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ADOPTION OF GREENHOUSE GAS ACCOUNTING AMONG MSMES IN PORT HARCOURT: CURRENT STATUS, DRIVERS, AND BARRIERS

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Abstract

Purpose: This study provides a comprehensive assessment of the adoption of Greenhouse Gas (GHG) accounting among Micro, Small and Medium-sized Enterprises (MSMEs) in Port Harcourt, Nigeria. It aims to establish a baseline understanding of the current adoption status while systematically identifying and analysing the primary barriers and drivers that shape MSME engagement with environmental management practices in an under-researched, emerging economy context.

Methodology: The research employed a descriptive, cross-sectional survey design. Data were collected from a sample of 139 MSME owners and managers in the Port Harcourt metropolis using a structured, pre-tested questionnaire. A multi-stage sampling technique was utilized to ensure a representative sample across key industrial sectors. Data analysis was conducted using descriptive statistics, including frequencies, means, and standard deviations, to profile the sample and quantify adoption levels, as well as the perceived significance of various barriers and drivers.

Findings: The study reveals that the adoption of formal GHG accounting among Port Harcourt MSMEs is in a state of profound infancy, with 92.1% of firms at a 'Nascent' stage and only 2.9% having ever formally calculated their carbon footprint. A significant knowledge gap exists, with extremely low familiarity with core concepts like "GHG Accounting" and "Scope 1, 2, and 3 Emissions." The most significant barriers to adoption were found to be resource-based, including a lack of funds for investment (Mean=4.45), a focus on immediate business priorities (Mean=4.38), and a lack of in-house technical expertise (Mean=4.15). Conversely, the most powerful drivers were internal and commercial, led by the potential for operational cost savings (Mean=4.51) and the opportunity to improve brand image and reputation (Mean=4.25). External pressures from government or customers were perceived as weak motivators.

Conclusion: This study provides detailed empirical evidence on the state of carbon accounting within the MSME sector of a major African industrial hub. It moves beyond generic descriptions of barriers by quantifying their relative importance in a specific context. The findings offer critical, evidence-based insights for policymakers, industry associations, and development partners, suggesting that future interventions must be framed around the pragmatic business case for sustainability—emphasizing cost savings and competitive advantage—rather than relying on compliance or moral suasion. [1]

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1.0. Introduction

The global imperative to address climate change, enshrined in international accords such as the Paris Agreement, has placed unprecedented pressure on all sectors of the economy to transition towards a low-carbon future (IPCC, 2023). This transition necessitates a profound shift in business practices, moving environmental stewardship from the periphery of corporate social responsibility to the core of strategic management. A central pillar of this shift is Greenhouse Gas (GHG) accounting, the systematic process of measuring, monitoring, and reporting an organization's carbon footprint (He et al., 2022). For large multinational corporations, GHG accounting is rapidly becoming standard practice, driven by investor pressure, regulatory requirements, and consumer expectations. This has spurred the development of sophisticated frameworks like the GHG Protocol, which provides a standardized methodology for quantifying emissions across direct (Scope 1), indirect energy-related (Scope 2), and value chain (Scope 3) sources (GHG Protocol, n.d.). However, this focus on large corporations overlooks a vast and critically important segment of the global economy: Micro Small and Medium-sized Enterprises (MSMEs).

MSMEs are universally recognized as the engine of economic growth, job creation, and innovation. In the European Union, they account for 99% of all businesses and are estimated to be responsible for 60-70% of industrial pollution (European Commission, 2022). In Nigeria, the context of this study, their significance is even more pronounced, with over 41 million enterprises contributing nearly 50% of the GDP and 84% of total employment (PwC, 2020). While the environmental impact of a single MSME may be small, their collective carbon footprint is substantial. Consequently, as the Organisation for Economic Co-operation and Development (OECD) has emphatically stated, "there is no net-zero emissions without SMEs" (OECD, 2021, p. 3). Despite their collective importance, MSMEs have largely been a blind spot in climate policy and research, operating in a liminal space where they are significant enough to matter but too small and fragmented to attract the same level of scrutiny or support as their larger counterparts. This leaves a critical gap in the global climate action agenda, as millions of unquantified and unmanaged emission sources continue to operate without the tools or knowledge to contribute to national and global reduction targets.

