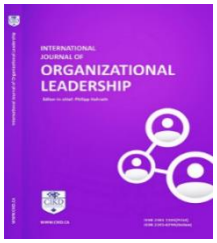
International Journal of Organizational Leadership 14(2025) 471-491



INTERNATIONAL JOURNAL OF ORGANIZATIONAL LEADERSHIP

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Leadership in Supply Chain Integration: Mediating the Impact of SCM Practices on Agribusiness Performance in Ethiopia

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Keywords:
Agribusiness performance, Supply chain integration, Supply chain management practices, Mediation, Ethiopia

Received
13 May 2025
Received in revised form
16 June 2025
Accepted
23 June 2025

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ABSTRACT

This study investigates the mediating role of leadership in supply chain integration (SCI) within the relationship between supply chain management practices (SCMPs) and agribusiness performance in Ethiopia's Oromia region. Drawing on a stratified sample of 256 agribusiness leaders, data were collected via structured questionnaires assessing SCMPs (information sharing, customer relationships, supplier partnerships, and responsiveness), leadership-driven SCI, and performance. Structural equation modeling revealed that information sharing and customer relationship management significantly and directly enhanced both supply chain integration and performance. Leadership-driven SCI partially mediated the positive relationships between information sharing and performance, and customer relationship management and performance, demonstrating how leaders fostering integration amplify SCMP efficacy. Crucially, strategic supplier relationships did not significantly influence SCI, though they directly improved performance. Moreover, supply chain responsiveness directly benefited performance, but SCI negatively mediated its relationship with performance. This suggests a trade-off where rapid responsiveness in this context may inadvertently hinder deeper integration. The study reveals that leadership is vital for SCI, especially in the context of Ethiopia's infrastructural and climatic challenges. These findings advance organizational leadership theory by positioning leadership as a dynamic capability, bridging resource-based and network theories, and offering a context-dependent view of the integration role of supply chain responsiveness. Practical implications advocate for leadership development that emphasizes stakeholder coordination, customer engagement, and context-specific, subtle SCMP adaptations, promoting sustainable performance gains for agribusinesses in similar developing contexts.

In an era of globalized markets and persistent disruptive shocks, from climate change to geopolitical crises, effective Supply Chain Management (SCM) has transcended mere operational efficiency to become a critical determinant of organizational resilience and enduring competitive advantage (Dubey et al., 2018; World Bank, 2023). Robust SCM practices (SCMPs), encompassing strategic supplier partnerships, transparent information sharing, and proactive customer relationship management, are empirically proven to reduce operational costs, enhance delivery efficiency, and significantly improve overall firm performance (Alahmad, 2021; Kwamega et al., 2019; Walden, 2021). However, the precise mechanisms through which these SCMPs translate into sustainable performance gains remain underexplored, particularly in developing contexts characterized by institutional voids and pervasive infrastructural gaps that necessitate highly adaptive approaches (Balouza, 2024; Rahman, 2022). This study addresses this critical gap by specifically investigating the mediating role of leadership-driven Supply Chain Integration (SCI) in Ethiopia's agribusiness sector, a vital yet understudied setting where agriculture directly sustains 80% of national livelihoods (World Bank, 2023).

SCI, defined as the strategic alignment of internal processes and the seamless synchronization of external partnerships across the value chain, and is widely recognized as a potent catalyst for superior performance (Leuschner et al., 2013; Phan et al., 2020). Despite its acknowledged potential, scholarly consensus on the consistent efficacy of SCI remains elusive. While meta-analyses confirm SCI's generally positive impact, indicating, for instance, a notable 23% boost in operational performance (Leuschner et al., 2013), its benefits can be attenuated by contextual factors unique to developing economies, such as Ethiopia's highly fragmented markets and severe climate volatility (Khan & Wisner, 2019; Wright, 2016). Crucially, the pivotal role of leadership in enabling and driving SCI has been notably overlooked in existing frameworks. Leaders are not merely facilitators; they actively foster integration by building essential trust among diverse stakeholders, including smallholder farmers, local processors, and distant distributors (Chatzoudes & Chatzoglou, 2015). They are instrumental in resolving conflicts that frequently arise from resource scarcity or competing interests (Kim & Cavusgil, 2009) and possess the adaptive capacity to tailor and implement SCMPs effectively despite profound infrastructural constraints (Teece et al., 1997).

Moreover, existing Ethiopian agribusiness studies tend to focus narrowly on the direct effects of SCMPs (e.g., Teklebrhan et al., 2020, on onion supply chains), critically neglecting how proactive leadership strategically amplifies the impact of SCI. This oversight is particularly consequential: while SCMPs such as information sharing are universally relevant, their practical effectiveness in developing economies profoundly hinges on leaders' ability to expertly navigate complex socio-cultural landscapes and local specificities (Rahman, 2022). For instance, even sophisticated mobile-based information platforms are prone to failure without local leaders who can align their implementation with varying literacy rates and traditional communication channels (Balouza, 2024). Furthermore, prior research suffers from a pervasive geographical bias, with an estimated 85% of SCI studies analyzing developed economies (Carrion et al., 2017), thereby limiting the applicability and generalizability of their insights to contexts such as Ethiopia, characterized by unique communal land tenure systems and intricate informal networks.

This study advances theory by integrating leadership into the SCI framework through three

key theoretical lenses: dynamic capabilities theory explains how leaders adapt SCMPs to climatic shocks; network theory positions leaders as central nodes, strengthening stakeholder ties; and the resource-based view shows how leadership creates competitive advantages through SCI. The findings offer practical insights for developing leadership skills in Ethiopian agribusinesses, particularly in conflict mediation and cross-stakeholder collaboration, while providing a transferable model for similar developing contexts.

Literature Review

The survival and growth of modern firms are increasingly predicated on their ability to manage complex supply chains effectively (Chopra & Meindl, 2007). In this section, we delineate the theoretical underpinnings of our study, critically review empirical evidence on Supply Chain Management (SCM) practices and Supply Chain Integration (SCI), articulate the specific research gaps, and contextualize these phenomena within Ethiopia's agribusiness sector.

