

SUPPLY CHAIN MANAGEMENT AND THE SUSTAINABILITY OF FAMILY-OWNED SUPERMARKETS: EVIDENCE FROM KIAMBU COUNTY, KENYA

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ABSTRACT

Purpose of the study: The study examined the effect of supply chain management on the sustainability of family-owned supermarkets in Kiambu County, Kenya, using the Resource-Based View and Stewardship Theory.

Statement of the problem: Although supply chain management is central to retail sustainability, its specific contribution among family-owned supermarkets in Sub-Saharan Africa remains insufficiently established. Existing evidence is largely drawn from manufacturing firms, large retail chains, and family businesses outside the Kenyan supermarket context. This creates limited subsector-specific evidence to guide supply chain investment decisions.

Research methodology: The study adopted a pragmatist philosophy and a mixed-methods, cross-sectional survey design. Structured questionnaires were administered to 183 owners, managers, and supervisors from 70 registered family-owned supermarkets selected through multistage stratified sampling, complemented by key informant interviews. Quantitative data were analysed using Partial Least Squares Structural Equation Modelling in STATA.

Findings: Supply chain management recorded strong reliability and validity and a high composite mean ($M = 4.22$). It had a strong positive effect on sustainability ($\beta = 0.631$, $t = 11.349$, $p < .001$), explaining approximately 41.6% of the variance. Supplier diversification

and communication quality were the strongest practices, while interview findings linked supplier diversification to business continuity during disruptions.

Conclusion: The study concludes that supply chain management is a core operational capability supporting the sustainability of family-owned supermarkets. Supplier diversification, efficient lead-time management, and collaborative supplier relationships strengthen continuity and operational resilience.

Recommendations: The study recommends deliberate investment in supplier diversification, resilience and contingency planning, and collaborative supplier relationship systems. Family-owned supermarkets should institutionalise these practices in routine strategic and operational planning. Industry associations and county business development offices should widen access to vetted regional suppliers and shared logistics infrastructure.

Keywords: *Supply chain management, sustainability, family-owned supermarkets, resource-based view, PLS-SEM, Kenya*

BACKGROUND TO THE STUDY

Supply chain management, encompassing the sourcing, procurement, inventory, and logistics functions that connect a retailer to its suppliers and, ultimately, to its customers, sits at the operational core of supermarket retailing and is distinct from, although complementary to, the institutional oversight functions performed by governance. Kenya's retail sector illustrates the consequences of supply chain failure. Nakumatt's collapse in 2017 was driven substantially by its inability to meet supplier payment obligations. That failure triggered a progressive withdrawal of supplier goodwill and, ultimately, empty shelves that eroded the customer trust on which the brand of the retailer had been built (Kenya Institute for Public Policy Research and Analysis [KIPPRA], 2020; Nandonde, 2020).

Uchumi Supermarkets' prolonged financial distress similarly manifested in disrupted stock availability and strained supplier relationships, compounding the firm's underlying financial difficulties. The exit of the regional retailer Choppies from the Kenyan market has likewise been linked in part to the operational and logistical strain of sustaining a multi-country supply chain under financial pressure (The EastAfrican, 2021). These episodes demonstrate that, whatever the financial or governance origin of retail distress in Kenya, supply chain breakdown is frequently the mechanism through which that distress becomes visible to customers and, ultimately, fatal to the business.

Against this backdrop, family-owned supermarkets operating in Kiambu County, a county whose commercial geography is closely integrated with Nairobi's metropolitan retail and wholesale supply networks, face a continuous operational challenge. They must maintain reliable, cost-effective, and resilient supplier relationships in a retail subsector characterised by perishable inventory, high transaction frequency, and persistent exposure to stockouts of fast-moving consumer goods. Effective supply chain management may mitigate these pressures in three principal ways. Supplier base diversification reduces dependence on any single supplier and therefore reduces vulnerability to disruption. Lead time optimisation and delivery scheduling efficiency reduce waste and improve product availability. Collaborative supplier relationships underpinned by effective communication secure more favourable trading terms and more responsive problem resolution when disruptions occur.

STATEMENT OF THE PROBLEM

Supply chain management is central to supermarket retailing, and the recent retail history of Kenya repeatedly illustrates the consequences of supply chain breakdown. The relative magnitude of its effect on sustainability has not yet been established empirically within the family-owned supermarket subsector of Kenya, particularly when it is tested alongside competing strategic drivers such as governance, management skills, and succession planning within a unified structural model. Existing research relevant to this context is dispersed across general manufacturing firms, large multinational retail chains, grocery SMEs in other African countries, and family businesses in other regions. Owners of family-owned supermarkets in Kiambu County are therefore lack guidance specific to their own subsector and institutional context on how much of their limited strategic attention and capital should be allocated to supply chain investment relative to priorities such as governance formalisation, management training, or succession planning. This study addresses that gap.

RESEARCH OBJECTIVE

To determine the effect of supply chain management on the sustainability of family-owned supermarkets in Kiambu County, Kenya.

RESEARCH HYPOTHESIS

H₀: Supply chain management has no statistically significant effect on the sustainability of family-owned supermarkets in Kiambu County, Kenya.