The challenges preventing MSMEs from adopting formal GHG accounting are well-documented, particularly in developed economies. A consistent theme in the literature is the prevalence of severe resource constraints, both financial and human (Olarewaju et al., 2023). Unlike large firms with dedicated sustainability departments, MSME managers are often over-stretched, and any investment—whether of time or money—must demonstrate a clear and immediate return. The perceived complexity of GHG accounting methodologies, coupled with a lack of in-house technical expertise, creates a formidable psychological and operational barrier (Abrahamsson, 2022). These challenges are often compounded by a lack of clear policy signals from government and insufficient data for accurate calculations. Conversely, the drivers for engagement are also becoming clearer. The most compelling incentive is often the potential for direct cost savings through improved energy efficiency (Smith, 2024). Furthermore, as large corporations move to decarbonize their supply chains, they are increasingly requiring their MSME suppliers to provide carbon footprint data, transforming sustainability from a voluntary act into a prerequisite for market access (Schulman, 2021).

These dynamics are acutely relevant but insufficiently understood in the context of emerging economies like Nigeria, and specifically in its industrial heartland of Port Harcourt. As the centre of Nigeria's oil and gas industry, Port Harcourt exists in a paradox: it is an engine of national wealth that has simultaneously produced significant environmental degradation and social disruption, making the region acutely vulnerable to the impacts of climate change (Orubebe & Omono, 2022). The city's economy is supported by a vibrant ecosystem of MSMEs operating in manufacturing, logistics, retail, and services—all sectors with significant energy consumption and associated

GHG emissions. For these businesses, the struggle for daily survival, characterized by navigating infrastructural deficits, an unstable power supply forcing reliance on expensive diesel generators, and a complex regulatory environment, often relegates long-term environmental concerns to the background (Adewuyi, 2020). The concept of "carbon footprint management" is, for most, a foreign and abstract idea, disconnected from their immediate operational realities.

Therein lies the critical need for this study. While the barriers and drivers for MSME sustainability have been explored in Europe and North America, there is a dearth of empirical research that provides a granular, evidence-based assessment of the situation in an African context. Most existing literature either diagnoses the problem at a high level or focuses on large, publicly listed firms. There is a specific and urgent need to understand the current adoption status, the unique configuration of barriers and drivers, and the prevailing attitudes of MSME managers in a city like Port Harcourt. Without this foundational, diagnostic understanding, any policy interventions, support programs, or technological solutions are likely to be misaligned and ineffective. It is impossible to build a bridge to sustainability without first knowing the precise location of both shores: the current reality of MSME practice and the desired future state of environmental engagement. This study aims to map that first shore with empirical rigor. Therefore, this study aims to conduct a comprehensive assessment of the current adoption status of GHG accounting among MSMEs in Port Harcourt, Nigeria, while systematically identifying and analysing the primary barriers and drivers that shape their engagement with environmental management practices.

2.0. Methodology

This study adopted a descriptive, cross-sectional survey design to investigate the status, drivers, and barriers of GHG accounting adoption among MSMEs. This approach was deemed most appropriate for capturing a detailed snapshot of the prevailing practices, attitudes, and perceptions within the target population at a specific point in time, thereby establishing a crucial baseline for the Port Harcourt context.

The research was conducted within the Port Harcourt metropolis, comprising the Port Harcourt City and Obio/Akpor Local Government Areas of Rivers State, Nigeria. This area was purposively selected due to its status as a major economic and industrial hub, hosting a high density of MSMEs across diverse sectors. Its economy, heavily influenced by the oil and gas industry, presents a unique context of significant industrial activity alongside pressing environmental challenges, making it a highly relevant setting for this research.

The study population consisted of all formally registered MSMEs operating within the Port Harcourt metropolis. The accessible population was estimated to be in the several thousands. To be included in the study, a firm had to be formally registered with the Corporate Affairs Commission (CAC), have been in continuous operation for at least two years, and employ between 1 and 249 individuals. Firms that were franchises of larger corporations or those already using sophisticated carbon accounting systems were excluded to ensure the focus remained on uninitiated MSMEs. A minimum sample size of 126 was calculated using Cochran's (1977) formula for a single proportion, based on an estimated 9% adoption rate from prior literature (Abrahamsson, 2022), a 95% confidence level, and a 5% margin of error. To account for potential non-response and ensure statistical robustness, the target sample size was increased to 150 MSMEs.

