

Green Labor Mobility and Human Capital Breadth in Small and Medium Enterprises

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Article History	Abstract
<p>Original Research Article</p> <p>Received: 01-04-2026</p> <p>Accepted: 02-05-2026</p> <p>Published: 26-05-2026</p> <p>Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.</p> <p>Citation: Osarenmwinda, Smart Ph.D & Surprise Osaigbovo Ph.D. (2026). Green Labor Mobility and Human Capital Breadth in Small and Medium Enterprises. UKR Journal of Economics, Business and Management (UKRJEBM), 2(5), 156-167.</p>	<p><i>This study investigates the influence of green labor mobility on human capital breadth among employees of selected Small and Medium Enterprises (SMEs) in Ekpoma and Uromi, Edo State, Nigeria. Anchored in human capital theory (Becker, 1964; Schultz, 1961), the study employs a descriptive survey research design using primary data from 237 employees across 45 SMEs. Green labor mobility is conceptualized as the systematic rotation and movement of employees across environmentally-oriented functions, while human capital breadth is operationalized along four dimensions: technical environmental skills, sustainability management knowledge, stakeholder engagement capabilities, and systems thinking competencies. Data were collected through a structured questionnaire and analyzed using descriptive statistics (frequencies, percentages, means, standard deviations) and inferential statistics (Pearson correlation, simple linear regression, ANOVA) via SPSS v26.0. Findings reveal that green labor mobility exists at a low extent (Mean = 2.47, SD = 1.09), with informal knowledge sharing (Mean = 3.12) prevailing over formal rotation systems (Mean = 1.89). Human capital breadth registers at a moderate level (Grand Mean = 2.70, SD = 1.15), with technical environmental skills most developed (Mean = 2.89) and systems thinking least developed (Mean = 2.51). Regression analysis confirms a statistically significant positive relationship ($\beta = 0.612, p < 0.001, R^2 = 0.375$), indicating that green labor mobility explains 37.5% of the variance in human capital breadth. The study concludes that green labor mobility, despite being underutilized, represents a potent mechanism for building sustainability capabilities in Nigerian SMEs. Recommendations include formalizing green job rotation programs, establishing green competency standards, and providing technical assistance for green HR development.</i></p> <p>Keywords: Green Labor Mobility; Human Capital Breadth; Green Human Resource Management; Small and Medium Enterprises.</p> <p>JEL Codes: M12, M14, M53, O15</p>

Introduction

The contemporary global economy is increasingly characterized by the imperative of environmental sustainability, compelling organizations across all sectors to integrate green management principles into their operational frameworks (Chowdhury *et al.*, 2025). Small and Medium Enterprises (SMEs) constitute the backbone of developing economies, with Nigeria hosting over 39.65 million MSMEs that contribute approximately 46.32% of

the nation's GDP and employ 87.9% of the workforce (SMEDAN, 2023). Despite this significant economic footprint, Nigerian SMEs remain largely underexplored in the context of green human resource management (GHRM) practices, particularly in relation to how workforce mobility across environmental functions can enhance the breadth of human capital within these organizations (Suleman, 2025). The concept of green labor mobility refers to the systematic

rotation and movement of employees across various environmentally-oriented roles, departments, and functions within an organization, enabling workers to accumulate diverse sustainability competencies, knowledge, and skills that transcend single functional boundaries (OECD, 2025). Human capital breadth, as conceptualized within the human capital theory framework originally articulated by Becker (1964) and extended by Schultz (1961), represents the diversity and range of skills, knowledge, and competencies that an individual worker possesses across multiple domains (Aly, 2024). In the context of green management, human capital breadth specifically encompasses the variety of environmental skills ranging from waste management and energy conservation to sustainable supply chain practices and carbon footprint reduction that employees acquire through exposure to different green functions within their organizations (Atika *et al.*, 2025). The relationship between labor mobility and human capital development has been extensively documented in general management literature, yet the specific application of this relationship to environmental sustainability contexts, particularly within African SMEs, remains significantly under-researched (Suleman, 2025).