Theoretical Foundations and Research Hypotheses

This study integrates three core theoretical perspectives to examine SCMPs in agribusiness supply chains: (1) Dynamic Capabilities Theory (Teece et al., 1997) explains adaptive responses to environmental shocks; (2) the Resource-Based View (Barney, 1991) frames leadership as a strategic resource for SCI; and (3) Network Theory (Wasserman & Faust, 1994) analyzes inter-organizational relationships. Together, these theories elucidate how SCMPs influence performance both directly and through SCI in Ethiopia's challenging context.

Empirical Review of Supply Chain Management Practices (SCMPs)

Effective SCMPs are crucial for agribusiness firms to navigate today's competitive and dynamic market environment. By optimizing the flow of goods and services, firms can enhance efficiency, reduce costs, improve customer satisfaction, and mitigate risks. The literature highlights several core SCMPs essential for efficiency and effectiveness.

The Influence of Supply Chain Management Practices on Supply Chain Integration

Supply chain integration (SCI), defined as the degree of collaboration and coordination within and across supply chain entities, is widely acknowledged as a critical enabler of overall supply chain performance (Leuschner et al., 2013). Empirical studies have consistently explored the influence of various SCMPs on fostering SCI.

Information Sharing (ISH) enhances SCI by creating valuable, hard-to-replicate capabilities (Barney, 1991). Empirical studies confirm this relationship across various contexts, including Phan et al. (2020) in Vietnamese manufacturing, Kwamega et al. (2019) in Ghanaian agribusiness, and Chatzoudes and Chatzoglou (2015) in broader manufacturing. In Oromia's agribusiness sector, marked by information asymmetry and fragmented supply chains, effective ISH becomes particularly crucial for bridging transparency gaps, improving perishable goods planning, and reducing post-harvest losses (Teklebrhan et al., 2020). However, Ethiopia's rural connectivity and literacy challenges present unique barriers to information platforms that this study examines.

Customer Relationship Management (CRM) enhances SCI by strengthening communication and aligning demand with downstream partners. Empirical studies demonstrate this positive relationship across various contexts, including Malaysian manufacturing (Sundram et al., 2016) and broader industries (Abdallah et al., 2014; Chatzoudes & Chatzoglou, 2015). However, Ethiopia's agribusiness sector presents unique conditions in which CRM operates through informal community ties rather than formal systems, necessitating a specific examination of how these practices drive integration.

Strategic Supplier Relationships (SSR) foster SCI by promoting trust-building and collaborative planning, thereby enabling process efficiencies (Phan et al., 2020; Chatzoudes & Chatzoglou, 2015). However, Ethiopia's supplier networks that characterized by smallholder dominance, informality, and market volatility, challenge conventional SSR models. While existing research focuses on formal industrial contexts (Abdallah et al., 2014; Sundram et al., 2016), this study addresses the gap in understanding the role of SSR in fragmented agribusiness systems.

Supply Chain Responsiveness (SCR) refers to the ability to adapt to changes in demand or supply, theoretically dependent on SCI (Teece et al., 1997). Integrated chains enable faster information flow and coordinated responses (Gligor & Holcomb, 2012). For Oromia's agribusinesses facing weather and price volatility, responsiveness is crucial. However, limited evidence exists about how SCR drives integration among informal actors in developing contexts, creating a key gap that this Ethiopia-focused study addresses.

Hypothesis 1: Based on the empirical evidence and theoretical arguments, it is hypothesized that there is a general positive effect:

H1: Supply chain management practices have a direct positive effect on supply chain integration in the Oromia regional state of Ethiopia. Following this general hypothesis, the following specific relationships are hypothesized:

H1a: Information sharing has a direct positive effect on supply chain integration in the Oromia regional state of Ethiopia.
H1b: Customer relationship management has a direct positive effect on supply chain integration in the Oromia regional state of Ethiopia.
H1c: Strategic supplier relationships have a direct positive effect on supply chain integration in the Oromia regional state of Ethiopia.
H1d: Supply chain responsiveness has a direct positive effect on supply chain integration in the Oromia regional state of Ethiopia.

The Influence of Supply Chain Management Practices on Agribusiness Performance

Effective SCMPs are crucial for the success of agribusiness firms. Numerous empirical studies across various sectors have consistently found strong relationships between supply chain management practices and organizational performance (Alahmad, 2021; Juliana et al., 2022; Muhamed et al., 2020; Mukhsin & Suryanto, 2022; Rombe & Hadi, 2022). More specifically, the literature highlights key SCMPs vital for firm efficiency and effectiveness: strategic supplier partnerships (Chen & Tsai, 2023; Chileshe & Phiri, 2022; Lee & Lee, 2020; Tagiyev, 2021), customer relationship management (Charles, 2020), information sharing (Chatzoudes & Chatzoglou, 2015; Kwamega et al., 2019), responsiveness (Barhmi, 2019),

agility, and lean practices (Phan et al., 2020). However, existing studies primarily examine formal, industrialized contexts, while Ethiopia's agribusiness sector features informal supplier networks and smallholder relationships that may modify these relationships (Chen & Tsai, 2023). This study addresses the critical gap in understanding how SCMPs affect performance in Oromia's unique agricultural context.

Hypothesis 2: Based on the empirical evidence and theoretical arguments, it is hypothesized that there is a general positive effect:

H2: Supply chain management practices have a direct, positive effect on the performance of agribusiness firms. Following this general hypothesis, the following specific relationships are hypothesized:

H2a: Information sharing has a direct, positive effect on the performance of agribusiness firms in the Oromia regional state of Ethiopia.
H2b: Customer relationship management has a direct, positive effect on the performance of agribusiness firms in the Oromia regional state of Ethiopia.
H2c: Strategic supplier relationships have a direct, positive effect on the performance of agribusiness firms in the Oromia regional state of Ethiopia.
H2d: Supply chain responsiveness has a direct, positive effect on the performance of agribusiness firms in the Oromia regional state of Ethiopia.

The Direct Impact of Supply Chain Integration on Agribusiness Performance and its Mediation Role

While SCI generally improves performance outcomes (Chatzoudes & Chatzoglou, 2015; Kwamega et al., 2018), its effectiveness varies by context. Studies show integration benefits differentiation strategies (Rakovska, 2016) but can be overshadowed by industry efficiencies (Wright, 2016) or yield insignificant impacts in certain settings (Khan & Wisner, 2019). These contingencies are particularly relevant for Ethiopia's agribusiness sector, where informal networks may substitute for formal integration. We therefore hypothesize a positive SCI-to-performance relationship while acknowledging contextual moderators.