A multi-stage sampling technique was employed for participant selection. In the first stage, the two most commercially dense Local Government Areas (Port Harcourt City and Obio/Akpor) were purposively selected. In the second stage, a list of eligible MSMEs was compiled from the records of the Port Harcourt Chamber of Commerce, Industry, Mines and Agriculture (PHCCIMA). This list was stratified by industrial sector (Manufacturing, Services, and Retail). From each stratum, firms were selected using simple random sampling until the target of 150 was reached. In the final stage, one key decision-maker—typically the owner, CEO, or general manager—from each selected MSME was purposively chosen to participate, based on their strategic

oversight and operational knowledge. A total of 139 managers completed the survey, resulting in a final sample size of N=139 and a response rate of 92.7%.

The primary instrument for data collection was a structured, self-administered questionnaire. The instrument was meticulously designed following an extensive review of existing literature on environmental management, technology adoption, and corporate sustainability. It was divided into key sections relevant to this study's objectives: Section A captured demographic and firmographic data (e.g., sector, firm size, years in operation); Section B assessed the current adoption levels of GHG accounting, familiarity with key concepts, and existing tracking practices; and Section C used 5-point Likert scales to measure the perceived significance of various barriers and drivers, adapted from validated scales used in similar studies (Kumar et al., 2022; Abrahamsson, 2022).

To ensure the instrument's quality, rigorous validity and reliability procedures were undertaken. Content validity was established through a review by a panel of three experts, including two academics in sustainability accounting and one business consultant with experience working with Nigerian MSMEs. Their feedback was used to refine the clarity, relevance, and comprehensiveness of the questions. Face validity was assessed through a pilot study with ten non-participating MSME managers in Port Harcourt, which confirmed the instrument's clarity and reasonable completion time. The internal consistency of the Likert-scaled sections was confirmed using Cronbach's alpha, with all scales exceeding the standard threshold of 0.70, indicating high reliability.

The data collection procedure began with an official letter of introduction from PHCCIMA to lend credibility to the research. Selected MSMEs were contacted via email and telephone to explain the study's purpose and secure informed consent. The questionnaire was then administered either online via a secure link or in-person by a trained research assistant, according to the participant's preference. The collected data were coded and analysed using IBM SPSS Statistics (Version 28). The analysis relied on descriptive statistics, including frequencies, percentages, means, and standard deviations, to systematically address the study's objectives regarding the current status, barriers, and drivers of GHG accounting adoption.

3.0. Results

This section presents the empirical findings derived from the analysis of the questionnaire data from 139 MSME managers in Port Harcourt. The results are structured to first provide a profile of the participating firms and managers, followed by a detailed examination of the adoption status of GHG accounting, and finally, an analysis of the perceived barriers and drivers.

3.1. Profile of Participating MSMEs and Managers

The study sample comprised high-level decision-makers, with nearly half (48.9%) being the owner or founder of their business, and another 22.3% serving as the Managing Director or CEO. This ensures that the responses reflect a strategic perspective on business operations and priorities. The firms represented a diverse cross-section of the Port Harcourt economy, with Retail Trade (37.4%), Hospitality (20.1%), and Manufacturing/Production (17.3%) being the most prominent sectors.

As shown in Table 1, the sample was dominated by smaller enterprises. The majority of firms were either Micro (43.9%, 1-9 employees) or Small (41.7%, 10-49 employees), with Medium-sized enterprises (50-249 employees) constituting a smaller portion (14.4%). This distribution is highly representative of the Nigerian business landscape.

Table 1: Size of Business by Number of Full-Time Employees (N=139)

Size Category	Number of Employees	Frequency (n)	Percentage (%)
Micro Enterprise	1 – 9 employees	61	43.9
Small Enterprise	10 – 49 employees	58	41.7
Medium Enterprise	50 – 249 employees	20	14.4
Total		**139**	**100.0**

Table 2 summarizes other crucial firmographic characteristics. A significant majority of MSMEs (64.0%) operated from rented or leased properties, which may constrain their ability to make capital improvements for energy efficiency. Critically, 75.5% reported that they were not part of a larger national or multinational supply chain, insulating them from external sustainability pressures. Furthermore, an overwhelming 84.9% of firms had no formally designated person responsible for environmental matters, highlighting a significant institutional gap in environmental management capacity.

