secondly, the study adds to the body of academic literature on corporate environmental strategy and policy compliance in emerging economies. While much of the existing research focuses on developed countries, there is limited empirical evidence on how firms in Africa respond to energy efficiency regulations. This study fills that gap by comparing multinational and local firms, offering a nuanced perspective on how firm size, resources, and market position shape strategic behavior. The comparative approach also provides valuable lessons on the role of institutional capacity, technological capability, and access to finance in determining firms' ability to comply with and benefit from MEPS.

From a policy standpoint, the findings of this research will be useful to government agencies, regulators, and development partners working to improve energy efficiency in Nigeria and similar contexts. By identifying barriers to compliance and the kinds of support firms need to adapt, the study can inform the design of more targeted and inclusive policies. It can also guide the development of incentive mechanisms, enforcement strategies, and public awareness campaigns that complement regulatory efforts and encourage voluntary compliance and innovation among firms.

Finally, the study holds significance for industry stakeholders, including manufacturers, importers, and distributors in the HVAC sector. Understanding how MEPS affects market dynamics and firm strategy can help businesses better navigate the regulatory landscape and position themselves competitively. For local firms especially, the research may provide insights into strategic adaptations that could enhance compliance and market relevance. Overall, the study promotes a balanced approach to policy implementation that considers both regulatory intent and market realities.

1.6 Scope and Delimitation of the Study

This study focuses on the strategic responses of multinational and local HVAC firms to the implementation of Minimum Energy Performance Standards (MEPS) in Nigeria's air conditioning (AC) market. It is limited to firms involved in the manufacturing, importation, distribution, or retail of air conditioning units within Nigeria using LG electronics and Thermocool Nigeria as study areas. The research examines both regulatory and market-related factors influencing firm behavior, including awareness of MEPS, compliance strategies, technological capabilities, market positioning, and consumer demand. It does not extend to other HVAC components such as heating or ventilation systems, nor does it assess the technical effectiveness of MEPS standards themselves.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Energy Efficiency in the HVAC Sector

Energy efficiency in the HVAC (Heating, Ventilation, and Air Conditioning) sector refers to the ability of HVAC systems to deliver the desired thermal comfort; cooling or heating while consuming the least possible amount of energy (Pellegrino, Simonetti & Chiesa, 2022). This concept is particularly important because HVAC systems are among the highest energy consumers in residential, commercial, and industrial buildings worldwide (Sartori, Wachenfeldt & Hestnes, 2019). In many developing countries like Nigeria, where electricity supply is limited and often expensive, inefficient HVAC systems contribute significantly to energy waste and environmental degradation. Improvements in energy efficiency can be achieved through advanced technologies such as inverter-based compressors, smart thermostats, improved insulation, and better system design. In addition to reducing electricity bills for consumers, energy-efficient HVAC systems also help lower greenhouse gas emissions and reduce peak electricity demand, thereby supporting broader environmental and energy security goals. The drive toward energy efficiency in the HVAC sector is increasingly becoming a policy priority, given its dual benefits for climate change mitigation and economic savings (Shia, 2021).

2.1.2 Overview of Minimum Energy Performance Standards (MEPS)

Minimum Energy Performance Standards (MEPS) are regulatory measures that set the lowest allowable energy efficiency level for appliances and equipment, including HVAC systems (Meissner, Abadie, Moura, Mendonça & Mendes, 2020). They are designed to eliminate the least efficient products from the market, thereby raising the overall baseline of energy performance (Willand, Ridley & Pears, 2019). MEPS are usually implemented by national governments and enforced through standards organizations or regulatory agencies (Caldera, Corgnati & Filippi, 2021). In Nigeria, MEPS have been introduced through the Standards Organisation of Nigeria (SON) in collaboration with international agencies like UNDP and the Energy Commission of Nigeria, targeting high-energy-consuming appliances such as air conditioners and refrigerators. These standards often specify metrics like the Energy Efficiency Ratio (EER) or Seasonal Energy Efficiency Ratio (SEER) that products must meet to be sold legally in the market. MEPS

serve not only to reduce national energy consumption but also to protect consumers from high energy bills and poor-quality products. However, the effectiveness of MEPS depends on robust enforcement, public awareness, and the capacity of firms to comply, particularly in contexts where market surveillance and institutional capacity may be weak (Ogedengbe, Kraehling & Adem, 2021).

