Application of Knowledge Management and Decision Support Systems in Lafarge Africa Plc

Adedola Atolagbe[1] and Gaga Thomas Ali[2]
[1]Lafarge Africa Plc, Nigeria
[2]Department of Information Technology, Bingham University, Karu, Nasarawa State, Nigeria

linkdola@gmail.com
Ali-gaga.thomas@binghamuni.edu.ng

Abstract: The twenty-first-century economy has been termed as the Knowledge economy that is driven by people, information, and technology. Knowledge management has also been proven to enhance strategic advantage and improve organizational performance. Decision making and Decision support systems are enhanced with knowledge management. It is, therefore, critical for organizations to focus on knowledge management that derives effective and well- informed decision making with decision making as a tool. The purpose of this research was to examine and establish a knowledge management strategy and decision support systems in Lafarge Africa Plc. The study focused on the following research questions: What is the current level of knowledge management in Lafarge Africa Plc? What are the gaps in knowledge management in Lafarge Africa Plc? What are the impacts of Knowledge management on decision making in Lafarge Africa Plc? How can knowledge management strategy enable decision support systems in Lafarge Africa Plc? A mixed research method was adopted using a survey design by administering a questionnaire and conducting an interview for data collection. The population universe 1532 was used to calculate the sample size of 307 comprises 7 Top Management staff and 300 employees, using sample size calculator. Stratified Random sampling was utilized to arrive at the final respondents. The researcher used a questionnaire administered through email and semi-structured interview as the primary source of data collection instruments. Data was analysed using quantitative measures and was presented using percentages and tables. The study revealed that the level of knowledge Management practices in the organisation is low as several employees (Operational Staff) are not even aware of it. Even though, the Results confirmed that knowledge management enhances effective decision making, however, there was no significant impacts of knowledge management (KM) on decision-making at Lafarge Africa Plc It was recommended for a systemic shift encompassing technology upgrades, cultural transformation, and governance frameworks that make knowledge visible, accessible, and actionable across all levels of the enterprise, It also recommended that the management should Select and appoint experts internally to analyse, design and implement integrated KM framework.

Keywords: Knowledge, Knowledge management, Knowledge management systems, Decision making, Decision support systems

1. Introduction

Knowledge gaps are especially dangerous for sectors like cement production (Augustine et al., 2023). Manufacturing companies are encouraged to create knowledge-sharing platforms, offer organized knowledge management (KM) systems, and make investments in sustainable KM-based manufacturing in order to improve performance, according to Ogunkoya et al. (2023) and Duru et al. (2023). Similarly, structured knowledge management systems yield measurable improvements, and SMEs have reported 22% faster innovation cycles with customer knowledge management (Chaithanapat et al., 2022). Obtaining necessary knowledge is challenging for 60% of manufacturing workers, resulting in costly delays (Meski et al., 2021; Aburub et al., 2024).

Lafarge Africa Plc is a member of LafargeHolcim Group, the largest building and concrete solution company globally. Primarily, one of the leading Manufacturer of cement products in Nigeria. In the last three years, the company restructured and downsized twice, where new employees who took up new roles kept calling former colleagues for advice, guidance and what to do in their current position. The lack of knowledge management has resulted to increase in the rate of errors, customer complaints, poor customer management and delay in customer complaint resolution by the new field force that was just recruited and is costing a lot to the Organisation.

A number of those laid off were absorbed by company to utilize the knowledge acquired to improve the business operations. This soon brought to bear that knowledge is residing in individual employees and is lost when they leave the organization. Therefore, the organization needs to create a system of converting such tacit knowledge to explicit/embedded knowledge and to enhance effective decision making based on organisational knowledge

Lafarge Africa Plc needed to swiftly design and implement an effective knowledge management system and create a learning culture that will deliver competitive advantages and improve business performance through excellent customer service delivery, based on an effective Decision Support System, The purpose of the study is to examine and establish a knowledge management strategy for decision support in Lafarge Africa Plc.

Four research hypotheses are used in this study to evaluate the association between KM and DSS. The null hypotheses: (H_{10}) states no significant relationship between knowledge management system implementation and decision-making efficiency at Lafarge Africa Plc; (H_{20}) Employee job level does not significantly influence perceptions of knowledge management effectiveness; (H_{30}) Departmental silos have no significant impact on knowledge accessibility and utilization; (H_{40}) The integration of knowledge management strategies with decision support systems does not significantly improve organizational performance metrics.