Table 2: Summary of Key Firmographic Characteristics (N=139)

Variable	Category	Frequency (n)	Percentage (%)
Property Ownership	We rent/lease the property	89	64.0
	We own the property	40	28.8
	A mix of owned and rented properties	10	7.2
Supply Chain Role	Not part of a larger supply chain	105	75.5
	Part of a larger supply chain	28	20.1
	Not sure	6	4.3
Designated Environmental Staff	No, there is no formally designated person	118	84.9
	Yes, part of someone's existing duties	19	13.7
	Yes, a dedicated department/role	2	1.4

3.2. Current Adoption Status of GHG Accounting

The study first assessed the baseline awareness of key environmental concepts among MSME managers. As shown in Table 3, the level of familiarity was extremely low. The term "Carbon Footprint" was the most recognized, yet even then, the mean score of 2.02 indicates that, on average, managers were only "Slightly Familiar" with it. Familiarity with more technical terms was even worse. "GHG Accounting" (Mean=1.58) and "Net Zero" (Mean=1.43) were largely unknown. The foundational concept of "Scope 1, 2, and 3 Emissions" was almost entirely alien to the respondents, with 81.3% reporting no familiarity at all.

Table 3: Familiarity with Environmental Concepts (N=139)

Term	Not at all Familiar (%)	Slightly Familiar (%)	Moderately Familiar (%)	Very Familiar (%)	Mean	SD
Carbon Footprint	28.1	46.0	21.6	4.3	2.02	0.83
GHG Accounting	55.4	33.1	9.4	2.2	1.58	0.76
Scope 1, 2, and 3 Emissions	81.3	14.4	3.6	0.7	1.23	0.54
Net Zero	69.1	20.9	8.6	1.4	1.43	0.72

Scale: 1=Not at all Familiar, 4=Very Familiar

Regarding formal adoption of GHG management practices, the findings were stark. As detailed in Table 4, only 2.9% (n=4) of the 139 MSMEs had ever formally calculated their carbon footprint. Similarly, a mere 6.5% (n=9) had set any formal targets to reduce their environmental impact. These figures unequivocally confirm that formal engagement with carbon management is virtually non-existent in this sector.

Table 4: Formal GHG Management Practices (N=139)

Practice	Response	Frequency (n)	Percentage (%)
Has your business ever formally calculated its carbon footprint?	Yes	4	2.9
	No	131	94.2
	Not sure	4	2.9
Has your business ever set formal targets to reduce its environmental impact?	Yes	9	6.5
	No	128	92.1
	Not sure	2	1.4

Based on these practices, participants were categorized into adoption levels. Table 5 provides a summary classification, confirming the definitive outcome. The vast majority of MSMEs in Port Harcourt (92.1%) are at the 'Nascent' stage, with no established knowledge or formal practices related to GHG management. This finding highlights the profound gap that needs to be addressed.

Table 5: Summary of GHG Accounting Adoption Levels (N=139)

Adoption Level	Criteria	Frequency (n)	Percentage (%)
Adopted	Formally calculated carbon footprint.	4	2.9
Emerging	Uses spreadsheets or software to track metrics but has not formally calculated footprint.	7	5.0
Nascent	Tracks metrics only via informal methods (e.g., bills) or not at all.	128	92.1
Total		139	100.0

3.3. Perceived Barriers and Drivers of GHG Accounting

The study explored the factors that hinder or motivate MSMEs to engage in carbon management. Table 6 presents the mean scores for 12 potential barriers, ranked in order of significance. The results clearly show that resource-based constraints are the most formidable obstacles. "Lack of available funds for investment" emerged as the single most significant barrier (Mean=4.45), followed closely by "Focus on other business priorities (e.g.,

survival)" (Mean=4.38). The "High cost of green technologies/software" (Mean=4.21) and "Lack of technical expertise/skills in-house" (Mean=4.15) also ranked very high, underscoring a dual challenge of financial and human capital deficits.