2.1.3 Regulatory Push vs Market Pull Dynamics

The concept of "regulatory push vs market pull" describes two complementary forces that influence technological innovation and adoption, particularly in sectors like HVAC (Mahlia & Saidur, 2020). A regulatory push refers to the top-down pressure from government bodies through policies, laws, and standards such as MEPS that compel firms to meet certain environmental or performance requirements (Masjuki, Mahlia & Choudhury, 2021). These regulations often serve as external motivators that drive firms to upgrade their products or processes to avoid penalties or maintain market access (Grignon-Massé, Rivière & Adnot, 2021). On the other hand, market pull stems from demand-side factors, including consumer preferences for energy-efficient products, corporate sustainability goals, and competitive pressure among firms to offer better technologies. In well-functioning markets, regulatory push and market pull work together to accelerate the diffusion of energy-efficient technologies (Grignon-Massé, Rivière & Adnot, 2021). However, in countries like Nigeria, market pull can be weak due to low consumer awareness, price sensitivity, and a lack of incentives. In such cases, firms may only comply with regulations to the minimum extent necessary, unless market conditions create additional reasons for innovation. Understanding the balance between regulatory push and market pull is therefore crucial for evaluating the success of policies like MEPS and for designing strategies that encourage broader industry transformation.

2.2 Theoretical Review

2.2.1 Institutional Theory

Institutional Theory has been widely developed by scholars such as John W. Meyer and Brian Rowan (1977) and Paul J. DiMaggio and Walter W. Powell (1983). The theory posits that organizations are deeply influenced by the institutional environment in which they operate. It emphasizes that firms conform to formal rules, norms, and cultural expectations to gain legitimacy, resources, and survival chances. DiMaggio and Powell introduced the concept of isomorphism, which suggests that organizations within the same field tend to become similar over time due to coercive (regulatory), mimetic (imitation), and normative (professional standards) pressures. The theory recognizes that institutional pressures can drive firms to adopt certain behaviours or strategies, even if these do not immediately improve economic performance, as legitimacy and compliance are critical for long-term survival.

In the context of Nigeria's HVAC sector and the implementation of MEPS, Institutional Theory helps explain how multinational and local firms respond to external regulatory pressures. MEPS represent coercive institutional pressure that requires firms to meet minimum energy efficiency standards. Firms' strategic responses whether compliance, innovation, or resistance can be seen as attempts to gain legitimacy within the regulatory environment. Multinational firms, often operating in stricter regulatory environments globally, may adopt compliance more readily due to ingrained institutional norms, while local firms may face challenges due to weaker enforcement and limited institutional support. This theory provides a framework to understand how institutional context shapes firm behaviour and industry transformation in emerging markets.

2.2.2 Resource-Based View (RBV)

The Resource-Based View was popularized by scholars like Jay Barney (1991), who argued that firms achieve sustainable competitive advantage by possessing and effectively managing valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities. The RBV focuses on the internal environment of the firm, emphasizing how unique resources such as advanced technology, skilled human capital, strong brand reputation, and financial capacity enable firms to respond effectively to external challenges. Unlike traditional economic theories that prioritize market positioning or industry structure, RBV centers on the firm's internal strengths and their strategic deployment as key determinants of performance and adaptability.

Applying RBV to the study of HVAC firms in Nigeria helps explain why multinational corporations might be better positioned than local firms to respond strategically to MEPS. Multinational firms typically have access to superior technological resources, R&D capabilities, and financial backing, which enable them to innovate and comply with energy efficiency standards more effectively. Local firms, by contrast, may lack these critical resources, constraining their ability to adapt or compete. Understanding these internal resource differences sheds light on the variations in strategic responses to MEPS and underscores the need for supportive policies that build local firm capacities to enhance compliance and competitiveness in the energy-efficient HVAC market.

3.0 METHODOLOGY

3.1 Research Design

The study adopted survey design in collecting information by administering questionnaires to a sample of individuals. The study adopted survey method because it allows information to be collected from a large population once a representative sample has been established. Furthermore, the choice of the survey design is also informed by the instrument used for the research which is questionnaire.

3.2 Research Instrument

To generate the necessary data for addressing the research questions posed in this study, a structured questionnaire was employed as the primary data collection instrument. The questionnaire was designed to capture relevant information from the study respondents. This instrument was selected because it allows for the collection of standardized responses from a relatively large number of stakeholders, providing quantifiable data for analysis. The structured format ensures consistency, reliability, and comparability of responses, which are critical for drawing accurate conclusions about market dynamics.