2. Literature Review

According to Saini et al. (2023), knowledge management (KM) encompasses the strategic alignment of organizational structures, technology, and people in order to generate value through innovation and knowledge asset reuse. There are three ways to look at it: operational, managerial, and business (Otundo, 2023). According to Sutton et al. (2020), decision support systems are interactive information systems that use data analysis to help guide business choices. For operational planning and strategic business choices, manufacturing decision support systems (DSS) are essential. According to Megawaty and Ulfa (2020), they are instruments that facilitate decision-making; Christ et al. (2022) describe them as systems that bridge gaps between planning levels; and Deitermann et al. (2022) describe them as data-driven ways to increase process efficiency. The Analytic Hierarchy Process, Simple Multi Attribute Rating Technique, and Simple Additive Weighting are common DSS techniques (Megawaty & Ulfa, 2020). By using multi-step techniques, DSS implementation in manufacturing can improve production planning and have a favourable effect on business decision processes (Christ et al., 2022). However, a lack of guidance causes organizations to struggle with implementation. A seven-step procedural approach that emphasizes the value of stakeholder involvement and makes use of implicit process knowledge has been proposed for creating an effective DSS in manufacturing (Deitermann et al., 2022).

KM is key to competitiveness and performance in global markets, involving the collection, preservation, sharing, and use of organizational knowledge (Otundo, 2023; Stadler, 2021). Integrating KM into decision-making ensures structured knowledge flow and aligns explicit and tacit knowledge to improve performance (Said et al., 2020). This integration influences decisions and boosts outcomes. A rise in related publications highlights KM's growing role in DSS (Melamed-Varela et al., 2020). KM leverages intellectual assets to enhance performance, especially at the technical-strategic interface in manufacturing (Prusak & Davenport, 2013). When paired with KM, DSS improve efficiency (Meski et al., 2021). However, only 32% of manufacturers implement knowledge effectively (Kasie et al., 2022), with Lafarge facing added delays from quality checks taking 18–22 hours weekly (Abiola et al., 2024). African studies affirm KM's performance value, highlighting leadership and IT as key drivers (Jeremiah, 2023; Ogunkoya et al., 2023; Duru et al., 2023). Efficient knowledge transfer directly boosts profitability and growth (Migdadi, 2022; Shodiya, 2021).

Augustine et al. (2023) reveals a critical implementation gap, with only 28% of Nigerian manufacturers formalizing KM policies despite recognized benefits, a finding that aligns conceptually with Lafarge's struggles with undocumented processes. Methodologically, their mixed-methods approach (surveying 120 firms) provides robust evidence of systemic barriers, including leadership disengagement and economic volatility. Complementing this, Meski et al. (2021) offer a success case through their longitudinal study of aeronautics firms, where KM-DSS integration reduced equipment diagnosis time by 35%. Their methodology combined sensor data analytics with workflow observations, demonstrating how structured knowledge capture enhances decision speed. This contrasts sharply with Lafarge's 18–22-hour weekly data retrieval delays (Abiola et al., 2024), underscoring the penalty for poor KM-DSS alignment. The studies collectively validate the conceptual framework that KM effectiveness depends on both technological infrastructure (DSS tools) and organizational enablers (leadership commitment), while methodologically illustrating how comparative case analysis can identify context-specific implementation strategies. Deitermann et al. (2022) caution that DSS success requires stakeholder-centric design, a gap in Lafarge's current systems. Collectively, these studies highlight the need for adaptive KM-DSS frameworks that balance technological upgrades (e.g., real-time dashboards) with cultural interventions (e.g., cross-department collaboration) in emerging markets

3. Research Design and Methodology

The study employed a mixed-methods survey design, ensuring 95% confidence with a 5% margin of error by using stratified random sampling (*Table 1*) derived using the statistic calculator found on https://www.surveysystem.com/sscalc.htm. The questionnaires were adapted from Abdelrahman et al. (2019), quantitatively assessed KM awareness, and a semi-structured interview was conducted for senior management (Aagaard, 2019). Quantitative analysis (done in SPSS) utilized descriptive statistics to assess KM system ratings

and usage patterns, while inferential tests (chi-square, Kruskal-Wallis, Spearman's correlation) evaluated associations between variables. Thematic analysis (done in Nvivo 11) of interview transcripts. Statistical significance was set at $p<0.05$, with effect sizes (Cramer's V, Cohen's d) calculated to assess practical importance.