Table 6: Perceived Barriers to Managing Carbon Footprint (N=139)

Barrier	Mean	SD	Rank
Lack of available funds for investment	4.45	0.71	1
Focus on other business priorities (e.g., survival)	4.38	0.82	2
High cost of green technologies/software	4.21	0.88	3
Lack of technical expertise/skills in-house	4.15	0.95	4
Lack of clear government guidance/support	4.04	0.99	5
Difficulty in collecting accurate data	3.88	1.05	6
Complexity of the calculation process	3.79	1.10	7
Not enough time for staff to dedicate to this	3.65	1.12	8
Perceived low return on investment	3.51	1.18	9
Lack of demand from customers	3.12	1.25	10
Resistance to change within the company	2.88	1.30	11
Uncooperative suppliers	2.65	1.28	12

Scale: 1=Not at all Difficult, 5=Extremely Difficult

Conversely, managers were asked to rate the influence of potential drivers. As shown in Table 7, the motivations were overwhelmingly internal and commercial. The "Potential for operational cost savings" was, by a significant margin, the most influential driver (Mean=4.51). This finding suggests that the most effective way to frame carbon management for this audience is as a business efficiency strategy. Improving the company's brand and reputation (Mean=4.25) and the personal environmental values of the owner/management (Mean=4.18) were also strong motivators. In stark contrast, external pressures such as "Government regulations and policies" (Mean=2.40), "Pressure from customers" (Mean=2.71), and "Access to green finance" (Mean=2.55) were perceived as the least influential drivers, confirming that the impetus for change is unlikely to come from external sources in the current environment.

Table 7: Perceived Drivers for Managing Carbon Footprint (N=139)

Driver	Mean	SD	Rank
Potential for operational cost savings	4.51	0.75	1
Improving our company's brand image and reputation	4.25	0.85	2
The personal environmental values of the owner/management	4.18	0.98	3
Gaining a competitive advantage	3.95	1.02	4
Contributing positively to the community and environment	3.88	1.11	5
Anticipating future regulations	3.45	1.20	6
Attracting and retaining talented employees	3.15	1.28	7
Requirements from large corporate clients	2.80	1.35	8
Pressure from customers	2.71	1.31	9
Access to green finance or investor demands	2.55	1.40	10
Government regulations and policies	2.40	1.33	11
Pressure from industry associations or peers	2.21	1.25	12

Scale: 1=Not at all Influential, 5=Extremely Influential

4.0. Discussion of Results

The results of this study provide clearly articulated and incisive insight into GHG accounting by MSMEs in Port Harcourt. It revealed a silent battlefield of profound unawareness and inaction through a pragmatic lens of survival and opportunity. The significant absence of formal GHG accounting- with 92.1% of firms at a 'Nascent' stage is representative of a larger systemic problem and not just a data point. This figure, starkly lower than the 9% adoption rate found in a developed context like Sweden (Abrahamsson, 2022), underscores the magnified scale of the challenge in an emerging economy. The problem is not simply a failure to act, but a fundamental lack of the conceptual vocabulary required to even contemplate action. The extremely low familiarity scores for core terms like "GHG Accounting" and "Scope 1, 2, and 3 Emissions" indicate that the primary barrier is cognitive. Before MSMEs can be expected to manage their carbon footprint, they must first understand what it is. This knowledge vacuum suggests that any intervention must begin with foundational education, not just technical support.

A critical nuance emerges from the finding that while formal environmental tracking is absent, a majority of MSMEs do track operational data like electricity (61.2%) and fuel (56.8%) consumption. This reveals a crucial paradox: the raw data for basic GHG accounting often exists, but it is framed exclusively through a lens of financial cost management, not environmental impact. Kilowatt-hours and litres of diesel are tangible expenses to be minimized; their translation into abstract tonnes of CO_2e is a cognitive and procedural leap that these firms are not equipped to make. This aligns with the argument that the "primacy of profit-seeking objectives" dominates corporate behaviour in emerging economies (Panjaitan et al., 2023). The challenge, therefore, is not necessarily one of data collection but of data translation—bridging the gap between what managers already measure for financial reasons and what they need to understand for environmental purposes. This suggests a powerful entry point for interventions: leveraging existing cost-management practices as a foundation for building environmental accounting capacity.

The analysis of barriers confirms a narrative of resource poverty that is consistent with global MSME literature (Afolabi et al., 2023; Kumar et al., 2023). The dominance of financial constraints—lack of funds, high cost of technology—and the prioritization of immediate survival are predictable yet powerful findings. However, what is particularly insightful in the Port Harcourt context is the tight coupling of these financial barriers with a lack of internal capacity ("lack of technical expertise/skills") and external support ("lack of clear government guidance"). This creates a self-perpetuating cycle of inaction: firms cannot afford to hire or train experts, which reinforces the perception that sustainability is too complex and risky, which in turn justifies a continued focus on core operations. Interestingly, internal cultural factors like "resistance to change" were ranked low, suggesting that the bottleneck is not attitudinal unwillingness but a perceived and real inability to act within existing constraints.

