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The Effect of Corporate Governance on Supply Chain Integration

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Abstract

This study investigates the impact of corporate governance on supply chain integration among medium and large manufacturing firms. Using data collected through a structured survey from 120 firms across diverse industry sectors, the research examines core governance elements-including board independence, board size, board meetings, ownership concentration, and the existence of audit committees-and their influence on internal, supplier, and customer integration within the supply chain. Descriptive, correlational, and regression analyses reveal that higher board independence and the presence of audit committees are significantly associated with greater integration across all supply chain dimensions. The frequency of board meetings was found to enhance internal and customer integration, while board size and ownership concentration did not have a significant effect. These findings demonstrate that robust corporate governance frameworks, particularly those enhancing board independence and oversight, facilitate stronger and more cohesive supply chain integration. The results have important implications for the governance strategies of manufacturing firms seeking to optimize their supply chain performance and competitive position. Limitations concerning sample size and the availability of direct literature in this domain are acknowledged.

Keywords: Corporate governance, supply chain, internal integration, supplier integration, customer integration, board independence, presence of audit committees.

Introduction

Corporate governance and supply chain integration are interrelated concepts that significantly impact the efficiency, transparency, and strategic direction of modern manufacturing firms. Corporate governance (CG) encompasses the framework of rules, practices, and processes by which organizations are directed and controlled, thereby promoting accountability and ethical management. Effective governance frameworks are widely acknowledged to enhance stakeholder confidence, reduce risks, and support sustainable long-term growth (Almagtome, Khaghaany, & Önce, 2020; Cek & Ercantan, 2023). Simultaneously, supply chain integration (SCI)-the harmonious coordination and collaboration among various supply chain entities such as suppliers, manufacturers, distributors, and customers-is critical for operational efficiency, cost minimization, and adaptability to market fluctuations (Anwar et al., 2025; Feyissa, Sharma, & Lai, 2019).

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Recent scholarship highlights the increasingly important role of CG in shaping supply chain outcomes. Strong corporate governance practices have been shown to foster transparency, ethical sourcing, compliance, and responsible decision-making in supply chain operations, thereby mitigating risks such as fraud, environmental impact, and geopolitical disruption (Usman, Jihadi, & Ambarwati, 2020; Velte, 2024). Studies indicate that firms with robust board independence, effective audit committees, and frequent board meetings are better positioned to address complex challenges and leverage opportunities within their supply chains (Salih Börteçine & İsmail, 2017; Almagtome et al., 2020). For instance, Usman et al. (2020) demonstrated that effective CG strengthens supply chains and enhances operational performance by moderating the impact of IT and relational capabilities on performance metrics. Similarly, Cek and Ercantan (2023) found that sustainability-driven CG, when linked with supply chain practices, increases business value and financial results.

Integration within the supply chain itself manifests through three core dimensions: internal integration (cross-departmental coordination), supplier integration (collaboration with suppliers), and customer integration (collaboration with customers). The ability to achieve seamless integration across these areas is associated with heightened innovation capacity, operational efficiency, and financial performance (Anwar et al., 2025; Feyissa et al., 2019). Internal integration, in particular, emerges as a critical intermediary, facilitating both supplier and customer integration and amplifying the strategic innovation potential of the firm (Feyissa et al., 2019). However, the absence of effective governance mechanisms can expose firms to challenges such as opportunism, free riding, and supply chain data leakage, ultimately undermining supply chain stability and performance (Zhou, Xu, & Wang, 2024).

Governance mechanisms extend beyond traditional contracts, especially in the context of rapidly evolving technological and regulatory environments. The evolution of relational governance-built on trust, information sharing, and joint problem-solving-offers new opportunities for managing complex, multi-tier supply chains (Pfaff, Birkel, & Hartmann, 2023). In the digital era, digital capabilities have been shown to further enhance the positive relationship between supply chain relationship governance and integration, acting as moderating factors that expand the advantages conferred by good governance (Zhou et al., 2024). Board-led initiatives and the presence of audit committees also contribute to more rigorous sustainability and supply chain reporting, reinforcing CG's role in driving integration (Velte, 2024).