Edo State, located in the South-South geopolitical zone of Nigeria, presents a compelling context for examining green labor mobility and human capital breadth. The state hosts numerous SMEs in Ekpoma and Uromi, two prominent towns with vibrant commercial activities spanning agriculture, retail, manufacturing, and services. Ekpoma, home to Ambrose Alli University, benefits from a relatively educated workforce and emerging entrepreneurial ecosystems, while Uromi serves as a commercial hub with diverse SME operations (Goodluck *et al.*, 2025). However, these enterprises face mounting environmental pressures, including waste management challenges, energy inefficiencies, and regulatory compliance demands, which necessitate the development of versatile workforces capable of addressing sustainability concerns from multiple functional perspectives (Adubasim *et al.*, 2025). The significance of this study lies in its potential to bridge the gap between green human resource management theory and SME practice in a developing economy context. While existing literature has predominantly focused on large corporations in developed economies (Yuan *et al.*, 2024), the unique structural, financial, and cultural constraints facing Nigerian SMEs demand context-specific empirical investigation (Dokai-Okonkwo *et al.*, 2025). Furthermore, as the global community intensifies its focus on sustainable development goals (SDGs), understanding how labor mobility mechanisms can enhance green human capital breadth becomes critical for organizational competitiveness and environmental stewardship (ILO, 2025). This study, therefore, seeks to examine the extent to which green labor

mobility practices influence the development of human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria, thereby contributing to both academic discourse and practical management interventions in the region (Okeke *et al.*, 2025).

Problem Statement

Despite the growing recognition of green human resource management as a strategic imperative for organizational sustainability, empirical evidence regarding the specific mechanisms through which SMEs in developing economies can build green human capital remains fragmented and inconclusive (Nwamekwe *et al.*, 2025). Nigerian SMEs, which constitute approximately 96% of all businesses nationwide and contribute 84% of total employment, face peculiar challenges in implementing structured green HR practices due to resource constraints, limited institutional support, and inadequate knowledge about the benefits of sustainability investments (Goodluck *et al.*, 2025). The problem is particularly acute in secondary cities such as Ekpoma and Uromi in Edo State, where SME operations are characterized by informal HR structures, minimal training budgets, and a predominant focus on short-term survival rather than long-term sustainability capability building (Adubasim *et al.*, 2025). The concept of green labor mobility defined as the internal movement and rotation of employees across environmentally-oriented functions has received limited scholarly attention in the African SME context (Suleman, 2025). While studies in developed economies have demonstrated that labor mobility enhances skill diversification and organizational adaptability (OECD, 2025), the applicability of these findings to resource-constrained Nigerian SMEs remains questionable. Existing research on GHRM in Nigeria has predominantly examined isolated practices such as green recruitment, green training, and green rewards, often neglecting the dynamic processes through which employees develop comprehensive environmental competencies through cross-functional exposure (Ogiemwonyi *et al.*, 2024). For instance, Ogiemwonyi *et al.* (2024) found that green recruitment, training, and performance management can transform employees into green human capital, but the study did not explicitly examine the role of mobility in this transformation process.

Moreover, the measurement and conceptualization of human capital breadth in green management contexts lack standardization, particularly for SME applications (Atika *et al.*, 2025). While human capital theory provides the foundational framework for understanding skill accumulation through education and training (Becker, 1964; Schultz, 1961), the specific dimensions of green human capital breadth encompassing technical

environmental skills, sustainability management knowledge, stakeholder engagement capabilities, and systems thinking competencies require empirical validation within the Nigerian context (Diversity Institute, 2025). The absence of such validation creates a significant knowledge gap that limits the ability of SME managers to design effective green workforce development strategies (Chowdhury *et al.*, 2025). The environmental challenges confronting Edo State SMEs further exacerbate this problem. With Nigeria's access to electricity standing at merely 61.2% as of 2023 (World Bank, 2023), and with the South-South region grappling with infrastructure deficits, SMEs in Ekpoma and Uromi must navigate energy inefficiencies, waste disposal limitations, and water scarcity while attempting to remain competitive (Goodluck *et al.*, 2025). These environmental pressures demand workforces that possess not only specialized technical skills but also broad-based environmental competencies that enable holistic problem-solving across functional boundaries (ILO, 2025). However, the extent to which current labor mobility practices within these SMEs facilitate the development of such competencies remains unknown. This study, therefore, addresses the critical problem of understanding how green labor mobility influences human capital breadth among employees of selected SMEs in Ekpoma and Uromi, with the aim of generating evidence-based insights for enhancing sustainability workforce development in the region (Okeke *et al.*, 2025).

Research Questions

Overall Research Aim

The overall aim of this study is to investigate the influence of green labor mobility on human capital breadth among employees of selected Small and Medium Enterprises in Ekpoma and Uromi, Edo State, Nigeria.

Specific Research Question

1. What is the extent to which green labor mobility practices influence the development of human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria?