LITERATURE REVIEW

This study draws its principal theoretical grounding from the Resource-Based View (RBV), developed by Barney (1991), which holds that firms achieve sustained competitive advantage through the possession and deployment of resources and capabilities that are simultaneously valuable, rare, imperfectly imitable, and non-substitutable. Applied to supply chain management, the Resource-Based View suggests that a well-diversified, resilient, and relationally embedded supplier network constitutes such a resource. It is valuable because it enables reliable product availability and cost control. It is relatively rare among smaller family-owned retailers, which may lack the negotiating leverage or administrative capacity to cultivate multiple supplier relationships. It is also difficult to imitate, because it depends on accumulated relational trust and firm-specific logistical knowledge developed over years of operational experience rather than on any single asset that a competitor could readily acquire or replicate. This framing positions supply chain management as more than a routine operational function; it is a potential source of strategic advantage that may distinguish sustainable family-owned supermarkets from less resilient competitors.

The study is also informed by Stewardship Theory (Donaldson & Davis, 1991), which was developed primarily to explain governance dynamics but extends to supply chain relationships in family-owned enterprises. Family-owned supermarkets that approach supplier relationships from a stewardship orientation, prioritising long-term relational trust and mutual benefit over short-term transactional advantage, are theorised to cultivate the collaborative supplier relationships and communication efficiency captured within the supply chain management construct of this study. Such relationships generate supplier goodwill that becomes valuable during periods of disruption or financial strain, especially when transactional, arm's-length supplier relationships are most vulnerable to breakdown.

Empirical studies have documented relationships between supply chain management and organisational sustainability or performance across diverse contexts. Pont and Simon (2025) established that supply chain reconfiguration strategies integrating supplier network diversification, systematic inventory optimisation, and digital ordering platforms significantly enhanced organisational resilience and sustainability outcomes among family businesses in Spain. Their investigation was conducted in the context of pandemic-related supply chain disruption. The crisis-resilience framing of that Spanish study offers a relevant comparative lens for this research. Family-owned supermarkets in Kiambu County likewise operate within

a retail environment subject to periodic supply disruptions arising from transport infrastructure constraints, seasonal agricultural supply fluctuations, and currency-related import cost volatility, all of which place a premium on the supplier diversification and relationship resilience captured by the supply chain management construct of this study.

Monnagaaratwe and Mathu (2022) demonstrated that robust supply chain management practices produced statistically significant improvements in cost-effectiveness, operational efficiency, and sustainability performance among grocery SMEs in South Africa. That study is among the most directly comparable prior investigations to this research, both in retail subsector, since it examined grocery and general merchandise retailing, and in firm scale, since the sampled small and medium enterprises operated with administrative and financial resources broadly comparable to those available to family-owned supermarkets in Kiambu County. The convergence between their South African findings and the Kenyan findings reported here, discussed further in Section 5, provides regional evidence of the sustainability-enhancing effect of supply chain management within economically comparable retail contexts.

Negi (2021), in a systematic review of the supply chain resilience literature, synthesised evidence that resilience capabilities, including supplier diversification, redundancy planning, and collaborative information sharing, consistently and positively predicted organisational performance and continuity across a wide range of industries. The review also identified persistent gaps in the empirical application of resilience frameworks to small and family-owned enterprises, a gap that this study addresses within the Kenyan family-owned supermarket subsector. Allam et al. (2021) examined the relationship between green supply chain management practices and organisational profitability. They found that environmentally oriented practices, including waste reduction and efficient resource utilisation, were positively associated with firm profitability. This result lends indirect support to the present finding that the waste-reduction dimension of supply chain management, captured through lead time optimisation and delivery scheduling efficiency, contributes to overall sustainability performance.

A further body of evidence relevant to this study concerns the specific operational sub-dimensions of supply chain management that most strongly predict performance outcomes. Killen et al. (2012), extending strategic management theory into project and operational capability research, argued that operational capabilities become sources of sustained competitive advantage when they are difficult for competitors to observe and replicate in the

short term. Firm-specific supplier relationship quality, of the kind captured in the SCM5 and SCM6 items that measure collaborative relationships and communication efficiency, satisfies that criterion more readily than practices such as basic inventory tracking, which are easily observed and copied. This distinction helps explain why the relational indicators SCM5 and SCM6 recorded among the highest CFA loadings within the supply chain management construct (0.813 and 0.840 respectively). Consistently with the framework of Killen et al. (2012), relationally embedded practices are the sub-dimensions of supply chain management most likely to function as durable strategic resources rather than as easily copied operational routines.

Two additional considerations clarify this study's contribution. First, the foundational Resource-Based View literature, including the extension of resource-based thinking into project and operational capability domains by Killen et al. (2012), establishes that operational capabilities, supply chain capabilities among them, can constitute strategic resources in the sense proposed by Barney (1991) when they are sufficiently firm-specific and difficult to replicate. The present study tests that proposition within the family-owned supermarket context. Second, none of the studies reviewed above examines the effect of supply chain management on sustainability within the family-owned supermarket subsector of Kenya using a structural equation modelling approach capable of testing its relative explanatory power alongside governance, management skills, and succession planning within the same firms. This constitutes the central contextual, conceptual, and methodological gap addressed by the study.

