

HOW DIGITAL ORIENTATION TRANSLATES INTO ESG OUTCOMES: THE MEDIATING ROLE OF SUPPLY CHAIN RESILIENCE

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Abstract. Amid escalating pressures for both digital transformation and sustainable value creation, an important yet insufficiently resolved question is how firms convert a digital strategic posture into meaningful environmental, social, and governance (ESG) outcomes. Existing research has largely emphasized direct associations between digitalization and sustainability performance, while offering limited insight into the organizational capabilities through which digital strategy translates into effective ESG outcomes. Addressing this theoretical and empirical gap, the present study draws upon the resource-based view (RBV) and dynamic capabilities perspective to investigate whether supply chain resilience (SCRE) serves as a key capability mechanism connecting digital orientation and ESG performance. Digital orientation enables firms to improve information processing, strengthen inter-organizational coordination, and enhance adaptability under uncertain environments, thereby contributing to more resilient supply chain structures. Using survey data collected from 500 firms and employing partial least squares structural equation modeling (PLS-SEM), this study examines the structural relationships among digital orientation, supply chain resilience, and ESG performance. The findings reveal that digital orientation exerts a significant positive effect on supply chain resilience, while supply chain resilience positively influences ESG performance. Moreover, supply chain resilience fully mediates the relationship between digital orientation and ESG, supporting an indirect-only mediation pattern. The study contributes by providing a more nuanced capability-based explanation of how firms align digital strategic initiatives with sustainable performance outcomes and offers practical implications for managers seeking to enhance ESG performance through resilient supply chain capabilities.

Keywords: *digital orientation, digital transformation, supply chain resilience, ESG performance*

Introduction

Digital transformation has moved from a discretionary modernization agenda to a strategic imperative for firms operating in volatile, interconnected, and disruption-prone environments. Contemporary research no longer treats digitalization as a narrow technological upgrade. Instead, it is increasingly understood as a broad organizational transformation that reshapes structures, processes, capabilities, and value-creation logics (Barba-Sánchez et al., 2024; Kraus et al., 2022). In that sense, digital transformation is not merely about adopting new tools. It is about altering how firms sense opportunities, coordinate activities, and renew their strategic configurations over time (Warner and Wäger, 2019). At the same time, firms are under growing pressure to demonstrate credible environmental, social, and governance (ESG) performance. ESG is no longer confined to symbolic reporting or investor communication. It has become a substantive

lens through which firms are evaluated by regulators, capital markets, supply chain partners, employees, and broader stakeholders (Truant et al., 2024). This shift is especially visible in supply chain settings, where sustainability concerns are closely tied to governance quality, supplier relationships, environmental accountability, and social responsibility across interconnected operations (Zhu and Zhang, 2024).

Despite the growing prominence of both digital transformation and ESG, the relationship between the two remains theoretically underdeveloped. Prior work has often relied on broad digitalization proxies or direct digitalization–performance arguments, leaving limited clarity on why some firms consistently convert digital efforts into strategic outcomes while others do not (Kraus et al., 2022). This gap is nontrivial. If digital transformation is fundamentally organizational rather than purely technological, then its downstream effects should depend on the strategic posture and capability configuration through which digital assets are mobilized (Xie et al., 2024). Recent work on digital orientation provides a more precise starting point for addressing this question. Digital orientation captures a firm-level strategic posture toward digital technologies, digital capabilities, ecosystem coordination, and digital architecture configuration (Kindermann et al., 2024). This perspective moves the discussion beyond digitization intensity or isolated IT investments. It emphasizes instead the organizational logic through which firms align digital scope, digital coordination, and architectural flexibility with strategic action. A strong digital orientation should therefore be understood not as a collection of tools, but as an embedded strategic configuration that influences how firms organize and renew their resources under changing conditions (Cepeda-Cardona and Arias-Pérez, 2025).

Even so, a strong digital orientation should not be expected to improve ESG automatically. ESG outcomes are operationally demanding. They require firms to maintain visibility, absorb shocks, coordinate suppliers, protect continuity, and adapt when unexpected disruptions occur. These are not simply technology outcomes; they are capability outcomes. This is where supply chain resilience becomes analytically central. Seminal work in logistics and operations research has long argued that resilience is a strategic requirement in vulnerable, globally dispersed supply networks (Ponomarov and Holcomb, 2009). More recent research conceptualizes supply chain resilience as a dynamic capability that enables firms to prepare for, respond to, recover from, and adapt after disruption (Li et al., 2025). Viewed from this perspective, the pathway from digital orientation to ESG is likely to be indirect. Firms with a stronger digital orientation are better positioned to improve information visibility, process integration, inter-organizational coordination, and reconfiguration capacity across their supply chains. These qualities should strengthen resilience by increasing readiness, responsiveness, flexibility, and recovery capacity. In turn, stronger supply chain resilience should help firms sustain environmental, social, and governance commitments under pressure, rather than allowing those commitments to collapse when operations are strained (Lin and Li, 2025). Yet empirical evidence on this mechanism remains fragmented, and much of the literature still relies on archival digital proxies rather than a validated firm-level digital orientation construct.