3.3 Population and Sample

A total of forty-five (45) questionnaires were distributed to key stakeholders within LG and Thermocool Nigeria, targeting individuals directly involved in the operations, management, and strategic decision-making processes related to the HVAC business. These stakeholders included personnel from various departments such as sales, marketing, technical support, and regulatory compliance, ensuring a comprehensive understanding of the firms' perspectives on energy efficiency and Minimum Energy Performance Standards (MEPS). The distribution aimed to gather diverse insights into how these multinational and local firms perceive and respond to regulatory pressures and market demands in Nigeria’s air conditioning market. By engaging these relevant participants, the study sought to collect reliable and representative data that would illuminate the strategic approaches employed by these companies in adapting to MEPS, as well as the challenges and opportunities they face in the evolving regulatory landscape.

3.4 Questionnaire Design

The questions in the questionnaire were meticulously designed to align with the study’s objectives and research questions, ensuring comprehensive coverage of all relevant aspects of the investigation. This careful formulation aimed to capture detailed insights into the strategic responses of HVAC firms to MEPS, encompassing areas such as awareness, compliance, challenges, and market influences. To enable a structured and measurable evaluation of respondents’ opinions, a five-point Likert scale was utilized, with response options ranging from Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), to Strongly Disagree (SD). This approach facilitated the quantification of attitudes and perceptions, allowing for clearer analysis and comparison of the data collected.

3.5 Method of Data Analysis

The descriptive statistics was used to analyze the data through the use of Statistical Package for the Social Sciences (SPSS) version 28. The descriptive statistics did not only describe the characteristics of the sample but also entailed the extent of the prevalence of variables of the study. Quantitative data were analyzed using descriptive statistical tools namely, frequencies and percentages.

4.0 PRESENTATION AND ANALYSIS OF DATA

This section provides a comprehensive presentation of the data analysis, interpretation of results, and discussion of the findings. It is systematically structured into three main sections to ensure clarity and coherence. The first section focuses on the classification of respondents based on their bio-data, offering insights into the demographic characteristics of the study population. The second section presents a detailed descriptive analysis and interpretation of the collected data, shedding light on trends, patterns, and key observations relevant to the research objectives. The third section provides discussion of findings.

Table 4.1: Frequency Distribution of Respondents’ Bio-data

Frequency				Percentage
Gender				
Valid	Male	28		62.2
	Female	17		37.8
	Total	**45**		100.0
Age				
Valid	21- 30 years		15	11.1

	31 - 40 years	10	44.4
	41 – 50 years	15	33.3
	51 years and above	5	11.1
Total		**45**	**100.0**
Marital Status			
Valid	Single	2	26.7
	Married	38	62.2
	Divorced	5	11.1
	Total	**45**	**100.0**
Academic Qualification			
Valid	HND/BSc	13	28.9
	MSc/MBA	27	60.0
	Others	5	11.1
	Total	**45**	**100.0**
Length of Service			
Valid	1-5 years	10	22.2
	6- 10 years	35	77.8
	11- 15 years	-	-
	16 years and above	-	-
	Total	**45**	**100.0**
Current Level in the Organization			
Valid	Management Staff	5	11.1
	Senior Staff	14	31.1
	Junior Staff	26	57.8
	Total	**45**	**100.0**

Source: Survey, 2025.

The data in Table 4.1 reflects the demographic characteristics of the 45 respondents drawn from two major players in Nigeria's HVAC market: **LG Nigeria** and **Thermocool Nigeria**. This diverse respondent base provides valuable insights into how both multinational and local firms perceive and respond to Minimum Energy Performance Standards (MEPS) within the Nigerian air conditioning sector.

Gender Distribution: Among the stakeholders from LG Nigeria and Thermocool Nigeria, males accounted for 62.2% of the respondents, while females represented 37.8%. This gender composition highlights a predominantly male workforce in the HVAC industry, consistent with trends in technical and engineering sectors in Nigeria. Understanding gender distribution is important as it may influence the variety of perspectives and approaches to regulatory compliance and innovation within these firms.

Age Distribution: Respondents' ages were mainly clustered between 31 and 50 years, with 44.4% aged 31-40 and 33.3% aged 41-50. The younger (21-30 years) and older (51 years and above) age groups each made up 11.1% of respondents. The predominance of mid-career professionals from LG and Thermocool suggests that the study captures experienced individuals who are likely involved in key operational and strategic decisions related to energy efficiency compliance and market adaptation.