Hypothesis

Drawing from the specific research question, the following null and alternative hypotheses are formulated for empirical testing:

H₀: Green labor mobility does not have a significant influence on human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria.

Literature Review (Conceptual Review)

Green Labor Mobility

Green labor mobility represents a specialized dimension of

internal labor mobility that focuses on the movement, rotation, and reassignment of employees across environmentally-oriented functions, roles, and departments within an organization. Unlike traditional labor mobility, which emphasizes horizontal or vertical career progression without specific environmental content, green labor mobility is deliberately designed to expose employees to diverse sustainability challenges, practices, and perspectives. This conceptualization aligns with the broader understanding of labor mobility as a mechanism for skill diversification and knowledge transfer, but adds the critical dimension of environmental sustainability as the organizing principle for such movements. The theoretical foundations of green labor mobility can be traced to human capital theory, which posits that investments in employee skills and knowledge yield returns in the form of enhanced productivity and organizational performance. Becker's (1964) seminal distinction between general and specific human capital is particularly relevant here: green labor mobility facilitates the accumulation of general green human capital skills that are transferable across firms and industries while also developing firm-specific environmental competencies that enhance organizational competitiveness. In the context of SMEs, where formal training programs are often limited by budget constraints, labor mobility offers a cost-effective alternative for building versatile sustainability workforces.

Empirical evidence on green labor mobility remains scarce, particularly in developing economies. Pelzeter (2022) examined employee mobility in the context of service-related management and carbon footprint reduction in German firms, finding that cross-functional movements contributed to more comprehensive environmental awareness among staff. However, this study focused on large corporations in a developed economy, leaving a significant gap regarding SME applications in resource-constrained contexts. In the African context, Suleman's (2024) inductive research in Ghanaian manufacturing companies identified green participation as one of five GHRM practices, but did not explicitly examine mobility as a distinct mechanism for skill development. Green labor mobility encompasses several operational dimensions: (1) rotational assignments across departments with environmental responsibilities (e.g., from operations to waste management); (2) temporary project-based assignments on sustainability initiatives; (3) cross-functional green teams that bring together employees from diverse backgrounds; and (4) job enlargement strategies that expand environmental task portfolios. Each of these mechanisms serves to break down functional silos and enable employees to develop multidimensional understandings of organizational sustainability challenges. For Nigerian SMEs, where organizational structures are

typically flat and informal, green labor mobility may occur organically through necessity rather than through formal HR design, yet its impact on human capital development may be equally significant.

Human Capital Breadth

Human capital breadth refers to the diversity, range, and variety of skills, knowledge, and competencies that an individual possesses across multiple functional, technical, and conceptual domains. This construct contrasts with human capital depth, which emphasizes specialization and expertise within a single domain. In the context of green management, human capital breadth encompasses the multidimensional environmental competencies that enable employees to understand, analyze, and address sustainability challenges from integrated perspectives spanning operations, finance, marketing, supply chain, and stakeholder relations. The conceptualization of human capital breadth draws heavily from Gardner's (1983) multiple intelligences theory and the Schultz-Nelson-Phelps view of human capital as the capacity to adapt to changing environments. According to this perspective, individuals with broad human capital are better equipped to navigate complex, dynamic, and uncertain situations precisely the characteristics of contemporary environmental management challenges. In SME contexts, where employees often perform multiple roles due to limited staffing, human capital breadth becomes not merely desirable but essential for organizational survival and sustainability. Recent scholarship has begun to specify the dimensions of green human capital breadth. Ogiemwonyi (2024) conceptualized green human capital as encompassing environmental knowledge, green skills, and eco-friendly attitudes, arguing that GHRM practices can systematically transform employees into green human capital. Extending this conceptualization, the present study operationalizes human capital breadth along four dimensions: (1) technical environmental skills (e.g., waste segregation, energy auditing, carbon calculation); (2) sustainability management knowledge (e.g., understanding of environmental regulations, green supply chain principles, circular economy concepts); (3) stakeholder engagement capabilities (e.g., communicating sustainability initiatives to customers, suppliers, and communities); and (4) systems thinking competencies (e.g., ability to identify interconnections between environmental, social, and economic factors in business decisions). The relationship between labor mobility and human capital breadth is well-established in general management literature. Employees who rotate across functions develop broader skill portfolios, enhanced cognitive flexibility, and improved problem-solving capabilities. However, the specific application of this relationship to green

management contexts requires further empirical validation. Chowdhury *et al.* (2025) noted in their comprehensive review that while green skills development has gained prominence in policy discussions, empirical research on the mechanisms through which such skills are accumulated remains a significant research desideratum. This study addresses this gap by examining whether green labor mobility serves as an effective mechanism for building human capital breadth in Nigerian SMEs.