Literature review and hypotheses development

ESG

The ESG literature has expanded rapidly across strategy, finance, sustainability, and supply chain management. Reviews in this area show that ESG has moved well beyond corporate communication or disclosure routines. It increasingly functions as a multidimensional indicator of how firms address environmental accountability, social responsibility, and governance quality across their operations and relationships (Liu et al., 2025). Even so, much of the existing literature has concentrated on ratings, disclosure, market reactions, and financial consequences (Verhoef Gillan et al., 2021). Comparatively less attention has been paid to the organizational capability foundations of ESG performance. That omission matters because ESG outcomes are difficult to sustain when firms face operational instability, supplier disruption, and coordination failures. Recent work has increasingly suggested that sustainability performance depends not only on reporting commitments or external pressure, but also on underlying adaptive capabilities and supply chain structures (Yuan et al., 2025; Lin and Li, 2025). The present study adopts this organizational view of ESG. It treats ESG performance as a firm-level outcome reflecting how effectively the firm operationalizes environmental, social, and governance practices. This is also consistent with the measurement logic adopted in the study. The scale developed by Oh et al. (2024) conceptualizes ESG as a perceived organizational outcome. In the current context, that logic is adapted to managerial assessment, allowing informed managers to evaluate their firms' ESG-related practices and performance.

Digital orientation

The resource-based view holds that sustained advantage depends on valuable resources and on the organizational capacity to deploy them effectively (Barney, 1991). The dynamic capabilities perspective extends this argument by emphasizing the processes through which firms integrate, build, and reconfigure resources in changing environments. Taken together, these perspectives suggest that technology-related advantage is unlikely to arise from isolated digital assets alone. Instead, it depends on how those assets are embedded in broader organizational configurations that support adaptation and renewal (Ambrosini and Bowman, 2009). This logic is especially relevant in digital transformation research. Reviews in the field consistently show that digital transformation cannot be reduced to simple technology adoption or IT spending. It involves organizational redesign, strategic renewal, and the development of new modes of coordination and value creation. The central issue, therefore, is not whether digital technologies matter, but why some firms convert digital initiatives into organizational outcomes more effectively than others. Digital orientation addresses that issue more directly. Kindermann et al. (2024) conceptualize digital orientation as a firm-wide strategic posture composed of digital technology scope, digital capabilities, digital ecosystem coordination, and digital architecture configuration. This conception shifts attention away from digitalization as a collection of discrete tools and toward digital logic as an organizing principle of the firm. A strong digital orientation implies broader digital visibility, better integrative capability, more coherent internal and external coordination, and greater architectural flexibility. As a result, it provides the strategic and infrastructural basis for how the firm responds to changing conditions and operational turbulence (Cepeda-Cardona and Arias-Pérez, 2025).

Supply chain resilience

Supply chain resilience has emerged as a central construct in operations and supply chain research because contemporary supply networks are exposed to increasing uncertainty, interdependence, and disruption. Christopher and Peck (2004) argued early on that globalization, lean operations, and tighter interdependencies had made resilience a strategic requirement rather than a peripheral risk-management concern. Subsequent conceptual and empirical work has developed this view further. Pettit et al. (2010) framed resilience in terms of the balance between vulnerabilities and capabilities, while Tukamuhabwa et al. (2015) showed that resilience reflects more than a one-off reaction to shocks. Chowdhury and Quaddus (2017) made this point especially clearly by conceptualizing supply chain resilience as a higher-order dynamic capability. From this standpoint, resilience encompasses preparation, response, recovery, and adaptation, all of which resonate closely with the dynamic capabilities literature on resource renewal under changing environmental conditions (Bag et al., 2025). This dynamic capability view makes supply chain resilience a particularly compelling mediator in the digital orientation–ESG relationship. Digital orientation may improve digital visibility, information processing, and coordination across internal and external interfaces. Yet ESG outcomes remain fragile if firms cannot maintain continuity under pressure. Resilience is therefore the capability through which digital preparedness is converted into durable organizational outcomes. When firms can anticipate disruptions, absorb shocks, and reconfigure operations effectively, they are better positioned to preserve stakeholder commitments and sustain responsible practices during turbulent periods (Yuan et al., 2025).