H3: Supply chain integration has a direct, positive effect on the performance of agribusiness firms in the Oromia regional state of Ethiopia.

Beyond its direct effects, SCI serves as a critical mediator between SCMPs and performance, as demonstrated in manufacturing contexts (Phan et al., 2020; Sundram et al., 2016), with integration types yielding differential effects (Kwamega et al., 2019). However, Ethiopia's agribusiness context is characterized by informal institutions, fragmented markets, and low-tech communication that may fundamentally alter these mediation pathways. Unlike formalized supply chains in developed economies (Carrion et al., 2017), Ethiopia's reliance on kinship ties and face-to-face interactions requires specific examination of how SCI mediates SCMP-performance relationships. It is therefore hypothesized that there is a general positive, significant effect, but this could be distinct in context.

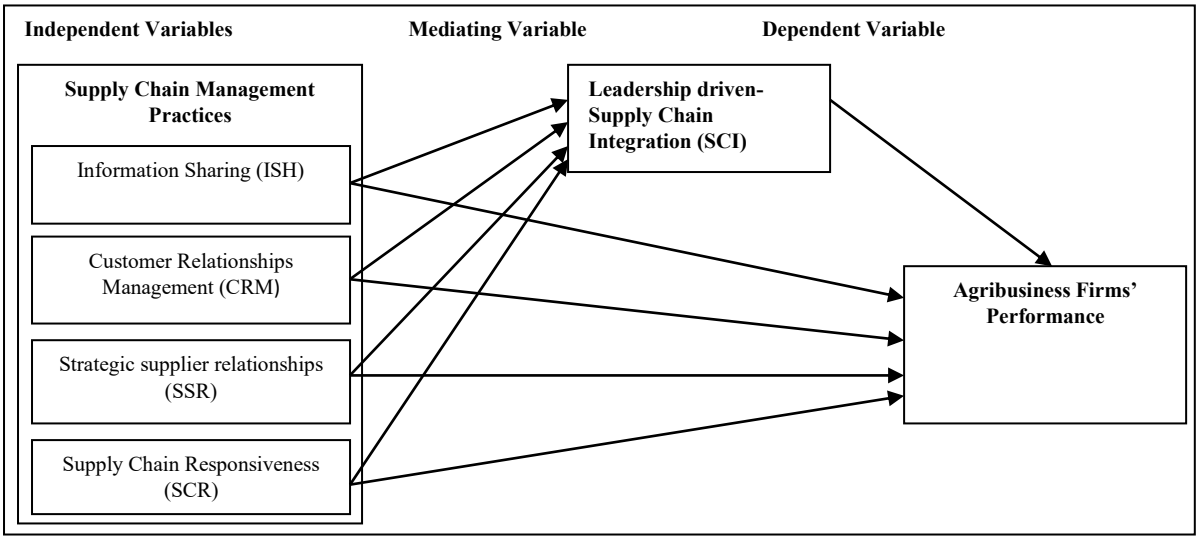
H4: Supply chain integration mediates the relationship between supply chain management practices and the performance of agribusiness firms. Following this general hypothesis, the following specific relationships are hypothesized:

H4a: Supply chain integration mediates the relationship between information sharing and the performance of agribusiness firms.
H4b: Supply chain integration mediates the relationship between customer relationship management and the performance of agribusiness firms.
H4c: Supply chain integration mediates the relationship between strategic supplier relationships and the performance of agribusiness firms.
H4d: Supply chain integration mediates the relationship between supply chain responsiveness and the performance of agribusiness firms.

Conceptual Framework of the Study

The conceptual framework, depicted in Figure 1, visually summarizes the proposed interrelationships between supply chain management practices, supply chain integration, and the performance of agribusiness firms in the Oromia region of Ethiopia. The independent variables, representing the antecedent factors, include the supply chain management practices of Information Sharing (ISH), Customer Relationship Management (CRM), Strategic Supplier Relationships (SSR), and Supply Chain Responsiveness (SCR). Supply Chain Integration (SCI) serves as the mediating variable, influencing the relationship between the SCMPs and the dependent variable, Agribusiness Firms' Performance. This framework is proposed based on the critical review of relevant theories and the empirical literature, leading to the posited relationships outlined in the hypotheses above.

Figure 1
Proposed Conceptual Framework of the Study



Method

Research Design

In meeting the objectives of the study, descriptive and explanatory research designs were adopted for the study alongside the cross-sectional design. Descriptive and explanatory research designs were used to describe the context and explain why and how there is a relationship between dependent and independent variables.

Sample and Procedure

The study targeted all active agro-processing firms in Ethiopia's Oromia region, totaling 3,956 registered businesses according to July 2022 records from the Oromia Investment Bureau. From this population, a representative sampling frame of 847 firms was selected from key agribusiness clusters, including the Oromia Special Zone (618 firms), Modjo logistics hub (26 firms), Bishoftu agro-processing zone (93 firms), and Adama (110 firms). The sample size was determined using Cochran's formula with a 95% confidence level (Z = 1.96), a 50% proportion estimate (p = .5), and a 5% margin of error, yielding an initial sample of 385 firms. After applying finite population correction for the 847-firm sampling frame and accounting for a 15-20% non-response rate, the final sample comprised 265 firms.

A stratified random sampling approach was implemented across the four geographical strata to ensure proportional representation of each cluster. The Oromia Special Zone contributed 193 firms (73% of sample), Modjo 8 firms (3%), Bishoftu 29 firms (11%), and Adama 35 firms (13%). Within each stratum, firms were randomly selected to minimize bias while maintaining the study's practical feasibility given regional infrastructure challenges. This sampling strategy balanced statistical rigor with fieldwork constraints, ensuring the findings would be representative of Oromia's diverse agribusiness landscape.

Data Collection Method

Primary data were collected through a structured questionnaire designed to measure supply chain management practices, leadership-driven SC integration, and firm performance, using validated scales adapted for the Ethiopian context. Prior to full implementation, the instrument was pilot-tested with 10 agribusiness firms to assess its clarity, cultural appropriateness, and relevance, with refinements made based on the feedback received.