THEORETICAL SYNTHESIS AND HYPOTHESIS DEVELOPMENT

The Resource-Based View and Stewardship Theory converge, for supply chain management, on a shared prediction that is distinct from, though complementary to, the governance-focused prediction developed in the companion article drawn from this parent study. Whereas the theorised effect of governance operates primarily through institutional oversight and accountability mechanisms, that of supply chain management operates through the accumulation of firm-specific operational and relational capability, namely supplier network breadth, logistical efficiency, and relational trust with suppliers, which competitors cannot replicate quickly. Both drivers should therefore predict sustainability positively, but the mechanisms through which they do so are conceptually distinct. Governance primarily prevents the internal, family-related failures of ownership conflict and accountability breakdown documented in cases such as the collapse of Tuskys, whereas supply chain

management primarily prevents the external, operational failures of supplier arrears, stockouts, and disrupted product availability documented in cases such as the collapse of Nakumatt. The near-parity in the structural effect sizes of these two drivers, reported in Section 4.4, supports the proposition that internally oriented and externally oriented strategic capabilities are similarly consequential for the sustainability of family-owned supermarkets. This finding has direct implications for how owners should allocate limited strategic attention between internally focused governance reform and externally focused supply chain investment.

Based on this theoretical grounding and the empirical evidence reviewed above, this study formally hypothesised, in its null form, that supply chain management has no statistically significant effect on the sustainability of family-owned supermarkets in Kiambu County, Kenya. The following sections detail the methodology used to test this hypothesis and report the results obtained.

RESEARCH METODOLOGY

This study adopted a pragmatist research philosophy that supported a mixed-methods design in which quantitative surveys tested the hypothesis of the study and qualitative key informant interviews explained the mechanisms underlying the observed relationships (Creswell & Creswell, 2018). The study employed a sequential explanatory design structured as a cross-sectional survey, combining quantitative and qualitative analysis to characterise the study variables and to examine the effect of supply chain management on sustainability.

The unit of analysis was the family-owned supermarket, of which 70 are registered in Kiambu County, while the unit of observation was the individual employee drawn from the top, middle, and lower management tiers of these establishments, giving a target population of 350. Using the sample size formula of Cochran (1977) at a 95 percent confidence level and a 5 percent margin of error, a sample of 183 respondents was derived. A multistage stratified sampling procedure was employed to ensure geographic and operational diversity. Supermarkets were first clustered by sub-county and stratified into large, medium, and small operational tiers. Simple random sampling was then applied within each stratum, and proportional representation was maintained across the top, middle, and lower management levels.

Supply chain management was operationalised through six indicator items that evaluated the breadth of supplier diversification, the robustness of supply chain resilience to external shocks, the optimisation of lead times for consistent product availability, operational waste reduction through efficient delivery scheduling, the depth of collaborative relationships with key

suppliers, and the communication quality that underpins supplier partnership effectiveness. The six indicators were constructed to reflect the dual strategic and operational character of supply chain management identified in the retail operations literature, spanning longer-term structural choices such as supplier base diversification and shorter-term operational practices such as lead time optimisation and delivery scheduling efficiency. This breadth of operationalisation is important for grocery supermarket retail, where perishable inventory categories impose timing and reliability demands on supplier relationships that are less pronounced in non-perishable retail subsectors. Sustainability, the dependent variable, was assessed through financial performance, internal business processes, family culture, and leadership quality, each measured on a five-point Likert scale, consistent with the operationalisation applied throughout the parent doctoral investigation.

Instrument reliability and validity were established before full data collection through a pilot study administered to respondents outside the main sampling frame, followed by confirmatory factor analysis (CFA) and internal consistency testing on the full dataset. Data were collected through structured, closed-ended questionnaires administered to owners, managers, and supervisors, complemented by key informant interviews with selected supermarket owners to provide qualitative corroboration of the quantitative findings. Of the 183 targeted respondents, 181 returned usable questionnaires, giving a response rate of 98.9 percent. Variance-based structural equation modelling through the partial least squares (PLS-SEM) algorithm was adopted as the principal analytical technique (Dijkstra & Henseler, 2015). All structural model estimations were executed using the `plsem` command in STATA 17, with 5,000 bootstrap replications employed to derive bias-corrected confidence intervals for the reported path coefficient. The simple structural effect of supply chain management on sustainability was estimated as:

$$Y = \beta_0 + \beta_{SCM} + \varepsilon$$

where Y represents sustainability, SCM represents supply chain management, β_0 is the constant term, β is the standardised path coefficient, and ε is the error term. Before hypothesis testing, the measurement model was subjected to diagnostic and psychometric assessment, including outer model indicator loadings, internal consistency reliability, convergent validity, discriminant validity, and structural-level multicollinearity testing. These results are reported alongside the substantive supply chain management findings in the following section. Ethical clearance was secured from the Institutional Scientific and Ethics Review Committee (ISERC)

of the university before data collection, and a research licence was obtained from the National Commission for Science, Technology and Innovation (NACOSTI).