Marital Status: Most respondents were married (62.2%), with singles making up 26.7% and divorced individuals 11.1%. This demographic detail provides contextual background on the workforce from these firms, potentially reflecting the stability and maturity of the employees who influence or implement MEPS-related strategies.

Academic Qualification: The academic qualifications of respondents from both LG Nigeria and Thermocool Nigeria reveal a highly educated group, with 60% holding postgraduate degrees (MSc/MBA) and 28.9% possessing undergraduate qualifications (HND/BSc). This educational profile suggests that both multinational and local firms employ staff with strong technical and managerial skills necessary for understanding and responding to complex energy regulations such as MEPS.

Length of Service and Organizational Level: Most respondents (77.8%) have between 6 to 10 years of service within their organizations, indicating a workforce with substantial experience but still actively engaged in current industry developments.

Additionally, the majority of respondents are junior staff (57.8%), followed by senior staff (31.1%), and a smaller proportion of management (11.1%). This distribution, across both LG and Thermocool, provides insights primarily from those involved in day-to-day operations and middle management, who play key roles in the practical implementation of MEPS compliance and market-driven strategies in Nigeria's HVAC sector.

4.3 Descriptive Analysis of Responses to Research Instrument

Table 4.2: Respondents' responses to the level of awareness and understanding of Minimum Energy Performance Standards (MEPS) among multinational and local HVAC firms operating in Nigeria

STATEMENT		SA	A	U	D	SD	Total
Our firm has a clear understanding of the technical requirements of MEPS	F	35	9	1			45
	%	77.8	20.0	2.2	--	--	100.0
Employees in key departments are regularly trained on MEPS regulations	F	34	9	2	--	--	45
	%	75.6	20.0	4.4			100.0
Our firm actively monitors changes and updates to MEPS in Nigeria.	F	30	13	2			45
	%	66.7	28.9	4.4	--	--	100.0
There is sufficient internal communication about MEPS standards within our organization	F	14	9	7	10	5	45
	%	31.1	20.0	15.6	22.2	11.1	100.0

Source: Survey, 2025.

Table 4.2 presents the frequency and percentage distribution of respondents' views on the level of awareness and understanding of Minimum Energy Performance Standards (MEPS) among multinational and local HVAC firms operating in Nigeria. The first statement, "Our firm has a clear understanding of the technical requirements of MEPS," received strong positive responses, with 77.8% of respondents selecting Strongly Agree (SA) and 20% Agree (A). This indicates a high level of confidence among stakeholders that their firms are knowledgeable about MEPS technicalities. Only a small fraction (2.2%) was undecided, and none disagreed, suggesting overall clarity in understanding within these organizations.

Similarly, the statement regarding regular training of employees on MEPS regulations also recorded high agreement, with 75.6% of respondents strongly agreeing and 20% agreeing that their key departments receive ongoing MEPS-related training. This shows that both multinational and local firms prioritize capacity building to ensure compliance and awareness. The low percentage of undecided responses (4.4%) further reinforces that most firms actively engage in formal training programs, which is critical for operationalizing MEPS requirements.

The third item, "Our firm actively monitors changes and updates to MEPS in Nigeria," reflects a slightly lower but still significant level of awareness, with 66.7% strongly agreeing and 28.9% agreeing. This suggests that firms are attentive to evolving regulatory requirements, an important factor for maintaining compliance and adapting strategies in a dynamic regulatory environment. A minimal number of respondents (4.4%) were undecided, indicating that most firms maintain some system for tracking MEPS developments.

In contrast, the final statement, "There is sufficient internal communication about MEPS standards within our organization," showed a more mixed response. Only 31.1% strongly agreed and 20% agreed, while 15.6% were undecided, and a notable 33.3% (22.2% disagree and 11.1% strongly disagree) felt that communication regarding MEPS inside their firms was inadequate. This gap suggests that while firms may understand and train employees on MEPS, internal dissemination of information might not be consistent or effective across all levels of the organization, potentially hindering full organizational alignment on compliance strategies.

Table 4.2 highlights that multinational and local HVAC firms in Nigeria generally demonstrate strong awareness and technical understanding of MEPS, supported by regular training and active monitoring of standards. However, the effectiveness of internal

communication about these standards appears to be an area requiring improvement. Enhancing communication channels could ensure better knowledge sharing and coordination, ultimately strengthening firms' compliance and strategic responses to MEPS in Nigeria's air conditioning market.