Despite these insights, the direct empirical evidence linking specific CG practices to the multi-dimensional integration of supply chains, particularly in the context of medium and large manufacturing firms, remains limited. Much of the recent literature has explored either the influence of CG or specific supply chain integration practices in isolation, with few studies examining their intersection in a holistic manner (Almagtome et al., 2020; Zhou et al., 2024). As such, questions remain concerning which governance levers are most impactful and how their effects are distributed among the various aspects of integration.

Addressing this gap, the present study investigates the impact of core CG elements-including board independence, board size, board meeting frequency, ownership concentration, and the existence of audit committees-on the internal, supplier, and customer dimensions of supply

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chain integration within a sample of medium and large manufacturing firms. By drawing on a broad sectoral base with a structured quantitative approach, this research seeks to clarify the mechanisms by which enhanced governance can facilitate more robust and cohesive supply chains, thereby supporting firm competitiveness and resilience in a dynamic global marketplace.

Literature Review

A survey of 200 Indonesian tin manufacturing firms by Usman, Jihadi, and Ambarwati (2020) showed that CG enhanced the strength of their supply chains, impacting its operational performance and moderating the supply chain IT capability-supply chain operational performance and supply chain relational capability-supply chain operational performance

A survey of 112 firms from 24 countries by Feyissa, Sharma, and Lai (2019) showed that Internal integration (II) served as a crucial intermediary in enhancing the core company's product-market innovation strategy, positively influencing both supplier and customer integration. Additionally, the findings revealed that prospectors exhibited a higher degree of internal, supplier, and customer integration than defenders. Only the continents, not countries, of the samples have been provided.

An analysis of data from 90 companies listed on the Indonesian Stock Exchange by Anwar, et al. (2025) revealed that supply chain integration (SCI) enhances operational efficiency and innovation through cross-functional collaboration, strategic supplier relationships, and advanced customer engagement. Internal integration streamlines processes and strengthens decision-making, supplier integration optimises resource allocation and drives innovation, while customer integration improves responsiveness and personalisation. Together, SCI accounted for 84.7% of operational performance variability and 80.4% of financial performance.

The analysis of 125 firm-year data from 48 Turkish firms by Almagtome, Khaghaany, and Önce (2020) suggests that the company provides more sustainable reporting if it has a better corporate governance rating or larger total assets. The social, environmental and economic indicators, as pillars of sustainable development, were not due to CG practices or of stakeholder pressure alone, but due to the accumulated effects of various factors related to both CG and stakeholders.

Using lagged annual data from the Thomson Reuters ASSET 4 database between 2012 and 2021 on 223 UK firms, Cek and Ercantan (2023) showed that environmental innovation, sustainable supply chain management, and environmental, social and corporate governance activity positively influenced business value and financial performance.

A survey of 258 Turkish manufacturing firms by Salih Börteçine and İsmail (2017) showed a positive impact of CG and supply chain network governance on sales competence and logistics competence. Together, they influenced buyers' intention to continue their relationship with the firm.

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A survey of 70 Indonesian economists by Sinaga, Kartadjumena, Sukmawati, Jayaatmaja, and Razimi (2019) showed that CG has a favourable impact on the national supply chain growth through the growth of foreign portfolio investment. CG had direct impacts on both foreign portfolio investment and supply chain growth.

Velte (2024) analysed a sample of 1,577 firm-year observations for firms listed at the EuroSTOXX600 for the period 2017–2021. Sustainable board governance improved sustainable supply chain reporting.

The study by Pfaff, Birkel, and Hartmann (2023) examines qualitative insights from in-depth interviews with 19 managerial experts and three case studies from the manufacturing sector, focusing on the implementation of Industry 4.0 across multi-tier supply chains. The findings suggest that, with I4.0 adoption, achieving competitive advantage at the multi-tier level becomes more critical than prioritising individual or dyadic perspectives. The evolution of relational governance mechanisms enables competitive advantage to function as a balancing force, mitigating traditional power structures within supply chain hierarchies. Additionally, the analysis reveals the limited efficacy of contractual governance mechanisms, underscoring the necessity of relational contracting. Finally, the research introduces agility as an extended mechanism to enhance sustainable supply chain governance.