Digital orientation and supply chain resilience

From an RBV and dynamic capabilities perspective, digital orientation should strengthen supply chain resilience because it reflects a coherent strategic commitment to digital scope, digital skills, ecosystem coordination, and architectural flexibility. These qualities improve information visibility, process integration, and reconfiguration capacity across the supply chain, all of which are central to resilient performance under disruption (Cepeda-Cardona and Arias-Pérez, 2025). Emerging empirical work supports this logic. Research on digitally enabled operations suggests that digital strategic emphasis and advanced analytics strengthen organizational responsiveness and adaptive capacity (Brahmana and Kontesa, 2024). When this logic is translated into supply chain settings, a digitally oriented firm should be better equipped to sense disruption signals, communicate rapidly across supply network actors, coordinate responses, and restore continuity. In that sense, digital orientation functions as an antecedent to resilience-building rather than as a narrow technological attribute. Accordingly, the first hypothesis is proposed:

H1. Digital orientation positively affects supply chain resilience.

Supply chain resilience and ESG

Resilience is not only about operational survival. It also underpins a firm's ability to honor environmental, social, and governance commitments when disruption occurs. If a firm lacks resilience, sustainability goals may become vulnerable to cost pressure, logistics breakdowns, supplier instability, and emergency decision-making. By contrast, resilient supply chains provide continuity, flexibility, coordination, and recovery

capacity, all of which help firms sustain responsible practices and stakeholder commitments under stress (Bag et al., 2025). This argument is increasingly consistent with the ESG literature in supply chain contexts. Work on sustainable supply chain management emphasizes that ESG performance depends on governance across supply relationships, environmental accountability in operations, and socially responsible coordination with stakeholders (Lin and Li, 2025). A supply chain that is more resilient should therefore be better able to preserve these outcomes under uncertainty. Accordingly, the second hypothesis is proposed:

H2. Supply chain resilience positively affects ESG performance.

The mediating role of supply chain resilience

The central theoretical argument of this study is that supply chain resilience mediates the relationship between digital orientation and ESG. This logic follows directly from the combined RBV and dynamic capabilities perspective. Digital orientation provides the strategic posture and organizational conditions that support resource orchestration, digital integration, and coordination, but those conditions do not automatically produce ESG outcomes. Instead, they first enhance the firm's adaptive operational capability, which then enables the firm to preserve and enact ESG commitments under uncertainty (Zhang et al., 2025; Cepeda-Cardona and Arias-Pérez, 2025; Zhang and Huang, 2024). This mediation argument also refines the digital transformation–ESG literature. Existing studies increasingly report positive links between digitalization and sustainability outcomes, but many of them rely on broad digital proxies or emphasize direct associations. A capability-based explanation is more persuasive. Digital orientation matters for ESG because it helps firms build resilient supply chain processes through which sustainability commitments can be maintained, coordinated, and enacted. In this sense, supply chain resilience is not an ancillary outcome of digital orientation; it is the mechanism through which digital orientation becomes consequential for ESG (Xu and Yin, 2025). Accordingly, the third hypothesis is proposed:

H3. Supply chain resilience mediates the relationship between digital orientation and ESG performance.

Materials and Methods

Sample and data collection

This study examines the relationship between digital orientation, supply chain resilience, and ESG performance at the firm level. The empirical setting focuses on firms with established supply chain operations and ongoing digital transformation activities. The analytical sample comprises 500 firm-level responses. The respondents occupy positions expected to provide adequate knowledge of the focal firms' strategic orientation, operational systems, and sustainability-related practices, including operations managers (21.6%), supply chain managers (18.0%), digital transformation managers (14.8%), general managers (14.2%), procurement managers (12.6%), and ESG/compliance managers (9.4%), as shown in *Table 1*. Meanwhile, the model was estimated using PLS-SEM in SmartPLS. This method is appropriate for predictive and

hierarchical latent variable models and is widely used when the research objective is to estimate complex relationships among higher-order constructs (Sarstedt et al., 2019).

Table 1. Sample profile.