Table 1: Proportionate Sample Size

Population distribution	Population size	Sample size
Executive/Snr Managers	35	7
Sales & Marketing	384	77
Industrial	509	102
HR/Admin	150	30
Finance	140	28
Supply Chain	185	37
Legal	70	14
Communication	59	12
Total	1532	307

4. Analysis, Results and Discussion

4.1 Demography

The survey demographics in *Table 2* reveal Operations staff as the majority (51.8%, n=159), with limited HR representation (10.4%, n=32), suggesting potential KM perspective gaps. Junior staff dominated responses (60.9%, n=187) versus few senior managers (9.1%, n=28), emphasizing frontline operational insights. Tenure data showed experienced employees (35.2%, n=108) and new hires (15.0%, n=46), highlighting knowledge transfer needs, while mid-tenure staff (49.8%, n=153) indicated stability. These patterns, consistent with Abiola et al.'s (2024) findings on African manufacturing, demonstrate the need for KM strategies addressing Lafarge's workforce structure - particularly leveraging middle management (30.0%, n=92) as knowledge bridges between strategic and operational levels. The low executive participation underscores challenges in aligning KM priorities across hierarchies

Table 2: Demography (N=307)

Responses	Frequency (n)	Percentage (%)
Department		
Operations	159	51.8
HR	32	10.4
Finance	45	14.7
Supply Chain	58	18.9
Other	13	4.2
Participant Distribution		
Junior Staff	187	60.9
Middle Management	92	30.0
Senior Management	28	9.1
Participant Distribution by Tenure		
<1 year	46	15.0
1-5 years	153	49.8
>5 years	108	35.2

4.2 Thematic Analysis

The thematic analysis revealed four primary barriers to effective KM implementation at Lafarge Africa Plc. Cultural resistance emerged as the most prominent challenge (43.8%), with employees perceiving KM as burdensome "extra work" and leadership failing to prioritize it, consistent with findings by Meher & Mishra (2019) and Aagaard (2019). Technological limitations accounted for 30.4% of issues, particularly poor DSS usability and underutilization of existing platforms like SharePoint, highlighting inadequate user-centered design. Organizational accountability gaps (26.8%) manifested through unclear KM ownership and persistent departmental silos, corroborating Mansour et al.'s (2021) observations about structural fragmentation. Notably, employees proposed practical solutions (33.9%), emphasizing performance-based KM incentives and real-time DSS alerts as immediately actionable improvements. These findings collectively demonstrate that Lafarge's KM challenges stem from interrelated cultural, technological, and structural factors, requiring a holistic intervention approach that addresses employee perceptions while enhancing system usability and clarifying organizational accountability. The preference for tangible quick wins suggests that incremental, visible improvements may help overcome initial resistance to broader KM adoption.

4.3 What is the Current Level of Knowledge Management in Lafarge Africa Plc?

Lafarge's KM is critically weak, 96% rate it poor or very poor, mirroring Kusa et al.'s (2024) view that manufacturers overestimate KM capacity. Chi-square results (*Table 3,* χ^2=6.82, p=0.146) show systemic, not role-specific failure. Informal methods dominate (58.6% use WhatsApp/chats), and 19% of staff, 46.7% in HR, say leadership deems KM "non-essential," aligning with Abiola et al.'s (2024) findings in African firms. Most (81.4%) report no formal KM, confirming Mansour et al.'s (2021) on infrastructure gaps in emerging markets. Senior managers report underused tools (observed/expected=1.6), while juniors note system absence (153 vs. 144.1 expected). Weak job-level association (Cramer's V=0.107) shows failures cut across ranks, unlike Chaithanapat et al.'s (2022) success with digital KM in Thai Es. Lafarge's KM immaturity demands systemic reform, targeting both structural and cultural barriers (Abdelrahman et al., 2019)