RESULTS

Sample Characteristics

The achieved sample therefore comprised 181 respondents. Table 1 presents the demographic and organisational profile of that sample.

Table 1: Demographic and Organisational Profile of Respondents

Characteristic	Category	Frequency	Percent
Position in supermarket	Owner	3	1.6%
	Manager	31	17.4%
	Supervisor	144	81.0%
Highest education level	Secondary	8	4.5%
	College diploma	94	53.1%
	Bachelor's degree	55	31.1%
	Postgraduate	20	11.3%
Years in operation	Less than 5 years	≈29%	≈29%
	5 years and above	≈71%	≈71%

Note. n = 181. Source: Field Data.

The composition of the sample was skewed towards supervisory personnel (81.0 percent), who have day-to-day operational visibility into supplier relationships, inventory management, and delivery scheduling. This composition is well suited to the assessment of supply chain management, because supervisors execute the supplier ordering, receiving, and stock management functions that the construct is designed to capture. Their operationally grounded vantage point complements the more strategic perspective of owners and managers, who formed the remaining 18.9 percent of the sample.

Measurement Model: Reliability and Validity of the Supply Chain Management Construct

Table 2 presents the item-level statistics, reliability, and confirmatory factor analysis (CFA) loadings for the supply chain management construct.

Table 2: Supply Chain Management Item Statistics, Reliability, and Convergent Validity

Item	Mean	SD	Item-Total r	CFA Loading
SCM1: Diverse supplier base improves operational resilience	4.32	0.67	0.671	0.847
SCM2: Supply chain is resilient to external disruptions	4.10	0.72	0.652	0.814
SCM3: Lead times are optimised for consistent product delivery	4.20	0.73	0.578	0.703
SCM4: Shorter lead times reduce waste and improve efficiency	4.24	0.74	0.664	0.824
SCM5: Strong collaborative relationships maintained with suppliers	4.19	0.76	0.648	0.813
SCM6: Positive supplier relations promote communication efficiency	4.25	0.72	0.679	0.840
Composite (Cronbach's α = 0.856; CR = 0.885; AVE = 0.562)	4.22	0.72	—	—

Note. CFA = Confirmatory Factor Analysis; CR = Composite Reliability; AVE = Average Variance Extracted. Source: Field Data.

All six supply chain management items recorded CFA loadings above the 0.70 threshold, which indicates high psychometric quality for the construct. SCM1, which represents supplier base diversification (0.847), and SCM6, which captures communication efficiency through positive supplier relations (0.840), were the strongest indicators. Supply network breadth and inter-organisational relationship quality were therefore the most discriminating supply chain dimensions. SCM3, which pertains to lead time optimisation (0.703), recorded the lowest loading, although it still exceeded the threshold. A Cronbach's alpha of 0.856 and a composite reliability of 0.885 were the highest values recorded across all constructs examined in the parent study, and an average variance extracted of 0.562 satisfied the convergent validity criterion. Supply chain management thus represents the most psychometrically robust measurement instrument among the strategic driver constructs examined in the parent doctoral investigation.

Discriminant Validity and Structural Collinearity Diagnostics

Discriminant validity was assessed using both the Fornell-Larcker criterion (Fornell & Larcker, 1981) and the Heterotrait-Monotrait (HTMT) ratio of correlations. Table 3 presents both sets of results for supply chain management in relation to the sustainability outcome variable and the remaining strategic drivers.

Table 3: Discriminant Validity, Fornell-Larcker Criterion, and HTMT Ratios

Construct Pairing	Fornell-Larcker ($\sqrt{\text{AVE}}$, diagonal)	Correlation	HTMT Ratio
Supply Chain Management ($\sqrt{\text{AVE}} = 0.750$)	0.750	—	—
SCM ↔ Sustainability	—	0.628	0.714
SCM ↔ Management Skills	—	0.287	0.339
SCM ↔ Succession Planning	—	0.264	0.308
SCM ↔ Governance	—	0.412	0.481

Note. AVE = Average Variance Extracted; HTMT = Heterotrait-Monotrait Ratio; SCM = Supply Chain Management. All HTMT values fall below the conservative 0.85 threshold, confirming discriminant validity. Source: STATA plssem output, Field Data.

The square root of the AVE for supply chain management (0.750) exceeded its correlation with every other construct in the model, which satisfies the Fornell-Larcker criterion for discriminant validity. This margin was also the largest recorded among the four strategic drivers examined, consistently with the superior psychometric performance of the construct documented in Section 4.2. All HTMT ratios involving supply chain management fell below the 0.85 threshold. At the structural level, supply chain management recorded a variance inflation factor of 1.298 against the competing strategic drivers, which is below the 5.0 threshold and confirms that its structural effect on sustainability, reported in Section 4.4, is not confounded by multicollinearity. The Breusch-Pagan and Cook-Weisberg test applied to the overall structural model was not statistically significant ($p = 0.692$), which supports the assumption of homoscedasticity. Harman's single-factor test returned a first unrotated factor accounting for 49.8 percent of total variance, below the 50 percent threshold conventionally treated as indicative of common method bias.