Green Labor Mobility and Human Capital Breadth: The Conceptual Link

The conceptual linkage between green labor mobility and human capital breadth rests on the premise that exposure to diverse environmental functions enables employees to accumulate varied sustainability competencies that would be unattainable through single-function specialization. When employees move from waste management roles to energy efficiency positions, or from procurement functions to sustainability reporting assignments, they encounter different environmental challenges, regulatory requirements, stakeholder expectations, and technical tools. This cross-functional exposure facilitates the development of what can be termed "green T-shaped skills" deep expertise in one environmental domain combined with broad understanding across multiple sustainability areas. The mechanisms through which green labor mobility enhances human capital breadth include experiential learning, socialization into different professional communities, exposure to diverse problem-solving approaches, and the development of boundary-spanning networks. Employees who have worked in multiple green functions are better positioned to integrate environmental considerations into business decisions because they understand how sustainability issues manifest differently across organizational domains. This integrative capacity is particularly valuable for SMEs, where environmental challenges often require holistic solutions that transcend departmental boundaries.

Furthermore, green labor mobility contributes to the development of adaptive human capital the capacity to respond effectively to changing environmental regulations, technologies, and market expectations. As Schultz (1961) and Nelson and Phelps (1966) argued, human capital is especially valuable in disequilibrium situations where workers must adapt to changing environments. The contemporary sustainability landscape is characterized by precisely such dynamism, with evolving carbon regulations, emerging green technologies, and shifting consumer preferences creating continuous demands for workforce adaptability. Green labor mobility, by exposing employees to diverse environmental contexts, builds the adaptive capacity necessary for organizational resilience. In

the Nigerian SME context, the conceptual link between green labor mobility and human capital breadth assumes particular significance due to the structural characteristics of these enterprises. With limited resources for formal training programs, SMEs in Ekpoma and Uromi rely heavily on informal learning mechanisms, on-the-job training, and cross-functional exposure to build employee capabilities. Green labor mobility, whether formal or informal, thus represents a critical pathway for developing the versatile sustainability workforces needed to address local environmental challenges while maintaining competitiveness. However, the extent to which this conceptual linkage holds empirically in the specific context of Edo State SMEs remains to be established, providing the primary motivation for this study.

Theoretical Framework

This study is anchored in Human Capital Theory, originally developed by Gary Becker (1964) and contemporaneously advanced by Theodore Schultz (1961). Human capital theory posits that individuals and organizations can increase productivity and economic returns through deliberate investments in education, training, and skill development. The theory conceptualizes human capital as a stock of knowledge, skills, abilities, and competencies that workers accumulate through formal education, on-the-job training, and work experience, which subsequently enhance their productivity and earning potential. Becker's (1964) seminal contribution distinguished between general human capital skills that are transferable across firms and industries and firm-specific human capital skills whose value is tied to a particular organization. This distinction is critical for understanding green labor mobility: when employees rotate across environmental functions within an organization, they accumulate both general green skills (e.g., waste management techniques applicable across industries) and firm-specific environmental competencies (e.g., knowledge of the organization's particular sustainability challenges and stakeholder relationships). The theory predicts that investments in general human capital, while beneficial to individual workers, may be underprovided by firms due to the risk of employee turnover and the inability to capture returns. However, in the context of green labor mobility within SMEs, the informal nature of employment relationships and the limited external labor market for green skills may reduce turnover risks, making such investments more attractive.

Schultz's (1961) extension of human capital theory emphasized the role of human capital in facilitating adaptation to changing economic conditions. This "adaptation view" is particularly relevant to green management contexts, where environmental regulations, technologies, and market expectations are in constant flux.

Employees with broad green human capital developed through mobility across environmental functions possess the cognitive flexibility and diverse knowledge base necessary to adapt to these changes effectively. The theory thus predicts a positive relationship between the breadth of green human capital and organizational capacity for environmental innovation and compliance. The application of human capital theory to green labor mobility and human capital breadth in Nigerian SMEs requires consideration of context-specific factors. Unlike large corporations with formal HR departments and structured training budgets, SMEs in Ekpoma and Uromi operate with limited resources and informal management practices. In such contexts, labor mobility may serve as a substitute for formal training programs, enabling skill development through experiential learning and cross-functional exposure. The theory suggests that even informal mobility mechanisms can yield significant human capital returns if they expose employees to diverse environmental challenges and solutions.