Table 3: Chi-square Test of Knowledge Management Level across Job Levels

Job Level	No Formal KM System (81.4%)	Tools Unused (11.9%)	Lack of Awareness (6.8%)	Total
Junior Staff (60.9%)	153 (Expected: 144.1)	22 (Expected: 21.0)	12 (Expected: 12.0)	187
Middle Mgmt (30.0%)	75 (Expected: 71.1)	11 (Expected: 10.4)	6 (Expected: 5.9)	92
Senior Mgmt (9.1%)	12 (Expected: 21.8)	2 (Expected: 3.2)	2 (Expected: 1.8)	16
Total	240	35	20	295

4.4 What are the Gaps in Knowledge Management in Lafarge Africa Plc?

The findings (*Table 4*) reveal critical gaps in Lafarge Africa's knowledge management (KM) systems, with junior staff (mean rank=152.3) perceiving the absence of formal KM systems as significantly more severe than senior management (mean rank=128.4; p=0.048). This hierarchical disconnect aligns with Abiola et al.'s (2024) recent findings that operational employees in African manufacturing firms are 2.1 times more likely to report systemic KM deficiencies than executives. The overall non-significant Kruskal-Wallis result (H=4.92, p=0.085) suggests these gaps are organization-wide, supporting Augustine et al.'s (2023) conclusion that Nigerian industrial firms face pervasive KM implementation challenges. Notably, the consistent ranking of "no formal system" as the top gap across all levels (highest mean ranks) mirrors Mansour et al.'s (2021) identification of structural deficiencies as the primary KM barrier in emerging market manufacturers.

Table 4: Kruskal-Wallis Test of KM Gaps across Job Levels

Job Level (n)	No Formal KM (MR)	Tools Unused (MR)	Lack Awareness (MR)	H Statistic	p-value
Junior Staff (187)	152.3	143.7	138.2	4.92	0.085
Middle Management (92)	146.8	149.1	142.5		
Senior Management (16)	128.4	132.6	155.8		
Total (295)					

The post-hoc analysis reveals an important nuance: while middle management's perceptions (mean rank=146.8) bridge the junior-senior divide, the significant junior-senior gap in formal system complaints suggests leadership may underestimate infrastructure needs. This finding (Table 5) corroborates Meher & Mishra's (2019) observation that executives often focus on tool availability (tools unused: p=0.103) rather than systemic solutions. The lack of significant differences for awareness gaps (p>0.05) contrasts with Chaithanapat et al.'s (2022) findings in Asian SMEs, suggesting Lafarge's challenges are more structural than educational. These findings collectively indicate that Lafarge's KM gaps stem from inadequate foundational systems rather than role-specific issues, necessitating comprehensive reforms that address both technological infrastructure and hierarchical perception gaps.

Table 5: Post-hoc Dunn's Test Results (adjusted p-values)

Comparison	No Formal KM	Tools Unused	Lack Awareness
Junior vs. Middle Mgt	0.412	0.537	0.621
Junior vs. Senior Mgt	0.048*	0.103	0.287
Middle vs. Senior Mgt	0.089	0.156	0.453

Compartmentalized knowledge is Lafarge's top KM issue, cited by 42% of respondents, followed by management-staff disconnect (28%). As Participant 6 noted, "KM is seen as fluffy because it's not tied to performance metrics," reflecting a culture lacking incentives for knowledge sharing. This aligns with Meher & Mishra's (2019) assertion that KM fails without accountability. Only 25% of essential job knowledge is documented, according to 68.4% of staff, worsening inefficiencies. Hierarchical resistance further deepens gaps—top managers undervalue frontline needs (mean rank difference, p=0.048)—echoing barriers in SMEs (Ramos Cordeiro et al., 2024). Underuse of KM tools (11.9%) underscores a "know-do gap," where technology exists but adoption lags due to procedural and cultural constraints, as also observed by Chaithanapat et al. (2022) in Thai firms.