Descriptive Findings

Table 4 presents the descriptive frequency distribution and item-level statistics for the six supply chain management indicators.

Table 4: Supply Chain Management Descriptive Statistics

Statement	SD	D	N	A	SA	Mean	SD
Diverse supplier base improves operational resilience	1.1%	1.7%	9.9%	38.7%	48.6%	4.32	0.67
Supply chain is resilient to external disruptions	1.1%	2.2%	13.3%	51.9%	31.5%	4.10	0.72
Lead times optimised for consistent delivery	1.1%	1.1%	14.9%	42.0%	40.9%	4.20	0.73
Shorter lead times reduce waste and improve efficiency	1.1%	1.1%	13.8%	40.9%	43.1%	4.24	0.74
Collaborative supplier relationships maintained	1.1%	1.7%	15.5%	40.3%	41.4%	4.19	0.76
Positive supplier relations promote communication efficiency	1.1%	1.1%	13.8%	39.8%	44.2%	4.25	0.72
Composite Mean						4.22	0.72

Note. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree.
Source: Field Data.

Supply chain management attained the highest composite mean of all constructs examined in the parent study ($M = 4.22$), which reflects near-universal adoption of effective supply chain practices among the respondents. The highest-rated item was SCM1, which states that a diverse supplier base improves operational resilience ($M = 4.32$). Family-owned supermarkets in Kiambu County appear, therefore, to have diversified their supplier networks as a core risk mitigation strategy, given the vulnerability of retail operations to single-supplier dependency. SCM6, on the contribution of positive supplier relations to communication efficiency ($M = 4.25$), and SCM4, on the effect of shorter lead times on waste and efficiency ($M = 4.24$), were the second and third most highly rated items respectively, which reflects the operational maturity of these supermarkets in supply chain coordination. The lowest-rated item was SCM2, on resilience to external disruptions ($M = 4.10$). Although this value still reflects strong agreement, it indicates a more cautious assessment of preparedness for external shocks within an otherwise strong performance profile.

The consistency of high scores across all six supply chain management indicators, with little item-to-item variation relative to the other constructs examined in the parent study, indicates that operational competence in supplier management and logistics is embedded as a standard business practice among family-owned supermarkets in Kiambu County. This near-uniform endorsement suggests that effective supply chain management functions less as a strategic differentiator than as a baseline operational competency that surviving family-owned supermarkets in this competitive retail environment have had to develop. That competitive-survival interpretation is examined further in Section 5, alongside the strong direct effect of supply chain management on sustainability.

A closer, item-by-item reading of Table 4 reinforces this pattern. Each of the six supply chain management items recorded a combined agree and strongly agree response rate above 80 percent, the most uniformly high level of endorsement recorded for any construct examined in the parent doctoral investigation. This uniformity contrasts with the wider spread of agreement levels documented for governance items in the companion article drawn from this parent study, where board independence recorded a combined agreement level of 58.4 percent against 80.2 percent for formal transition planning. The narrower spread observed here suggests that supply chain management practices have been adopted comprehensively and uniformly across all six constituent dimensions, whereas governance sub-practices appear to have been adopted selectively. This pattern is consistent with the broader interpretation of supply chain management as a baseline competitive-survival competency rather than a selectively adoptable strategic option.

Structural Model: Effect of Supply Chain Management on Sustainability

Table 5 presents the results of the simple path analysis conducted with supply chain management as the predictor and sustainability as the outcome.

Table 5: Effect of Supply Chain Management on Sustainability

	Unstandardised B	Std. Error	Standardised β	t-value	p-value
(Constant)	1.074	0.267	—	4.022	< .001
Supply Chain Management	0.715	0.063	0.631	11.349	< .001

Note. Dependent Variable: Sustainability. 95% bias-corrected bootstrap confidence interval for β : [0.521, 0.741]; $R^2 \approx 0.416$. Source: STATA plssem output, Field Data.

Table 6 presents the structural model fit indices computed for the total-effects specification within which the path from supply chain management to sustainability was estimated.

Table 6: Structural Model Fit Indices

Fit Index	Saturated Model	Estimated Model	Interpretation
SRMR	0.058	0.064	Acceptable fit (below 0.08 conservative threshold)
d_ULS	0.612	0.697	Acceptable; modest increase from saturated model
d_G	0.331	0.368	Acceptable; modest increase from saturated model
Chi-square	186.204	191.850	Small increase; interpreted with caution in PLS-SEM
NFI	0.771	0.759	Moderate-to-good fit

Note. SRMR = standardised root mean square residual; d_ULS = squared Euclidean distance; d_G = geodesic distance; NFI = normed fit index. Source: STATA plssem output, Field Data.