Category	Frequency	Percentage
Gender		
Male	304	60.8
Female	196	39.2
Pos.		
Ops. mgr.	108	21.6
SC mgr.	90	18.0
Digital mgr.	74	14.8
Gen. mgr.	71	14.2
Proc. mgr.	63	12.6
ESG/comp.	47	9.4
Industry		
Manufacturing	182	36.4
Logistics/transport	70	14.0
Logistics	59	11.8
Consumer goods	58	11.6
Tech./electronics	54	10.8
Pharma/healthcare	40	8.0
Pharma/healthcare	37	7.4
Ownership		
Agri-food/food	220	44.0
State-owned/mixed	98	19.6
SOE/mixed	93	18.6
Private family	89	17.8
Firm size		
Foreign-invested/JV	88	17.6
50–249 emp.	196	39.2
250–999 emp.	149	29.8
> 1,000 emp.	67	13.4
Region		
East China	139	27.8
South China	123	24.6
North China	96	19.2
Central China	86	17.2
West China	56	11.2

Measurement of variables

All focal constructs were operationalized using established multi-item scales adapted from prior studies. Digital orientation was measured using the scale developed by Kindermann et al. (2024), which conceptualizes digital orientation as a higher-order construct comprising digital technology scope, digital capabilities, digital ecosystem coordination, and digital architecture configuration. Supply chain resilience (SCRE) was measured using the scale developed by Chowdhury and Quaddus (2017), who conceptualized resilience within a dynamic capability framework and operationalized it as a hierarchical construct. ESG performance was assessed using an adapted version of the perceived ESG scale proposed by Oh et al. (2024). Because the original scale was designed to capture public perception toward organizations' ESG performance, the item wording was contextualized to the firm level so that informed managers could evaluate their firms' ESG-related practices and performance. Given the hierarchical nature of the model, the constructs were specified as higher-order latent variables in line with established higher-order construct guidance in PLS-SEM. *Table 2* summarizes the measurement structure.

Table 2. Measurement scales.

Construct	Type	Source	Dimensions/codes
Digital Orientation	Higher-order construct	Kindermann et al. (2024)	DTS, DC, DEC, DAC

Supply Chain Resilience (SCRE) ESG Performance	Higher-order construct Higher-order construct	Chowdhury and Quaddus (2017) Adapted from Oh et al. (2024)	PC, RC, SCD PE, PG, PS
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Reliability and validity test

The measurement model was assessed in terms of internal consistency reliability, convergent validity, discriminant validity, and collinearity in *Table 3*. For the first-order constructs, internal consistency was satisfactory overall. Cronbach's alpha values generally ranged from 0.724 to 0.824, composite reliability values ranged from 0.782 to 0.867, and most AVE values exceeded or were close to the conventional benchmark of 0.50. At the higher-order level, reliability remained acceptable, with Cronbach's alpha values of 0.829 for Digital Orientation, 0.903 for SCRE, and 0.865 for ESG. The first-order outer loadings were mostly acceptable, ranging from approximately 0.499 to 0.824. Most indicators loaded adequately on their intended first-order constructs, although a small number of environmental indicators under the ESG block showed relatively weaker loadings. Because the model includes higher-order constructs, the higher-order AVE values for Digital Orientation (0.247), SCRE (0.179), and ESG (0.231) should be interpreted with caution and in conjunction with hierarchical component model guidance rather than as standalone first-order reflective constructs (Sarstedt et al., 2019).

Table 3. Construct reliability and convergent validity.

Construct	Alpha	rho_A	CR	AVE
COM	0.736	0.742	0.835	0.559
CRI	0.780	0.780	0.858	0.602
DAC	0.779	0.783	0.850	0.531
DC	0.787	0.789	0.854	0.540
DEC	0.746	0.752	0.840	0.568
DEN	0.724	0.726	0.845	0.644
DTS	0.742	0.753	0.829	0.494
EF	0.581	0.582	0.782	0.544
DO	0.829	0.832	0.860	0.247
ESG	0.865	0.868	0.885	0.231
FLX	0.805	0.808	0.857	0.462
FS	0.747	0.753	0.840	0.568
INT	0.745	0.749	0.840	0.568
MS	0.797	0.798	0.868	0.621
PC	0.864	0.866	0.884	0.199
PE	0.824	0.828	0.861	0.343
PG	0.790	0.790	0.847	0.443
PS	0.775	0.784	0.839	0.428
RC	0.700	0.706	0.796	0.362
RD	0.625	0.632	0.799	0.570
REC	0.750	0.752	0.842	0.572
RED	0.639	0.654	0.787	0.484
RES	0.635	0.636	0.804	0.578
SCD	0.767	0.768	0.825	0.301
SCRE	0.903	0.905	0.914	0.179

Model Fit Test

The structural model was evaluated by examining path coefficients, bootstrapped t-values and p-values, explanatory power (R^2), effect sizes (f^2), and model fit. Following current PLS-SEM practice, the analysis focused on the significance and substantive relevance of the structural relationships, as well as the indirect mechanism linking digital orientation to ESG through supply chain resilience (Hair et al., 2020). The model fit statistics indicated an SRMR of 0.089 for the saturated model and 0.092 for the estimated model. The model's explanatory power was modest but acceptable for a

capability-based firm-level model, with R^2 values of 0.099 for SCRE and 0.079 for ESG. *Tables 4* summarizes the structural-model results.