Furthermore, human capital theory provides the rationale for examining human capital breadth as a multidimensional construct. Following the Gardner (1983) view of multiple intelligences and the contemporary understanding of green skills as encompassing technical, managerial, and social dimensions, this study conceptualizes human capital breadth along four dimensions: technical environmental skills, sustainability management knowledge, stakeholder engagement capabilities, and systems thinking competencies. This multidimensional conceptualization aligns with the theory's recognition that human capital is not unidimensional but comprises diverse skills that contribute differentially to productivity in different contexts.

The theoretical framework also informs the hypothesized relationship between green labor mobility and human capital breadth. Based on human capital theory, it is expected that employees who experience greater mobility across green functions will accumulate broader and more diverse environmental competencies than those who remain in single-function roles. This expectation derives from the theory's core proposition that investments in diverse skill-building experiences yield returns in the form of enhanced human capital stocks. The empirical testing of this hypothesis in the Nigerian SME context will contribute to extending human capital theory's applicability to green management in developing economies.

Empirical Review

This section reviews five empirical studies that have examined relationships between green human resource management practices, labor mobility, human capital development, and sustainability outcomes in organizational contexts.

Ogiemwonyi *et al.* (2024) conducted a quantitative study examining how green human resource management practices influence green employee behavior through the mediating mechanism of green human capital in the fast-food sector of Iligan City, Philippines. Using a sample of 385 employees and structural equation modeling, the study found that green recruitment and selection, green training, and green performance management significantly predicted green human capital, which in turn fully mediated the relationship between GHRM practices and green employee behavior. The study validated the Ability-Motivation-Opportunity (AMO) theory and Resource-Based View (RBV) by demonstrating that the "ability" dimension, embodied in green human capital, is the essential mechanism for behavioral outcomes. The findings are relevant to the present study because they establish the empirical link between GHRM practices and green human capital development, although the study did not specifically examine labor mobility as a practice. The research contributes to understanding that GHRM is most effective when it builds employees' green competencies, supporting the present study's focus on mobility as a competency-building mechanism.

Alkhateeb *et al.* (2025) investigated the impact of green HRM practices on organizational performance in the Bahraini retail sector using a sample of 250 employees. The study employed structural equation modeling and found that green recruitment, green training, green performance appraisal, and green rewards significantly influenced organizational performance, with employee environmental behavior serving as a partial mediator. The study highlighted the importance of green skills development in translating HR practices into performance outcomes. While the research did not explicitly examine labor mobility, its findings on green training's role in building environmental competencies are relevant to understanding how cross-functional exposure might enhance human capital breadth. The Bahraini context, while more developed than Nigeria, shares similarities with the present study in examining service-sector SMEs and their sustainability challenges.

Dumont *et al.* (2017) examined the effects of green HRM practices on employee workplace green behavior in Chinese manufacturing firms, with a particular focus on the moderating roles of psychological green climate and employee green values. Using a multi-level analysis of data from 563 employees across 94 teams, the study found that green HRM practices positively influenced workplace green behavior, and this relationship was strengthened by supportive psychological green climates and strong employee green values. The study's contribution lies in its demonstration that GHRM practices are most effective when embedded in supportive organizational contexts. For

the present study, this finding suggests that green labor mobility's impact on human capital breadth may be contingent on the presence of a supportive green organizational culture. The Chinese manufacturing context, while different from Nigerian SMEs, provides valuable insights into how formal GHRM practices translate into behavioral and competency outcomes.

Gao *et al.* (2025) explored the relationships between green HRM, leadership, organizational culture, and workplace pro-environmental behavior using a comprehensive literature review and empirical analysis. The study found that green HRM practices, particularly when combined with transformational green leadership and supportive organizational culture, significantly enhanced employee engagement in environmental initiatives. The research emphasized the context-dependent effectiveness of specific HR mechanisms, noting that in fast-paced environments, culture and communication-based practices often exert stronger effects than formal reward systems. This finding is particularly relevant to Nigerian SMEs, where informal practices and cultural factors may play a more significant role in shaping green human capital than formal HR systems. The study's focus on the interplay between HR practices and organizational context supports the present study's examination of how labor mobility often an informal practice in SMEs influences human capital development.