Questionnaires were administered to senior managers and supply chain professionals in the sampled firms, selected for their comprehensive knowledge of operations, partnerships, and performance metrics. Following collection, all responses underwent rigorous quality checks, with nine questionnaires excluded due to incompleteness or inconsistencies. The final dataset comprised 256 valid responses, achieving a 96.6% response rate that ensures robust statistical power for analysis.

Measures

All constructs in this study were measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Specific adaptations were made to existing scales to align with the unique context of Ethiopia's agribusiness sector and to incorporate the study's emphasis on leadership-driven dimensions of SCI and practices. The rationale and specifics of these adaptations are detailed below.

Supply Chain Management Practices (SCMPs). The measurement of supply chain management practices was based on adapted scales from Al-Madi (2017), Govindaraju et al. (2016), and Chatzoudes and Chatzoglou (2015), modified to fit Ethiopia's agribusiness context. The instrument assessed four key dimensions: strategic supplier relationships, customer relationship management, information sharing, and supply chain responsiveness. Significant adaptations were made to reflect the leadership-driven nature of these practices in Ethiopia's unique environment, where informal networks and smallholder relationships

predominate. For instance, new items were added to evaluate how leaders actively facilitate information sharing ("Our leadership ensures timely information flow across all supply chain partners") and build supplier relationships ("Leaders prioritize long-term partnerships with suppliers to ensure resource stability"). The scales maintained their original psychometric properties while incorporating contextual relevance through careful rewording and the addition of leadership-specific items. These adapted measures successfully captured both the universal aspects of SCMPs and their distinctive implementation within Ethiopia's agricultural sector.

Supply Chain Integration (SCI). The SCI scale was primarily adapted from Govindaraju et al. (2016), which originally focused on internal, customer, and supplier integration. To emphasize the mediating role of leadership in enabling SCI, the original items were modified to explicitly refer to leadership's influence on the integration process. This modification involved: rephrasing existing items, for instance, an original item like "our internal departments work closely together" was rephrased to "our leadership actively promotes collaboration and integration between our internal departments. New items were introduced to capture how leaders directly facilitate integration. Examples include items assessing leaders' efforts in fostering shared goals, promoting inter-organizational trust, or allocating resources for integration initiatives across supply chain partners. For example, "Our leadership fosters a culture of trust and shared goals that facilitate long-term integration with our supply chain partners."

Agribusiness Performance. The performance scale was adapted from Buallay (2022) and was contextualized specifically for Ethiopia’s agribusiness sector to ensure its relevance and validity for the target firms. While Buallay's (2022) scale covers broad financial and operational performance, items were refined to include metrics commonly understood and tracked by agribusinesses in the local context. For example, "market access improvement," or "timeliness of delivery" were prioritized. Additionally, the adaptation ensured a balance between financial indicators (such as sales growth and profitability) and operational performance indicators highly pertinent to agricultural value chains (such as efficiency, reduced waste, and improved product quality).

Validation of Measures (Measurement Model)

Cronbach's alpha was computed to evaluate the internal consistency of each construct. All the scales employed to assess the study objectives are a good fit, as they exhibited coefficients above the recommended cut-off of .70 (Tavakol & Dennick, 2011). Thus, the scales exhibited an acceptable reliability coefficient and were suitable for the investigation. In addition, Composite Reliability (CR) and the Average Variance Extracted (AVE) were calculated. The accepted threshold for composite reliability is .70 or higher. Based on this, all the variables are above the stated thresholds, indicating that the overall reliability of the construct is good. Moreover, AVE measures the level of variance captured by a construct relative to the variance due to measurement error. AVE value greater than 0.50 suggests good convergent validity (Hair et al., 2014; Surucu & Maslakci, 2020). The results of each test are indicated in Table 1.

Table 1

Measurement Items, Loadings, and Validation Results

Constructs	Measurement items	Loadings	Cronbach's alpha	Composite Reliability	AVE
Information Sharing (ISH)	ISH1	.76***	.84	.81	.53
	ISH2	.65***			
	ISH3	.84***			
	ISH4	.70***			
	ISH5	.67***			
Customer Relationship Management (CRM)	CRM1	.71***	.84	.84	.63
	CRM2	.54***X			
	CRM3	.84***			
	CRM4	.83***			
	CRM5	.64***			
Strategic Supplier Relationship Practice (SSR)	SSR1	.48*** X	.76	.81	.59
	SSR2	.78***			
	SSR3	.67***			
	SSR4	.84***			
	SSR5	.45*** X			
Supply chain responsiveness practice (SCR)	SCR1	.79***	.89	.90	.63
	SCR2	.71***			
	SCR3	.87***			
	SCR4	.76***			
	SCR5	.83***			
Supply Chain Integration (SCI)	SCI)	.74***	.77	.77	.53
	SCI)	.66***			
	SCI)	.74***			
	SCI)	.67***			
	SCI)	.50*** X			
Agribusiness Firms Performance (PR)	PR1	.53*** X	.87	.88	.60
	PR2	.81***			
	PR3	.83***			
	PR4	.73***			
	PR5	.77***			
	PR6	.69***			

Note. ***Significant at the p<.001 level and (X) represents deleted indicators

Furthermore, the assessment of discriminant validity was conducted by calculating by measuring the square root of AVE, and the findings are presented in Table 2. Each square root of AVE was more significant than the correlation among the items, indicating that the constructs are different and have acceptable discriminant validity.

Table 2

Discriminant Validity

	CR	AVE	MSV	MaxR(H)	ISH	CRM	SSR	SCR	SCI	PR
ISH	.81	.53	.18	.85	.72					
CRM	.81	.59	.22	.82	-.03	.76				
SSR	.79	.55	.10	.81	.15	.06	.74			
SCR	.88	.63	.03	.90	-.16	.08	.15*	.78		
SCI	.77	.53	.333	.78	.39**	.36***	.11	-.12	.73	
PR	.88	.58	.333	.89	.52***	.47***	.30***	.16*	.575***	.77

Note. *Significant at the p<0.05 level. ** Significant at the p<0.01 level. *** Significant at the p<0.001 level.

Data and Analysis

The collected quantitative data underwent a careful analysis process using SPSS version 24 and SPSS AMOS 23 software. The data analysis was conducted in two distinct stages:

descriptive and inferential (CFA and SEM), designed to comprehensively address the study's objectives.