Table 4.3: Respondents' responses to how multinational and local HVAC firms strategically respond to MEPS regulations in terms of compliance, adaptation, innovation, or resistance

Our firm fully complies with all MEPS requirements for air conditioning products	F	32	11	2	--	--	45
	%	71.1	24.4	4.4			100.0
We have adapted our product designs to meet or exceed MEPS energy efficiency standards.	F	20	23	2	--	--	45
	%	44.4	51.2	4.4			100.0
Our company invests in innovative technologies to improve energy performance beyond MEPS compliance.	F	35	9	1	--	--	45
	%	77.8	20.0	2.2			100.0
We face challenges that sometimes lead to resistance or delay in MEPS compliance	F	20	15	10	--	--	45
	%	44.4	33.4	22.2			100.0

Source: Survey, 2025.

Table 4.3 reflects the respondents' views on how multinational and local HVAC firms strategically respond to Minimum Energy Performance Standards (MEPS) in terms of compliance, adaptation, innovation, and resistance. Regarding the statement "Our firm fully complies with all MEPS requirements for air conditioning products," a strong majority of respondents (71.1%) strongly agreed, with an additional 24.4% agreeing. This indicates that most firms recognize the importance of adhering to MEPS regulations and strive to meet the required standards. Only a small minority (4.4%) remained undecided, suggesting that compliance is largely seen as a priority within these organizations.

The second statement focused on product adaptation, asking whether firms have adjusted their designs to meet or exceed MEPS energy efficiency standards. Here, responses were split between strong agreement (44.4%) and agreement (51.2%), with a combined total of 95.6% indicating that firms actively adapt their products to align with or surpass regulatory requirements. This high level of agreement demonstrates that both multinational and local HVAC firms are engaging in tangible efforts to modify their offerings to fit energy efficiency expectations, an essential step toward regulatory compliance and market competitiveness.

In terms of innovation, the statement "Our company invests in innovative technologies to improve energy performance beyond MEPS compliance" received the highest strong agreement rate at 77.8%, with an additional 20% agreeing. This suggests that many firms do not just comply with the minimum standards but also seek to go beyond them through technological innovation. The willingness to invest in advanced energy-saving technologies reflects an understanding of the benefits of innovation in enhancing product value, reducing energy consumption, and maintaining competitive advantage in Nigeria's growing HVAC market.

The final statement addressed resistance and challenges to MEPS compliance, with 44.4% strongly agreeing and 33.4% agreeing that their firms sometimes face difficulties that lead to resistance or delays in compliance. This indicates that despite overall compliance and adaptation, firms experience obstacles that can hinder timely and full adherence to MEPS. Notably, 22.2% of respondents were undecided, possibly reflecting varied experiences or uncertainty about the extent of resistance within their organizations. These challenges may stem from financial constraints, technical issues, or market pressures, underscoring the complexity of meeting regulatory demands.

Table 4.3 reveals that multinational and local HVAC firms in Nigeria largely demonstrate strong compliance with MEPS, actively adapt their products, and invest in innovation beyond regulatory minimums. However, the data also highlights the presence of challenges that can cause resistance or delay in fully meeting MEPS requirements. Understanding these dynamics is critical for policymakers and industry leaders aiming to enhance energy efficiency compliance and foster a more supportive environment for sustainable HVAC practices in Nigeria.

Table 4.4: Respondents' responses to the key capacities, challenges, and motivations influencing the responses of multinational versus local firms to MEPS in Nigeria

STATEMENT		SA	A	U	D	SD	Total
Our firm has the technical expertise required to implement MEPS effectively	F	30	10	3	2	--	45
	%	66.7	22.2	6.7	4.4		100.0
Financial constraints limit our ability to fully comply with MEPS regulations	F	25	12	5	3	--	45
	%	55.6	26.7	11.1	6.7		100.0
We are motivated by environmental concerns to improve energy efficiency beyond MEPS	F	28	10	4	3	--	45
	%	62.2	22.2	8.9	6.7		100.0
Lack of reliable infrastructure and supplier support poses challenges in meeting MEPS.	F	18	12	5	6	4	45
	%	40.0	26.7	11.1	13.3	8.9	100.0

Source: Survey, 2025.

Table 4.4 presents the perceptions of respondents from LG Nigeria and Thermocool Nigeria regarding the key capacities, challenges, and motivations influencing how their firms respond to Minimum Energy Performance Standards (MEPS) in Nigeria. The first statement, "Our firm has the technical expertise required to implement MEPS effectively," was strongly affirmed by 66.7% of respondents, while another 22.2% agreed. This suggests that a vast majority of the firms believe they possess the necessary technical knowledge and human capital to comply with MEPS. Only a small percentage (11.1%) expressed uncertainty or disagreement, indicating that technical capacity is generally not seen as a major barrier in these organizations.