Garavan *et al.* (2023) examined employee perceptions of individual green HRM practices and their influence on voluntary green work behavior from a signaling theory perspective. Conducted across multiple countries including developing economies, the study found that employees interpret green HRM practices as signals of organizational commitment to sustainability, which in turn influences their voluntary environmental behaviors. The research highlighted the importance of perceived authenticity in GHRM practices, noting that employees are more likely to engage in green behaviors when they believe organizational sustainability commitments are genuine. This finding has implications for the present study: green labor mobility may serve as a particularly strong signal of organizational commitment to sustainability, as it demonstrates tangible investment in developing employees' environmental capabilities. The study's cross-national scope, including developing economy contexts, enhances its relevance to the Nigerian SME setting.

Gap in Knowledge

While existing studies confirm that GHRM practices enhance sustainability outcomes and green human capital (Ogiemwonyi *et al.*, 2024; Alkhateeb *et al.*, 2025; Dumont *et al.*, 2017), four critical gaps persist. First, GHRM research treats practices as static interventions rather than

dynamic processes like labor mobility that build skills through cross-functional exposure. Second, green human capital breadth encompassing technical skills, management knowledge, stakeholder capabilities, and systems thinking remains unoperationalized as a multidimensional construct. Third, research overwhelmingly focuses on developed economies and large corporations, neglecting Nigerian SMEs in secondary cities like Ekpoma and Uromi where informal HR structures and resource constraints alter mobility mechanisms. Fourth, human capital theory (Becker, 1964; Schultz, 1961) lacks empirical extension to green labor mobility in SME contexts. This study addresses these gaps by examining green labor mobility's influence on multidimensional human capital breadth among Edo State SMEs.

Methodology

This study employed a descriptive survey research design to examine green labor mobility's influence on human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria (Creswell & Creswell, 2018). The study area comprised Ekpoma (Esan West LGA), hosting Ambrose Alli University and SMEs in retail, hospitality, agriculture, and manufacturing, and Uromi (Esan North-East LGA), a commercial hub with

trade, food processing, and service enterprises, both facing environmental challenges yet underdeveloped in green management. The target population was 615 employees across 45 SMEs meeting inclusion criteria (minimum two years operation, 10–199 workers, environmental relevance, tenure ≥ 1 year), distributed as 340 employees from 25 SMEs in Ekpoma and 275 from 20 SMEs in Uromi across manufacturing (18%), agriculture (22%), hospitality (15%), retail (25%), transportation (12%), and services (8%). Sample size was determined using Krejcie and Morgan's (1970) formula: Thus, 237 respondents were selected through multi-stage sampling combining purposive SME selection with simple random employee selection. Primary data were collected via a structured questionnaire with three sections: demographics, green labor mobility (15 items, = 0.84), and human capital breadth (20 items, = 0.88), using 5-point Likert scales. Content validity was established through expert review. Data were analyzed using SPSS v26.0 through descriptive statistics (frequencies, percentages, means, standard deviations) and inferential statistics (Pearson correlation, simple linear regression, ANOVA) at < 0.05 .

Data Analysis and Presentation of Results

Descriptive Analysis of Green Labor Mobility

Table 1: Descriptive Statistics for Green Labor Mobility Items

S/N	Item Statement	N	Mean	Std. Dev.	Remark
1	My organization rotates employees across departments with environmental responsibilities	237	2.48	1.12	Low Extent
2	I have been assigned to work on environmental projects outside my primary department	237	2.35	1.08	Low Extent
3	My organization encourages cross-functional collaboration on sustainability initiatives	237	2.67	1.15	Moderate Extent
4	Employees in my organization frequently move between roles to gain diverse environmental experiences	237	2.21	1.05	Low Extent
5	My organization has a formal system for green job rotation	237	1.89	0.98	Low Extent
6	I have received training in environmental practices from multiple departments	237	2.54	1.10	Low Extent
7	My supervisor supports my participation in cross-functional green activities	237	2.78	1.18	Moderate Extent
8	My organization creates opportunities for employees to learn about environmental management in different areas	237	2.42	1.09	Low Extent
9	I have worked with colleagues from other departments on green improvement projects	237	2.89	1.21	Moderate Extent
10	My organization recognizes employees who develop diverse green competencies	237	2.31	1.07	Low Extent
11	Employees are temporarily reassigned to help with environmental compliance in other units	237	2.15	1.03	Low Extent

12	My organization uses job enlargement to expose employees to green tasks in different functions	237	2.08	0.99	Low Extent
13	I have gained environmental knowledge by interacting with employees from other departments	237	3.12	1.24	Moderate Extent
14	My organization facilitates knowledge sharing about environmental practices across departments	237	2.64	1.14	Moderate Extent
15	Overall, my organization provides adequate opportunities for green labor mobility	237	2.38	1.11	Low Extent
	Grand Mean	237	2.47	1.09	Low Extent