PLS-SEM path analysis showed that supply chain management exerted a strong, positive, and statistically significant effect on sustainability ($\beta = 0.631$, $t = 11.349$, $p < .001$). The 95 percent bootstrap confidence interval [0.521, 0.741] excluded zero, which confirms the robustness of the effect. The path coefficient of 0.631 recorded for supply chain management is only marginally smaller than the 0.652 recorded for governance in the parent structural model. Supply chain management is therefore the second strongest individual strategic driver of sustainability among the four examined, and institutional governance and operational supply chain capability are of near-equivalent strategic importance in this sample. Considered independently, supply chain management explained approximately 41.6 percent of the variance in sustainability, the second largest share of variance explained by any individual strategic driver examined, trailing the 42.9 percent recorded for governance only narrowly. Effect size analysis classified the contribution of supply chain management to the full structural model as small to medium ($f^2 = 0.093$; Cohen, 1988), the second largest individual effect size recorded among the four strategic drivers.

This near-parity between governance and supply chain management, both of which outperform management skills and succession planning in standalone effect size, indicates an empirical distinction between strategic drivers that operate at the institutional and oversight level and those that operate at the day-to-day operational level. Sustainability among family-owned supermarkets in Kiambu County appears to depend similarly on sound institutional oversight

and on sound operational logistics, with less of the variance attributable to individual management competence or succession preparedness alone.

Qualitative Corroboration

Qualitative evidence gathered through key informant interviews strongly corroborated the supply chain management-sustainability relationship documented quantitatively. The owner of a mid-sized supermarket chain operating three branches across Kiambu County described a deliberate decision, taken five years earlier, to diversify from two to seven regular suppliers across key product categories. That decision allowed the business to maintain consistent shelf availability during a period when several competitors experienced prolonged stockouts caused by a regional transport disruption affecting a small number of dominant suppliers. He explained that the strategy, although it initially increased administrative complexity, became a competitive advantage during the kind of external shock that the quantitative supply chain resilience item (SCM2) was designed to capture.

A second key informant, a manager responsible for procurement across two affiliated family-owned supermarkets, reported that regular, structured communication with key suppliers, including scheduled monthly review meetings, enabled the business to negotiate more flexible payment terms during a period of tight cash flow. She believed that such terms would not have been available had the business maintained only transactional, arm's-length supplier relationships. These accounts reinforce the quantitative finding that supplier diversification and relational communication quality are not merely correlated with the sustainability outcomes documented in this study but appear to be instrumental in producing them.

DISCUSSION OF THE FINDINGS

The finding that supply chain management exerts the second-strongest individual effect on sustainability among family-owned supermarkets in Kiambu County, trailing governance only marginally, both confirms and extends the existing empirical literature on supply chain management and retail sustainability. Pont and Simon (2025) demonstrated that supply chain reconfiguration strategies integrating supplier diversification, inventory optimisation, and digital ordering significantly enhanced resilience and sustainability among family businesses in Spain, a crisis-oriented finding that resonates with the qualitative evidence reported here, in which an owner attributed the continuity of his business during a period of regional transport disruption to a prior investment in supplier base diversification. The convergence between the Spanish and Kenyan evidence, obtained in substantially different economic and institutional

contexts, suggests that the protective effect of supplier diversification during periods of disruption reflects a general operational logic rather than one specific to either the European or the East African retail environment.

Monnagaaratwe and Mathu (2022), examining grocery SMEs in South Africa, found that supply chain management practices produced statistically significant improvements in cost-effectiveness, operational efficiency, and sustainability performance. Their study is among the most directly comparable prior investigations to this research, given its shared focus on grocery retailing and on small and medium enterprise scale. The consistency between their South African findings and the Kenyan findings reported here provides regional evidence that supply chain management is a robust determinant of sustainability among African grocery retailers operating under comparable resource constraints. This consistency strengthens confidence that these findings reflect a regional pattern rather than an artefact specific to Kiambu County.

Negi (2021) found in a systematic review that supply chain resilience capabilities consistently and positively predict organisational performance and continuity across diverse industries, while also identifying a persistent gap in the empirical application of resilience frameworks to small and family-owned enterprises. The present findings address that gap. By demonstrating that supply chain management, including its resilience dimension, exerts a strong and statistically robust effect on sustainability within a family-owned retail context, this study extends the broader resilience literature into the under-examined enterprise type that the systematic review identified as requiring further empirical attention. The finding of Allam et al. (2021) that waste-reduction-oriented green supply chain practices are positively associated with firm profitability similarly resonates with this result that the waste-reduction dimension of supply chain management, operationalised here through lead time optimisation and delivery scheduling efficiency (SCM3 and SCM4), contributed to the overall effect of the construct on sustainability. SCM4 recorded one of the higher item-level means ($M = 4.24$) and CFA loadings (0.824) among the six supply chain indicators examined.

THEORETICAL IMPLICATIONS

The present findings extend the application of the Resource-Based View into the domain of supply chain management in family-owned supermarkets by demonstrating that a firm-specific, relationally embedded supplier network functions as the kind of valuable, rare, and difficult-to-imitate resource that the framework of Barney (1991) predicts will generate sustained competitive advantage. The strong measurement properties recorded for the supply

chain management construct, namely the highest composite reliability, convergent validity margin, and discriminant validity margin among all constructs examined in the parent investigation, are themselves theoretically informative. They suggest that supply chain management is measured with unusual clarity and internal coherence by respondents. This clarity may reflect the fact that supply chain practices, unlike governance practices, are experienced continuously through the daily routines of ordering, receiving, and stocking merchandise with which the predominantly supervisory sample is familiar.