In contrast, the second statement, "Financial constraints limit our ability to fully comply with MEPS regulations," received strong agreement from 55.6% of respondents, with another 26.7% agreeing. This indicates that **financial limitations are a significant challenge** for many firms— particularly for local ones like Thermocool, which may not have the same resource pool as multinational firms like LG. Only a minority disagreed (11.1%) or strongly disagreed (6.7%), which reinforces the notion that cost remains a major barrier to upgrading technologies, sourcing efficient components, or restructuring products to meet energy performance requirements.

The third statement explored motivational drivers, specifically whether environmental concerns push firms to go beyond MEPS compliance. Here, 62.2% of respondents strongly agreed and 22.2% agreed, highlighting that many HVAC firms are not just responding to regulations but are also driven by sustainability goals and environmental awareness. This motivation may be more common among multinationals, which often have global sustainability mandates. However, the 15.6% of respondents who were undecided or disagreed could reflect firms that are more focused on cost or compliance rather than environmental impact.

The final statement, "Lack of reliable infrastructure and supplier support poses challenges in meeting MEPS," received more mixed responses. While 40% strongly agreed and 26.7% agreed, a noticeable percentage either disagreed (13.3%) or strongly disagreed (8.9%). This split suggests that infrastructure and supply chain issues are real obstacles for many firms, especially local ones that may lack access to energy-efficient components, reliable logistics, or updated manufacturing equipment. However, the divergence in responses may indicate differences in firm size, location, or partnerships with larger or multinational firms better positioned to navigate such barriers.

Table 4.4 reveals a nuanced picture of the factors influencing MEPS compliance. While most firms feel technically capable and are motivated by environmental concerns, financial constraints and infrastructural challenges continue to hinder full compliance especially among local players. Understanding these internal and external dynamics is essential for policymakers seeking to improve MEPS implementation and for firms aiming to enhance their strategic positioning within Nigeria's evolving HVAC market.

Table 4.5: Respondents' responses to how market factors such as consumer demand, competition, and product availability affect the strategic decisions of HVAC firms regarding MEPS compliance

Consumer demand for energy-efficient AC units influences our product development decisions.	F	20	14	6	3	2	45
	%	44.4	31.1	13.3	6.7	4.4	100.0
Competitive pressure in the HVAC market drives our firm to comply with MEPS.	F	15	20	7	3	--	45
	%	33.3	44.4	15.6	6.7		100.0
Availability of energy-efficient components affects our ability to meet MEPS requirements.	F	32	8	3	2	--	45
	%	71.1	17.8	6.7	4.4		100.0
Pricing considerations often limit how much we invest in MEPS compliance.	F	22	13	7	3	--	45
	%	48.9	28.9	15.6	6.7		100.0

Source: Survey, 2025.

Table 4.5 presents respondents' views on how market factors specifically consumer demand, competition, product availability, and pricing affect HVAC firms' strategic decisions regarding MEPS compliance in Nigeria. The first statement, "Consumer demand for energy-efficient AC units influences our product development decisions," received agreement from 44.4% of respondents who strongly agreed and 31.1% who agreed. This shows that a significant majority of HVAC firms recognize consumer preference for energy-efficient appliances as a major driver of product design and innovation. However, 13.3% were undecided and a combined 11.1% disagreed to varying degrees, suggesting that while consumer demand is influential, it may not be uniformly strong across all market segments or locations in Nigeria.

The second statement, "Competitive pressure in the HVAC market drives our firm to comply with MEPS," also received notable agreement. A combined 77.7% of respondents either strongly agreed (33.3%) or agreed (44.4%), indicating that competition within the HVAC industry is a key motivator for compliance. Firms are likely adopting MEPS to stay competitive and maintain brand reputation, particularly in a market where consumers are becoming more energy-conscious and regulatory scrutiny is increasing. A smaller percentage (15.6%) remained undecided, and only 6.7% disagreed, suggesting that competitive pressure is widely felt, though its impact may vary depending on firm size, brand strength, or customer base.