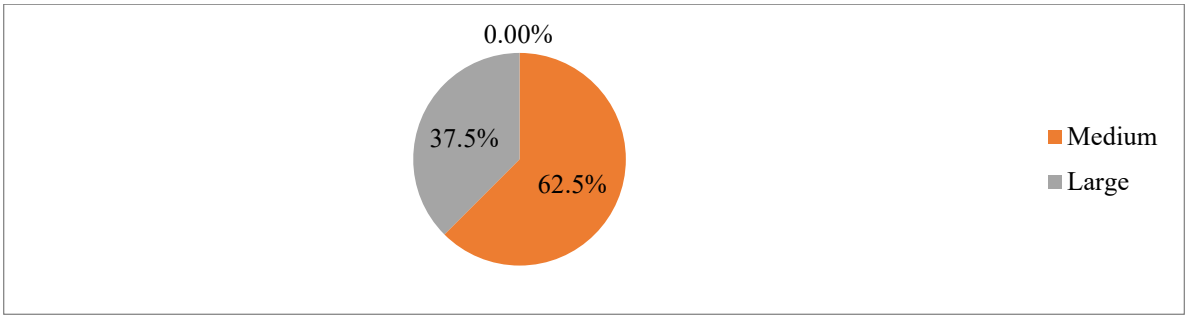
In the first stage, descriptive statistical analysis was performed. This stage focused on understanding the fundamental characteristics of the sample firms, their current levels of SCM practices, and their reported performance. To effectively present this information, means, standard deviations, and frequencies were computed and utilized. The second stage involved inferential analysis (CFA and SEM), which was crucial for testing the raised research hypotheses and uncovering the relationships between variables.

Descriptive Analysis

The analysis of the descriptive statistics from the questionnaire provides an initial idea of the characteristics of the selected agribusiness firms. Figures 1, 2, and 3 show the firm size, type, and geographic characteristics of the agribusiness firms, respectively.

Figure 1

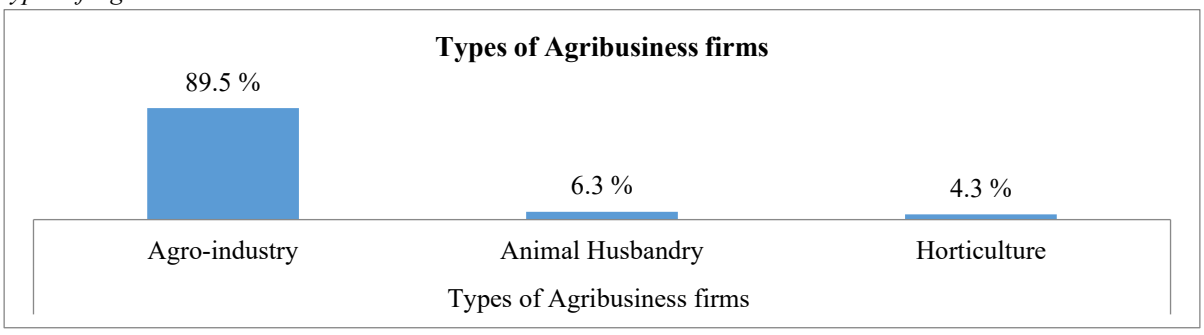
Firm Size



The analysis of the surveyed firms revealed that the majority (62.5%) were medium-sized, while large firms constituted the remaining 37.5% of the total sample.

Figure 2

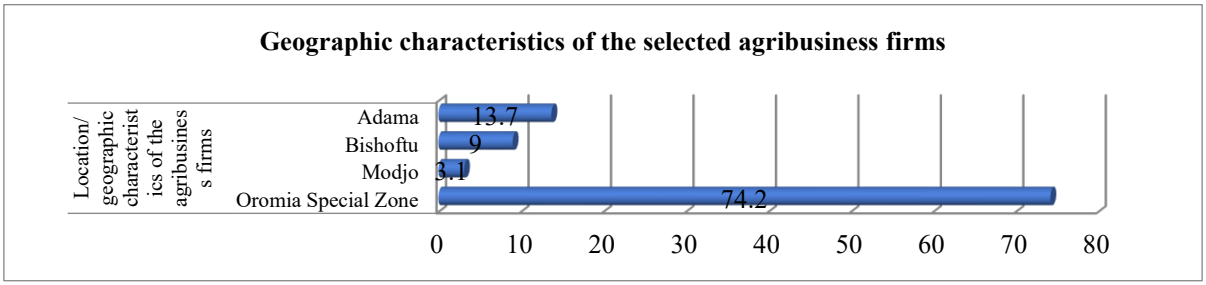
Types of Agribusiness Firms



Regarding the types of agribusiness firms, the agro-industrial firms' was the predominant category, accounting for 89.5% of all selected firms. Animal husbandry shares 6.3%, while the horticultural firms constitute 4.3%.

Figure 3

Geographic characteristics of the agribusiness firms



The geographic characteristics of the surveyed firms showed that the majority of these agribusinesses are located in the Oromia Special Zone, which accounts for 74.2% of the total sample, followed by Adama with 13.7%, Bishoftu with 9.0%, and Modjo with 3.1%, respectively. In general, these findings give an overview of the structural profile in terms of both operational scale and geographic distribution of agribusiness firms within the studied area.

Confirmatory Factor Analysis (CFA)

The study employed CFA to validate the measurement model's structure, following rigorous psychometric standards. Initial analysis revealed suboptimal model fit (χ^2 [419] = 966.2, p < .001; CFI = .84; RMSEA = .08), prompting systematic refinements. Using Tabachnick and Fidell's (2007) criteria, we removed seven underperforming items with factor loadings below 0.63 or excessive residual covariances (ISH2, CRM1/5, SSR1/5, SCI2/5, PR1) and incorporated theoretically justified covariances based on modification indices. These adjustments yielded a significantly improved final model (χ^2 [212] = 337.1; CFI = .95; RMSEA = .05; SRMR = .05) that met all recommended fit thresholds: χ^2/df ratio of 1.59 demonstrated good absolute fit, while CFI > .95 and RMSEA < .06 indicated excellent comparative fit. The SRMR of 0.05 further confirmed well-specified residual variances. This refined measurement model maintained strong construct representation while achieving parsimony, ensuring the reliability of subsequent structural analyses. The comprehensive validation approach balanced statistical rigor with theoretical coherence, particularly important for capturing the unique aspects of Ethiopia's agribusiness supply chain context. The comparison of the two models is summarized in Table 3.