Table 4. *Model fit.*

Fit index	Saturated model	Estimated model
SRMR	0.089	0.092
d_ULS	219.813	235.592
d_G	n/a	n/a
Chi-square	infinite	infinite
NFI	n/a	n/a

Results and Discussion

Descriptive statistics

The descriptive profile of the sample indicates that the dataset covers a heterogeneous group of firms in terms of sector, ownership, firm size, and geographic region. Manufacturing firms account for the largest share of the sample, followed by logistics and transportation, consumer goods and retail supply, and technology and electronics. Most respondents hold middle- to senior-level managerial positions closely related to operations, supply chain management, digital transformation, or sustainability functions, which strengthens the appropriateness of the responses for the focal constructs. At the construct level, the average scores were relatively balanced across the three major domains. The overall mean score was approximately 3.90 for Digital Orientation, 3.90 for SCRE, and 3.90 for ESG, suggesting moderate-to-high perceived levels across the sampled firms. The corresponding standard deviations were 0.85 for Digital Orientation, 0.72 for SCRE, and 0.82 for ESG, indicating sufficient dispersion for model estimation.

Structural paths

The structural model results support the proposed capability-based mechanism. Digital Orientation had a positive and significant effect on SCRE ($\beta = 0.315$, $t = 7.431$, $p < 0.001$) in *Table 5*. This result supports the argument that a stronger firm-wide digital orientation enhances the organization's resilience capability within the supply chain. In turn, SCRE had a positive and significant effect on ESG ($\beta = 0.282$, $t = 6.679$, $p < 0.001$). This finding indicates that firms with stronger supply chain resilience capabilities are better positioned to achieve higher ESG-related outcomes. The structural model showed modest explanatory power. Digital Orientation explained 9.9% of the variance in SCRE ($R^2 = 0.099$, adjusted $R^2 = 0.097$), while SCRE explained 7.9% of the variance in ESG ($R^2 = 0.079$, adjusted $R^2 = 0.077$). The effect size of Digital Orientation on SCRE was $f^2 = 0.110$, and the effect size of SCRE on ESG was $f^2 = 0.086$, indicating small-to-moderate substantive effects. Overall, the results suggest that digital orientation contributes to ESG not through an explicitly modelled direct path, but through the resilience capability developed in the firm's supply chain processes.

Table 5. *Structural model results.*

Hyp.	Path	Beta	t-value	p-value	Res.
H1	DO $\rightarrow$ SCRE	0.315	7.431	0.000	Yes
H2	SCRE $\rightarrow$ ESG	0.282	6.679	0.000	Yes

Mediation test

The mediation analysis further clarifies the mechanism linking Digital Orientation and ESG in *Table 6*. The indirect effect of Digital Orientation on ESG through SCRE was positive and statistically significant ($\beta = 0.0887$, $t = 4.539$, $p = 0.000006$). The associated 95% confidence interval [0.0526, 0.1295] did not include zero, providing clear support for the mediating role of SCRE. Because the final structural model does not include a direct path from Digital Orientation to ESG, the results indicate an indirect-only mediation pattern. In substantive terms, this means that digital orientation improves ESG performance by strengthening the firm's supply chain resilience capability, rather than by exerting a direct effect on ESG outcomes.

Table 6. Mediation test.

Indirect path	Beta	t-value	p-value	95% CI	Res.
DO → SCRE → ESG	0.0887	4.539	0.000006	[0.0526, 0.1295]	Yes

The findings provide a clear capability-based explanation of how firms convert a digital strategic posture into ESG-related outcomes. The empirical results show that digital orientation positively influences supply chain resilience, that supply chain resilience positively influences ESG, and that the relationship between digital orientation and ESG operates through an indirect-only mediation pattern. Substantively, this means that digital orientation does not generate ESG value automatically. Its value is realized when firms are able to convert digital strategic intent into resilience capability embedded in supply chain processes (Yuan et al., 2025). This finding refines the dominant narrative in the digital transformation literature. Much prior research has treated digitalization as a generally positive organizational force and has often linked it directly to innovation, performance, or sustainability outcomes (Verhoef Gillan et al., 2021). Yet such direct-effect logic is often theoretically thin. The present study suggests that digital orientation is not a self-sufficient source of ESG performance. Rather, it equips the firm with the foundations for resource orchestration, information integration, and cross-functional coordination, which then strengthen supply chain resilience. In that sense, digital orientation matters not because firms possess more digital tools, but because they are better able to organize those tools into adaptive and coordinated responses under uncertainty (Cepeda-Cardona and Arias-Pérez, 2025).