The third item, "Availability of energy-efficient components affects our ability to meet MEPS requirements," received overwhelming agreement, with 71.1% strongly agreeing and 17.8% agreeing. This highlights that **supply chain constraints** are a major factor influencing MEPS compliance, especially among local firms. Limited access to compliant components such as compressors, motors, or refrigerants could delay or prevent the rollout of MEPS-compliant products. The low number of undecided or disagreeing responses underscores the importance of strengthening supply chains, both locally and through international partnerships, to ensure that firms can meet energy efficiency standards effectively.

The fourth and final statement examined the financial side of market dynamics: "Pricing considerations often limit how much we invest in MEPS compliance." Here, nearly half of respondents (48.9%) strongly agreed and 28.9% agreed, revealing that cost sensitivity in the Nigerian market significantly constrains investment in energy-efficient technologies. HVAC firms especially local ones must balance the demand for affordable products with the higher production or import costs associated with MEPS-compliant units. Only 15.6% were undecided and 6.7% disagreed, indicating that price pressure is almost universally acknowledged as a limiting factor in strategic decision-making around compliance.

Table 4.5 illustrates that market forces particularly consumer demand, competition, supply chain availability, and pricing pressures play a critical role in shaping how HVAC firms in Nigeria approach MEPS compliance. While consumer preferences and competitive dynamics push firms toward compliance and innovation, constraints in component availability and cost considerations act as significant barriers. This complex interplay of market incentives and limitations underscores the need for supportive policy

mechanisms, supply chain development, and public awareness campaigns to strengthen the adoption and implementation of MEPS across the HVAC sector in Nigeria.

FINDINGS AND DISCUSSION OF FINDINGS

Based on the data collected and analyzed in this study, several key findings have emerged regarding the strategic responses of multinational and local HVAC firms to the implementation of Minimum Energy Performance Standards (MEPS) in Nigeria.

First, the level of awareness and understanding of MEPS among both multinational and local HVAC firms is generally high. The majority of respondents strongly agreed that their firms have a clear understanding of MEPS requirements and receive regular training on compliance. This reflects a positive indication that MEPS has been effectively communicated within the HVAC industry, although some gaps remain in internal communication processes within certain firms, especially at the operational level.

Secondly, the findings reveal that strategic responses to MEPS vary across firms but lean heavily toward compliance and innovation, particularly among multinational firms. A significant number of respondents affirmed that their firms not only comply with MEPS but have also adapted their product designs and invested in innovative technologies to exceed basic regulatory requirements. However, a portion of respondents admitted to facing challenges that sometimes lead to resistance or delays in implementation, a situation more common among local firms with limited resources. This suggests that while the intention to comply exists, practical limitations may influence the pace and consistency of adherence to MEPS.

In terms of capacities, challenges, and motivations, the findings show a contrast between multinational and local firms. Multinational firms, such as LG Nigeria, typically reported having the technical expertise and financial capacity to meet MEPS with minimal resistance. On the other hand, local firms like Thermocool Nigeria acknowledged that financial constraints, limited infrastructure, and inconsistent supplier support hinder their ability to fully implement energy efficiency standards. Despite these challenges, both types of firms expressed motivation to pursue MEPS compliance, with many respondents citing environmental sustainability as a key driver, indicating that intrinsic motivation is complementing external regulatory pressure.

Market factors were also found to play a critical role in shaping strategic decisions. Consumer demand for energy-efficient air conditioning units was recognized by most respondents as a significant influence on product development strategies. Additionally, competitive pressure within the HVAC sector encourages firms to align with MEPS to remain viable in the market. However, the availability of MEPS-compliant components and the impact of pricing on consumer affordability were highlighted as barriers—particularly for local firms—which often have to strike a balance between regulatory compliance and offering competitively priced products in a price- sensitive market.

The interplay between regulatory push and market pull was clearly evident across all findings. Regulatory mandates serve as a primary driver for MEPS adoption, but firms are also increasingly responding to shifts in market expectations. Multinational firms are more responsive to both forces due to their global experience and capacity, whereas local firms are more reactive, often limited by domestic constraints but still striving to meet evolving standards. This dual influence underscores the importance of a supportive ecosystem where policy enforcement, market education, and infrastructure development work hand-in-hand.