Table 3

Comparison of the Two CFA Models

Model fit index	Estimate of initial CFA model	Estimate of CFA model II	Stringent Cutoff	Related Cutoff	Interpretation of the study model
Chi-square (χ2)	959.3	337.1	--		Significantly improved
DF	419	212	--		Significant change
CMIN/DF	2.29	1.59	Between 1 and 3	> 3 < 5	Excellent
CFI/TLI	0.856	0.95	> 0.95	> 0.90	Excellent
SRMR	0.071	0.05	< 0.06	< 0.08	Excellent
RMSEA	0.071	0.05	< 0.06	< 0.08	Excellent
PColse	0.000	0.61	< 0.05	➢ 0.05	Excellent

Note. The stated dynamic fit index cutoffs are based on Gaskin and Lim (2016) and McNeish and Wolf (2023).

SEM Analysis

The structural equation modeling (SEM) analysis revealed important insights about the relationships between Supply Chain Management Practices (SCMPs), Supply Chain Integration (SCI), and firm performance in Ethiopia's agribusiness sector. The model demonstrated good explanatory power, with SCMPs accounting for 37% of the variance in SCI (R^2 = .37) and the full model accounting for 64% of the variance in performance (R^2 = .64). This indicates that while SCI plays a significant mediating role, additional factors beyond our model contribute to firm performance in this context. The model exhibited excellent fit to the data, as evidenced by multiple fit indices: χ^2/df ratio of 1.59 (χ^2 = 337.1, *df* = 212, *p* = 0.001), CFI = .95, GFI = .90, SRMR = .05, and RMSEA = .05 (PClose = .62), all meeting recommended thresholds for good model fit.

Parameter estimates using the unstandardized, standardized coefficients, and hypothesis testing

The regression results presented in Table 4 provide insight into the relationships between various SCMPs influencing leadership-driven supply chain integration and the performance of agribusiness firms. The analysis comprises unstandardized and standardized regression estimates, standard error, critical ratio, and significance level (P-values). Information sharing and customer relationship management positively and significantly affect leadership-driven SCI, while strategic supplier relationship and responsive supply chain have statistically zero and insignificant effects. However, all the study variables positively and significantly influence agribusiness firms' performance.

Table 4

Regression Results

Hypothesis	Path	Unstandardized Regression Weights			Standardized Regression Weights	P	Result
		Estimate	S.E.	C.R.	Estimate		
H1a	SCI <---ISH	.77	.25	3.07	.38	.002	Accepted
H1b	SCI <---CRM	.18	.04	4.75	.37	***	Accepted
H1c	SCI <--- SSR	.06	.064	.70	.05	.482	Rejected
H1b	SCI <--- SCR	-.07	.04	-1.72	-.12	.086	Rejected
H2a	PR <--- ISH	1.17	.354	3.33	.42	***	Accepted
H2b	PR <--- CRM	.22	.05	4.75	.35	***	Accepted
H2c	PR <--- SSR	.17	.07	2.49	.15	.013	Accepted
H2d	PR <--- SCR	.16	.04	3.71	.22	***	Accepted
H3	PR <--- SCI	.40	.11	3.69	.30	***	Accepted

The unstandardized coefficients indicate how much the dependent variable varies in relation to the independent variables when all other independent variables are held constant. The standardized coefficient indicates the relationship and its strength. Since it is more appropriate to present the standardized regression weights in this kind of study, this relationship is interpreted and presented as follows:

The Direct Influence of Supply Chain Management Practices (SCMPs) on Supply Chain Integration (SCI)

The analysis reveals distinct effects of different SCMPs on SCI. Information sharing demonstrates a significant positive influence (β = .38, $p < .05$), indicating that a one standard deviation increase in information sharing corresponds to a .38 standard deviation improvement in SCI, holding other factors constant. Similarly, customer relationship management shows a strong beneficial effect (β = .37, $p < .001$), underscoring its importance in fostering supply chain coordination.

In contrast, strategic supplier relationships exhibit a negligible and statistically insignificant impact (β = .05, $p = .482$), likely reflecting the informal nature of supplier networks in Ethiopia's agribusiness sector. Supply chain responsiveness shows a weak negative association (β = -.12) that lacks statistical significance ($p = .086$), indicating no reliable relationship with SCI in this context.

These results strongly support hypotheses H1a and H1b, confirming that information sharing and customer relationship management are the primary drivers of supply chain integration, while other practices show limited direct effects.

The Direct Influence of Supply Chain Management Practices (SCMPs) on Agribusiness Firms Performance (PR)

The standardized beta coefficient for information sharing on performance is .42 with a P-value of .001. This indicates a statistically significant and strong positive effect on the performance of agribusiness firms. It interpreted that a one standard deviation increase in information sharing is associated with a 0.42 standard deviation increase in the performance of agribusiness firms, holding other SCMPs constant. Customer relationship management also has a statistically significant and moderately strong positive effect on agribusiness firm performance, with a standardized beta of .35 and $p = .001$. This is interpreted as a one standard deviation increase in CRM leads to a .35 standard deviation increase in agribusiness firms' performance, other things being constant.

Similarly, strategic supplier relationships have a statistically significant, albeit weaker, positive effect on the performance of agribusiness firms, with a standardized beta of .15, $p = .13$. A one standard deviation increase in SSR is associated with a .15 standard deviation increase in agribusiness firms' performance. Moreover, supply chain responsiveness has a statistically significant and moderate positive effect on agribusiness firms' performance, despite its negative SCI link. It is interpreted that a one standard deviation increase in SCR is expected to increase agribusiness firms' performance by .22 standard deviations, holding other SCMPs constant. From this direct analysis with performance, for hypothesis (H2), all four hypothesized direct relationships between SCMPs and agribusiness firms' performance are supported.

The Direct Impact of Supply Chain Integration (SCI) on Agribusiness Firms Performance (PR)

Supply chain integration has a statistically significant and moderately strong positive impact on the performance of agribusiness firms. A one standard deviation increase in SCI is associated with a .30 standard deviation increase in PR. This confirms that greater integration

across the supply chain directly contributes to improved firm performance in the agribusiness sector.