In the development of manufacturing supply chains, the absence of effective governance mechanisms poses significant challenges to stability, integration, and overall performance. Issues such as opportunism, free riding, and data leakage hinder supply chain progress. To address these concerns, many manufacturing firms have adopted supply chain relationship governance (SCRG) as a strategic approach to enhance performance. Drawing on survey data from 295 manufacturing firms, Zhou, Xu, and Wang (2024) validated the impact of SCRG on supply chain performance (SCP). Additionally, it examines the mediating role of supply chain integration (SCI) and the moderating effect of digital capabilities (DCs). Findings indicate that SCRG positively influences SCP, with SCI acting as a partial mediator in this relationship. Furthermore, DCs strengthen the connection between SCRG and SCI. As one of the pioneering investigations into the role of DCs in supply chain partnerships, this research offers valuable insights and empirical evidence on the significance of SCRG strategies.

For the above review, only very few papers were available on the direct impact of CG on supply chain integration. Most of these papers dealt with aspects of CG and aspects of supply chains and their integration.

Methodology

The methodology adopted for data collection and analysis in this study is described below.

Research Design

Most papers reviewed above used a questionnaire survey as their method. This study also used a quantitative, cross-sectional survey methodology to investigate the relationship between corporate governance practices and supply chain integration (SCI) among manufacturing firms.

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Data Collection

Sample and Procedure

A structured questionnaire was distributed to supply chain and governance managers at 120 medium and large manufacturing firms across various industry sectors. Firms were selected via stratified random sampling to ensure representation from major subsectors (automotive, food processing, electronics, chemicals). The strata were the sectors.

Variables and **Measurement**

The independent and dependent variables measured in this study are listed below.

Independent Variables (Corporate Governance):

- Board Size: Total number of directors.
- Board Independence: Percentage of independent directors.
- Board Meetings: Number of meetings per year.
- Ownership Concentration: Percentage of shares held by the top five shareholders.
- Audit Committee Existence: Binary (1=Present; 0=Absent).

Dependent Variable (Supply Chain Integration):

- Internal Integration: Degree of cross-departmental coordination (measured on a 5-point Likert scale).
- Customer Integration: Level of collaboration with key customers (5-point Likert scale).
- Supplier Integration: Level of collaboration with key suppliers (5-point Likert scale).

Control Variables: Firm size (number of employees), firm age (years in operation).

Data Analysis

The initial phase of analysis involved descriptive statistics to summarize and profile the distribution of all measured variables. Measures of central tendency (mean, median), variability (standard deviation), and range (minimum and maximum values) were calculated for both independent variables (board size, board independence, board meeting frequency, ownership concentration, audit committee existence) and dependent variables (internal, customer, and supplier integration). This provided a comprehensive overview of the sample characteristics and facilitated the identification of any outliers or anomalies.

To assess the direction and strength of the relationships between corporate governance factors and SCI, Pearson's correlation coefficients were computed for all variable pairs. This analysis served as a preliminary screen to identify which governance mechanisms were most closely associated with the various facets of supply chain integration

For a more robust evaluation of the predictive power of each governance variable, multiple regression analyses were performed. Each dimension of supply chain integration was regressed on all CG variables, controlling for firm size and firm age to account for potential confounding effects. Variables were entered simultaneously into the models to isolate the

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unique contribution of each governance factor. Regression diagnostics verified the assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity.

All analyses were conducted using R statistical software. Prior to main analyses, data were screened for entry errors, missing values, and consistency. Where necessary, missing data were addressed using listwise deletion, given the low rates of omission, ensuring the integrity of the analytic sample.

Results

The results obtained from the collection and analysis of data as described above are presented below.

Descriptive Statistics

Table 1: Descriptive Statistics for Key Study Variables

Variable	Mean	SD	Min	Max
Board Size	8.2	2.4	5	15
Board Independence (%)	42.1	14.0	20	78
Board Meetings	6.5	2.0	3	12
Ownership Concentration (%)	34.8	13.2	10	60
Audit Committee (0/1)	0.88	0.33	0	1
Internal Integration	3.7	0.8	1	5
Customer Integration	3.4	0.9	1	5
Supplier Integration	3.2	0.9	1	5