Source: Field Survey (2026)

The descriptive analysis of green labor mobility reveals a grand mean of 2.47 (SD = 1.09), indicating that green labor mobility practices exist at a low extent among the selected SMEs in Ekpoma and Uromi. This finding suggests that while some elements of cross-functional environmental exposure are present, systematic and formalized green labor mobility mechanisms are largely absent. The highest mean score was recorded for item 13 ("I have gained environmental knowledge by interacting with employees

from other departments," Mean = 3.12, SD = 1.24), indicating that informal knowledge sharing across departments is the most prevalent form of green labor mobility. Conversely, the lowest mean was for item 5 ("My organization has a formal system for green job rotation," Mean = 1.89, SD = 0.98), confirming the absence of structured mobility programs.

Descriptive Analysis of Human Capital Breadth

Table 2: Descriptive Statistics for Human Capital Breadth Dimensions

Dimension	N	Mean	Std. Dev.	Remark
Technical Environmental Skills	237	2.89	1.16	Moderate Extent
Sustainability Management Knowledge	237	2.76	1.13	Moderate Extent
Stakeholder Engagement Capabilities	237	2.64	1.18	Moderate Extent
Systems Thinking Competencies	237	2.51	1.11	Low Extent
Grand Mean (Human Capital Breadth)	237	2.70	1.15	Moderate Extent

Source: Field Survey (2026)

The analysis of human capital breadth dimensions reveals a grand mean of 2.70 (SD = 1.15), indicating a moderate extent of green human capital breadth among employees. Technical environmental skills recorded the highest mean (2.89, SD = 1.16), suggesting that employees possess relatively stronger technical competencies in areas such as waste management and energy conservation. Systems

thinking competencies recorded the lowest mean (2.51, SD = 1.11), indicating that employees have limited ability to integrate environmental considerations across multiple organizational domains. This pattern suggests that while employees have developed specific technical skills, their capacity for holistic sustainability thinking remains underdeveloped.

Table 3: Detailed Descriptive Statistics for Human Capital Breadth Items

S/N	Item Statement	N	Mean	Std. Dev.	Remark
	Technical Environmental Skills				
1	I can identify appropriate waste segregation methods for different materials	237	3.24	1.21	Moderate Extent
2	I understand energy conservation techniques applicable to my workplace	237	3.08	1.18	Moderate Extent
3	I can calculate the carbon footprint of basic organizational activities	237	2.45	1.12	Low Extent
4	I know how to minimize water usage in my work processes	237	2.98	1.19	Moderate Extent

5	I can operate environmentally friendly equipment and technologies	237	2.81	1.15	Moderate Extent
Sustainability Management Knowledge					
6	I understand the environmental regulations applicable to my organization	237	2.92	1.17	Moderate Extent
7	I am familiar with green supply chain management principles	237	2.58	1.14	Low Extent
8	I understand the concept of circular economy and its business applications	237	2.41	1.10	Low Extent
9	I can explain the triple bottom line framework (people, planet, profit)	237	2.87	1.20	Moderate Extent
10	I know how to conduct a basic environmental audit	237	2.54	1.13	Low Extent
Stakeholder Engagement Capabilities					
11	I can effectively communicate environmental initiatives to customers	237	2.71	1.16	Moderate Extent
12	I can engage suppliers on environmental compliance requirements	237	2.48	1.11	Low Extent
13	I can present environmental concerns to community members	237	2.69	1.19	Moderate Extent
14	I can collaborate with government agencies on environmental matters	237	2.45	1.08	Low Extent
15	I can persuade colleagues to adopt environmentally friendly practices	237	2.88	1.22	Moderate Extent
Systems Thinking Competencies					
16	I can identify connections between environmental, social, and economic factors in business decisions	237	2.62	1.15	Moderate Extent
17	I understand how activities in one department affect environmental outcomes in other departments	237	2.48	1.12	Low Extent
18	I can develop integrated solutions that address multiple sustainability challenges simultaneously	237	2.35	1.09	Low Extent
19	I can anticipate the environmental consequences of business decisions across the value chain	237	2.51	1.13	Low Extent
20	I can balance short-term operational needs with long-term environmental sustainability	237	2.69	1.18	Moderate Extent

Source: Field Survey (2026)

Test of Hypothesis

Table 4: Model Summary for Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.612	0.375	0.372	0.912

Source: SPSS v26

The model summary reveals an R-value of 0.612, indicating a moderately strong positive correlation between green labor mobility and human capital breadth. The R-square value of 0.375 indicates that green labor mobility explains

37.5% of the variance in human capital breadth among employees of the selected SMEs. The adjusted R-square of 0.372 confirms that the model maintains explanatory power after adjusting for the number of predictors.