Mediation Analysis

The mediation analysis is performed by treating information sharing, customer relationship management, strategic supplier relationships, and supply chain responsiveness as independent variables, while the firm's performance is treated as a dependent variable, and leadership-driven supply chain integration is treated as a mediator. This mediation analysis is based on the analysis of indirect effects using the classical approach by Baron and Kenny (1986). The researchers performed a mediation analysis using the direct and indirect effects based on a bootstrap procedure (500 samples) and a 95% biased-corrected bootstrap confidence interval. The results are depicted in Table 5.

Table 5

SEM standardized result for mediation analysis

HP	Path	Direct effects	Indirect effects	Remark	Insights
		Standardized estimate	Standardized estimate		
H4a	ISH > C I > PR	. 38**	.11**	Hypothesis is supported since the indirect effect is statistically significant	Confirms partial mediation (11% of effect via SCI). Suggests ISH benefits both directly and through integration.
H4b	CRM > CI > PR	037**	.11**	Hypothesis is supported since the indirect effect is statistically significant	Confirms partial mediation (11% of effect via SCI).
H4c	SSR > CI > PR	.05	.01	Hypothesis is not supported since the indirect effect is statistically insignificant	Non-significant mediation which aligns with its low SCI influence.
H4d	SCR > CI > PR	.-13*	-.04*	Hypothesis is supported since the indirect effect is statistically significant	This reveals a suppression effect. While SCR affects performance positively and directly, it confirms negative partial mediation

Note. *** Significant at the p<0.001 level, ** significant at less than .01, * and significant at less than .05.

Table 5 depicts the results of the mediation analysis, examining whether SCI mediates the relationship between SCMPs and agribusiness firms' performance. The analysis considers both the direct and indirect effects for each pathway, presenting standardized estimates along with their significance levels (*** $p < .001$, ** $p < .01$, * $p < .05$). Here, for mediation to be supported, the indirect effect must be statistically significant. If the direct effect also remains significant, it suggests partial mediation. However, if the direct effect becomes non-significant, it suggests full mediation.

When we examine the mediation role of SCI between information sharing and the performance of agribusiness firms, the direct effect is .38, and the indirect effect is .11. Both are statistically significant at $p < .01$. This confirms partial mediation (11% of effect via SCI). This implies that supply chain integration partially mediates the relationship between information sharing and the performance of agribusiness firms. While information sharing

directly contributes to performance, a significant portion of its positive impact is also mediated through improved supply chain integration

The mediation role of SCI between customer relationship management and agribusiness firms' performance yields a direct effect of .37 and an indirect effect of .11. Both are statistically significant at $p < .01$, which support hypothesis H4b. This means that supply chain integration partially mediates the relationship between customer relationship management and the performance of agribusiness firms. This strengthens the argument that SCI is a crucial medium for CRM's positive impact on performance.

On the other hand, the direct effect of strategic supplier relationships on the performance of agribusiness firms is not statistically significant. Consistent with this, the indirect effect through supply chain integration is also very small (i.e., .01) and not statistically significant. This confirms that supply chain integration does not mediate the relationship between strategic supplier relationships and the performance of agribusiness firms. This aligns with the non-significant direct effect observed in H1c, suggesting that SSR, as measured, does not significantly contribute to performance either directly or indirectly via integration in this context.

However, while SCR positively and significantly influences the performance of agribusiness firms, its direct effect on SCI is negative and not statistically significant. The mediation analysis reveals that the direct effect of SCR on the performance of agribusiness firms is negative and statistically significant, with a standardized value of -.13. The indirect effect through supply chain integration is also negative and statistically significant at $p < .05$, although its contribution is small (i.e., -.04). This suggests that supply chain integration partially mediates the negative relationship between supply chain responsiveness and the performance of agribusiness firms. This is a particularly interesting finding, suggesting that while SCR might have a direct negative impact on performance, a portion of this negative effect is also mediated through SCI.

Discussions

This study examined the critical relationships between SCMPs, SCI, and firms' performance within the agribusiness sector of the Oromia Regional State of Ethiopia. The analysis yields three major findings that contribute to supply chain management literature in developing economy contexts.

First, information sharing and customer relationship management emerge as the strongest drivers of supply chain integration, consistent with prior research (Kwamega et al., 2019; Phan et al., 2020). These practices help overcome information asymmetries and coordination challenges prevalent in Ethiopia's fragmented agricultural markets. The significant positive effects align with institutional theory, as they represent formal mechanisms that complement existing informal networks.

Second, the study finds that strategic supplier relationships and supply chain responsiveness show insignificant effects on integration, contrary to findings from developed economies. This likely reflects Ethiopia's infrastructure constraints, including poor transportation networks (Gebremedhin et al., 2019) and limited cold storage (Matiwos, 2021), which hinder formal integration efforts. The prevalence of informal intermediaries, which

control 60-70% of market linkages (Meaza et al., 2020), further explains why traditional supplier relationship approaches prove less effective.

Third, the study reveals a complex mediation pattern. While supply chain integration partially mediates the positive effects of information sharing and CRM on performance, it shows a surprising negative mediation for responsiveness. This suggests that in resource-constrained environments, firms face a trade-off between rapid responsiveness and deep integration, a finding supported by contingency theory (Lawrence & Lorsch, 1967) and consistent with observations in other developing contexts (Silvestre, 2015).

Notably, all four practices directly improve firm performance, with information sharing having the strongest effect (β = .42). This hierarchy of impacts offers practical guidance for managers operating in similar environments, suggesting that investments in information systems and customer relationships may yield greater returns than investments in supplier development in the short term.

These findings advance supply chain theory by demonstrating how institutional and infrastructure constraints in developing countries modify established relationships between practices and outcomes. It particularly highlights the need for context-specific models that account for informal networks and resource limitations characteristic of agricultural supply chains in Ethiopia. Future research should explore how these dynamics evolve as infrastructure improves and formal institutions develop.

Implications

This study provides significant theoretical, practical and policy implications for understanding supply chain management practices, integration, and performance within the agribusiness sector of developing economies, specifically Ethiopia.