The theoretical distinction proposed in Section 2.1, between the internally oriented protective function of governance and the externally oriented protective function of supply chain management, receives further support from the qualitative evidence discussed in Section 4.5. Both accounts, the first concerning supplier diversification during a regional transport disruption and the second concerning relational supplier communication during a period of tight cash flow, describe mechanisms through which supply chain management buffers the firm against externally originating shocks. That mechanism is theoretically distinct from the internally originating conflict-prevention function that governance was shown to perform in the companion article drawn from this parent study. The applicability of Stewardship Theory to supply chain relationships, evidenced by the value that the sampled owners placed on relational rather than transactional supplier engagement, therefore operates as a secondary mechanism that enhances relationship quality. It is layered on the primary mechanism of accumulated, firm-specific supplier network capability identified by the Resource-Based View.

MANAGERIAL AND POLICY IMPLICATIONS

For family-owned supermarket owners, these findings carry a clear practical implication. Supply chain investment, and specifically supplier base diversification and relational supplier engagement, should be treated as among the highest-priority strategic investments available. Its expected sustainability return is comparable to that of governance formalisation and exceeds the return expected from management skills development or succession planning alone. Owners who have not yet diversified their supplier base beyond a small number of dominant suppliers should treat diversification as an urgent priority, given the vulnerability of concentrated supplier dependency to regional disruption illustrated in the qualitative evidence reported here. For owners who have already achieved strong supplier diversification, as the uniformly high descriptive scores in Section 4.3 suggest most of the sampled supermarkets have, the lower rating recorded for resilience to external disruption (SCM2, $M = 4.10$) indicates

that further sustainability gains may be available through formal contingency planning, such as pre-identified backup suppliers for critical product categories, rather than through incremental supplier base expansion alone.

For policymakers, industry associations, and business development organisations supporting the retail sector in Kiambu County, these findings suggest that interventions aimed at strengthening supplier network infrastructure would address the operational vulnerability identified here as most consequential for sustained retail viability in this subsector. Such interventions include facilitating introductions between family-owned supermarkets and a wider pool of vetted regional suppliers, and supporting shared logistics and warehousing infrastructure that would reduce the fixed cost of supplier diversification for individual small retailers.

SUPPLY CHAIN LESSONS FROM KENYA'S RETAIL FAILURES

The present findings gain further interpretive depth when read against the supply chain failures documented in the recent retail history of Kenya and introduced in Section 1.1. The collapse of Nakumatt in 2017 involved a progressive breakdown in supplier payment obligations that triggered a withdrawal of supplier goodwill and, ultimately, the empty shelves that became the most visible public symptom of its distress (KIPPRA, 2020; Nandonde, 2020). Viewed through the supply chain management lens developed in this study, that experience illustrates the risk that supplier base diversification and collaborative, communication-rich supplier relationships, the two most strongly rated indicators in the supply chain management construct (SCM1, $M = 4.32$; SCM6, $M = 4.25$), are theorised to mitigate. A retailer with a diversified, relationally invested supplier base is less exposed to the risk that a payment difficulty with a single dominant supplier escalates into a business-threatening stock availability crisis.

The exit of Choppies from the Kenyan and wider East African market has similarly been linked to the operational and logistical strain of sustaining a multi-country supply chain under financial pressure (The EastAfrican, 2021). That failure mode speaks to the resilience dimension of supply chain management (SCM2), which recorded the lowest item-level mean among the six supply chain indicators in this study ($M = 4.10$). Although this remains a comparatively strong rating in absolute terms, its position as the weakest item within an otherwise uniformly high-scoring construct suggests that resilience to major, systemic disruption, as distinct from routine supplier reliability, may represent a residual vulnerability even among the better-managed family-owned supermarkets operating in Kiambu County.

This reinforces the practical urgency of the contingency planning recommendation developed in Section 6.

CONCLUSION

This study set out to examine the effect of supply chain management on the sustainability of family-owned supermarkets in Kiambu County, Kenya. The evidence demonstrates that supply chain management is the second most powerful individual driver of sustainability among the strategic drivers examined, trailing governance only marginally. Supplier base diversification, resilience to disruption, lead time optimisation, waste reduction, and collaborative supplier relationships together explain a substantial proportion of the variation in sustainability observed in the data. Supply chain management has, on this evidence, become a baseline operational competency that is virtually indispensable for continued survival among family-owned supermarkets operating in the competitive retail environment of Kiambu County, rather than a differentiating strategic choice reserved for the most sophisticated operators.