Table 5: ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	118.452	1	118.452	142.387	0.000
Residual	195.548	235	0.832		
Total	314.000	236			

Source: SPSS v26

The ANOVA results show an F-statistic of 142.387 with a significance value of 0.000 ($p < 0.05$), indicating that the regression model is statistically significant. This confirms that green labor mobility significantly predicts human capital breadth.

Table 6: Coefficients for Regression Analysis

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta		
(Constant)	1.245	0.142		8.768	0.000
Green Labor Mobility	0.587	0.049	0.612	11.933	0.000

Source: SPSS v26

The coefficients table reveals that green labor mobility has a positive unstandardized coefficient ($B = 0.587$) with a standardized beta coefficient of 0.612. The t-value of 11.933 is significant at $p < 0.05$, confirming that green labor mobility has a statistically significant positive influence on human capital breadth. The regression equation can be expressed as:

$$\text{Human Capital Breadth} = 1.245 + 0.587(\text{Green Labor Mobility})$$

Decision: Since the significance value (0.000) is less than 0.05, we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1).

Conclusion: Green labor mobility has a significant positive influence on human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria.

Summary of Findings

The findings reveal that green labor mobility exists at a low extent (Mean = 2.47, SD = 1.09) among selected SMEs in Ekpoma and Uromi, with informal knowledge sharing (Mean = 3.12) prevailing over formal rotation systems (Mean = 1.89) consistent with Suleman's (2025) observation that African SMEs lack structured GHRM mechanisms and Goodluck et al.'s (2025) findings on informal HR practices in Nigerian SMEs. Human capital breadth registers at a moderate level (Grand Mean = 2.70, SD = 1.15), with technical environmental skills most developed (Mean = 2.89) and systems thinking least developed (Mean = 2.51), corroborating Atika et al.'s (2025) identification of fragmented green skill development in developing economies. Regression analysis confirms a significant positive relationship ($\beta = 0.612$, $p <$

0.001, $R^2 = 0.375$), supporting Ogiemwonyi et al.'s (2024) mediation findings and Chowdhury et al.'s (2025) call for dynamic GHRM processes. The demographic profile young (81.9% below 46 years) and educated (65.4% tertiary) suggests workforce readiness, yet only 6.3% occupy environmental departments, reflecting structural constraints noted by Dokai-Okonkwo et al. (2025). The mobility-human capital breadth disconnect indicates underutilized potential, aligning with OECD (2025) and ILO (2025) recommendations for formalized green workforce development in SMEs.

Conclusion

This study investigated green labor mobility's influence on human capital breadth among employees of selected SMEs in Ekpoma and Uromi, Edo State, Nigeria. Three conclusions emerge. First, green labor mobility is underutilized in Nigerian SMEs formal rotation systems are virtually absent (Mean = 1.89), with only informal knowledge sharing (Mean = 3.12) prevailing, consistent with Suleman's (2025) and Goodluck et al.'s (2025) findings on unstructured GHRM in African SMEs. Second, human capital breadth is multidimensional but unevenly developed: technical environmental skills dominate (Mean = 2.89) while systems thinking lags (Mean = 2.51), corroborating Atika et al.'s (2025) identification of fragmented green competency development in developing economies. Third, and critically, green labor mobility significantly and positively influences human capital breadth ($\beta = 0.612$, $p < 0.001$, $R^2 = 0.375$), validating Becker's (1964) and Schultz's (1961) human capital theory in green management contexts and supporting Chowdhury et al.'s (2025) call for dynamic GHRM processes

underscoring mobility as a cost-effective workforce development mechanism where formal training resources are scarce.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed

1. SME managers should develop structured job rotation programs exposing employees to diverse environmental functions, building on existing informal knowledge sharing (Mean = 3.12) to create systematic mobility systems that enhance green human capital breadth.
2. The National Board for Technical Education and professional bodies should develop standardized green competency frameworks defining technical skills, management knowledge, stakeholder capabilities, and systems thinking requirements guiding SME mobility program design and enabling employee credentialing.
3. NGOs and development partners should deliver capacity-building programs equipping SME managers with job rotation planning, competency mapping, and performance tracking tools, addressing the structural constraints that limit formal green workforce strategies in resource-constrained contexts.

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