Theoretical Implications

This study makes three key theoretical contributions to supply chain management literature. First, it extends dynamic capabilities theory (Teece et al., 1997) by demonstrating how leadership adapts practices to contextual constraints, particularly evident in the negative mediation (β = -.04) between responsiveness and integration. Second, it bridges RBV (Barney, 1991) and Network Theory (Wasserman & Faust, 1994) by showing leadership's dual role as both a strategic resource and network orchestrator in informal economies. Third, it develops a leadership-mediated framework that explains varying practice outcomes across contexts, challenging linear SCM models. The findings reveal that while information sharing (β = .38) and customer management (β = .37) strongly drive integration, supplier relationships operate differently in informal networks (Meaza et al., 2020), highlighting the need for context-specific models. These insights enhance our understanding of how institutional voids (Matiwos, 2021) and infrastructure constraints (Gebremedhin et al., 2019) influence SCM dynamics in developing economies.

Practical Implications

For agribusiness leaders and managers in developing countries, particularly within the Oromia region, the study offers several actionable strategies:

First, leaders' are advised to prioritize information sharing and customer relationships. Given their significant positive effects on both SCI and performance, leaders should invest in developing robust information-sharing mechanisms. This includes implementing low-tech solutions and training leaders in conflict mediation, collaborative decision-making, and adaptive strategy formulation to enhance SCI. Furthermore, targeted technology adoption, such as implementing mobile-based platforms for real-time information sharing, is crucial. These solutions should be tailored to address the unique literacy levels and connectivity constraints prevalent in rural Oromia, maximizing their practical impact. Similarly, developing better relationships with customers by understanding their needs, preferences, and expectations, and implementing customized services and feedback mechanisms, is essential to enhance loyalty and satisfaction, and consequently, firm performance.

Secondly, agribusiness firms' are advised to rethink strategic supplier relationships for integration. While strategic supplier relationships directly contribute to performance, their non-significant role in driving integration suggests that a singular focus on formal, capital-intensive SSR may not be the most effective pathway for integration in this context. Thus, agribusiness firms should still prioritize building strong, trust-based relationships with suppliers, focusing on mutually beneficial outcomes that may manifest through informal networks and direct performance gains, rather than solely through formal integration initiatives that may not yield the expected benefits of integration.

More importantly, this study presents sound evidence indicating the positive effect of supply chain integration on performance, both in a direct role and as a mediator for other relationships. Agribusiness firms can thus enhance their overall performance and competitiveness by improving coordination, information sharing, and cooperation with their partners across the supply chain.

Policy Implications

The main policy implication for regional and federal policymakers is to strategically focus on leveraging information sharing within the agribusiness sector, alongside targeted interventions for other key supply chain practices.

It is crucial to prioritize and invest in platforms and initiatives that foster formal information sharing across the entire agribusiness supply chain. Additionally, policymakers should consider initiatives that encourage and facilitate stronger customer-centricity within the sector. This could include developing guidelines or best practices for customer engagement, supporting training programs for firms on customer service and feedback mechanisms, and potentially establishing platforms like industry associations and digital marketplaces that enable agribusinesses to better understand and respond to the diverse needs of their end-consumers, fostering loyalty and market stability.

Moreover, regional policymakers are advised to consider support initiatives aimed at improving information technology infrastructure, specifically to facilitate formal information sharing within agribusiness sectors. Alongside this, capacity-building programs for agribusiness firms in supply chain management practices and integration should be developed in collaboration with experts. Finally, establishing a supportive regulatory framework for these firms and actively supporting the sector through research funding and development are also recommended to foster sustainable growth and competitiveness.

Limitations and Future Research Direction

Although the study made several contributions, it also presents several limitations that warrant consideration. Firstly, the study examined the relationship between supply chain management practices, leadership-driven supply chain integration, and the performance of medium and large agribusiness firms in the Oromia region of Ethiopia. This may hamper the generalizability of the study. Secondly, the study employs a cross-sectional survey design, which may limit the ability to examine changes in the study variables over time. Additionally, the study primarily relies on quantitative research. This approach may overlook the importance of qualitative insights that could enrich understanding of the complexities involved in supply chain management practices. Moreover, the reliance on self-reported data can also introduce bias, as respondents may provide socially desirable answers rather than candid assessments of their practices and experiences.

Therefore, for future research directions, it would be useful to conduct studies covering all types of agribusiness firms across extended geographic areas using a longitudinal study approach to track changes in supply chain practices and their impact on integration and performance over time. Escalating the sample to include a wider range of agribusiness types and sizes could enhance the strength of findings and improve generalizability. Moreover, it is recommended that the integration of qualitative methods, such as interviews and case studies, could have revealed more about the constraints and successful incidents regarding the adoption of supply chain management practices by firms in future inquiries. Additionally, investigating external factors such as government policy, market conditions, and technological changes would provide insight into how these variables interact with the practice to affect agribusiness performance in Oromia and similar regions.

Conclusion

This study investigated the mediating role of leadership-driven supply chain integration in the relationship between various supply chain management practices and agribusiness performance in Ethiopia's Oromia region. The findings indicate the pivotal, albeit sometimes complex, role of leadership in driving integration and translating specific SCMPs into tangible performance outcomes, offering critical insights for both theory and practice in developing contexts.

The study confirms that adopting suitable supply chain management practices is crucial for enhancing both integration and overall performance in agribusiness supply chains. While information sharing and customer relationship management consistently serve as foundational pillars for integration and performance, the effectiveness and mediating role of SCI for other practices, such as strategic supplier relationships and supply chain responsiveness, are deeply influenced by the specific socio-economic and infrastructural realities of developing regions. These findings emphasize the necessity for context-specific SCM strategies and the indispensable role of leadership in navigating these complexities to foster resilient and high-performing agribusiness supply chains.

Declarations

Acknowledgements
Not applicable.

Disclosure Statement
No potential conflict of interest was reported by the authors.

Ethics Approval
Not applicable.

Funding Acknowledgements
Not applicable.

Citation to this article
Aredda, M. M., Kero, C. A., & Abegaz, M. B. (2025). Leadership in supply chain integration: Mediating the impact of SCM practices on agribusiness performance in Ethiopia. *International Journal of Organizational Leadership, 14*(1), 471-491. https://doi.org/10.33844/ijol.2025.60517

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