The positive relationship between digital orientation and supply chain resilience deserves particular attention. The coefficient is statistically strong and substantively meaningful, suggesting that firms with a more pronounced digital strategic posture are better able to build resilient supply chain systems. This result implies that digital orientation improves disruption visibility, accelerates information sharing, enhances process integration, and strengthens the firm's ability to reconfigure operations in response to unexpected events. In turbulent supply chain environments, such qualities are central to resilience. The finding is therefore consistent with work that views digitally enabled coordination and analytics as important antecedents of adaptive organizational capability (Zhang and Huang, 2024). The positive effect of supply chain resilience on ESG is equally important. ESG is often discussed in the literature as a matter of disclosure, legitimacy, stakeholder signaling, or external ratings. The present findings point to a deeper operational logic. ESG outcomes are not sustained by commitments alone; they also depend on whether firms possess the resilience required

to maintain responsible practices when they face disruption, volatility, and pressure. A resilient supply chain allows firms to preserve continuity, sustain coordination with external partners, manage risk more effectively, and avoid the breakdown of environmental, social, and governance commitments under strain. In this sense, resilience is not merely an operational safeguard; it is an enabling condition for credible ESG implementation.

The mediation result is the central contribution of the study. By demonstrating that supply chain resilience significantly mediates the relationship between digital orientation and ESG, the findings move beyond a simple direct-association argument and identify the organizational mechanism through which digital orientation becomes consequential for sustainability-related outcomes. This is theoretically important because it clarifies that digital orientation is not valuable for ESG in abstraction. Its relevance depends on whether it strengthens the firm's capability to absorb shocks, recover from disruptions, and adapt supply chain structures and processes over time. Thus, the study offers a more precise explanation of how digital transformation translates into sustainability performance: not through technology alone, but through the development of resilience capability. From a theoretical standpoint, the study contributes in three ways. First, it extends digital orientation research by identifying ESG as an important downstream outcome. Existing digital orientation research has mainly focused on innovation, strategic alignment, and general organizational performance. By contrast, this study shows that digital orientation also matters for sustainability-related outcomes, but that its influence is indirect and capability-dependent. Second, it advances the supply chain resilience literature by positioning resilience as a mediating dynamic capability rather than as a terminal operational outcome. Third, it contributes to ESG research by demonstrating that ESG performance can be explained not only by external pressures, stakeholder expectations, or reporting practices, but also by deeper internal capability formation. These contributions reinforce the value of combining the resource-based view with the dynamic capabilities perspective to explain sustainable digital transformation.

The relatively modest explanatory power of the model should be interpreted with care rather than treated as a weakness. The R^2 values for SCRE and ESG are 0.099 and 0.079, respectively, indicating that the proposed pathway explains a meaningful but not exhaustive share of variance. This is entirely plausible, as both resilience and ESG are multidimensional and influenced by numerous organizational, environmental, and institutional factors beyond the focal model. The contribution of the present study is therefore not to claim that digital orientation and supply chain resilience fully determine ESG, but to demonstrate that they form one coherent and empirically supported pathway through which ESG can be improved. In complex firm-level research, especially on sustainability-related outcomes, such parsimonious yet significant pathways are theoretically valuable. The findings also yield clear managerial implications. Managers should avoid equating digital transformation with technology acquisition alone. The results suggest that ESG gains are unlikely to follow simply from adopting digital tools, platforms, or systems. What matters is the development of a broader digital orientation that aligns digital technologies with organizational capabilities, coordination routines, and architectural choices. Managers should also recognize supply chain resilience as a strategic bridge between digital transformation and sustainability. If firms want digital initiatives to support ESG, they need to channel those initiatives into resilience-building processes by investing in supply chain

visibility, early-warning capability, partner coordination, flexible response routines, and recovery mechanisms. More broadly, the findings imply that ESG performance should be managed not only through compliance systems and disclosure frameworks, but also through operational capability development. ESG is more likely to be credible and durable when it is underpinned by resilient supply chain structures and processes (Bag et al., 2025).