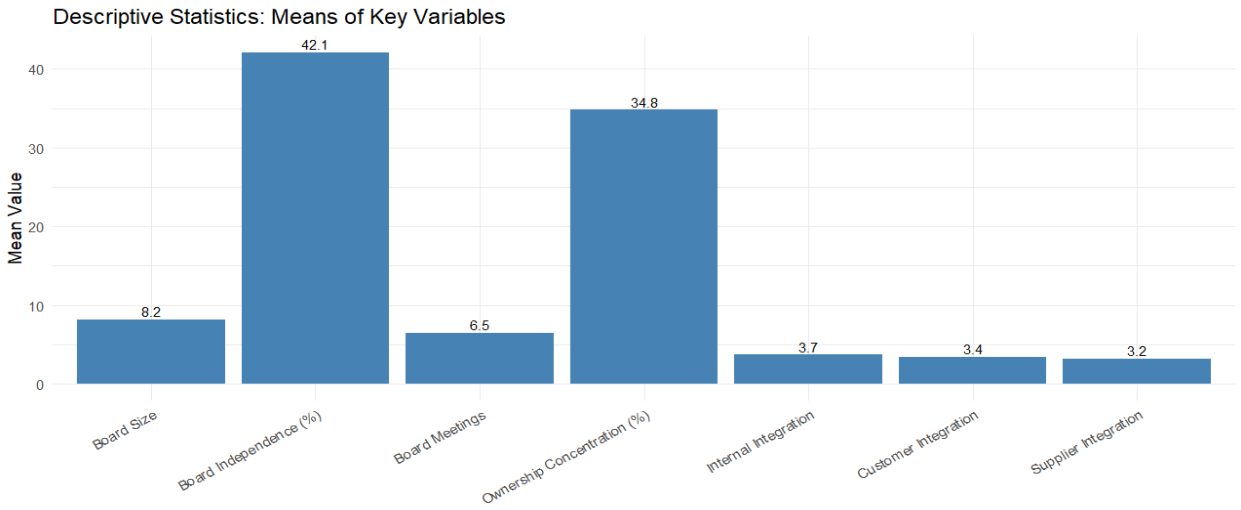

Figure 1: Descriptive Statistics for Key Study Variables

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The value of board size ranged from 5 to 15, with an average of 8.2, lower than the midpoint. Thus, most firms had board sizes of less than 10. The mean percentage of board independence was 42.1 for a range of 20 to 78. Thus, most firms had their board independence less than 49, the midpoint. For a range of 3 to 12 board meetings, the average was 6.5, below the midpoint. Hence, there were fewer than 7 meetings of the boards of most firms. For a range of 10% to 60%, the average ownership concentration was 32.5%, below the midpoint of 35%. Most companies had an audit committee, as shown by the average value of 0.88 for a range of 0 to 1. Internal integration was present in most firms, with the average value of 3.7 being above the midpoint of 3 (range 1 to 5). However, supplier integration (3.2) and customer integration (3.4) values were below the midpoint (range 1 to 5).

Correlation Analysis

Table 2: Pearson Correlations Between Corporate Governance and SCI Variables

Variable	Internal Integration	Customer Integration	Supplier Integration
Board Size	0.17*	0.13	0.10
Board Independence	0.35**	0.29**	0.25*
Board Meetings	0.21*	0.20*	0.16
Ownership Concentration	-0.15	-0.12	-0.14
Audit Committee	0.24*	0.19*	0.21*