CONTRIBUTION TO KNOWLEDGE

This study makes three distinct contributions to knowledge. Theoretically, it extends the application of the Resource-Based View into the previously under-examined domain of supply chain management in Kenyan family-owned supermarkets, demonstrating that firm-specific, relationally embedded supplier networks function as a strategic resource in the sense proposed by Barney (1991). It also extends the supply chain resilience literature reviewed by Negi (2021) into the family-owned enterprise context that the review identified as requiring further empirical attention. Empirically, and to the knowledge of the authors, the study contributes the first evidence quantifying the relative explanatory power of supply chain management for sustainability against competing strategic drivers within the family-owned supermarket subsector of Kenya. It establishes supply chain management as the second most powerful individual predictor among the drivers examined, trailing only governance. Methodologically, the study demonstrates the value of combining partial least squares structural equation modelling with qualitative key informant triangulation in supply chain management research. This approach allowed the quantitative strength of the effect to be explained through the operational experience of practising family-owned supermarket owners and managers.

RECOMMENDATIONS

Three specific recommendations follow directly from these findings. First, family-owned supermarkets that have not yet diversified their supplier base beyond a small number of dominant suppliers should prioritise supplier network diversification as an urgent risk-mitigation measure. The vulnerability of concentrated supplier dependency was documented both quantitatively, through the status of SCM1 as the highest-rated supply chain indicator, and qualitatively, through the key informant account of diversification protecting business continuity during a regional transport disruption.

Second, family-owned supermarkets should formalise supply chain disruption contingency planning to address the comparative weakness identified in resilience to external disruption (SCM2, $M = 4.10$, the lowest-rated supply chain item in this study). Practical contingency measures could include identifying and maintaining limited relationships with backup suppliers for critical, fast-moving product categories, even where those suppliers are not used for routine ordering, so that a rapid switch is possible if a primary supplier relationship is disrupted.

Third, family-owned supermarkets should invest in structured supplier communication systems, such as scheduled periodic review meetings with key suppliers. Such systems would build on the foundation of supplier communication efficiency documented in this study (SCM6, $M = 4.25$) and would extend it into a systematic and replicable organisational practice rather than one that depends on the relational skill of an individual manager or owner. The qualitative evidence gathered in this study, in which structured supplier communication was credited with securing more favourable payment terms during a period of tight cash flow, provides a replicable template that industry associations and county business development offices could promote among family-owned retailers seeking to strengthen supplier relationship resilience.

A fourth, cross-cutting recommendation concerns the strategic sequencing of investment across governance and supply chain management, the two strongest strategic drivers identified in this parent investigation. Given the near-parity of their effect sizes ($\beta = 0.652$ for governance and $\beta = 0.631$ for supply chain management), owners with limited strategic attention or capital available for improvement initiatives should not treat these two domains as substitutes for one another but should pursue parallel, incremental investment in both. The theoretical and qualitative evidence reviewed in Section 5 indicates that governance and supply chain management protect the business against distinct failure modes, internal family conflict and external operational disruption respectively, which are not mutually compensating.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Several limitations qualify the generalisability of the findings. The cross-sectional survey design constrains the strength of causal inference that can be drawn from the structural model, because supply chain management and sustainability were measured at a single point in time. Longitudinal designs that track the same family-owned supermarkets across successive supply chain investment decisions and subsequent disruption episodes would permit stronger verification of causal ordering. Such designs would also allow researchers to test directly whether supplier diversification undertaken in anticipation of disruption produces measurably better outcomes than diversification undertaken after a disruption has occurred. The geographic focus on Kiambu County limits generalisability to other Kenyan counties. Future research should replicate this investigation in other commercially active counties to establish whether the sustainability pathway identified here holds nationally.

Sustainability was operationalised through the perceptual self-assessments of respondents, which may be subject to social desirability bias. Future research should triangulate these perceptions with objective supply chain performance indicators such as documented stockout frequency, supplier lead time records, and inventory turnover ratios. Such indicators would allow the relationship identified here to be verified against outcomes less susceptible to respondent bias. The occupational composition of the sample, weighted towards supervisory personnel (81.0 percent), was appropriate for capturing day-to-day operational realities, as discussed in Section 4.1, but it may under-represent the ownership-level perspective on supply chain investment decisions. Future research could oversample owners and senior managers and examine whether their assessment of supply chain resilience priorities diverges from that of supervisory personnel.

Because this article reports the effect of supply chain management separately from the moderating variable of the parent study, future research should examine whether external environmental factors, including regulatory volatility, fuel price fluctuations, and currency exchange rate movements, moderate the relationship documented here. This direction is important because several of the disruption mechanisms discussed in Section 4.5, including regional transport disruption, are tied to the external environmental volatility that the moderating variable was designed to capture at the aggregate strategic driver level. Finally, supply chain management and governance were shown in the parent investigation to be the two dominant strategic drivers of sustainability, with only a modest correlation between them ($r =$

0.412, reported in Table 4). Future research employing an interaction or moderated-mediation design could examine whether the two constructs interact, for instance whether strong governance amplifies the sustainability benefit of supply chain investment by subjecting supplier-related decisions to more disciplined and accountable processes.

Overall, this study makes a focused empirical contribution by isolating supply chain management as the second most consequential strategic driver of sustainability among family-owned supermarkets in Kenya. The finding extends the explanatory reach of the Resource-Based View into the domain of family retail supply chain management and offers owners, and the policymakers who support them, an empirically grounded investment priority to be pursued alongside, rather than instead of, governance formalisation.

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