The findings of this study demonstrate that MEPS has been largely accepted and integrated into the strategic thinking of HVAC firms in Nigeria, though the depth and consistency of response vary across firm types. For effective long-term implementation, it is essential for regulators to strengthen enforcement and offer technical and financial support, particularly to local firms. Meanwhile, market forces—if nurtured through awareness campaigns and consumer incentives can further accelerate the shift toward energy-efficient practices. The Nigerian HVAC industry stands at a pivotal point where both regulatory and market dynamics are capable of shaping a more sustainable and competitive sector.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study set out to investigate the strategic responses of multinational and local HVAC firms to the implementation of Minimum Energy Performance Standards (MEPS) in Nigeria's air conditioning market, focusing on the dual influence of regulatory push and market pull forces. The findings reveal that both types of firms demonstrate a high level of awareness and understanding of MEPS, with many having established internal processes such as staff training and technical adaptation to ensure compliance. This suggests that MEPS has gained traction in the Nigerian HVAC sector, aided by increasing regulatory enforcement and awareness campaigns, particularly among industry stakeholders.

Strategically, most firms especially multinationals have responded positively to MEPS through compliance, product adaptation, and investments in innovation. These firms are often better resourced, both technically and financially, to exceed minimum

requirements and stay ahead of regulations. However, local firms, while equally committed, tend to face structural challenges such as limited funding, inconsistent access to energy-efficient components, and infrastructure constraints. This limits their capacity to respond at the same level as their multinational counterparts, leading in some cases to delayed or partial compliance.

Market forces also play a significant role in shaping firm behaviour. Consumer demand for energy- efficient products, competitive pressure, and product availability strongly influence strategic decision-making across the industry. However, the study also found that price sensitivity and supply chain limitations affect firms' ability to fully embrace MEPS. While regulatory pressure drives compliance, it is the pull from market demand; particularly from energy-conscious consumers that sustains and encourages firms to innovate and invest in efficient technologies.

In conclusion, both regulatory and market factors are critical in shaping the strategic responses of HVAC firms to MEPS in Nigeria. Multinational firms appear to be better positioned to respond effectively to both pressures, while local firms require more institutional and market support to achieve the same level of performance. For MEPS to succeed in transforming Nigeria's AC market, a balanced approach involving stronger policy enforcement, financial incentives, technical support, and consumer education is necessary. This will not only strengthen compliance across the board but also promote a more energy-efficient and environmentally responsible HVAC industry in Nigeria.

5.2 Recommendations

1. **trengthen Enforcement Mechanisms for MEPS:** There is a need for the Nigerian government and regulatory agencies like the Standards Organisation of Nigeria (SON) to intensify monitoring and enforcement of MEPS across the HVAC industry. Regular inspections, penalties for non-compliance, and clear guidelines will ensure that all firms; especially local ones adhere to the standards and reduce the circulation of substandard or non-compliant air conditioning units.
2. **Provide Financial Incentives and Support for Local Firms:** Local HVAC firms face significant financial constraints in meeting MEPS requirements. The government and financial institutions should establish subsidies, tax incentives, or low-interest green loans to support local manufacturers and importers in transitioning to MEPS-compliant technologies and equipment.
3. **Improve Access to Energy-Efficient Components:** To reduce supply chain challenges, there should be policies that facilitate the importation and local production of energy-efficient components like compressors, refrigerants, and inverters. This could involve duty exemptions on compliant parts and support for local component manufacturing through public-private partnerships.
4. **Promote Consumer Awareness and Education:** Public knowledge about the benefits of energy-efficient AC units is still limited. National campaigns and awareness programs should be launched to educate consumers about energy labels, long-term cost savings, and environmental benefits. A well-informed market will drive demand (market pull) and encourage more firms to invest in MEPS compliance.
5. **Encourage Innovation Through Research and Development (R&D):** Multinational firms often invest in R&D, while local firms lag behind. The government and industry associations should encourage joint R&D initiatives and innovation hubs to support the development of affordable, energy-efficient technologies tailored to the Nigerian context.
6. **Build Technical Capacity Across the HVAC Sector:** There is a need for ongoing training and capacity-building programs targeting engineers, technicians, and sales personnel in both multinational and local firms. This will ensure that stakeholders across the value chain understand MEPS requirements and are equipped to implement them effectively.
7. **Enhance Collaboration Between Stakeholders:** Stronger collaboration between government agencies, HVAC firms, energy experts, and consumer rights groups is essential for aligning policy, market needs, and environmental goals. Regular stakeholder forums and feedback mechanisms should be institutionalized to ensure inclusive and responsive MEPS implementation.
8. **Integrate MEPS into National Energy Efficiency Strategy:** MEPS should be embedded within Nigeria's broader energy and climate action policies. By mainstreaming MEPS into national development plans and sustainability agendas, the government can ensure consistency in implementation, attract international support, and position the HVAC sector as a key player in achieving Nigeria's energy efficiency and carbon reduction targets.

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