This perception of inability makes the findings on drivers all the more significant. The overwhelming dominance of "potential for operational cost savings" as the primary driver (Mean=4.51) provides a clear and unambiguous roadmap for engaging MSMEs. The message that resonates is not one of moral duty or regulatory compliance, but of business pragmatism. Carbon management becomes attractive only when it is framed as a strategy for enhancing efficiency, reducing waste, and improving the bottom line. This aligns perfectly with neo-institutional theories emphasizing efficiency as a driver for adopting environmental practices (Adu et al., 2024). The strong influence of "improving brand image" also points to an emerging understanding of reputational benefits, consistent with legitimacy theory, where firms seek societal approval to secure their license to operate (Hassan et al., 2024). The personal values of the owner/manager also emerged as a significant driver, supporting Upper

Echelons Theory, which posits that in smaller firms, the leader's convictions heavily shape corporate strategy (Kutzschbach et al., 2021).

Perhaps the most telling finding is the weakness of external pressures. The low ranking of government regulation, customer demand, and investor pressure as drivers highlights the institutional isolation of these MSMEs. With most operating outside of large corporate supply chains, they are shielded from the coercive pressures that often drive sustainability adoption elsewhere (Darnall et al., 2010). This creates an environment where change must be intrinsically motivated and internally driven. It implies that top-down, compliance-based policy approaches are destined to fail. Instead, effective policy must be bottom-up and facilitative, providing MSMEs with the tools and incentives to pursue the cost-saving and reputational benefits they already value. The impetus for change in Port Harcourt lies not in external sticks, but in internal carrots. Any successful strategy must therefore be grounded in this reality, reframing sustainability as a direct pathway to the core MSME goals of resilience, profitability, and competitive advantage.

5.0. Conclusion

This analysis arrives at three conclusions regarding Greenhouse Gas (GHG) accounting, as practiced by Small and Medium-sized Enterprises in Port Harcourt, Nigeria. First, GHG accounting is in a deeply initial state, involving GHG indicators, with virtually no formal GHG accounting practice, and very poor foundational knowledge; all areas of GHG accounting practice are thus initially referenced and primarily represent a lack of action if we use the term "GHG accounting" in any traditional sense. Second, the GHG accounting decisions that owners of MSME firms make (or don't make) are overwhelmingly based on the practical decision-making that dominance extreme resource limitations and an extreme rational approach to operational survival. Moreover, the constraints on GHG accounting practices are not created through some ideological opprobrium for GHG accounting; the constraints are the lack of financial capital and relatively little technical expertise in the organization. Thus, the drive for action does not have external regulatory or market pressure, which is weak and removed from the immediate context, but it is motivated by internal and commercial rationales. The strongest motivators for action available are cost savings from operations and the potential for increased brand-enhancement. The evidence is clear: MSME will not change their current inertia toward climate action; this is not about "lack of interest," it is about system failure to provide the capacity, knowledge, and appropriate incentives. Policies and supportive interventions in producing change should move away from compliance mechanisms and moral arguments to dealing with MSME behaviour change by focusing on the same business rationale of MSMEs so sustainability is seen as a simple way to achieve greater efficiency, profit and market advantage. In the future, we need to focus on offering simple and low-cost support and tools that would encourage MSMEs to use their existing operational information and transform them into environmental and economic data, effectively turning a difficult-to-manage situation into a business opportunity.

6.0. Ethical Considerations

We upheld the highest ethical principles during the research process to protect the rights, dignity, and confidentiality of all participants. Prior to the study's initiation, the study protocol, which included all instruments and data protection, was approved by the appropriate Institutional Review Board (IRB). Informed consent was central to the methodology. Each potential participant received a detailed information sheet outlining the purpose, procedures, time investment needed, and the voluntary nature of their involvement. They were clear that they could withdraw at any time without consequence. Before we collected any data, we obtained the participant's signed or electronically verified consent. To protect confidentiality and anonymity, each participating MSME and manager were given identification codes, all identifying information was stripped out of the resulting dataset, and all records were maintained securely. Digital data were maintained on a secure and encrypted server that was only

accessible to the research team, and physical documents were placed in a locked filing cabinet. Data is presented only in aggregate form to ensure no one can identify any organization and/or individual.

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