4.5 What are the Impacts of Knowledge Management on Decision Making in Lafarge Africa Plc?

The findings (*Table 6*) demonstrate significant impacts of knowledge management (KM) on decision-making at Lafarge Africa Plc, revealing a strong negative correlation (Spearman's $\rho = -0.612$, $p<0.001$) between KM tool usage and decision delays. This aligns with recent research by Melamed-Varela et al. (2020), who found that integrated KM systems reduce decision latency by 42% in manufacturing firms. The cross-tabulation shows stark contrasts: 78.9% of non-KM-tool users experience severe delays versus 0% among frequent users, mirroring Chaithanapat et al.'s (2022) findings about digital KM adoption in Thai SMEs. These results empirically validate that Lafarge's KM deficiencies directly impair operational responsiveness, with tool non-users being 4.8 times more likely to face severe delays than occasional users ($\chi^2=112.4$, $p<0.001$). The moderately strong association (Cramer's V=0.428) suggests KM tool adoption explains approximately 18% of variance in decision delays, comparable to Bousdekis et al.'s (2021) reported 15-22% efficiency gains from KM-enabled decision support systems.

Table 6: Spearman's Correlation between KM Tool Usage and Decision Delay Severity

Variable	KM Tool Usage Frequency	Decision Delay Severity
KM Tool Usage	1	-0.612**
Decision Delay	-0.612**	1

The analysis reveals departmental silos as another critical factor, with siloed units reporting significantly higher delay scores (M=4.12) than collaborative departments (M=3.02; t=6.74, p<0.001). This 1.10-point Likert scale difference (large effect size, d=1.18) supports Augustine et al.'s (2023) conclusion that knowledge silos increase operational delays by 35-50% in Nigerian manufacturers. The 95% CI [0.78, 1.42] confirms the reliability of this gap, which aligns with Abiola et al.'s (2024) finding that African firms with strong cross-departmental KM practices resolve issues 2.1 times faster. Notably, the 36% higher severe delay incidence in siloed departments echoes Mansour et al.'s (2021) identification of structural silos as primary KM barriers in emerging markets. These results (*Table 7*) collectively demonstrate that both technological (tool adoption) and organizational (silo reduction) KM dimensions substantially influence decision-making efficiency.

Table 7: Independent Samples t-test: Decision Delays in Siloed vs. Collaborative Departments

Group	n	Mean Delay Score	SD	t-statistic	df	p-value
Siloed Departments*	129	4.12	0.87	6.74	305	<0.001
Collaborative Departments	178	3.02	1.03			

The study's most compelling insight is the compound effect of poor KM practices: departments facing both low tool adoption and high siloization experience near-systematic decision delays (78.9% severe delays). This synergism aligns with recent frameworks by Sonmez Cakir et al. (2024), who argue that KM effectiveness requires simultaneous technological and cultural interventions. The findings (*Table 8*) suggest Lafarge could reduce delays by 61% (ρ=-0.612) through comprehensive KM improvements, particularly targeting tool adoption in siloed units. However, the persistence of moderate delays (30%) even among frequent KM tool users indicates additional unaddressed factors, possibly leadership or training gaps identified by Meher & Mishra (2019). These results provide quantitative evidence that Lafarge's decision-making challenges are primarily KM-driven, requiring integrated solutions that combine digital tools, cross-functional collaboration, and cultural change to achieve sustainable improvements.

Table 8: Cross-Tabulation of Delay Severity by KM Tool Usage

Delay Severity	Never Use KM Tools (n=185)	Occasionally Use (n=26)	Frequently Use (n=10)
Severe Delay (5)	78.90%	15.40%	0%
Moderate Delay (4)	18.40%	61.50%	30%
Minimal Delay (1-3)	2.70%	23.10%	70%

The study shows a clear causal link between poor KM and decision delays, with 62.6% of employees reporting moderate to severe slowdowns due to inaccessible knowledge. Maintenance teams lose 18–22 hours weekly retrieving quality-control data, and Participant 5 noted missed emissions targets from unshared best practices. These inefficiencies align with Melamed-Varela et al.'s (2020) view of KM-DSS integration as key to agility. A strong negative correlation ($\rho = -0.612$, $p < 0.001$) between KM tool use and delays confirms that better KM improves decision speed. Siloed teams face 36% more delays ($t = 6.74$, $p < 0.001$), supporting Bousdekis et al.'s (2021) findings on information flow barriers in manufacturing. The push for real-time dashboards (40.7%) reflects a broader shift toward data-driven decisions, as echoed in Zamiri & Esmaeili's (2024) study on digital KM adoption.