Conclusion

This study examined how digital orientation is translated into ESG outcomes through the mediating role of supply chain resilience. Drawing on the resource-based view and dynamic capabilities perspective, it proposed that digital orientation constitutes a strategic organizational posture, while supply chain resilience represents the adaptive capability through which that posture becomes consequential for sustainability-related outcomes. The empirical results support this logic. Digital orientation positively affects supply chain resilience, supply chain resilience positively affects ESG, and the indirect effect of digital orientation on ESG through supply chain resilience is significant. The findings therefore indicate that the relationship operates through an indirect-only mediation pattern. In substantive terms, firms do not improve ESG simply because they adopt a stronger digital posture. Rather, digital orientation becomes valuable for ESG when it helps firms build resilient supply chain systems that can absorb disruption, coordinate responses, maintain continuity, and sustain responsible practices under uncertainty. The central conclusion is straightforward but consequential: digital orientation does not create ESG value by itself; it creates ESG value by strengthening the resilience capability that enables firms to sustain responsible conduct in turbulent supply chain environments. This insight helps move the conversation from a broad claim that digitalization improves sustainability to a more precise explanation of how that transformation actually occurs.

This study should be interpreted in light of several limitations, which also open up directions for future research. First, the model adopts a relatively focused mediation structure linking digital orientation, supply chain resilience, and ESG. While this parsimony is theoretically useful, ESG is a multidimensional strategic outcome that is likely shaped by a broader set of organizational, institutional, and environmental conditions. Future studies could extend the framework by incorporating additional antecedents, boundary conditions, or contextual contingencies, such as environmental uncertainty, competitive intensity, stakeholder pressure, or governance quality. Second, the current study relies on a managerial assessment of firm-level ESG-related practices and performance rather than externally verified ESG ratings or archival sustainability indicators. This approach is useful for capturing organizationally embedded ESG perceptions, especially where external ESG metrics may be unavailable or inconsistent across firms. However, it also means that the findings reflect perceived ESG performance rather than objective ESG outcomes in the narrow rating-based sense. Future research could strengthen external validity by combining perceptual survey measures with archival ESG indicators, third-party ESG scores, or disclosure-based metrics. Third, the model is estimated using a single-source survey design. Although the analysis indicates that collinearity is not a serious concern and procedural remedies were considered, the possibility of common method bias cannot be eliminated entirely in self-reported data. Future studies could address this issue more rigorously by

collecting multi-source data, using matched responses from different functional managers, or combining survey data with objective firm records and external databases.

Fourth, the model is estimated using a single-source survey design. Although the analysis indicates that collinearity is not a serious concern and procedural remedies were considered, the possibility of common method bias cannot be eliminated entirely in self-reported data. Future studies could address this issue more rigorously by collecting multi-source data, using matched responses from different functional managers, or combining survey data with objective firm records and external databases. Fifth, the study is based on a cross-sectional design, which limits strong causal inference. The theoretical logic of the model is grounded in the resource-based view and dynamic capabilities perspective, and the empirical results are consistent with the proposed directional relationships. However, cross-sectional data do not fully rule out reverse causality or reciprocal influence. Future research could address these concerns by using longitudinal data, panel survey designs, or time-lagged models to examine capability development more dynamically.

Finally, the explanatory power of the model is modest. This is not surprising given the complexity of both resilience and ESG, but it does suggest that additional explanatory mechanisms remain to be identified. Future research could examine whether the effect of digital orientation on ESG is also transmitted through other organizational capabilities, such as innovation capability, risk-management capability, or inter-organizational collaboration capability, and whether particular dimensions of digital orientation or supply chain resilience exert stronger effects on specific environmental, social, or governance outcomes.

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Conflict of interest

The authors confirm that there is no conflict of interest involved with any parties in this research study.

REFERENCES

- [1] Ambrosini, V., Bowman, C. (2009): What are dynamic capabilities and are they a useful construct in strategic management? – *International Journal of Management Reviews* 11(1): 29-49.
- [2] Bag, S., Rahman, M.S., Chiarini, A. (2025): Building sustainable supply chain resilience: Insights from a mixed-method study. – *Business Strategy and the Environment* 34(2): 2103-2127.
- [3] Barba-Sánchez, V., Meseguer-Martínez, Á., Gouveia-Rodrigues, R., Raposo, M.L. (2024): Effects of digital transformation on firm performance: The role of IT capabilities and digital orientation. – *Heliyon* 10(6): 12p.
- [4] Barney, J.B. (1991): Firm resources and sustained competitive advantage. – *Journal of Management* 17(1): 99-120.
- [5] Brahmana, R.K., Kontesa, M. (2024): Does digital orientation enhance firm performance? – *Vision: The Journal of Business Perspective* 10p.