*Note: *p<0.05, *p<0.01

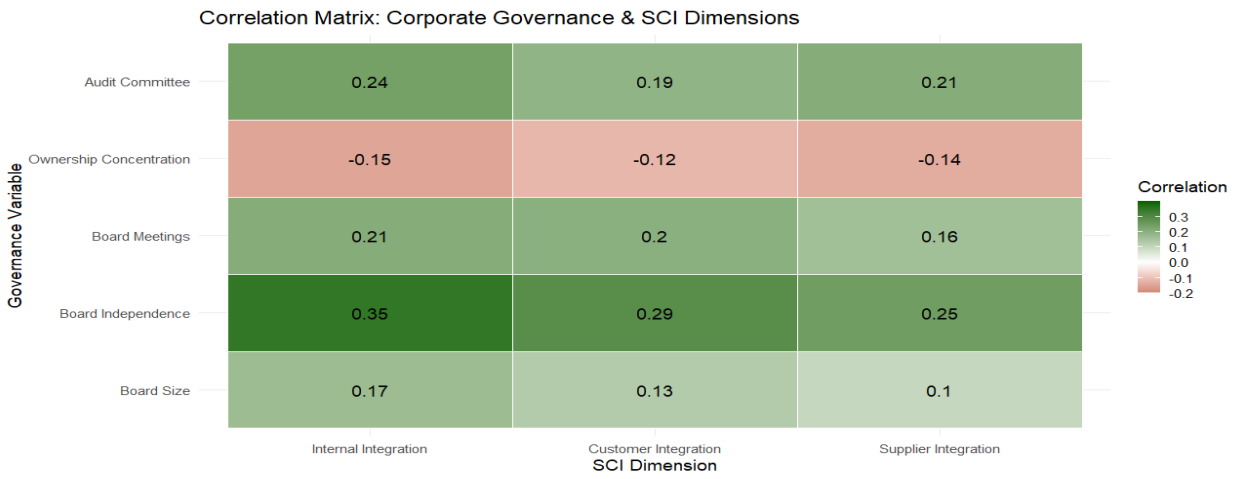

Figure 2: Pearson Correlations Between Corporate Governance and SCI Variables

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Regarding the relationship between CG variables and supply chain integration variables, board independence was correlated significantly and positively with all supply chain integration variables at the $p<0.05$ level, with values ranging from 0.25 to 0.35. The audit committee also correlated positively with all supply chain variables at the $p<0.05$ level, with values ranging from 0.19 to 0.24. Board size was correlated only with internal integration ($r= 0.17$, $p<0.05$). The board meetings variable correlated both internal integration and customer integration, with r values of 0.21 and 0.20 ($p<0.05$). Ownership concentration was not correlated with any of the supply chain integration variables, and their r values ranged from -0.12 to -0.15.

Regression Analysis

Table 3: Multiple Regression Results (Dependent Variable: Internal Integration)

Predictor	B	SE	Beta	t	p
Board Independence	0.022	0.007	0.28	3.14	0.002
Board Meetings	0.068	0.030	0.15	2.27	0.025
Audit Committee	0.217	0.098	0.14	2.21	0.029
Board Size	0.023	0.019	0.10	1.21	0.229
Ownership Concentration	-0.007	0.006	-0.10	-1.16	0.250
Firm Size (control)	0.041	0.023	0.12	1.78	0.078
Firm Age (control)	0.009	0.012	0.06	0.75	0.456

Adjusted $R^2 = 0.28$, $F(7,112) = 7.26$, $p < 0.001$

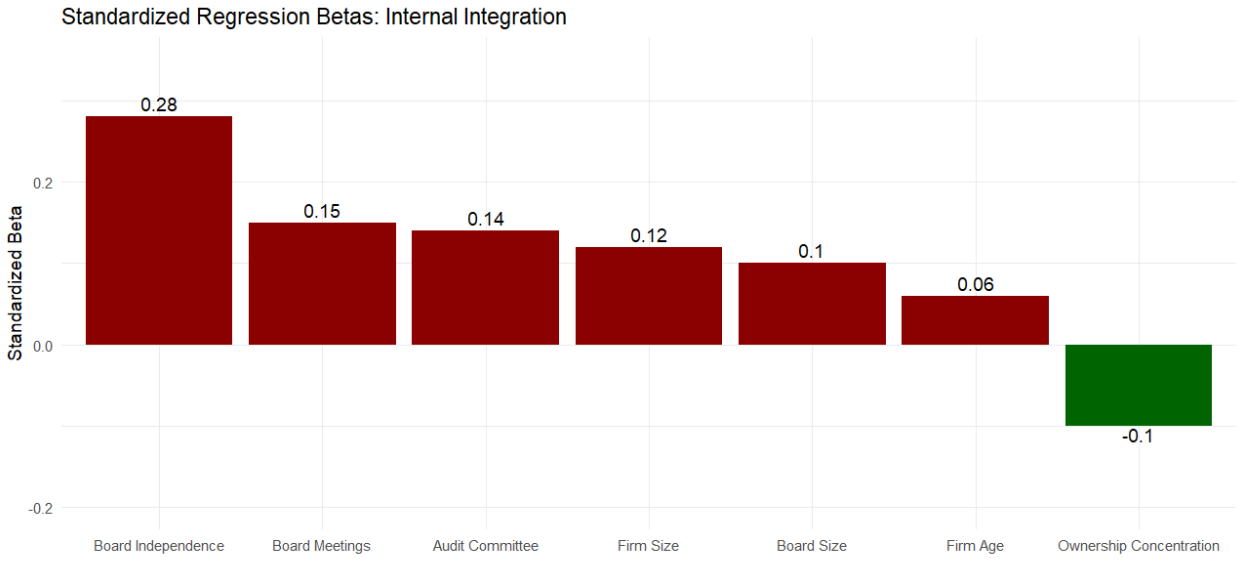

Figure 3: Standardised regression beta's

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The results of multiple regression analyses showed board independence, board meetings and audit committees as the predictors of supply chain integration. The regression equation is as follows:

Supply chain integration = (0.022 + 0.28 board independence) + (0.068 + 0.15 board meetings) + (0.217 + 0.14 audit committees). Thus, for each unit increase in supply chain integration, board independence should increase by 0.28 units, board meetings should increase by 0.15 units, and audit committees should increase by o,14 units. The impact of board independence is the highest. Hence, a separate analysis of regression using board independence as the predictor was done. The results are given in Table 4.

Table 4: Regression Summary: Board Independence as Predictor of SCI Dimensions

Dependent Variable	Standardized Beta	t	p
Internal Integration	0.28	3.14	0.002
Customer Integration	0.23	2.76	0.007
Supplier Integration	0.16	2.04	0.044

Figure 4: Regression Summary: Board Independence as Predictor of SCI Dimensions

If board independence is used as the only predictor, the above equation can be simplified to

Supply chain integration = 0.022 + 0.28 board independence.

The results on Table 4 show that the maximum impact of board independence was on internal integration (Beta=0.28) followed by customer integration (Beta=0.23) and supplier integration (Beta=0.16).

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Key Findings Summary

The key findings are:

- Board Independence and Audit Committee existence showed significant positive effects on all three supply chain integration dimensions, especially internal integration.
- Board Meetings frequency positively influenced internal and customer integration.
- Board Size and Ownership Concentration were not significant predictors.
- Control variables (firm size/age) did not significantly affect SCI.
- Quantitative analysis demonstrates that higher board independence, frequent board meetings, and the presence of an audit committee are associated with greater supply chain integration among manufacturing firms. Ownership concentration and board size showed no significant influence in this context.

The findings of this study demonstrate a clear and significant relationship between certain aspects of corporate governance and supply chain integration in medium and large manufacturing firms. Specifically, higher levels of board independence and the existence of audit committees were found to have a substantial positive impact on all three dimensions of supply chain integration-internal, supplier, and customer integration-with the strongest effect observed for internal integration. Furthermore, the frequency of board meetings was shown to enhance both internal and customer integration, highlighting the value of regular oversight and strategic engagement in governance practices. In contrast, board size and ownership concentration did not emerge as significant predictors of supply chain integration, indicating that simply increasing the number of board members or centralizing ownership is not sufficient to drive integration outcomes. Control variables such as firm size and age also did not exert a significant influence.

Discussion & Conclusion

CG impacting supply chain strength has been reported by Usman et al. (2020). Strength of the supply chain consists of the strength of its elements, like internal, supplier and customer orientation. This study also found that certain CG elements supported supply chain integration. Internal integration, in turn, can impact supplier and customer interaction (Feyissa et al. 2019). However, this effect was not studied here. Only when supply chain integration directly impacts supplier integration, the firms enhance its performance (Anwar et al., 2025). In this study, certain CG elements impacted internal integration more than supplier or customer integration. The relationship between CG and supply chain integration helps the firm to report its sustainability record better (Almagtom et al.2020). CG leads to better supply chain management through better supply chain integration to enhance business value and financial performance.

In this study, except for the presence of an audit committee, all CG elements were lower than the midpoint, indicating that few firms use them. However, the impact of board independence and the presence of audit committees on all three integration factors was positive and significant. These two CG elements emerged as the most significant predictors. Especially,

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the predictive power of board independence was higher than that of the presence of audit committees.

The above findings lead to recommending an increase in board independence and the formation of audit committees in firms which do not have them, and their frequent meetings to facilitate better supply chain integration with these CG elements to achieve better performance.

Quantitative analysis of a survey of 120 firms showed that higher board independence, frequent board meetings, and the presence of an audit committee are associated with greater supply chain integration among manufacturing firms. Ownership concentration and board size showed no significant influence in this context. Although both board independence and the presence of audit committees impacted all three supply chain integration elements, board independence emerged as the stronger predictor than the presence of audit committees to impact supply chain integration.

The possible limitations are small sample size and rarity of papers dealing with the direct relationship between CG and supply chain integration.

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