4.6 How can Knowledge Management Strategy Enable Decision Support Systems in Lafarge Africa Plc?

The findings in Table 9 highlight two key KM priorities for Lafarge employees: real-time dashboards (40.7%) and cross-department collaboration (29.3%). These align with research showing dashboards can boost decision

speed by 35% (Melamed-Varela et al., 2020) and silos cut productivity by 22% (Augustine et al., 2023). Low emphasis on training (10.4%) and documentation (19.5%) indicates deeper cultural and systemic barriers over skill gaps. The data supports a dual KM-DSS strategy: implement real-time dashboards for faster decisions and establish structured collaboration to break silos. This approach targets both tech gaps and cultural inertia, in line with challenges seen in African manufacturing (Abiola et al., 2024).

Table 9: Top KM Improvements for Decisions

Improvement	Frequency (n=614*)	Percentage (%)
Real-time data dashboards	250	40.7
Cross-departmental sharing	180	29.3
Standardized documentation	120	19.5
Training on DSS tools	64	10.4

*Total responses exceed 307 due to multi-select.

4.7 Summary of the Hypotheses Tests

The statistical analysis led to the rejection of three null hypotheses: (H_{1o}) was rejected as a strong negative correlation ($\rho = -0.612$, $p < 0.001$) was found between KM implementation and decision delays; (H_{3o}) was rejected with siloed departments showing significantly longer delays ($t = 6.74$, $p < 0.001$, $d = 1.18$); and (H_{4o}) was rejected as KM-DSS integration showed measurable performance improvements. However, (H_{2o}) was accepted ($\chi^2 = 6.82$, $p = 0.146$), indicating no significant differences in KM perceptions across job levels. These findings collectively demonstrate that while KM systems and structural factors significantly impact organizational outcomes, employee hierarchy does not substantially influence KM effectiveness assessments at Lafarge Africa Plc.

4.8 Recommendation

Based on the reviewed literature and research findings, four key recommendations were proposed to improve Knowledge Management (KM) implementation in Lafarge Africa Plc: (1) engage a consultant to design and set up a Knowledge Academy across the organisation, (2) implement a Knowledge Management System focused on knowledge-based decision support using an integrated KM strategy, (3) appoint internal experts to analyse, design, and implement an integrated KM framework, and (4) employ a senior management staff to strategically design and implement a KM strategy. To identify the most suitable option, a Preference Analysis was conducted using criteria such as cost, value, ease of implementation, and timeliness. The results showed that Option 1 scored 66, Option 2 scored 62, Option 3 scored 72, and Option 4 scored 70. With the highest score of 72, Option 3—appointing internal experts to develop and implement the KM framework—was identified as the most effective and practical solution, offering the best balance between value to the business and implementation feasibility.

5. Conclusion

Employees emphasized the need for real-time decision tools and better cross-functional collaboration to address current challenges. This study exposes major gaps in Lafarge Africa Plc's KM systems that hinder effective decision-making. The absence of structured KM frameworks, siloed departments, and cultural resistance severely limits knowledge access and use. These findings exacerbate the need for an integrated KM strategy that aligns technology with culture. For Lafarge and similar manufacturers in emerging markets, KM must be treated as a strategic priority, not a side function, as it directly affects efficiency and competitiveness. Building a knowledge-driven organization requires a unified approach combining tech upgrades with cultural transformation.

Ethics Declaration: This research adhered to stringent ethical standards, ensuring the confidentiality and anonymity of all participants. Informed consent was obtained prior to data collection, and participants were made aware of their right to withdraw at any point. The data collected was used solely for the purposes of this study, and all findings were presented objectively, without bias. The researchers-maintained impartiality throughout the study, and any potential conflicts of interest were disclosed and managed appropriately.

AI Declaration*:* This study acknowledges the use of AI-assisted tools for language refinement and data organization; however, all aspects of research design, data collection, analysis, and interpretation were conducted solely by the human researcher. AI applications were limited to grammar and syntax checking of

interview transcripts, formatting assistance for tables, and keyword extraction during thematic analysis. The core intellectual work—including interview execution, coding decisions, and conclusion formulation—remained entirely human-driven. All AI outputs were critically evaluated and verified against primary data at every stage to ensure accuracy and integrity.

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