- [6] Cepeda-Cardona, J., Arias-Pérez, J. (2025): Bridging digital orientation and firm performance through employee-driven digital innovation: Is technostress a red flag or a red herring? – *International Journal of Productivity and Performance Management* 74(9): 3009-3031.
- [7] Chowdhury, M.M.H., Quaddus, M. (2017): Supply chain resilience: Conceptualization and scale development using dynamic capability theory. – *International Journal of Production Economics* 188: 185-204.
- [8] Christopher, M., Peck, H. (2004): Building the resilient supply chain. – *The International Journal of Logistics Management* 15(2): 14p.
- [9] Hair, J.F., Howard, M.C., Nitzl, C. (2020): Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. – *Journal of Business Research* 109: 101-110.
- [10] Kindermann, B., Schmidt, C.V.H., Fengel, F., Strese, S. (2024): Expanding the boundaries of digital orientation research: Scale development and validation. – *Journal of Business Research* 185: 14p.
- [11] Kraus, S., Durst, S., Ferreira, J.J., Veiga, P., Kailer, N., Weinmann, A. (2022): Digital transformation in business and management research: An overview of the current status quo. – *International Journal of Information Management* 63: 18p.
- [12] Li, K., Bashiri, M., Lim, M.K., Akpobi, T. (2025): How to improve supply chain sustainable performance by resilience practices through dynamic capability view: Evidence from Chinese construction. – *Resources, Conservation and Recycling* 212: 14p.
- [13] Lin, Y., Li, S. (2025): Supply chain resilience, ESG performance, and corporate growth. – *International Review of Economics & Finance* 97: 13p.
- [14] Liu, J., Song, R., Fu, Y. (2025): Digital finance empowering corporate ESG performance: The dual-engine role of digital transformation and green technological innovation. – *Sustainability* 17(23): 23p.
- [15] Oh, H.J., Lee, B., Ma, H.H., Jang, D., Park, S. (2024): A preliminary study for developing perceived ESG scale to measure public perception toward organizations' ESG performance. – *Public Relations Review* 50(1): 10p.
- [16] Pettit, T.J., Fiksel, J., Croxton, K.L. (2010): Ensuring supply chain resilience: Development of a conceptual framework. – *Journal of Business Logistics* 31(1): 1-21.
- [17] Ponomarov, S.Y., Holcomb, M.C. (2009): Understanding the concept of supply chain resilience. – *The International Journal of Logistics Management* 20(1): 124-143.
- [18] Sarstedt, M., Hair, J.F., Cheah, J.H., Becker, J.M., Ringle, C.M. (2019): How to specify, estimate, and validate higher-order constructs in PLS-SEM. – *Australasian Marketing Journal* 27(3): 197-211.
- [19] Truant, E., Broccardo, L., Dana, L.P., Cappa, F. (2024): Environmental, social and governance issues in supply chain management: A systematic literature review. – *Journal of Cleaner Production* 434: 17p.
- [20] Tukamuhabwa, B.R., Stevenson, M., Busby, J., Zorzini, M. (2015): Supply chain resilience: Definition, review and theoretical foundations for further study. – *International Journal of Production Research* 53(18): 5592-5623.
- [21] Verhoef Gillan, S.L., Koch, A., Starks, L.T. (2021): Firms and social responsibility: A review of ESG and CSR research in corporate finance. – *Journal of Corporate Finance* 66: 24p.
- [22] Warner, K.S.R., Wäger, M. (2019): Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. – *Long Range Planning* 52(3): 326-349.
- [23] Xie, X., Zhu, H., Zhao, J. (2024): How effective is digital transformation? Heterogeneous insights from listed companies' ESG performance. – *Humanities and Social Sciences Communications* 11: 14p.

- [24] Xu, J., Yin, J. (2025): Digital transformation and ESG performance: The chain mediating role of technological innovation and financing constraints. – *Finance Research Letters* 71: 10p.
- [25] Yuan, Y., Dai, H., Ma, J. (2025): The impact of corporate ESG performance on supply chain resilience: A mediation analysis based on new quality productive forces. – *Sustainability* 17(10): 22p.
- [26] Zhang, M., Huang, Z. (2024): The impact of digital transformation on ESG performance: The role of supply chain resilience. – *Sustainability* 16(17): 18p.
- [27] Zhang, X., Wang, Z., Luo, W., Guo, F., Wang, P. (2025): How digital orientation affects innovation performance? Exploring the role of digital capabilities and environmental dynamism. – *Systems* 13(5): 19p.
- [28] Zhu, Y., Zhang, Z. (2024): Supply chain digitalization and corporate ESG performance: Evidence from supply chain innovation and application pilot policy. – *Finance Research Letters* 67: 9p.